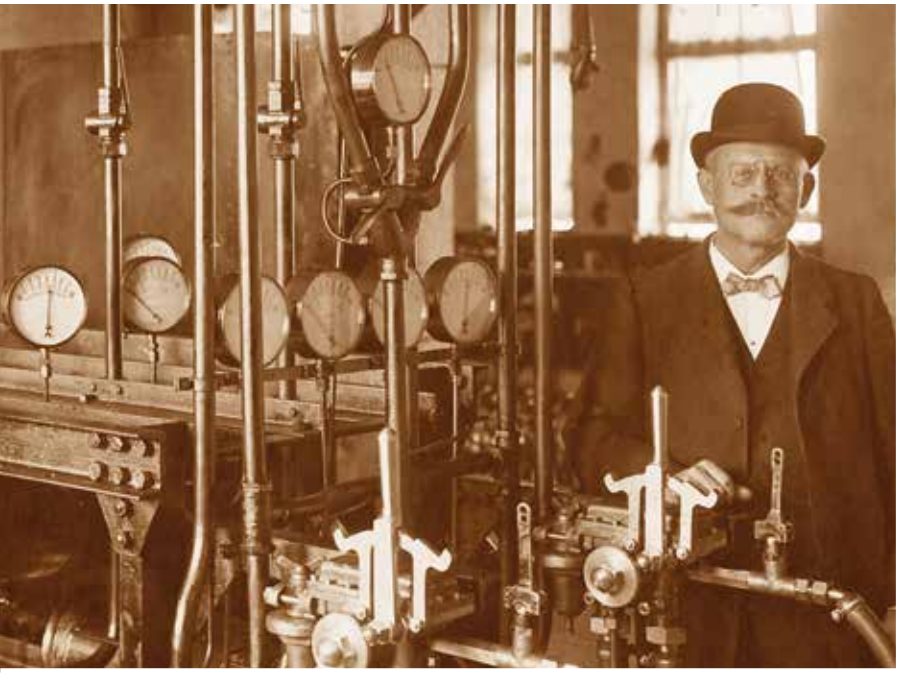
KNORR-BREMSE

110 Years

making mobility safer.

Annual Report 2015



At a Glance

KNORR-BREMSE GROUP		2011	2012	2013	2014	2015
Sales	EUR mill.	4,241	4,300	4,303	5,206	5,831
Net income	EUR mill.	329	295	367	560	645
Employees (as per Dec. 31)*	Number	20,050	19,120	20,833	23,916	24,275
Personnel costs	EUR mill.	805	861	907	1,038	1,213
Balance-sheet total	EUR mill.	2,530	2,615	2,869	3,543	4,002
Equity	EUR mill.	902	995	1,107	1,443	1,736
Capital expenditure **	EUR mill.	159	166	159	161	210
Depreciation **	EUR mill.	165	160	125	169	199
Incoming orders	EUR mill.	4,073	3,948	4,752	5,510	5,668
Research and development expenditure	EUR mill.	209	250	253	296	347

* including HR leasing.
** Not including investments in financial assets.

About Knorr-Bremse

The Knorr-Bremse Group is the world's leading manufacturer of braking systems for rail and commercial vehicles. For more than 110 years the company has pioneered the development, production, marketing, and servicing of state-of-the-art braking systems. Through all its products, Knorr-Bremse makes a crucial contribution to improving safety by road and rail across the globe. Every day, more than a billion people around the world put their trust in systems made by Knorr-Bremse.

110 YEARS OF KNORR-BREMSE
MILESTONES FOR RAIL AND COMMERCIAL VEHICLES

1905
Good ideas and determination prove a recipe for success. Georg Knorr founds Knorr-Bremse in Berlin. He has already spent twelve years striving to improve air brakes for trains. With the invention of the K1 Knorr rapid-action brake he achieves his goal of braking passenger trains faster, more safely, and smoothly.

1918
Gradual-release freight train brake brings a breakthrough. The Kunze-Knorr or KK brake revolutionizes freight train operation. Until then, trains had been braked by brakemen positioned along the train who responded to a signal from the driver and turned a hand crank to apply the brakes.
The KK brake goes on to become far and away the leading gradual-release brake in Europe.

1922
First patent for commercial vehicle brakes. Knorr-Bremse is the first company in Europe to equip commercial vehicles with four-wheel air brake systems. By the end of the 1930s, some 90% of German trucks in the 7 to 16 t category are equipped with Knorr-Bremse braking systems.

1931
New standard brake for trains. The Hildebrand-Knorr (HiK) brake system for freight trains is launched and obtains UIC approval. This is followed in 1933 by the passenger train brake and just one year later by the express train version. Ultimately the HiK brake becomes the standard system in 17 countries and by 1955, 280,000 units have been installed.

1945
Troubled times. After the Second World War, the main Berlin-Lichtenberg plant in the Soviet occupation zone is dismantled and expropriated. Employees manage to rescue a number of design drawings. Knorr-Bremse GmbH is re-established in 1946 in Volmarstein before headquarters relocate to Munich in 1953.

1953
The KE brake – the gradual-release control valve for trains. Following intensive development work, the KE control valve is launched and receives UIC approval. Built to a modular design, the KE brake is then subjected to continuous improvement and new functionalities are added. By the end of 1994 almost 1.3 million units of this UIC-approved brake have been manufactured and entered service in more than 40 countries.

1969
The first commercial vehicle disc brake. At the international automobile exhibition IAA in Frankfurt, Knorr-Bremse presents the first disc brake for heavy commercial vehicles.

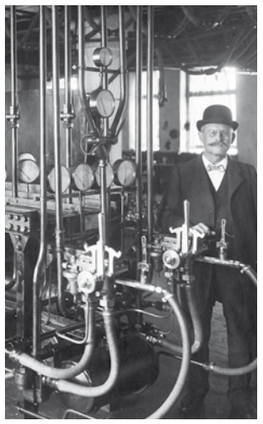
1981
Series production of anti-lock brakes begins. Knorr-Bremse has been working on the development of anti-lock brakes (ABS) and traction control systems (ASR) for commercial vehicles since the 1970s. But it is only with the advent of more powerful electronics that the complex control processes can be mapped reliably and efficiently.
In 1981 the first volume-built ABS from Knorr-Bremse enters service in trucks built by development partner MAN.

1985
The Thiele era. Heinz Hermann Thiele has been with Knorr-Bremse for almost 16 years when, in 1985, he grasps the opportunity to buy the Company. As Chairman of the Board he transforms a failing enterprise into a global market leader and sets sales spiraling. Since 2007 Thiele has been Chairman of the Supervisory Board of Knorr-Bremse AG, which remains wholly owned by the Thiele family.

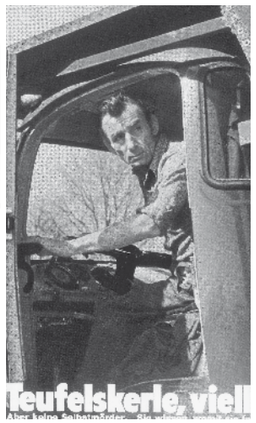
1991
The age of the high-speed train. High-speed trains make great demands on their braking systems. The electro-pneumatic auxiliary brake from Knorr-Bremse is further enhanced and installed in Deutsche Bahn's ICE 1 trains.

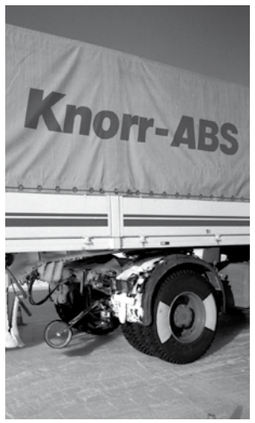
2002
Acquisition of Bendix. The U.S.-based company is a leading supplier of air brakes, components, and safety systems. Knorr-Bremse is able to benefit from Bendix's strong market position in North America, while Bendix can draw upon the engineering expertise of Knorr-Bremse in its future development work.

2015
New Test and Development Center in Munich. With the completion of the new Test and Development Center in Munich the Company's major investment program of recent years reaches an initial climax. To safeguard its future, Knorr-Bremse has invested more than EUR 1.3 billion in the expansion, modernization, and maintenance of its production and development facilities since 2010.







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The Executive Board of Knorr-Bremse AG

Dr. Peter Laier
Member of the Executive Board since January 1, 2016, responsible for the Commercial Vehicle Systems division.

Dr. Lorenz Zwingmann
Member of the Executive Board since 2008, responsible for Finance, Controlling, and IT.

Klaus Deller
Member of the Executive Board since 2009, Chairman of the Executive Board since January 1, 2015.

Dr. Dieter Wilhelm
Member of the Executive Board since 2003, responsible for the Rail Vehicle Systems division.

Hinrich J. Woebcken
Member of the Executive Board until June 30, 2015

The Supervisory Board of Knorr-Bremse AG

Erich Starkl*
Passau
Deputy Representative of the IG Metall Trade Union, Passau Office

Wolfgang Tölsner
Uetersen
Management consultant

Hans-Georg Härter
Salzweg
Former Chairman of the Executive Board of ZF Friedrichshafen AG

Günter Wiese*
Berlin
Chairman of the Works Council of Knorr-Bremse Systeme für Schienenfahrzeuge GmbH, Berlin plant

Dr. Wolfram Mörsdorf
Essen
Retd. Member of the Executive Board of Thyssen-Krupp AG

Dr. Eduard Gerum*
Rosenheim
1st Deputy Chairman, Consultant to the Executive Board of Knorr-Bremse Systeme für Nutzfahrzeuge GmbH

Heinz Hermann Thiele
Munich
Chairman, Entrepreneur

Manfred Wennemer
Bensheim
2nd Deputy Chairman, Former Chairman of the Executive Board of Continental AG

Michael Jell*
Munich
Deputy Chairman of the Works Council of Knorr-Bremse Systeme für Schienenfahrzeuge GmbH, Knorr-Bremse AG, KB Media GmbH, Knorr-Bremse IT Services GmbH

Georg Weiberg
Stuttgart
Retd. Head of Development, Daimler Trucks

Werner Ratzisberger*
Munich
Project engineer mechanical surface treatment Knorr-Bremse Systeme für Nutzfahrzeuge GmbH

Sebastian Roloff*
Munich
Attorney at law with IG Metall Trade Union, Munich Office

* Employee representative.

Report of the Supervisory Board

In the course of fiscal 2015, the Supervisory Board concerned itself in detail with the state and development of Knorr-Bremse AG and all Group companies.

Along with important individual transactions and human resources decisions, this also included consideration of fundamental aspects of strategic direction and corporate planning. In addition, the Supervisory Board received regular reports from the Executive Board, either in the course of its meetings or in written or oral form, regarding the commercial and financial development of the Company, as well as its risk situation and risk management. The Supervisory Board examined important individual transactions as well as deciding on items of business that required its approval either by law or in line with Company statutes. The information and analyses upon which the decisions of the Supervisory Board were based were discussed and assessed in depth together with the Executive Board. In addition, two meetings of the Financial Statements Committee were held in mid-year. At its meetings, the Financial Statements Committee dealt in particular with the supervision of the accounting process, the efficacy of the internal controlling system, the risk management system, and the internal audit system, as well as the work of the auditors. Knorr-Bremse has committed itself to expand and reinforce its compliance management and effective January 1, 2016 a Chief Compliance Officer was appointed.

In fiscal 2015 the Knorr-Bremse Group posted worldwide sales of EUR 5.83 billion. This represents a 12% increase over the previous year (2014: EUR 5.2 billion). The Rail Vehicle Systems division benefited above all from sales growth in Europe and North and South America, led by rising orders for freight cars and locomotives, as well as growth in both OE and aftermarket business. The Commercial Vehicle Systems division reported rising sales above all in Europe, North America, and Asia.

To safeguard the future competitiveness of the Group, in 2015 Knorr-Bremse continued the major investment program of recent years. One noteworthy major individual project concerned the construction of the new Test and Development Center at the Group's Munich site. The cornerstone was laid in 2014 and the building, which will provide modern workplaces for 350 engineers and technicians, as well as housing 100 high-tech test rigs, will be completed in 2016. The year under review also saw investments made in localization projects as well as in additions to plant and equipment. At the beginning of 2015, Knorr-Bremse acquired Selectron Systems AG, based in Lyss, Switzerland. The company specializes in the development of innovative solutions for the automation, networking, and control of rail vehicles. The month of May brought the official start of operations for the joint venture between Knorr-Bremse and Dongfeng Motor Group Co. Ltd. The new company, Knorr-Bremse DETC Commercial Vehicle Braking Technology Co., Ltd., is based in Shiyan in China's Hubei province and manufactures mechanical brake components and ABS systems for medium- and heavy-duty trucks. Through these activities Knorr-Bremse underpins its determination to safeguard its competitiveness.

The Knorr-Bremse Group can look back on the most successful year in its history to date. The Company worked continuously to optimize quality, processes, methods, and structures. In the course of internal quality audits and assessments organized worldwide, the implementation of the quality management system was reviewed and improved. Across both divisions the Company staged Supplier Days as part of intensive efforts to improve quality and integrate suppliers more firmly into the ongoing quality program. Partnerships along the supply chain were strengthened, with a positive impact on the quality of bought-in components.

In addition, in March 2105 the Top Employers Institute named Knorr-Bremse "Top Employer for Engineers in Germany." Continuous improvement activities at all of the Group's sites around the world and the consistent pursuit of defined fields of action have played their part in making Knorr-Bremse a highly attractive employer. In July, sustainability management at Knorr-Bremse was honored by the CNH Industrial Group with the "Industrial Sustainability Supplier of the Year 2015" award in recognition of very good corporate responsibility performance. The members of the jury were particularly impressed by the level of social engagement demonstrated by the Company's employees and by the climate protection initiative ECCO$_2$. Moreover, the Commercial Vehicle Systems division won the title of "Best Brand" in the brakes category for the tenth time in succession.

The 2015 Financial Statements and the Management Report on Knorr-Bremse AG, the 2015 Consolidated Financial Statements and the Management Report on the Knorr-Bremse Group drawn up by the Executive Board, and the Company's accounts were examined by the auditors elected by the Annual Shareholders' Meeting, KPMG AG Wirtschaftsprüfungsgesellschaft, Munich, and endorsed with their unqualified opinion dated March 1, 2016.

The Financial Statements of Knorr-Bremse AG and the Consolidated Financial Statements were prepared in line with the principles of adequate and orderly accounting and with the accounting provisions of the German Commercial Code (HGB), as well as with supplementary legal and statutory regulations. The Financial Statements Committee also examined the Financial Statements for fiscal 2015, the Management Report, the proposed allocation of unappropriated retained earnings, and the Consolidated Financial Statements and Management Report on the Knorr-Bremse Group. As there were no objections to be raised, the Financial Statements Committee recommended that the Supervisory Board approve the Financial Statements. At its meeting on March 11, 2016, the Supervisory Board approved the 2015 Financial Statements of Knorr-Bremse AG and the Consolidated Financial Statements, which thereby became legally binding. The Supervisory Board concurs with the Executive Board's proposal for the allocation of unappropriated retained earnings.

The auditors attended the meeting of the Financial Statements Committee on February 26, 2016 as well as the financial statements meeting of the Supervisory Board on March 11, 2016, reported on their key findings and answered outstanding questions. KPMG AG Wirtschaftsprüfungsgesellschaft, Munich, also examined the Executive Board's report on relations with affiliated companies, drawn up in line with Section 312 German Corporation Law (AktG). The auditors endorsed this report with the following opinion: "No transactions subject to reporting took place in the 2015 financial year." The Supervisory Board also examined the Executive Board's report on relations with affiliated companies and has no objections to the concluding statement by the Executive Board or to the auditors' findings.

Hinrich J. Woebcken, appointed to the Executive Board on April 1, 2014 with responsibility for the Commercial Vehicle Systems division, resigned from the board effective June 30, 2015. Mr. Woebcken left the Company by mutual consent in order to pursue his career elsewhere. Effective July 13, 2015, Mr. Woebcken also stepped down from his position as Chairman of the Supervisory Board of the Commercial Vehicle Systems division. On behalf of Knorr-Bremse AG, the Supervisory Board wishes to thank Mr. Woebcken for his contribution to its work. On July 1, 2015, Klaus Deller assumed interim responsibility for the Commercial Vehicle Systems division in addition to his existing duties as Chairman of the Executive Board of Knorr-Bremse AG.

Effective January 1, 2016, Dr. Peter Laier was appointed to the Executive Board of Knorr-Bremse AG with responsibility for the Commercial Vehicle Systems division. Dr. Laier has acquired extensive management experience in the automotive industry and commands a comprehensive knowledge of the fields of development, production, vehicle electronics and sensors, and sales. Most recently, Dr. Laier was Chief Operating Officer (COO) of the Benteler Group, where he was responsible for the Automotive and Steel/Tube divisions, as well as for strategic corporate development.

The term of office of the current members of the Supervisory Board expires with the resolution releasing the members of the Supervisory Board from liability for the 2015 financial year, probably in March 2016. At this point in time the newly appointed Supervisory Board will be established.

Munich, March 11, 2016

The Supervisory Board

Heinz Hermann Thiele,
Chairman

24 HOURS
WITH KNORR-BREMSE.

IF YOU'RE GOING TO MOVE PEOPLE AROUND IN SAFETY, YOU NEED TO BE FAMILIAR WITH THEIR DAILY LIVES. AWARE OF THIS, KNORR-BREMSE GEARS ITS SOLUTIONS FOR RAIL AND COMMERCIAL VEHICLES TO THE PEOPLE WHO USE THEM. AROUND THE CLOCK, AROUND THE WORLD.

23:00

An enjoyable evening at the movies or theater is followed by a relaxing trip home. In many metros components from Knorr-Bremse make for a safe journey.

01:00

With an extra-wide load to transport safely through the night, Mike can rely on the electronic leveling system from Knorr-Bremse.

03:00

Commuters enjoy a last few minutes for themselves on their way to work. Knorr-Bremse keeps them company.

05:00

Wide loads are hard to handle on narrow roads, but systems from Knorr-Bremse make maneuvering easier.

21:00

Unforgettable: a monorail ride through the glittering world of Las Vegas. The door control units are supplied by Knorr-Bremse.

19:00

Dan is still a couple of hours from home, but he knows he'll get there safely – with technology from Knorr-Bremse.

07:00

Rush hour in Shanghai: Hundreds of people get on and off at every stop. Entrance systems from Knorr-Bremse make for safety and efficiency.

09:00

Speeding across the ice at 100 km/h in Sweden: During winter testing the drivers try out all Knorr-Bremse systems under extreme conditions.

17:00

Without buses, mass transit in India's cities would be unthinkable. Knorr-Bremse helps with robust technology.

15:00

136 freight cars roll through vast open spaces. A failure out here would prove very expensive. It's a good thing they have Knorr-Bremse systems on board.

13:00

At the Australian iron ore mine, the midday heat is stifling. Thanks to his Knorr-Bremse air conditioning, driver Ethan keeps a cool head.

11:00

On a family visit to a rail museum in Augsburg, Germany, Tim reads out "Knorr-Bremse." His mom says, "They're like part of the railroads."

The Thiele era.

In 1985, the opportunity arose for Heinz-Hermann Thiele to buy Knorr-Bremse after 16 years with the Company – the start of a remarkable success story. As Chairman of the Board he transformed a failing Company into a global market leader and set sales spiraling. Chairman of the Supervisory Board since 2007, he is to step down from the post in March 2016.

As 1985 began, it seemed as if Knorr-Bremse had weathered the storm. The turbulent times in which the company's two equal owners, Joachim Vielmetter and his nephew Jens von Bandemer, had blocked each other's strategies, creating an ongoing stalemate, were over. The Company was now wholly owned by von Bandemer. He then assigned overall responsibility for all aspects of the business to his Head of Sales, Heinz Hermann Thiele, who also took a 7% stake in Knorr-Bremse. Then came the news that shook the Company to its foundations: von Bandemer was planning to abandon his business interests completely and dedicate his life to a religious organization.

For Knorr-Bremse, already flying into a strong headwind, this posed a real problem. Customers were unsettled and the uncertainty about future developments impacted on the business. Jens von Bandemer wanted to sell his shares, but not to a major investor. Finally he asked Thiele, his right-hand man with whom he had always had a very good relationship, to handle the sales negotiations.

Deutsche Bank provided backing

Heinz Hermann Thiele set customers' minds at rest and calmed an anxious workforce. Then he put out feelers. Already closely bound up with Knorr-Bremse through his shareholding, he decided to make an offer for the Company himself. "I decided to make a virtue out of necessity," as Thiele puts it. Two circumstances worked in his favor: Jens von Bandemer agreed to accept staggered payments over a period of several years and Thiele had the full support of Deutsche Bank. To Thiele's surprise, Alfred von Herrhausen, who had recently become the bank's Board Spokesman, at once agreed to grant the necessary loan and undertook to support him. In August 1985, von Bandemer sold 71% of the shares to Thiele. Thiele went on to acquire the outstanding stake from von Bandemer's family three years later. But the role of new proprietor and Chairman of the Board that Thiele had taken upon himself was both challenging and beset with risk. At that point, no one could say with any certainty whether Knorr-Bremse could actually be turned around. "Nothing was as it should be," recalls Thiele. In 1985, with a workforce of 3,500 employees, Knorr-Bremse reported sales of EUR 254 million, of which brakes accounted for EUR 180 million.

Now it was all down to one man

On the positive side, few people knew Knorr-Bremse quite as well as Heinz Hermann Thiele. On completing a degree in jurisprudence, Thiele had joined the Company in 1969 as a legal specialist in the Patents department. Three years later he took charge of the Legal Affairs and Patents department. In 1975 he was made Head of the Commercial Vehicle Brakes unit, and in 1979 he was given overall responsibility for Sales. At this point, for Thiele one thing was clear above all else: All the risks, all the opportunities were his to take and all decision-making authority was vested in him.

What the Company needed most was a clear strategy. The Supervisory Board called in a management consultancy and they concluded that there was no real future in brakes and the Company should instead focus on industrial pneumatics. Thiele was having none of it. His program for the future was built around brake technology for road and rail, complemented by a new legal structure, a systems strategy, separate divisions for rail vehicle and commercial vehicle systems, and rapid internationalization. In line with the motto "the key to growth lies in getting smaller" he sold off all activities that were not related to rail or commercial vehicles and ensured all corporate functions were product-related. With his work ethic founded on a disciplined, rational, and decisive approach, he established a new corporate culture. He expected his most knowledgeable top managers to take rapid and bold entrepreneurial decisions – decisions they first had to defend in open debate with Thiele.

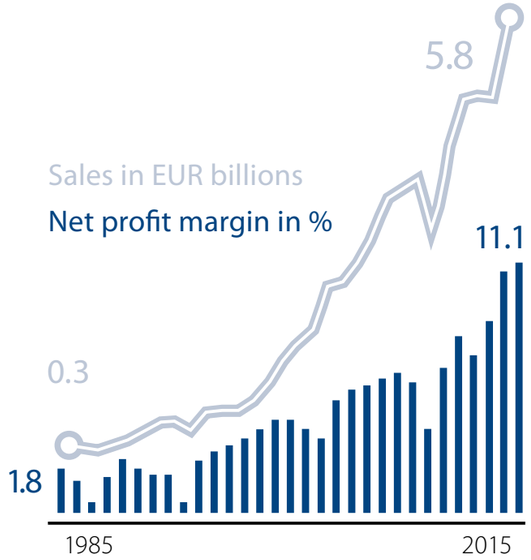
Heinz Hermann Thiele: at the helm of Knorr-Bremse for 30 years.

The price of success

For decades, Thiele took personal responsibility for driving the internationalization of Knorr-Bremse, traveling incessantly to foster customer relations and build up new production sites. "It was a struggle that called for incredible efforts on the part of my staff and myself," he says. "I didn't expect it to be that tough."

But after five years of restructuring, Knorr-Bremse was able to embark on a process of rapid growth. In 1987 the Company first presented its pneumatically actuated disc brake, of which 30 million units are today in service around the world. By 1989, the electronic braking system (EBS) had been developed. This was the year in which Thiele concluded the first major deal with China to supply brakes for the Shanghai Metro. 1991 saw the dawn of high-speed rail in Germany with the advent of the ICE 1, which featured enhanced electro-pneumatic auxiliary brakes. That same year, Knorr-Bremse acquired the U.S.-based company New York Air Brake, which would go on to write a success story with the EP-60 freight car brake valve. In 1999 the commercial vehicle brake activities of Bosch were integrated into a joint venture company. And in 2002 with the takeover of Bendix, Knorr-Bremse also entered the North American commercial vehicle market.

Heinz Hermann Thiele took over in charge of Knorr-Bremse in 1985.



Strong growth: After the initial restructuring period, Knorr-Bremse embarked on a period of rapid growth that is still ongoing.

Superior systems

An international integrated production network comprising a mixture of high- and low-wage countries ensured that the Company remained competitive. Today some 5,000 of the total Knorr-Bremse workforce of 25,000 employees work in the high-growth Chinese market, where the Company has cornered 75% of the high-speed train market. In all, Knorr-Bremse maintains a presence at over 100 locations in 30 countries. Technically superior systems are the key factor in all of the Company's successes.

From the outset, Thiele decided to make research and development a focus of his investment strategy, a practice that continues to this day. The new Test and Development Center in Munich is currently being occupied. Thiele himself has been planning to take a back seat for some time now, and as he recently announced: "After over 30 years at the helm of the Knorr-Bremse Group, in future I want to dedicate more time to my private life and personal business interests. Needless to say, as proprietor of the Knorr-Bremse Group I will retain my close links to the Company and will continue to be involved in all important and above all strategic decisions."

Setting new standards.

In January 2016, following two years of planning and a further two years of construction work, Knorr-Bremse's new Test and Development Center finally came into operation: an interdisciplinary cradle of new ideas for rail and truck specialists that will further strengthen the Company's position as a technology leader.

As a central element in Knorr-Bremse's strategy to expand its systems competence and generate new solutions offering genuine added value for customers, this major project will have a crucial impact on the Company's future. A total of EUR 90 million has been invested in building and equipping the center, in which the Rail Vehicle Systems and Commercial Vehicle Systems divisions will develop and test new systems and components on a cross-divisional basis.

Detailed planning

The basic concept goes well beyond the idea of just putting engineers from both divisions and colleagues from the testing workshop under one roof. The architecture has been deliberately designed to create scope for staff to exchange ideas and develop a sense of common purpose. The building's layout, with the test rigs in the ground floor and basement, test labs on the first floor, and team offices and meeting rooms on the second and third floors, is based on the international standards for process organization, labor efficiency, logistics, and quality set out in the global Knorr-Bremse Production System (KPS).

An intensive advance planning phase ensured that everything was designed to maximize effective and efficient collaboration. Every detail had to be just right – every corridor, staircase, and meeting room had to encourage communication. And there also had to be space to accommodate around 100 test rigs.

Six-story Innovation Center

At the heart of the building is a two-story atrium, with a huge, 400 m^2 unsupported glass roof that floods the interior with natural light, making it an ideal place for ad-hoc meetings. Meeting rooms with glass walls offering uninterrupted views through the building are clustered around the atrium. And transparency is also the name of the game in the second and third floor offices – the heart of the creative process – where a bright, friendly ambience has been created for more than 300 people working there.

Joint ideas incubator for rail and commercial vehicle specialists.

The idea is that communication should be both horizontal and vertical, and the key to this is the test preparation workshops, which are situated on the first floor between the test rigs on the ground floor and the offices above, offering people an opportunity to meet and chat freely. This type of ideas incubator, with the atmosphere of a modern start-up, will bring the next evolutionary step for Knorr-Bremse – with new product ideas and customer-focused mobility solutions for tomorrow's world.

Cutting-edge technologies

As new ideas are generated, they can immediately undergo practical testing on the ground floor and basement test rigs. The star of these is ATLAS – the 'Advanced Test Laboratory for Adhesion Based Systems.' 15 meters high and weighing in at 760 tonnes, this massive rig simulates real-life track operation of rotors, wheelsets, and bogies. The 'track' consists of two 16-tonne wheels measuring three meters in diameter and mounted in the basement with only their tops visible in the test lab.

A powerful 2.5 MW electric motor sets them in motion – at speeds of up to 350 km/h. Knorr-Bremse uses ATLAS to further develop integrated braking systems and all their subsystems. Housed in a climate chamber, the huge test rig can cope with all track gauges and standards and can simulate all sorts of operating conditions such as rain and headwinds – and even ambient temperatures ranging between -20 and +50 degrees Celsius. Using the test rigs reduces the need for field testing and helps the Company to further develop braking systems that minimize wear, cut costs and maintenance requirements, and reduce noise emissions.

Other highlights include the universal train test rig (UZP), which can simulate the braking of passenger and freight trains with up to 208 cars and 3,145 meters in length, and a new 3D pulser that recreates the entire life cycle of a truck braking system with all the usual jarring and jolting. A modular electro-hydraulic test rig multi-dimensionally tests components to ensure that cracking and fracturing does not occur; and engineers can use the NVH (Noise, Vibration, and Harshness) inertia dynamometer to test the performance of braking systems to the limits of the materials involved.

Effective damping of vibrations

When they are set in operation, ATLAS and the other big test rigs inevitably generate noise and vibration, and for this reason the entire basement and the individual test rigs are acoustically isolated from the rest of the building.

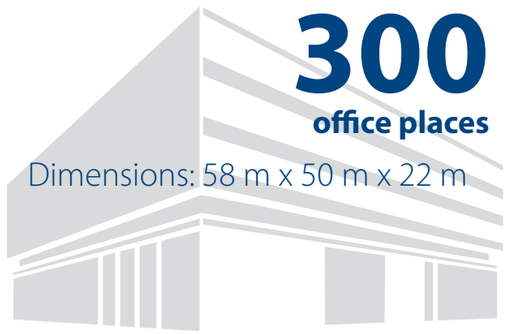
This state-of-the-art testing equipment enables technical ideas to be rapidly validated and converted into reality for the customer. Knorr-Bremse's systems competence, its standardization of components, and its simulation capabilities will provide a new impetus to the development of solutions aimed at greater sustainability and energy-saving, for example through braking energy recuperation. Time to market will be reduced, and Knorr-Bremse will be able to maintain its technological lead over its competitors and offer customers optimal solutions worldwide.

45,000
tonnes of rebar steel

Foundation stone laid on April 28, 2014

360,000
meters of electric cabling

Architects: Henn GmbH



300
office places

Dimensions: 58 m x 50 m x 22 m

The concept

- To create synergies between the rail and truck divisions
- Based on Knorr-Bremse production system (KPS)
- KPS process organization, operational efficiency, and quality
- Sustainable energy concept with waste heat recycling
- 400 m^2 freestanding glass roof
- Light-suffused center to encourage communication
- Team offices designed for friendly, motivating ambience
- Atmosphere of a modern start-up

05:00

Wide loads are hard to handle on narrow roads, but systems from Knorr-Bremse make maneuvering easier.

24 HOURS
WITH KNORR-BREMSE.

China: Opportunities in the mass transit sector.

Before the metro train can start off, the driver first has to get out and stand a couple of feet from his cab door. He stretches out his arm along the gap between the train and the platform edge and peers down the length of the train. The doors are clear.

He drops his arm and presses the button to close the doors. Then he raises it again. Check: All doors closed. The whole process lasts a mere three or four seconds before he returns to his cab and the train moves off. It's a ritual that will be familiar to anyone who has experienced Chinese metro systems. And if the transport planners get their way, it is going to become an even commoner sight in the future.

Efficient mass transit systems for urban areas

For years, transport planning in China was mainly about high-speed trains. Some three years ago, for example, the country opened the longest high-speed route in the world – 2,298 km of track linking the capital Beijing with the technology center of Guangzhou in the south. Since then, high-speed travel between these two urban centers has become something that is taken for granted. And hundreds of the trains operating on the Chinese high-speed network are equipped with Knorr-Bremse braking systems as well as door and HVAC systems from the Group.

Now, however, the focus is changing to urban mass transit systems. Metro networks are expanding, and the relatively new above-ground LRV sector is gathering momentum. The reason for this change of emphasis in the world's most heavily populated nation is the powerful pull exercised by megacities and urban centers on the rural population. At the end of 2010, China had 119 cities with more than a million inhabitants, and by the year 2025 this is expected to grow to more than 200. As a result, massive expansion of the public transport system is the order of the day. Private car ownership is clearly not the solution – on the one hand there is simply no room for building broad new highways; and on the other, air pollution is increasingly becoming a problem. In December 2015, the first smog 'red alert' in Beijing led to a temporary ban on private car use.

Metro lines form the backbone of the Chinese mass transit system. In the last 25 years, Knorr-Bremse has equipped well over 10,000 Chinese metro cars with braking systems.

Metros and streetcars complement each other

The main backbone of mass transit systems in China remains the metro. Over the past 25 years, Knorr-Bremse braking systems have been installed in more than 10,000 Chinese metro cars, and the Company has been an important partner for metro operators from the very beginning. As well as door and HVAC systems, another important element in the Company's product portfolio is sanding systems to improve wheel-rail adhesion and enable safe drive-off and braking in adverse weather conditions. Now Knorr-Bremse has received its first order to retrofit a sanding system to Chinese metro cars. Having proven itself on Chinese high-speed trains, the system is to be installed in trains operating on Shanghai's overground Metro Line 16. During the year under review Chinese metro operators also ordered braking systems for 3,350 and door systems for 694 metro cars from the Knorr-Bremse Group.

Knorr-Bremse has maintained close contacts with China since the late 1970s, and received its first order for braking systems for a Chinese metro back in 1990. By the year 2011 it was already able to celebrate delivery of systems for the 10,000th Chinese metro car. Up to the present day the Company has managed to establish and steadily expand its leading position in the growing Chinese market, providing equipment for metro lines for example in Dalian, Beijing, Shenzhen, Shanghai, Nanjing, Nanchang, Ningbo, Qingdao, Dongguan, and Wuxi.

There is, however, no danger of light rail systems and metros competing with one another – and nor is one trying to replace the other. Instead, the two transport modes are closely intermeshed. Metros mainly connect urban districts with one another or operate between city centers and international airports, whereas the LRVs bring passengers to the metro stations or link up areas that have not previously had a public transport connection.

Growth in LRV segment

When speed is of the essence, cities are increasingly opting for light rail vehicles, as they are relatively easy to plan, do not require much space, and can be swiftly installed. No wonder China is investing so energetically in this hitherto unknown mode of transport! In summer 2015 the country's entire LRV network amounted to some 260 km, but by the end of the year this had virtually doubled. Within the next five years the plan is to expand this to a total of 3,000 km. Knorr-Bremse estimates that around half the 2,000 LRVs produced worldwide during this period will be destined for the Chinese market. No fewer than 30 cities are currently planning new lines, analyzing commuter flows and passenger behavior patterns, and exploring new urban planning options. Whether it is Pingdingshan in central China, Tangshan in the north-east, Taizhou in the east, or Foshan in the south – major Chinese cities are beginning to see construction of an LRV system as the next logical step. The planners' vision is of two-, three- or four-section LRVs gliding silently past queues of gridlocked motor vehicles.

By the year 2025, China is set to have more than 200 cities with over a million inhabitants.

The Chinese LRV market is highly diversified, with 17 different vehicle builders competing to attract city authorities and operators. To ensure that the new vehicles fit a city's image, the city fathers often impose specific civic design requirements. This increases not only the number of versions being built but also the variety of braking systems required.

This whole development is having a strong impact on Knorr-Bremse's sales figures. During the course of 2015 the Company secured contracts to supply braking systems for 156 LRVs in China, with 30 of these also being supplied with Knorr-Bremse HVAC systems, and another 20 with door systems. Added to this are a total of 48 power converters from Knorr-Bremse's PowerTech brand. The Company has been quick to recognize the enormous potential of LRVs for the Chinese transportation market, and has invested heavily in technological skills, local production facilities, and staff training.

With more than a dozen sites and joint ventures for both corporate divisions, Knorr-Bremse has had a strong presence in China for many years, and has been able to establish a reputation for reliability: It has the necessary engineering expertise and can deliver systems punctually on demand.

Rush hour in Shanghai: Hundreds of people get on and off at every stop. Entrance systems from Knorr-Bremse make for safety and efficiency.

Sustainable innovation.

In the past, a successful invention had above all to be economical. Nowadays, new products also have to meet environmental and social requirements. To achieve this, a Company can either wait for someone to come up with a bright idea – or it can take a methodical approach to the challenge. Knorr-Bremse has managed to incorporate corporate responsibility into the innovation process itself.

What a crazy idea: to use electromagnetism to brake a high-speed train! The raw material for the magnetic coils – valuable copper – is not only extremely expensive but also very heavy. And every additional kilogram of weight costs energy … So it was understandable that some of the experts were skeptical when, at the end of the 1990s, people started talking about reviving the age-old principle of the electromagnetic eddy current brake. It was surely much too expensive and much too complex! But within a few years their attitude had changed. Piloted on a German ICE 3 high-speed train, the system proved to be both robust and reliable. And because it is frictionless and not subject to wear, its maintenance is actually cheaper than for traditional braking systems. Use of the eddy current brake on the ICE 3 significantly reduced brake pad wear, and it was reckoned that over a life cycle of 25 years the total cost of operation – despite the initial outlay – could actually be as much as 45% lower. Looking back, one can now say: The sums added up.

Knorr-Bremse is currently working hard on further developing the eddy current brake – this time with a focus on the system's sustainability credentials: "As well as reducing wear, the eddy current brake also significantly cuts noise emissions," explains Robert Heigl of the Innovation & Technology department at Knorr-Bremse Rail Vehicle Systems.

» You can find **more information** about the Company's sustainability management in the Knorr-Bremse AG Communication on Progress Report 'Responsibility for sustainable success.'

» *Knorr-Bremse ensures that sustainability aspects are integrated into the innovation process from the initial idea right down to the finished product.*

Taking the long view

Thus at the outset it was mainly the economic argument – based on a calculation of life cycle costs – that contributed to the system's breakthrough, and the idea of greater sustainability was an additional advantage. The same goes for many innovations that were originally motivated by a desire to cut costs rather than the parallel pursuit of environmental, economic, and social goals. Today, though, the challenge is to incorporate aspects of sustainability from the very start of the innovation process – from the first bright idea right down to production of the actual product. So how can we design the process to ensure that the ideas generated also meet the challenges of sustainability? After examining questions like these, Knorr-Bremse set out to develop a way of embedding sustainability in its innovation strategies, structures, and procedures from the very outset.

Using international guidelines and conventions such as the UN Global Compact, Knorr-Bremse first carries out a materiality analysis, systematizing and evaluating all the issues and challenges that it faces, whether from customers, employees or other stakeholders – or indeed people's expectations in terms of safety. The result of the analysis is a matrix in which all the important issues for the Company's future viability are weighted and systematized – nothing less than a roadmap for sustainability.

Turning ideas into actual products

Ideas are then converted into actual products. To make sure that the roadmap is followed, the elements in the matrix are integrated into Knorr-Bremse's product strategy. "After all, our products have to deliver long-term answers to future challenges," explains Stefan Bräuherr, Head of the Corporate Responsibility (CR) Department. The journey is a lengthy one. "Basically we have to create a climate of re-

sponsibility throughout the workforce. All our employees have to realize that any idea for a product or process – however unlikely it may appear to be at first glance – is welcome," adds Bräuherr.

Once an idea is born, the real work begins. It has to be categorized, evaluated, assessed, and translated into a strategic innovation process. The innovators – the people who came up with the product idea – not only have to analyze its market prospects and assess its commercial potential but also precisely identify their project's advantages in terms of predefined sustainability criteria: energy efficiency, emission reduction, safety, use of eco-friendly materials, reduction in life cycle costs, and ease of maintenance. A score card is then drawn up to assess the influence of these criteria. Following this, the process of approval for research or development funding begins, leading ultimately to a new product. The Head of CR is involved in every step of the approval process. "The experience we gather with these processes helps us to further develop our assessment and measurement system and systematically incorporate social and environmental aspects into the innovation process," explains Bräuherr.

Innovation as a management task

Apart from development of specific project and product ideas, innovation is above all a task for management. A mindset involving a constant search for sustainable innovations has to be established worldwide. That is why Knorr-Bremse's CR strategy is currently being rolled out in all regions – with local aspects added to it. The process has turned out to be highly successful: The Group's North American subsidiary Bendix, for example, has set up its own department with responsibility not only for CR management but also for communicating product innovations. A recent example from 2015 is a package of innovative products for commercial vehicles ranging from air management to driver assist systems that enable heavy-duty trucks to meet future statutory requirements for fuel consumption and emissions.

However, the main drivers of innovation are not just statutory requirements or specific customer requests. Knorr-Bremse also develops ideas for sustainable products out of a deep-rooted conviction that this is the ethically right thing to do. As such, for example, it supports the vision of accident-free driving. "The accident statistics for trucks prompted us to start working on ways of reducing the accident rate," reports Christian Staahl, innovation and technology specialist at Knorr-Bremse Commercial Vehicle Systems. This recently led to the idea of a system that automatically brakes a truck if it fails to keep a safe distance from the vehicle in front, so as to avoid an accident or at least mitigate the force of the collision. Policymakers were quick to recognize the system's potential, and since November 2015 it has been mandatory for all newly-registered commercial vehicles in Europe.

Similar motivation lay behind the current work on a so-called Blind Spot Assistant (BSA), including a Turning Assistant. The background to this is the fact that trucks turning right (or left) in urban traffic represent a serious risk for cyclists and pedestrians who may be in the driver's blind spot, particularly when the vehicle is starting off at traffic signals. Knorr-Bremse is currently working on a system that uses sensors to warn the driver of this risk by means of an optical and/or acoustic signal. "It will ensure that fewer people are injured on the roads," comments Staahl. That is sustainable innovation.

Ideas for sustainable products are the result of a deep-rooted conviction on the part of the Company.

09:00

Speeding across the ice at 100 km/h in Sweden: During winter testing the drivers try out all Knorr-Bremse systems under extreme conditions.

24 HOURS
WITH KNORR-BREMSE.

“Mobility should be fun.”

They’re eco-friendly, comfortable and safe: Trains have a lot going for them. But what is their future, as patterns of mobility change? And what training will be required for young engineers to be able to develop the right solutions? An interview with Prof. Dr. Corinna Salander, Europe’s first female university professor of rail technology.

Professor Salander, we were almost late for this interview as our train was delayed. Don’t you sometimes find that annoying?
Prof. Dr. Corinna Salander: Of course I do – delays are annoying, but on the whole I’m pretty happy with what the railroads have to offer. I personally make a lot of use of trains – I try to avoid air travel on domestic journeys, even over long distances like Stuttgart to Berlin. I can use the time on the train to get some work done in peace.

So you take the train for practical reasons. To be honest we thought that, given your profession, you would also have a strong emotional link to trains …
Salander: If you mean did I play with model trains when I was a kid or do I get out my cellphone to take pictures of old trains when I see them, then I have to disappoint you: I’m no train-spotter. Of course I find the sector fascinating, and as a physicist and scientist I’m particularly interested in the technology involved. But as a member of the traveling public I admit that I take a strictly practical view and just enjoy the advantages of train travel.

Are the advantages such that you can envisage trains still playing an important role in the world of tomorrow?
Salander: I’m sure they will – not least because they have enormous environmental advantages. But there’s a lot to be done: It can be summed up with one word – intermodality.

What exactly do you mean by that?
Salander: For me, a well thought-through intermodal system would mean I could drive my e-automobile from my country home to the nearest railroad station, hook it up to a recharging unit and leave it there, get onto a regional train without waiting too long, catch a bus when I reach my destination and have an e-scooter or a bicycle immediately available for the last leg of my journey. I also wouldn’t have to worry about buying tickets or looking for timetables because I would be able to do all that online. Obviously this would call for regular regional and urban train services, but it would also require a new image. Traveling by train needs to be cool and fun. Trains have to be practical, networked, regular, clean, and good value for money. That’s the only way people will be willing to use them. And only then will operators be prepared to regularly improve their service.

You’ve been describing the response to changes in patterns of usage. But what technical developments will make trains fit for tomorrow’s mobility?
Salander: In many ways they are already fit. But there are certain important trends that are going to loom larger. For example, condition-based maintenance: Instead of trains being taken out of service at regular intervals they will only be taken to the workshop when this is required, for example if a pneumatic suspension unit is getting close to the limit of acceptable wear.

What other developments are there?
Salander: An important one is driver advisory systems that can increase efficiency as well as comfort and safety. Knorr-Bremse recently showcased one such system in the ‘Train to Paris’ (a campaign coordinated by the UIC International Union of Railways in connection with the World Climate Summit in Paris in 2015). I’m talking here about systems that give the locomotive engineer suggestions for an energy-saving driving style, regulate air-conditioning systems, and ensure optimum energy distribution throughout the train. All these developments are moving in the right direction. And then of course there’s braking energy recuperation.

So to sum up – there are a number of technological developments and new patterns of use. But what are the implications for the younger generation of engineers?
Salander: We need people who understand the railroad system in its entirety and grasp what people’s needs are, so they can develop the necessary technical solutions.

What are the qualities needed for this?
Salander: Above all they have to be able to think in networks. The railroad market is international and contains many different players. Finding exactly the right solutions calls for close collaboration between manufacturers, suppliers, and operators. And that means not just being able to speak English but also understanding how international railroads operate. And they also have to be able to shoulder the much greater responsibility that manufacturers bear nowadays.

How can we get such engineers?
Salander: I think it is up to the universities to provide them with a proper university education.

What do you mean precisely?
Salander: Take the choice of lecture subjects, for example. Obviously any future engineer needs a solid grounding in rail-wheel dynamics and multi-body simulation. But these are highly technical subjects and not always popular with students. That’s why it’s all the more important to also look at ‘modern’ issues that will prepare young engineers for today’s challenges. Take for example the European legislative process, on which we are now offering lectures for the first time in Germany.

Professor Corinna Salander holds the endowed chair for rail vehicle technology at the University of Stuttgart Institute for Machine Elements.

To be honest that doesn't sound incredibly exciting either.
Salander: It may not sound exciting, but it certainly opens young people's eyes. Only someone who understands how a technical innovation has to go through various standardization procedures and legal processes will understand the bigger picture. What's more, young people have to learn that they can no longer develop a technology in isolation – they have to be able to operate in a team and be able to present and defend their ideas in meetings.

What other aspects are important?
Salander: The approach has to be more practical, with close links between the university and industry. Only if our young engineers can actually research and develop within specific projects will they get to know what state-of-the-art railway technology is about and forget the rather dusty image of the industry. With the help of the industry I can break down stereotypes and show just how exciting and varied this industry is.

That sounds like a huge challenge.
Salander: And that's why many companies have problems recruiting suitable staff. And there's something else: Exciting, innovative technology is not necessarily associated with rail vehicles – people tend more to think of automobiles or airplanes. That's a shame, because 180 years ago the situation was completely different. Nowadays people still associate the industry with public employees, steam locomotive enthusiasts, and rail anoraks.

What?
Salander: Don't you know the term? 'Anorak' is used to describe people who spend all their spare time obsessing about a particular subject – in this case trains and railroads. That's the image people associate with us, which is why a lot of people decide against making a career in this industry, because they think it's old-fashioned and fusty. They don't realize that locomotives nowadays are brimming with state-of-the-art high-performance electronics.

And what's your answer to combating this fusty image?
Salander: We can only set an example in our daily teaching and research. And of course the involvement of private companies like Knorr-Bremse also helps. It enables us to look at the construction and operation of vehicles as a complete system. It helps young people to think in more general terms and understand the system as a whole. Then they will very quickly realize the opportunities offered by the industry to help shape tomorrow's mobility.

I've heard that you're quite old-fashioned in one respect – in your lectures you often don't use an overhead projector, preferring instead to write on the board.
Salander (laughs): That's true – but I do it deliberately. It is my experience that people quickly switch off when you give a slide presentation. When I write on the whiteboard I do so at the speed of thought and the audience finds it easier to keep up with me and follow my ideas. So in that way – but only that way – I like to be old-fashioned!

Professor Salander, thank you very much for talking to us.

Prof. Dr. Corinna Salander

Professor Corinna Salander holds the endowed chair for rail vehicle technology at the University of Stuttgart Institute for Machine Elements. Born in 1967, Prof. Salander is Europe's first female university professor of rail technology. After gaining her doctorate she spent 15 years in management positions at Deutsche Bahn AG, the European Railway Agency ERA, and train manufacturer Bombardier, where she focused on aspects of safety management and rail vehicle licensing, among other things.

Endowed chair

Knorr-Bremse AG is a major sponsor of the endowed chair for rail vehicle technology at the University of Stuttgart Institute for Machine Elements for a period of ten years. This involvement enables the Company – without influencing the actual choice of research areas – to contribute to the training of young engineers and the development of research. The Company also hopes to use the endowed chair to help the university, with which it has had close contacts for many years, to embark on new research areas and respond to current trends.

» **Further information** about the Company's HR policy can be found in the 2015 Communication on Progress Report 'Responsibility for sustainable success'.

En route to the autonomous truck.

When will mass-produced self-driving trucks become available? An interview with Hans-Jürgen Sander, Vice President of the Brake Control Business Unit at Knorr-Bremse, and Claus Beyer, Vice President Control Systems at Bendix Commercial Vehicle Systems, on the dynamic calculation of space and movement, stationary cyclists, and the difference between fail-safe and fail-operational.

The Society of Automotive Engineers (SAE) International has developed a six-level classification for the development of fully automated vehicles. What level have we currently reached?

Hans-Jürgen Sander: Today we basically have three systems: adaptive cruise control, which within certain limits matches your speed to the vehicle in front, lane departure assist, which warns the driver if the vehicle drifts off course, and an emergency braking system that alerts the driver and automatically applies the brakes if there is a danger of collision with a stationary or moving vehicle in front. These are all important systems that take some of the burden off the driver and increase safety. However in the SAE classification they are all only at Level I – in other words far short of what we would call autonomous driving.

Claus Beyer: Knorr-Bremse has already sold some 100,000 driver assistance systems. The transition to a higher level of automation will occur step by step. For example, this year saw Navistar in the USA begin series production of trucks with an integrated version of our emergency braking system. This combines information from a camera and radar sensors, making it the safest system in the market. Even in the case of stationary objects it doesn't trigger unnecessary braking – just imagine an automated system that suddenly decided to stop your truck in the middle of a highway! But it still applies the brakes in a real emergency, for example if you suddenly come round a bend and find yourself confronted with a tailback.

Sander: That is precisely the challenge – to offer systems that avoid inappropriate reactions whatever the situation, offer maximum availability, have the necessary fail-safe systems, and maximize benefits for drivers and society in general.

Hands-free driving – just a dream today, but perhaps soon a reality? Hans-Jürgen Sander is working on it.

Passenger automobiles seem to have got further with driver assistance systems. Why can't you just transfer this technology directly to trucks?

Sander: In technical terms, trucks pose completely different geometrical and dynamic challenges depending on whether you are dealing with a semitrailer or tractor/trailer combination. And the same goes for the number of possible different designs. It's much easier to install systems like these in automobiles, as they are produced in large volumes and have greater standardization of components. And the drive dynamics are easier to monitor.

So it will be a long time before we see a truck that can automatically park itself, for example?

Beyer: Actually we will see that quite soon, even if it is a much more complex process than for an automobile. It involves complicated maneuvering rather than just driving into a parking space, and that requires considerably more room and more sensors to provide a full picture of the entire surrounding area. Even if we could transfer an automobile system completely, we would still only cover a tiny proportion of the situations in which a customer would require the system.

But the basic challenges regarding recognition of the surroundings are the same, aren't they?

Sander: In the future we will need systems that not only look forwards but also deliver a dynamic picture of the entire surrounding area, so that a range of different applications can use them. For example a lane departure system that not only warns the driver but also intervenes in the steering, or a blind spot assistance system that also recognizes a stationary baby stroller or a cyclist at the corner.

Beyer: Generally speaking, to move from an assistance system to autonomous driving, the number of objects the system has to automatically recognize increases dramatically. The potential for a collision has to be calculated in advance, and the system has to come up with an adequate response to all these situations.

So the computing platform required doesn't yet exist?

Sander: It is currently being developed. On the one hand you need high-performance computers and algorithms that can process the stream of data quickly enough; and on the other hand the vehicle components must be so flexibly networked that they allow complex control processes to take place. And the entire system must remain operational even in the case of a malfunction.

So many sensors, so much computing power – and everything duplicated to ensure it is fail-safe. Surely the question is whether this would be commercially viable?

Sander: Automobile owners have a natural interest in the technology involved. They want to see how it works, and are attracted by the additional convenience. In the truck sector, on the other hand, the biggest issue is economy of operation. There are basically two levers here: avoiding accidents and therefore reducing maintenance costs, and potential reductions in insurance premiums, higher levels of availability, and longer driving times.

Beyer: Ensuring that the system functions properly in all situations is essential for professional use in a commercial vehicle. Take the example of the USA: Most vehicles are bought by large fleet operators who usually only have insurance cover for serious accident damage, with more minor damage covered by a self-administered fund. That is why a relatively high proportion of trucks are equipped with ESP and driver assistance systems in the USA, and the number is still growing, despite their not being required by law. This applies above all to highway-relevant systems. In Europe, where trucks often operate in inner cities, we think our blind-spot monitor has considerable potential. The idea is that it would not only recognize if another vehicle on the left or the right was preventing the truck from

changing lane, but also warn the driver of collision risks in city traffic. Here the focus is on safety for the public at large.

Sander: We and the vehicle manufacturers will certainly have to prove that our systems relieve the driver to such an extent that accidents caused by fatigue can be dramatically reduced and drivers can safely spend longer periods at the wheel.

Beyer: Take the example of stop-and-go driving in heavy traffic. If the active cruise control system can drive a truck up behind the vehicle in front, stop, and then automatically start off again, that takes a considerable load off the driver's shoulders. There is also considerable potential for improving fuel consumption. Again, take the USA, where trucks travel cross-country at steady speeds of 110 or 120 km/h. If vehicles could be lined up with 10 or 12 meters between them, air resistance would be reduced and that would result in huge fuel savings. But without reliable cruise control, uninterrupted communication between the vehicles, and a reliable emergency braking system, this is not possible.


C. Beyer

Everyone in the market knows that Knorr-Bremse has the necessary hardware expertise. But why come to you for software and data as well?

Sander: Even the current Knorr-Bremse braking systems have software elements for safety-critical functions such as ESP. We have the expertise to efficiently develop and test such systems and to ensure that they enable the vehicles to operate safely. And we intend to continue doing so in the future …

… even if you have to collaborate with many different partners to come up with the solutions?

Sander: We obviously won't be manufacturing our own cameras or radar sensors. Our competence lies in specifying, integrating, and developing applications that enable a vehicle to operate safely. We know everything about commercial vehicles – and that includes the electronics. We are thoroughly familiar with the drive dynamics and we have considerable experience in managing a large number of components and various different platforms. Our systems already involve highly complex control processes that even intervene in the transmission and engine management. With our new Global Scalable Brake Control system we will be launching an electronic platform that offers an ideal basis for the next generation of complex control processes required for automated driving.

When will the time come when the driver can fill in his tax return at the wheel?

Sander: We are talking initially about assistance systems that do not relieve the driver of his responsibilities. Turn-off assist, blind-spot assist, lane departure warning – we have already mentioned all these. A function like the congestion assist system, which enables semi-automated convoy driving, comes into the same category. All this will be feasible by the year 2020.

Beyer: Highly automated solutions, which would be the equivalent of SAE Level 3 or higher, represent an important threshold, as they start taking responsibility out of the driver's hands. If something goes wrong, he can't take over control on the spot, as he is probably doing paperwork or taking a nap. So it's not enough to make systems 'fail-safe' – to ensure that the braking system can be operated even if the electronics fail. What one needs here is for them to be 'fail-operational.' Let's assume the steering control system packs in – a system like this would immediately use the engine and brake management to park the vehicle safely at the side of the road.

Sander: It's going to take a lot of development work and coordination before we can offer such functions. I think we can only expect them to be available as standard equipment in trucks well after 2020.

Above all the legal issues also have to be solved before then.

Sander: Before we can take responsibility out of the driver's hands and free him up to do other things during the journey, we need to have exactly the level of technical redundancy that we mentioned earlier on. That is technically feasible, but such systems are not yet ready for volume production. But I still have the impression we are considerably more advanced on the technical than on the legal front.

TODAY: 2015 → **TOMORROW: up to 2020** → **FUTURE: from 2020**

Collision Avoidance	Fusion AEBS	OverVue (= Birdview)	Platooning	Lane Keep Assist	Turn-off Assist	Congestion Assist	Highway Pilot	Platooning 2.0
2007 Emergency braking in the case of moving vehicles	**2015** Emergency braking in the case of stationary vehicles	**2018** All-round visibility of vehicle environment	**2018** Automatic driving in convoys, with vehicles exchanging data	**2019** System actively intervenes in steering	**2020** Prevents turn-off in case of pedestrians, cyclists or oncoming vehicles	**2020** Automatically follows vehicle in front	**approx. 2023** Automated driving relieves the driver, saves fuel, and improves road safety	**approx. 2025**

Fail Safe Strategy
The driver is required and has to continue to monitor certain functions.
The system does not continue to function in the case of failure.

Fail Operational
In the case of failure the vehicle has redundant systems and continues to function.

ABS | EBS	Global Scalable Brake Control (GSBC) PHASE 1	GSBC PHASE 2

Controlling vehicle dynamics

Brake specialist Knorr-Bremse has already developed its own systems to control vehicle dynamics. At the top of the list is longitudinal control – which is where adaptive cruise control and emergency braking offer an addition to various standard electronic braking systems. The electronic stability program ESP detects any loss of lateral control and stabilizes the vehicle by applying the brakes on individual wheels. Lane departure warning also monitors lateral movement and warns the driver if the vehicle inadvertently drifts off course. The air suspension system even allows the vehicle height to be altered or its weight distributed more evenly across all the wheels. Sensors also monitor vehicle yaw and tilt and, in an emergency, prevent rollover. All these are ideal ways of reducing the driver's burden of complex steering processes and further improving safety.

RailServices makes overhaul easier.

When operators have received multiple deliveries of new trains at short intervals, you can be sure that a lot of overhaul work will required eight years down the line. To cope with this, RailServices has come up with a cleverly designed parts exchange warehouse that makes for greater planning certainty, minimizes risks, and reduces throughput times by preventing bottlenecks in the supply of materials.

If Marek Affeldt, manager of the Berlin RailServices depot, wants to check how one of the Knorr-Bremse Group's latest service concepts is shaping up, he doesn't have to go far. Only a few meters separate his office from the goods reception area where the transport containers for FLIRT braking systems arrive. This is the new parts exchange system in action – jointly developed by RailServices and WestfalenBahn GmbH. Overhaul of the FLIRT multiple units was scheduled for 2015, and this included the braking system.

The challenges

Braking systems are not to be taken lightly – either in terms of their function or their size. The air supply unit alone measures some 1.2 m x 60 cm x 60 cm. Then there are the brake control components and the bogie equipment. Depending on the number of rail cars, every FLIRT train is equipped with one or two of these systems. "If you include the mounting frame, the contents of the containers measure around two-and-a-half by two meters," explains Affeldt.

FLIRT is a German abbreviation for "rapid, lightweight, innovative regional multiple unit," and is the name of a highly successful rail vehicle platform for regional and commuter trains designed by Swiss manufacturer Stadler Rail. First built in 2004, the trains are now a familiar sight on networks and train stations in Europe.

Efficient interaction of man and machine results in perfect service.

Availability under time pressure

WestfalenBahn GmbH operates 19 three- and five-section FLIRT cars on the 300-kilometer Teutoburger Wald network in North Rhine-Westphalia and Lower Saxony. The fleet was significantly expanded in December 2015 with the addition of a further 15 four-section FLIRTs and 13 six-section KISS double-deckers for use on the Emsland and Mittelland networks. This has doubled the annual train-kilometers from some 4.5 million per year to more than 11 million. As with many relatively small operators, the vehicles are heavily used: "We depend on maintenance work running smoothly," comments WestfalenBahn managing director Rainer Blüm. "And that of course includes overhaul of the subsystems."

Blüm's Company took delivery of the first 19 vehicles in 2007. "As all the multiple units arrived within a period of a few months, they were all going to have to be serviced more or less together – including a major overhaul of the brake components," he explains. Three weeks are required to service a three-section FLIRT multiple unit, including replacing the brake components and testing the entire trainset. Not only is the time available for overhaul extremely limited – the entire task is also highly challenging logistically. That was why the parts exchange warehouse concept was chosen.

Overhaul in Berlin, parallel installation in Krefeld

The system operates as follows: WestfalenBahn delivers the vehicles for overhaul to service provider DB Fahrzeuginstandhaltung GmbH in Krefeld, where all the brake components are removed and packed into special containers which are then shipped by a logistics Company to the Knorr-Bremse Service Center in Berlin.

At the same time, a replacement set of parts is available at the DB Fahrzeuginstandhaltung depot in Krefeld. "This means the technicians there can always start work immediately," explains Blüm. That is the only way that the major overall can be carried out within the three-week window.

RailServices site manager Affeldt is able to precisely plan the deployment of his workforce and equipment on the basis of the operator's overhaul plan. While Krefeld installs a recently-delivered set of exchange parts in the vehicle, work on overhauling the next set of components begins in Berlin.

This involves the technicians inspecting the contents of the containers for any unusual features such as defects in parts that would not normally be replaced. The components are dismantled right down to their individual parts. "From the outside you don't necessarily see what is relevant for the overhaul process." The parts are also cleaned and then passed on to colleagues, who diagnose what work is required and forward them to the individual overhaul lines. At the end of the process, the components are reassembled and a final inspection carried out. Depending on the work required, the overhauled set of components is usually returned to a container for shipping back to Krefeld within a week.

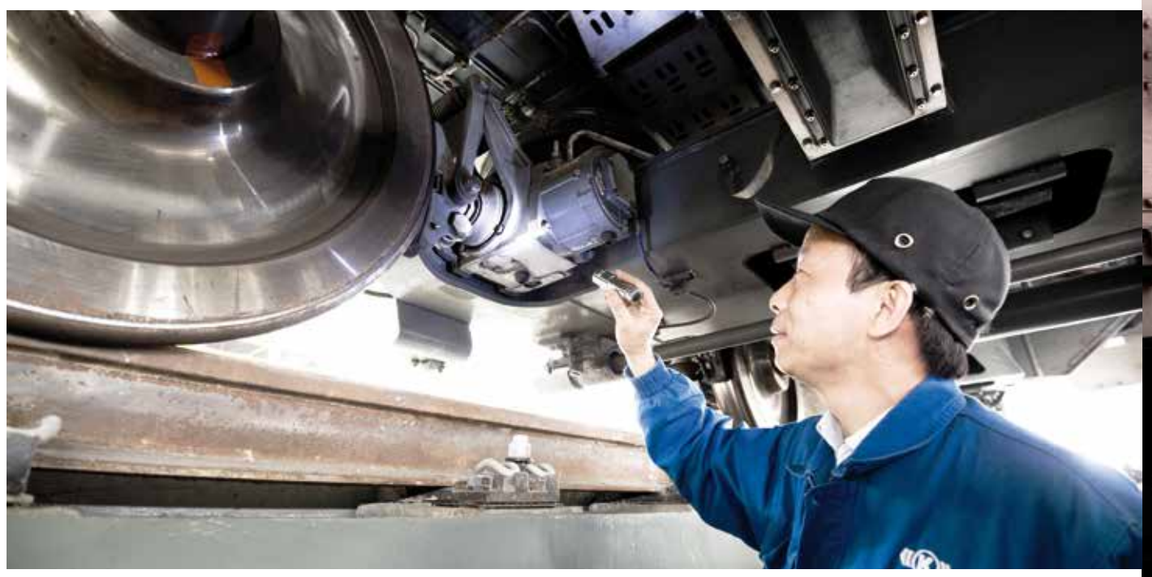
Added value for operators

The parts exchange warehouse is a good example of the work of the RailServices brand, under which Knorr-Bremse Rail Vehicle Systems has bundled all its service activities. The system just described was developed in response to increasing demands from operators and vehicle owners for rapid availability and top performance – always with a focus on quality. Throughout the entire process Knorr-Bremse applies the same standards as for its OE business.

Technological progress means that servicing of rail systems is becoming increasingly specialized. The overhaul of safety-critical subsystems also calls for highly specific expertise and extensive experience. Knorr-Bremse's delivery of country-wide, customer-specific overhaul services relies on a first-class workforce and state-of-the-art assembly and testing equipment.

The system generates genuine added value for operators. "We can reduce throughput times to a minimum," says WestfalenBahn managing director Blüm. "The vehicles go back into service on schedule, because delays due to a lack of materials are now a thing of the past." With most of the overhaul work now completed, Blüm can sum up the situation with some satisfaction: "There's no doubt about it – without the parts exchange warehouse concept we would never have been able to complete the overhaul in the required timeframe."

Worldwide growth: RailServices meets with a positive response in all markets.



15:00

136 freight cars roll through vast open spaces. Any failures out here would prove very expensive. It's a good thing they have Knorr-Bremse systems on board.

24 HOURS WITH KNORR-BREMSE

Fit for the second round.

Liberec, Czech Republic, has become the center of Knorr-Bremse's European remanufacturing activities. In 2015, a huge 9,000-square-meter workshop was officially opened for this purpose.

When Karel Žára powers up his pneumatic wrench at one of the disassembly workplaces, he is effectively pressing the rewind button for the life of a product – triggering a long series of processes that will remove all traces of the hundreds of thousands of kilometers that it has already traveled. And it all begins with him applying the wrench to the heads of bolts that have largely disappeared under a layer of grime. The initial work carried out by Žára and his colleagues as part of the remanufacturing process makes both economic and ecological sense.

"Remanufactured products are becoming increasingly important for Knorr-Bremse," says Wolfgang Krinner, Member of the Management Board of Knorr-Bremse Commercial Vehicle Systems. "In our main markets the average age of vehicle fleets is growing. Products remanufactured to OE standards offer an inexpensive alternative to new replacement parts – and are also considerably more environmentally friendly. Bendix has been driving this development in the USA for years, but since 2015 we have also been focusing our competence in this area in Europe as well, expanding our reman portfolio and building up our capacity." The new facility in Liberec plays a central role in the process.

Products remanufactured to OE standards offer operators an inexpensive alternative to new replacement parts.

Reman center for Europe

Before the components end up on Žára's workbench, they have been collected from workshops all over Europe and brought to Liberec in wire mesh crates via Knorr-Bremse's logistics center in Passau, near the German, Polish, and Czech borders. During the first year of operation after its official opening in 2015, more than one-and-a-half million parts were brought here. The initial sorting process is a challenge: The experts have drawn up 1,000 criteria that have to be met. "It's not just enough to know what a compressor or electronic air treatment unit is," says Matthias Sander, managing director of Knorr-Bremse Systémy pro Užitková Vozidla. "We need detailed knowledge of every part number to be sure that the individual components really are identical." And that means apparently similar components often ending up in different containers. It is a task that calls for a lot of experience.

Special treatment for electronics

Most of the components go directly from the warehouse to the disassembly process presided over by Karel Žára and his colleagues. But those containing printed circuit boards first have to take a detour via the ESD protected area, where Michal Kopecký, resplendent in ESD workwear and standing on a special antistatic mat, removes the most valuable elements from their metal casings. As Kopecký explains: "If I were to send a spark on to the circuit board, it could easily render the chip useless." His workplace is also separated off from the rest of the workshop, and when he comes and goes he has to open a barrier by hand so as to discharge any static electricity that might damage the circuit board.

Depending on the component and version involved, Kopecký removes individual elements using a soldering iron and puts them in an ultrasonic bath for cleaning. The software is also tested and upgraded, and the circuit board is returned to the production process in a black, ESD-tested crate.

Lengthy process for mechanical parts

Larger parts such as cast compressor casings and covers go to furnaces, where the remaining oil and dirt and residual paint layers are burned off at temperatures up to 420 °C. Once they have cooled off, sandblasting removes any final traces and they then go through various cleaning processes.

Sensitive aluminum parts or compressor crankshafts bypass the furnace and are taken straight to the wash and rinse system. The latest version of this high-pressure cleaning facility rapidly spray-washes the parts, rotating them in the fully flooded chamber, and then removes the last layers in an ultrasonic bath prior to vacuum-drying. When the door of the chamber opens there is not even any smell of chemicals – the water used contains hardly any additives.

Depending on the components concerned, they are now subjected to further mechanical processes, for which the reman facility in Liberec is equipped with virtually everything required for metalworking – cutting, milling, drilling, and coating. The cylinders of the compressor casings have to be rebored (honed) to ensure that the rings form a tight seal, and the finest grooves are removed from the crankshaft to reduce friction to a minimum.

OE-type processes

Whatever processes the parts have been subjected to, they all have to undergo a final inspection, with clearances and diameters measured, and threads checked for fit. In the case of more complex components, failure checklists with photos of reference samples are used. After comparison, a decision is made as to whether the component is to be given a second chance – or not. As Sander says: "We are constantly checking every part, even though remanufactured components will anyhow have to pass the usual production end-of-line tests."

The real expertise goes into the procedures that all product types have to pass through before they are released for remanufacturing. The engineers have defined hundreds of measurements for this purpose, and the disassembled and cleaned parts are minutely inspected and measured. The component is only approved for remanufacturing if its tolerances are within permissible limits, a failure checklist has been drawn up, and the entire process has been described, right down to reinstallation. As Sander says: "This involves a lot of expertise on the part of Knorr-Bremse. We are the only people who know the exact specifications for a component to be recycled after the many millions of kilometers it has traveled." That is the key to ensuring that Knorr-Bremse's remanufacturing processes deliver the level of quality one can only expect from an OE manufacturer.

Focus on value retention boosts remanufacturing business

"Remanufacturing helps fleet operators and freight companies to ensure their vehicles are both safe and reliable, and to save resources thanks to their extended operating life," explains Henry Foxx, Director of Remanufacturing at Bendix, Knorr-Bremse's North American subsidiary in the commercial vehicle segment. Bendix has more than 40 years of experience and expertise in remanufacturing truck components. In 2015 alone, the company delivered a million remanufactured air dryers and three million brake shoes – ample evidence of the continued success of the remanufacturing business.

Foxx adds: "Across the industry, we're seeing a renewed focus on remanufacturing, as more fleets, technicians, and drivers discover the benefits of partnering with a skilled, established, and technology-driven remanufacturer. When it comes to safety-critical systems such as brakes, the expertise of an original equipment manufacturer is essential."

Brake shoes, for example, are subjected to extremely high forces and temperature fluctuations during their operating lives and this inevitably leads to distortion in the long term. If, as is usually the case, the friction material is merely renewed, the geometry of the shoes is no longer correct. The result is that the pads fail to make full contact with the brake drum and the braking effect is reduced. That is why Bendix uses a 1,000-tonne coining press to apply the full force needed to return a shoe to its originally specified shape.

Remanufactured brake shoes from Bendix comply with U.S. Reduced Stopping Distance (RSD) requirements and meet all the needs of vehicles on today's roads. As Foxx puts it: "Knorr-Bremse and Bendix offer the same statutory warranty periods for reman as for OE components. The fact is, we have the confidence in our expertise and our machinery to be able to make this sort of pledge."

A steadily expanding portfolio

Knorr-Bremse's portfolio of remanufactured products already contains more than 300 individual article numbers. By 2018 the Company intends to expand its remanufacturing to include most of its entire product range.

Compressors

Electronic braking system modules (EBS)

Electronic air treatment (EAC)

Electronic clutches

Spring-type cylinders (K2 actuators)

Oil separation cartridges (OSC)

Delivering hope to children in Mexico.

Involvement in community projects has long since become a tradition at Bendix, with both local management and the Group providing support – as well as the charitable organization Knorr-Bremse Global Care e. V.

The Mexican city of Acuña lies on the Rio Grande, close to the U.S. border. This fast-growing city is home to almost 200,000 people, as well as to three Bendix manufacturing sites that produce components and systems for the North American commercial vehicle market.

In what is already the fifth such project since 2013, the Acuña plant is supporting the construction of a children's home. Mexico has a large orphan population, mainly due to a high maternal mortality rate and extremely high levels of teenage pregnancies. Poverty and the fear of social exclusion among young mothers mean that large numbers of children grow up without parental care.

Today the Casa de Esperanza (House of Hope) children's home in Acuña looks after 55 children and young people. They are often traumatized by their terrible experiences and in poor health as a result of malnutrition. At the children's home they find a place of refuge, a source of care, and a structure for their daily lives – the basic prerequisites for starting or resuming their education, despite all the difficulties. In 2013, Bendix employees who had long been supporting Casa de Esperanza decided the time had come for a new building to replace the aging children's home. With 450 square meters the old building could house just 27 children and young people, no longer complied with government safety requirements, and could not provide suitable accommodation for children with special needs.

Initially the biggest challenge of all was to meet the construction costs of USD 428,000. This is where Knorr-Bremse Global Care, which supports international aid projects, joins forces with local initiatives at individual sites to great effect. In this case, Bendix Acuña and Global Care were able to contribute a combined USD 278,000 toward the construction costs. Work began in July 2014. The new Casa de Esperanza is a bright and friendly building and with 750 square meters of space it is much larger than its predecessor. The house is equipped with modern bathrooms, study rooms, and space for staff and social workers. The security equipment is state of the art. Bendix employees watched over the construction work and in the summer of 2015 a team of 50 volunteers and their families helped paint the interior of the finished building.

The next project in Acuña is already under way: In May 2015 a violent tornado struck the city, completely destroying many homes. Knorr-Bremse Global Care has undertaken to support the rebuilding effort.

Knorr-Bremse Global Care joins with many Knorr-Bremse sites around the world to help people in need – in this case in conjunction with employees from Bendix.

Detailed information on the work of Knorr-Bremse Global Care can be found in the organization's annual report entitled 'Prospects for people in need'.

Knorr-Bremse Global Care e. V.

Ever since it was first set up in 2005, Global Care has operated on the principle of helping people to take responsibility for themselves and lead more independent lives. The organization supports the long-term development of educational and social infrastructures, but also provides emergency aid in the aftermath of disasters, when a rapid response is required. Since 2013, its main focus has been on two global development issues: vocational education and water.

To achieve effective change, Global Care carefully selects the projects it supports and works closely with local partner organizations to implement them and ensure their long-term continuation. For example, newly built schools and living accommodation are administered and maintained by the local community. And Knorr-Bremse employees act as project sponsors, supporting the partner organizations with their own specialized and personal expertise.

To mark the tenth anniversary of Knorr-Bremse Global Care in 2015, the Knorr-Bremse Group supported the voluntary commitment of its employees at its sites around the world with a one-off donation totaling some EUR 500,000 that benefited more than 220 charitable organizations and initiatives.

10 YEARS GLOBAL CARE 2005 - 2015

Since the organization was first set up

€14,300,000 has been spent supporting

194 projects.

More than **625,000** people

in **52** countries have benefited from the aid projects.

17:00 **19:00** 21:00

Dan is still a couple of hours from home, but he knows he'll get there safely – with technology from Knorr-Bremse.

24 HOURS
WITH KNORR-BREMSE.

The year in figures

€5,831,000,000

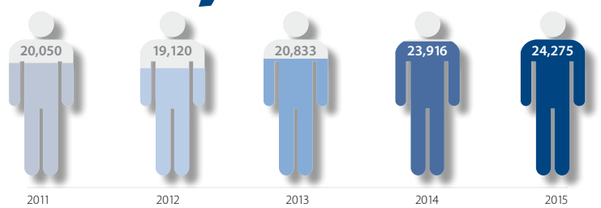
sales

€645,000,000

net income

AS PER DEC. 31, 2015

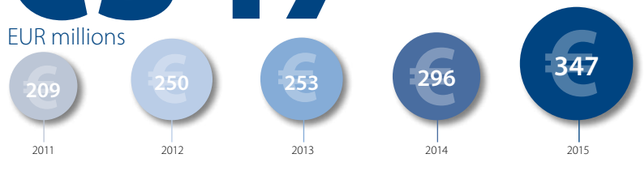
24,275 employees



€5,668,000,000

incoming orders

€347 research & development expenditure



Capital expenditure

€210 million

Combined management report Knorr-Bremse AG and Group

Status and development

The Knorr-Bremse Group can look back on the most successful year in its history. In fiscal 2015 the Company posted sales of EUR 5.83 billion (2014: EUR 5.21 billion), which equates to an increase of 12% against the previous year. Adjusted for foreign exchange effects at actual 2014 rates, sales growth stood at 3.5%. Incoming orders rose 3% to reach EUR 5.67 billion (2014: EUR 5.51 billion). The Rail Vehicle Systems division benefited above all from sales growth in Europe, North and South America, and Asia/Australia, led by rising orders in the freight car and locomotive segments as well as growth in both OE and aftermarket business. The Commercial Vehicle Systems division reported rising sales in three regions: Europe, North America, and Asia/Australia.

About the Group

An overview of the Knorr-Bremse Group

The structure of the Knorr-Bremse Group is based on the regions Europe, North/South America, and Asia/Australia, and the Group's efforts are geared to meeting the specific requirements of these markets and customers. Knorr-Bremse is the world's leading manufacturer of braking systems for rail and commercial vehicles. For more than 110 years the Company has pioneered the development, production, marketing, and servicing of state-of-the-art braking systems. In the rail vehicle systems sector, other lines of business include entrance systems, HVAC systems, control components, windscreen wiper systems, platform screen doors, friction material, simulators, driver assistance systems, power conversion systems, and control technology. The product range in the commercial vehicle systems sector includes complete braking systems with driver assistance systems, as well as torsional vibration dampers and powertrain-related solutions, and transmission control systems for enhanced energy efficiency and fuel economy.

The Group's regional structure is designed to offer globally active customers uniform technical platforms which at the same time take specific local needs into account. It also ensures that customers who operate on a regional basis are supplied with globally proven components and systems.

Business report

General economic and industry-related backdrop

The global economy showed moderate growth in the year under review. The economic recovery in the industrialized nations contrasted with falling growth rates in the developing and emerging economies.

The worldwide market environment for rail vehicles remained stable compared to the prior year. The global commercial vehicle market showed a further downturn in 2015. Truck output increased in the markets of Western Europe, North America, and Japan, with production up by some 77,000 units (+6.6%). In the BRIC countries, by contrast, truck output fell by approximately 239,000 units (-17.0%). The negative market development in China is reflected in the declining output not only in the BRIC countries but also at global level.

Europe/Africa

The rail vehicle market in Europe again remained at its prior-year level. While the market volume was largely unchanged in Germany, France, Spain, and Italy, in Russia numerous project-related call-offs under existing framework agreements were postponed to future years.

Truck production in Europe rose 5.5% in 2015 after falling 9.5% in 2014. The recovery was led by positive developments in Germany, Spain, Italy, and the UK.

North America

Following several years of steady growth, demand for rail vehicles in North America remained stable in 2015. While demand in the rail freight market faded in the second

half-year, demand for rail vehicles in the passenger sector remained stable over the year as a whole.

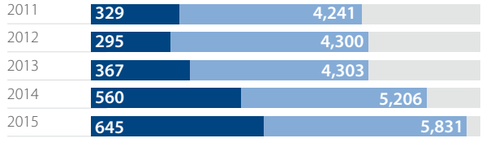
Truck production in North America benefited from the stable development of the U.S. economy in 2015 and showed substantial 7.7% growth (2014: +18.8%).

South America
In the South American rail vehicle sector, demand stagnated at the prior-year level. Against the backdrop of the marked political and economic crisis in Brazil, which also impacted on neighboring countries, no positive impetus was forthcoming.

As in 2014, the year under review brought a further recession-led downturn in truck production in South America. In all, the market showed a 46.6% fall-off year-on-year, after a 28.4% decline in 2014.

Asia/Australia
The rail vehicle markets in Asia/Australia were dominated by demand from the high-speed sector in China. Demand from the mass transit sector continued to increase. Outside China the markets showed stable development.

The commercial vehicle markets in Asia/Australia were in decline in 2014, with truck production a significant 11.8% down on the prior year (2014: -2.7%). In India truck production increased (+44.5%), unlike in Japan (-5.2%) and China (-24.1%), where output fell.



Sales and net income for the Knorr-Bremse Group in EUR millions

Sales
Net income

Development of the Knorr-Bremse Group in 2015

Developments by region and division

Europe/Africa

Rail Vehicle Systems
In the year under review, Knorr-Bremse was again able to maintain its strong market position in Europe by securing important orders.

The passenger concept of the Twindexx double-deck trains from Bombardier Transportation is state of the art, with maximum car configuration flexibility, wheelchair capacity, and access ramps. The same holds true for the braking and entrance systems that Knorr-Bremse is supplying for 102 cars for operator DB Regio Oberbayern. These trains will provide a regional service between Munich and Nuremberg on the Ringzug West route. Knorr-Bremse supplied the initial systems in the year under review.

The national rail operator in the Netherlands, Nederlandse Spoorwegen, is reducing the average age of its fleet with the addition of 118 new trains. The company has placed an order for 50 four-car trains and 68 three-car units based on Spanish manufacturer CAF's Civity platform. Knorr-Bremse won the contract to develop and supply braking and HVAC systems.

During 2017 rail operator Abellio will introduce its first AT200 series regional trains, which are being built by Hitachi Rail. The new trains will be operated by ScotRail on the Edinburgh to Glasgow route. The trains will run in two configurations: 24 four-car trains and 46 three-car units. Knorr-Bremse is responsible for supplying the braking and entrance systems. The Knorr-Bremse systems include EP2002 Distributed Braking Control and the new 'Generation 4' door system from Knorr-Bremse's Austrian subsidiary, IFE.

At 57 kilometers the Gotthard Base Tunnel will be one of the longest railroad tunnels in the world. For its high-speed cross-border link, Swiss rail operator SBB has ordered 29 EC250 trains from Stadler Rail. Knorr-Bremse is the exclusive supplier of braking systems and the train control system from Selectron for what is the manufacturer's first high-speed platform.

The 603 passenger cars being built for Kazakhstan state railroad company Kazakhstan Temir Scholy by Spanish manufacturer Talgo and its Kazakh joint venture Tulpar-Talgo are being equipped with braking and HVAC systems from Knorr-Bremse. The braking systems will comply with the GOST standard applicable in Kazakhstan. The main components have been approved for operation at temperatures as low as -50 °C.

Six metro lines are currently being built in Riyadh, the capital of Saudi Arabia, as part of a major public transport concept. The purchase decision for the metro cars was taken in the year under review. Knorr-Bremse is to supply the bogie equipment and entrance systems for 238 cars being built by Siemens, as well as the complete braking systems for 94 cars from Bombardier Transportation. All components are specially designed for use in a sandy environment.

As part of an extensive modernization project, Budapest Metro has commissioned Russian manufacturer Metrowagonmash to upgrade 37 trains comprising 222 cars. The order for the new entrance systems was placed in 2015 and went to Knorr-Bremse.

Italian railroad operator Trenitalia first introduced its Type ALn 668 and ALn 663 diesel multiple units more than 40 years ago. To help extend the service life of an initial 220 cars, Trenitalia commissioned Knorr-Bremse to upgrade the entrance systems.

Mining company VALE, which operates a stretch of railroad between Mozambique and Malawi in southern Africa, is having new braking systems installed in 289 of its freight cars. Knorr-Bremse has been commissioned to replace the old vacuum brakes with state-of-the-art pneumatic braking systems. The company has opted for the DB60 system, which was specially developed for freight trains. The upgrade is taking place on site at both ends of the line, at Natala in Mozambique and Lembi in Malawi.

Commercial Vehicle Systems
As in past years, in 2015 disc brakes and electronic braking systems were the key sales drivers for the Commercial Vehicle Systems division in Europe. Knorr-Bremse secured its leading market position by concluding a long-term agreement running until 2021 with a major European commercial vehicle builder. The agreement covers electronics and screw-type compressors.

Further agreements were signed with several European commercial vehicle manufacturers for the supply of engine flap valves until 2020 and clutch-type compressors and electro-pneumatic parking brakes until 2022. Numerous agreements governing the supply of brake control systems, wheelend systems, and driver assistance systems promise to deliver additional growth.

In the trailer segment, Knorr-Bremse again scored major successes in 2015. A framework agreement running until 2021 was concluded with JOST governing the supply of foundation brakes for trailers and trailing axles. Two-year agreements were signed with Polish market leader Wielton and Spanish market leader LeciTrailer for the supply of brake control and chassis management systems. Schmitz Cargobull and SAF have successfully introduced the ST7 trailer disc brake, the lightest dual-piston brake caliper on the market. More than 100,000 disc brakes of this type are currently in service.

In a challenging market environment, the aftermarket segment posted an increase in sales, marking a further step in the successful ongoing expansion of the Company's market leadership in the EMEA region. This development is also being supported by the growing remanufacturing business, in which Knorr-Bremse is stepping up its investments. With industrial-scale series production of remanufactured products, Knorr-Bremse offers the operators of older commercial vehicles a low-cost alternative to new genuine replacement parts, which at the same time helps to conserve resources. As well as opening a new central remanufacturing facility in Liberec, Czech Republic, for the first time Knorr-Bremse also showcased its duly expanded portfolio of remanufactured parts at the world's premier remanufacturing event, ReMaTec in Amsterdam.

During the year under review, Alltrucks, a joint venture between Bosch, Knorr-Bremse, and ZF, was able to recruit numerous additional workshops to its network in Germany, Austria, and Switzerland, bringing the number of partner workshops to more than 100.

North America

Rail Vehicle Systems
Business in North America developed positively in 2015; Knorr-Bremse was able to maintain its strong market position by winning some important orders.

The Washington Metropolitan Area Transit Authority commissioned Knorr-Bremse to supply the braking and HVAC systems for an additional 220 cars, bringing the total to 748 cars. Deliveries are slated for completion by October 2018.

In addition, the Los Angeles County Metropolitan Transit Authority took up options 1 and 4 for the equipment of a further 97 light rail vehicles with braking, entrance, and HVAC systems, bringing the total order volume to 175 cars.

Knorr-Bremse also won multiple individual orders covering equipment for light rail vehicles in Dallas and Detroit, locomotives (for SEPTA in Philadelphia and MARC in Maryland), and both light rail vehicles and commuter trains for Massachusetts Bay Transportation Authority.

In the year under review, Knorr-Bremse's U.S. subsidiary New York Air Brake (NYAB) celebrated its 125th anniversary. The launch of the VV1000T oil-free compressor was a success, with more than 200 units being built in only the second year of series production. And the new air supply system for freight cars was rounded off by the introduction of the LD1000 air dryer.

Many of the metro cars in Mexico City were originally built in the late 1960s. Knorr-Bremse subsidiary Knorr Brake Company, based in Westminster, Maryland, USA, is replacing 144 of their air supply units with modern SL22 compressors, both rebuilt and new. The order represents another major overhaul project in Mexico for Knorr-Bremse.

Commercial Vehicle Systems

Knorr-Bremse's North American business is handled by its subsidiary Bendix Commercial Vehicle Systems LLC, Elyria, Ohio (USA) under the Bendix brand. In June of the year under review, Bendix produced its 1 millionth air disc brake, while in August the 1 million milestone came up for a high-performing solenoid valve.

Also in the year under review, Bendix announced the expansion of its own remanufacturing portfolio. The new all-makes product line is focused on remanufactured compressors and comprises 20 of its own components and 100 from other manufacturers. In this way, Bendix is supporting a U.S. government initiative aimed at promoting the use of remanufactured products in public-sector vehicles. Bendix has been remanufacturing air dryers for the commercial vehicle industry for the past 25 years and in the year under review shipped its 1 millionth remanufactured AD-9 dryer. Production of the Bendix M-40 pressure control valve also reached the 1 million unit production milestone in 2015. Following robust, growing sales, the ESP Electronic Stability Program from Bendix surpassed the 400,000 delivery threshold. And at the Mid America Truck Show, Bendix presented its new premium driver assistance system Wingman Fusion, rounding off its state-of-the-art range in this segment.

South America

Rail Vehicle Systems

One major achievement for Knorr-Bremse came in the shape of an order from South America's largest logistics operator, RUMO/ALL. This covers the replacement and upgrading of the current braking systems on a total of 8,500 sugar cane cars. For the most part, this concerns DB60 and DB60-II control valves, as well as slack adjusters and other components that comply with the AAR standard that applies in South America. In addition, Knorr-Bremse is to have exclusive responsibility for maintaining these systems over the next 15 years.

Commercial Vehicle Systems

Owing to the serious economic crisis in the region and with the market in sharp decline, the commercial vehicle manufacturers have cut their output and shelved development projects.

Asia/Australia

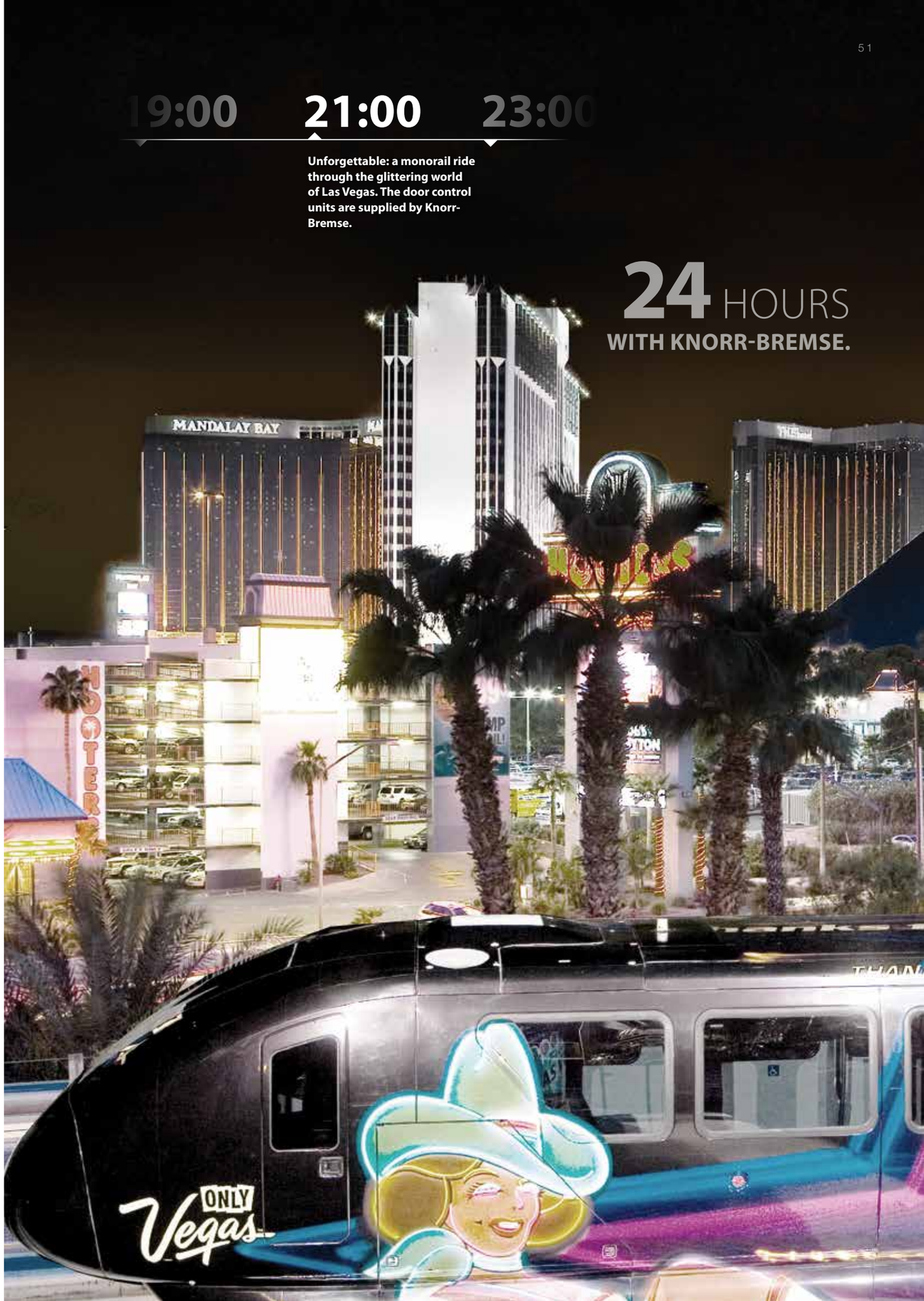
Rail Vehicle Systems

Knorr-Bremse benefited from the expansion of the Chinese high-speed rail network and, as in the previous year, the Rail Vehicle Systems division was able to post sales of over EUR 1 billion in China.

Braking systems from Knorr-Bremse are featured in all Chinese high-speed platforms and in the year under review Knorr-Bremse supplied braking equipment for 521 high-speed trains, as well as a proportion of the entrance and HVAC systems.

In addition, new orders were obtained for a further 344 trains. As a rule, these each comprise eight cars. For the first time ever, orders were also placed for 16-car sleeper trains to travel at speeds of up to 250 km/h.

The locomotive segment was in decline in 2015, clearly reflecting the weaker demand for freight transport. Knorr-Bremse supplied the braking systems for 548 locomotives being built by Chinese manufacturers, CSR Zhuzhou Electric Locomotive and CNR Dalian Locomotive. In the year under review Knorr-Bremse also received new orders concerning 395 locomotives. These include prototypes of five new types of locomotive that should lead to



Unforgettable: a monorail ride through the glittering world of Las Vegas. The door control units are supplied by Knorr-Bremse.

series production orders in the coming years. In all, 1,158 locomotives were ordered in the year under review and Knorr-Bremse was commissioned to supply the braking systems for 395 of them.

The metro segment again showed positive development, benefiting from the continuing market growth of recent years. In 2015, Knorr-Bremse supplied the braking systems for 2,161 metro cars. New orders were obtained for a further 3,350 cars, with four cities ordering vehicles for the first time as the total number of cities with metro systems in China rose to 33.

In the light rail vehicle (LRV) segment, Knorr-Bremse won the order for the first LRV line in Shanghai. The project comprises hydraulic braking systems, HVAC systems, and auxiliary power converters for 30 five-car LRV units.

Knorr-Bremse was able to expand its service business in China substantially compared to the previous year. The fleets equipped with Knorr-Bremse components and systems have now been in service for several years and are increasingly generating business in terms of replacement parts and overhauls.

One highlight of Knorr-Bremse's export business in conjunction with Chinese OEMs was the order to supply 5,500 sets of braking equipment for freight cars in Argentina. Another order from Argentina concerned braking systems from Knorr-Bremse for 100 locomotives.

Rail vehicle builder Sifang ordered braking and HVAC systems from Knorr-Bremse for a major commission covering 93 eight-car metro units as part of the upgrade of the MTRC Hong Kong fleet.

On May 28, 2015 a joint venture agreement was signed with partner company GuoTong. The joint venture is based in the Guangdong Regional Rail Transit Industrial Park in Jiangmen. In the future this is where final assembly and service activities for braking, HVAC, and entrance systems will take place. The government of Guangdong Province has already honored the investment with an order for braking systems for 16 eight-car local mass transit trains.

In Japan, Knorr-Bremse was able to secure further orders for the new Shinkansen generation. Kawasaki Heavy Industries is to equip 364 metro cars for the Thomson Line in Singapore with Knorr-Bremse systems. And in South Korea, Knorr-Bremse received an order for braking systems for 200 cars for Metro Line 2 in Seoul.

With three major orders to the value of some EUR 120 million, Knorr-Bremse was able to maintain its market position in Australia. The Company is supplying braking and HVAC systems for new mass transit trains in Brisbane in the northeast of Australia, new entrance systems for existing trains in Sydney, and state-of-the-art braking systems for iron-ore trains in Western Australia.

Commercial Vehicle Systems

The new joint venture Knorr-Bremse DETC Commercial Vehicle Braking Technology Co., Ltd. began production in the year under review. Initially the joint venture will produce mechanical components and ABS systems, including both conventional brake valves and brake pressure control valves. In the future the product spectrum will embrace the full portfolio of braking systems for medium and heavy-duty trucks, including air supply, brake and transmission control, and exhaust brake components.

Acquisitions, additions, and joint ventures

At the beginning of 2015, Knorr-Bremse acquired Selectron Systems AG, based in Lyss, Switzerland. The company specializes in the development of innovative solutions for the automation, networking, and control of rail vehicles. At the end of January, the Company's former majority shareholding in Westinghouse Platform Screen Doors (Guangzhou) Limited, based in Guangzhou, China, was reduced to a 35% stake. Also in January, to accompany the existing production joint venture in the commercial vehicle sector, the sales joint venture DETC Commercial Vehicle Braking Systems (Shiyan) Co., Ltd., Shiyan, China, was founded with Knorr-Bremse holding a minority (49%) stake. This company is consolidated at equity. Overall, these acquisitions had no substantial effect on the assets, financial status, and profitability of the Knorr-Bremse Group in fiscal 2015.

Quality and processes

In the Knorr Excellence management system that has been rolled out worldwide, Knorr-Bremse has concentrated its initiatives targeting the continuous improvement of its business processes. The focus here is increasingly on digitization, that is to say IT-assisted process organization and execution. One example here is what is known as Function Based System Engineering, or FBSE. FBSE supports reduction of the number of variants, boosts quality, makes for shorter development cycles, and accelerates homologation processes. In the Commercial Vehicle Systems division, one of the benefits of digitization is effective and efficient development collaboration between the various locations. And as part of the continuous improvement of production processes, under the heading of Industry 4.0 Knorr-Bremse is investigating the potential scope for greater efficiency resulting from additional opportunities for data networking and analysis.

Internal quality audits and assessments conducted worldwide examine and enhance the implementation of the quality management system. This was confirmed in the course of external IRIS and ISO/TS 16949 certification audits. In the year under review, the Commercial Vehicle Systems sites in Nizhny Novgorod, Russia, were certified to ISO/TS 16949, while the Rail Vehicle Systems sites in Wolverton and Springburn in the UK and in Tver in Russia were certified to ISO 9001. Knorr-Bremse RailServices in Burton, UK, and the Technology Center in Pune, India, were re-certified in line with IRIS.

At the Rail Vehicle Systems division, the focus was on reducing the cost of quality. Together with a raft of improvement measures along the entire value chain, even stricter cost control and quality management, as well as heightened cost awareness led to a further substantial 20% reduction in the cost of quality compared to fiscal 2014. At the same time, a long-term quality improvement project by the name of Q-Vadis 2020 was launched. The aim here is to anchor preventive quality management within the business processes. This initiative is built around process optimization in four key areas: problem-solving, design- and project management, supplier management, and production.

In the Commercial Vehicle Systems division a database-based tool for the product creation process was successfully introduced, while the integration of test and requirement management was concluded. One new aspect was the definition and implementation of a remanufacturing process for the aftermarket sector. The systematic improvement of warranty processes and the application of a field evaluation tool made for greater transparency of shipped quality. Statistical methods of process capability analysis and measuring system analysis were enhanced and deployed. The division also boosted awareness of product safety management through intensive training courses and workflow-related or in-process coaching.

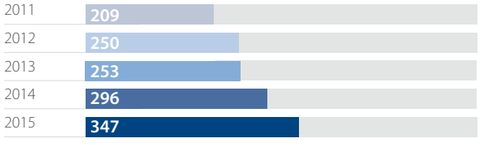
In 2015 various activities were again launched within the Quality First initiative, aimed at improving product quality, boosting process efficiency, continuing employee development, and increasing customer satisfaction. Six Sigma training courses and projects were staged and led to a rise in process efficiency. Across both divisions the Company staged Supplier Days in an intensive effort to integrate suppliers more firmly into the ongoing quality program.

Research and development

Knorr-Bremse continued to drive forward its research and development efforts in the year under review in close collaboration with its customers. Total expenditure on research and development and customer-specific development modifications amounted to EUR 347.3 million in 2015 (2014: EUR 295.5 million), which equates to 6.0% (2014: 5.7%) of consolidated sales.

As the global technology leader in the fields of braking systems for rail and commercial vehicles, Knorr-Bremse develops innovative products distinguished by their safety, high quality, reliability, and customer benefits. This applies in equal measure to the other fields covered by the product portfolios of the two divisions, Rail Vehicle Systems (entrance systems, HVAC systems, driver assistance systems, driving simulators, control components, platform screen doors, friction materials, power conversion systems, and control technology) and Commercial Vehicle Systems (driver assistance systems, torsional vibration dampers, and other powertrain-related components, such as engine air-intake and transmission control systems).

The construction of a new Test and Development Center at the Munich site represents the next step in the Company's extensive worldwide program of investment in the modernization of its production equipment and facilities, as well as in the expansion of its research and development capacities. With more than 100 different test rigs and dynamometers the new Test and Development Center offers unparalleled conditions for the development and testing of innovative braking systems for the rail and commercial vehicle markets. From 2016 onward 350 engineers and technicians from both divisions will be able to pursue interdisciplinary development work here on future technologies that will bring a further in-



Consolidated research and development expenditure in EUR millions

crease in customer benefits and strengthen the Company's competitiveness.

In the year under review the Rail Vehicle Systems division presented its pioneering portfolio of climate-compatible solutions on Deutsche Bahn's special "Train to Paris," heading for the 21st UN Climate Change Conference in the French capital. With these products, the railroads – already a resource-efficient mode of transport – can operate even more energy-efficiently, thereby helping to protect the climate. The portfolio includes modern, energy-optimized HVAC systems from Merak and Sigma, both subsidiaries of Knorr-Bremse, as well as the driver assistance system iCOM Assist that helps drivers operate their trains as energy-efficiently as possible, achieving a substantial reduction in absolute energy consumption. The energy metering system iCOM Meter, which was also on show, registers and records the actual energy consumption of the train in real time. This enables railroad operators to check their electricity bills precisely and provides them with valuable information to help identify further potential energy savings.

Since 2014, Knorr-Bremse Rail Vehicle Systems and DB Schenker Rail have been testing the iCOM Assist (formerly LEADER) system in actual rail freight operations. A comparison shows that use of the driver assistance system not only cuts CO_2 emissions but also leads to a marked reduction in absolute energy consumption in train operation. The system thus makes a valuable contribution toward reducing the environmental footprint of rail freight operations and improving their competitiveness. iCOM Assist goes into regular service in 300 DB Schenker locomotives in January 2016.

Knorr-Bremse is making a further contribution to the promotion of rail freight through a marked reduction in noise levels in collaboration with TIS (Technischer Innovationskreis Schienengüterverkehr – Technical Innovation Group Rail Freight), SBB Cargo, and the Swiss Federal Office of Transport (BAV). Together they have configured a train with bogies, wheel sets, and braking systems from several different manufacturers in such a way that the measurements they aim to conduct will enable them to compute an optimum solution for noise reduction. The outcome is expected to greatly enhance public acceptance of rail transport.

The hydraulics business segment and the iCOM product team have together executed the first pilot installation of iCOM Monitor in light rail vehicles operated by the Berlin mass transit authority BVG. iCOM Monitor conducts preventive diagnostics for the early identification of wear and damage to bring about a substantial reduction in downtimes and unexpected train failures. The recording and analysis of field data is a significant step toward enabling condition-based maintenance (CBM).

Together with the German Railway Industry Association (VDB), Deutsche Bahn has created what it calls the Quality Partnership. As a member of the VDB, Knorr-Bremse played a key part here in providing the rail sector – not only in Germany – with an exemplary means of quality control, covering everything from initial specification to customer satisfaction.

In the Commercial Vehicle Systems division, the focus of development activities was on the start of series production for the Autonomous Emergency Brake System (AEBS) and the Lane Departure Warning System (LDWS) that became mandatory in new commercial vehicles across Europe in the fall of 2015. In addition, the innovative GSBC brake control system concept that will enable the modular merging of current ABS and EBS systems from 2018 and lay the foundations for a global, scalable braking system was first presented to customers with great success.

In the field of air supply, the emphasis was on the development of a single-cylinder compressor with an aluminum casing that makes it possible to reduce the weight of the compressor by around 40%. In addition, development of a new Energy Saving System (ESS) with a marked reduction in energy uptake and oil contamination was driven forward in order to start series production in 2016. Work also continued on the enhancement of the screw-type compressor for hybrid and electric buses. The low-noise operation of this compressor makes it predestined for use in vehicles with electric drive. To cut fuel consumption, recuperated brake energy can also be used to drive the compressor. In the air treatment sector, the focus in 2015 was on an additional application for the electronic parking brake and on creation of a concept of a modular, scalable air treatment system.

Along with development of the new Synact disc brake, refinements to brake component functionalities in the interests of fuel economy or to facilitate automated driving were high on the R&D agenda. New brake disc concepts that support the integrated wheelend approach are also under development. In the powertrain sector the focus was on boosting the efficiency of products in the areas upstream (intake) and downstream (exhaust) of the engine, as well as on new clutch and transmission control concepts for the BRIC countries.

Sustainability and social responsibility

Sustainability represents an important component of Knorr-Bremse's business model. The Company combines the creation of long-term economic value with ecological and social responsibility. To live up to this responsibility, Knorr-Bremse has defined its principles of sustainable development in a Corporate Responsibility Policy and sets annual priorities.

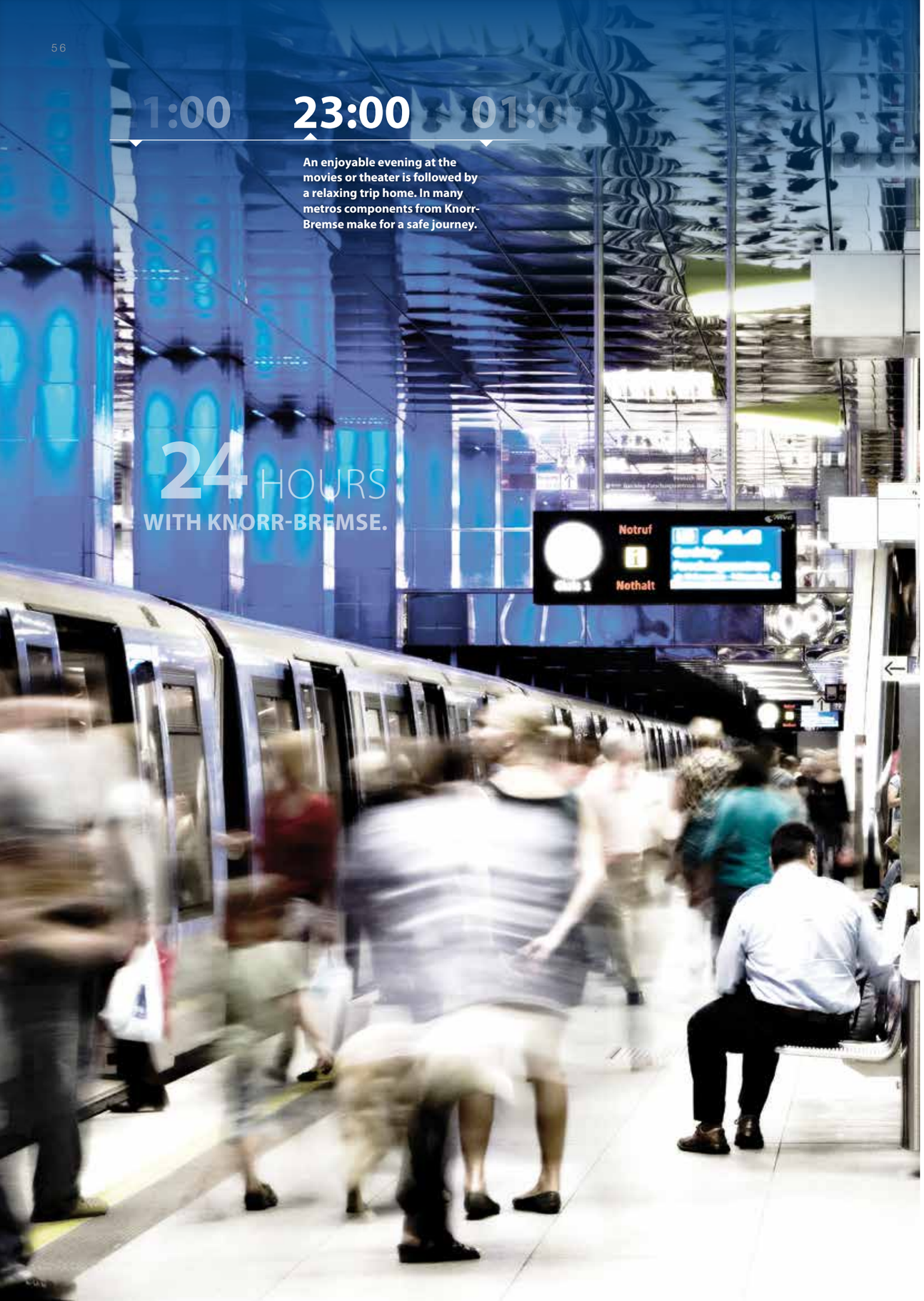
Knorr-Bremse is aiming to anchor the basic principle of sustainable development more firmly within its long-term strategic direction. To this end, the Company constantly analyzes how its products help customers make mobility more future-proof, safer, and more environmentally compatible. The anticipated environmental impacts of a product are analyzed at the earliest stages of the development process. Life cycle assessments that cover the entire value chain provide Knorr-Bremse with valuable findings concerning the use of material and resources at the production stage and environmental compatibility during the use phase.

Knorr-Bremse expects its suppliers to comply with minimum ecological and social standards and has laid down appropriate sustainability requirements. At the beginning of 2015, together with other rail industry companies (Alstom, Bombardier Transportation, Deutsche Bahn, Nederlandse Spoorwegen, and SNCF) Knorr-Bremse founded an initiative by the name of Railsponsible. The aim of this initiative is to promote sustainable procurement strategies along the entire value chain. One key module is the uniform appraisal of suppliers' sustainability performance. In the year under review, Knorr-Bremse called upon 160 key suppliers in the rail industry to take part in a sustainability appraisal. By the end of 2015, some 20% of these suppliers had been duly assessed. The aim is to flow the findings into the supplier selection process.

At the same time, in the Commercial Vehicle Systems division more than 50% of suppliers have signed a quality management agreement (QMPP) which among other things includes binding compliance with the UN Global Compact.

With the reduction of energy and resource consumption becoming increasingly important from both economic and ecological perspectives, in both the Rail Vehicle and Commercial Vehicle sectors Knorr-Bremse is investing in the remanufacturing of used components. Despite the cost and effort involved in returning, disassembling, cleaning, and inspecting these components for industrial-scale reconditioning, the benefits for the environment are substantial. Compared to production of a new component, remanufacturing in this way can cut carbon dioxide emissions by as much as 75%.

As a globally active group of companies, Knorr-Bremse bears its share of responsibility for the quality of life in society around the world. In response, the Company demonstrates social engagement at both local and global level. As in previous years, in 2015 Knorr-Bremse supported the charitable organization Knorr-Bremse Global Care. The organization's projects open up new prospects for people in need and are based on the principle of helping them to help themselves. Knorr-Bremse Global Care was founded at the beginning of 2005 in response to the tsunami disaster in Southeast Asia to provide unbureaucratic and effective help to the victims. In the year under review 54 aid projects were realized in a total of 28 countries on four continents. In most cases the projects are supervised on a voluntary basis and with great dedication by Knorr-Bremse employees. In 2015, by providing EUR 2.06 million in funding, Knorr-Bremse Global Care reached out to help more than 120,000 people. To mark the tenth anniversary of Knorr-Bremse Global Care, in 2015 the Company also promoted the voluntary activities of employees at all of its plants around the world through a major one-off campaign. A total of EUR 500,000 was made available to support more than 220 projects and initiatives in which employees demonstrated social engagement.



Assets, financial status, and profitability

Profitability

At EUR 5,830.6 million, in the year under review consolidated sales were 12.0% up on the prior-year level (2014: EUR 5,206.0 million), outperforming the forecasts for 2015 by a clear margin. Adjusted for foreign exchange effects at actual 2014 rates, sales growth totaled 3.5%. In Europe/Africa, sales climbed 6.7% to EUR 2,617.8 million (2014: EUR 2,454.4 million), which corresponds to 44.9% of the consolidated total (2014: 47.1%). In the Americas, sales increased 23.1% to EUR 1,432.7 million (2014: EUR 1,163.6 million), contributing 24.6% (2014: 22.4%) to the consolidated total. In the Asia/Australia region, sales rose 12.1% to EUR 1,780.1 million (2014: EUR 1,587.9 million), which equates to 30.5% (2014: 30.5%) of the consolidated total.

The Rail Vehicle Systems division was able to increase sales to EUR 3,341.1 million (2014: EUR 2,982.0 million). The Commercial Vehicle Systems division also posted an upturn in sales in the year under review, with revenues totaling EUR 2,491.8 million (2014: EUR 2,227.7 million).

Incoming orders were valued at EUR 5,668.3 million (2014: EUR 5,509.9 million), 2.9% up on the previous year. Orders on the books at the Knorr-Bremse Group fell 1.5% in the year under review to EUR 3,823.7 million (2014: EUR 3,882.3 million).

Net income for the Knorr-Bremse Group moved ahead in the year under review to EUR 644.8 million (2014: EUR 560.0 million), outperforming the forecast for 2015 by a clear margin. Net return on sales reached 11.1% (2014: 10.8%). The European region contributed EUR 228.9 million to net income, corresponding to a net return on sales of 8.7%. Net income from the Americas totaled EUR 143.8 million, with a net return on sales of 10.0%. The Asia/Australia region posted net income of EUR 272.1 million, which equates to a net return on sales of 15.3%.

Assets

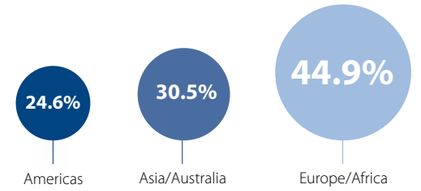
The consolidated balance sheet total rose 13.0% in 2015 to EUR 4,001.9 million (2014: EUR 3,543.0 million). At year-end 2015, total assets represented 68.6% of sales. As a proportion of the balance sheet total, intangibles, fixed assets, and investments were up from 25.4% in the prior year to 26.0%. Working capital, defined as the sum of inventories and accounts receivable, minus accounts payable trade, stood at EUR 669.4 million at year-end (2014: EUR 692.6 million) or 41 days' sales (2014: 48 days), although the forecasts for 2015 were slightly higher. The equity ratio rose by 2.7 percentage points from 40.7% to 43.4%. Of the Group's total assets, 49.6% are tied up in the European region (2014: 51.0%), 17.8% in the Americas (2014: 19.5%), and 32.6% in the Asia/Australia region (2014: 29.5%).

Financial status

The increase in net liquidity, defined as the balance of liquid funds and liabilities to financial institutions, to EUR 1,199.5 million (2014: EUR 944.2 million) was primarily achieved by the positive balance of inflow of funds from operating activities in the amount of EUR 918.0 million and outflow of funds to investments in the amount of EUR 210.2 million, and disbursements to company owners and minority shareholders in the amount of EUR 396.0 million. The forecast for 2015 was outperformed here by a clear margin.

In 2015, the Knorr-Bremse Group's investments in fixed and intangible assets totaled EUR 210.2 million and were up by 30.9% compared to the previous year, outperforming the forecasts for 2015. At EUR 128.1 million, 61.0% of the Company's capital expenditure was invested in Europe. EUR 42.8 million (20.3%) was invested in the Americas and EUR 39.3 million (18.7%) in Asia/Australia. In 2015, investment activity focused primarily on property and equipment for the Test and Development Center in Munich (Germany), as well as on machinery and property in South Africa to strengthen the market position in the Rail Vehicle Systems sector. Replacement investments were also undertaken. Broken down by division, the allocation of capital expenditure was such that the Rail Vehicle Systems division benefited in the amount of EUR 117.6 million (2014: EUR 93.7 million) and the Commercial Vehicle Systems division in the amount of EUR 81.1 million (2014: EUR 57.7 million).

Depreciation on intangible and fixed assets increased across the Group, rising from EUR 169.1 million in 2014 to EUR 198.9 million in the year under review. With

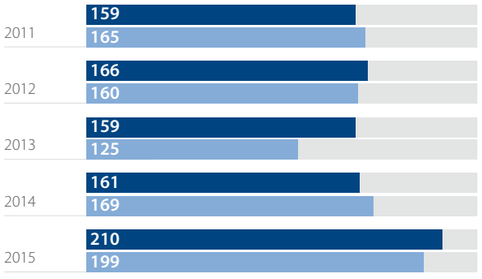


Consolidated sales by region

EUR 140.9 million, Europe accounted for the largest share of depreciation, followed by the Americas with EUR 35.1 million and Asia/Australia with EUR 22.9 million. A breakdown of depreciation by division shows that the larger proportion of EUR 121.0 million was accounted for by the Rail Vehicle Systems division, while depreciation at the Commercial Vehicle Systems division amounted to EUR 68.4 million. The ratio of net liquidity to shareholders' equity stood at 69.1%, compared to 65.4% in 2014.

The Group has committed credit facilities in place in the amount of EUR 1.2 billion, of which EUR 0.8 billion remained untapped in the year under review. Due dates and interest rates for the liabilities are in line with the market.

Two external agencies have been rating the Knorr-Bremse Group's activities since 2000. The ratings have been of investment grade status from the outset and they have improved continuously over time. Since 2011, Moody's has rated the Group "A3/Outlook stable," while Standard & Poor's has rated Knorr-Bremse "A-/Outlook stable" since 2010. Both agencies confirmed their prior-year ratings in 2015, honoring in particular the ongoing positive development of the Group's business and its robust strategic positioning, its strong competitive position, and its conservative financial policy.



Consolidated capital expenditure and depreciation in EUR millions

Capital expenditure
Depreciation

Overall assessment of the economic position of the Group

Within the general economic environment described above, the Knorr-Bremse Group improved its overall position with regard to its assets and financial status, and was able to further optimize its liquidity position. The Group's profitability was ensured by rigorous cost management and by further improvements to internal processes and structures.

With an equity ratio of 43.4% and net liquidity of EUR 1,199.5 million, the structure of the Group's assets is extremely stable. In sum, the Executive Board confirms that the representation of the Group's assets, financial status, and profitability presents an accurate overall picture of the Group on December 31, 2015.

Development of Knorr-Bremse AG in fiscal 2015

As the parent company, Knorr-Bremse AG performs the role of service provider and holding company, as well as a strategic management function on the operational side. Rising income from investments in associated and related companies, resulting from positive development in the regions Europe, the Americas, and Asia/Australia, meant that income before taxation increased to EUR 485.7 million in the year under review (2014: EUR 463.5 million). At EUR 447.6 million (2014: EUR 433.1 million), income from investments in associated and related companies was in line with forecasts for 2015.

Along with interests in affiliated companies, the balance sheet of Knorr-Bremse AG largely reflects receivables from and payables to Group companies. These are centrally administered, partly within the framework of a cash-pooling process managed by Knorr-Bremse AG.

Knorr-Bremse AG acts as an in-house bank for its subsidiaries around the world. This includes handling the central hedging of market price risks. The subsidiaries contract their hedging transactions with Knorr-Bremse AG, which in turn hedges part or all of the net residual risk for the Group with external banks.

With the aid of global process standardization and transparency, achieved through Knorr Excellence, Knorr-Bremse AG is able to efficiently control its own business and that of the associated and related companies.

Appropriation of retained earnings

Knorr-Bremse AG posted unappropriated retained earnings of EUR 618.3 million in fiscal 2015 (2014: EUR 490.8 million). The Annual Shareholders' Meeting will be asked to approve the proposal that an amount of EUR 364.0 million from these unappropriated retained earnings be used to pay a dividend of EUR 140 (2014: EUR 120) per dividend-bearing share with a par value of EUR 26, with the balance to be carried forward to new account.

Relations with affiliated companies

KB Holding GmbH, Grünwald, Germany, directly holds more than half the share capital of Knorr-Bremse AG. Pursuant to Section 312 German Corporation Law (AktG), a report on relations with affiliated companies has been drawn up which includes the following statement: "No transactions subject to reporting took place in the 2015 financial year." The report was verified by the Auditors and received their unqualified opinion.

Non-financial performance indicators

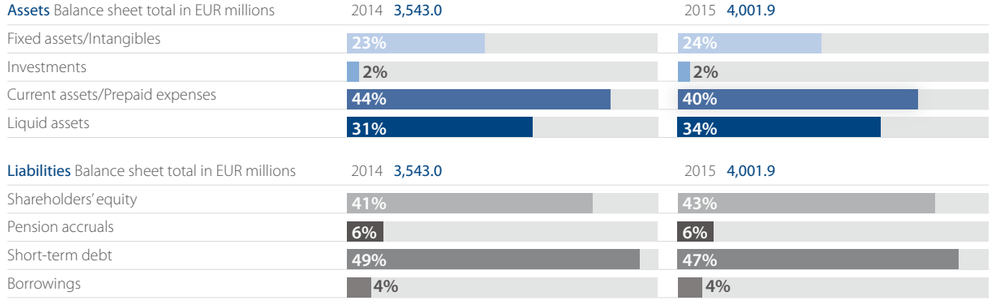
Human Resources

At year-end 2015, the Knorr-Bremse Group employed a total of 24,275 persons (21,783 excluding HR leasing). This equates to a year-on-year increase of 1.5% (4.3% excl. HR leasing) and was in line with the expectations for fiscal 2015.

In the European region, there were 12,858 employees on the payroll at year-end 2015 (11,950 excl. HR leasing) compared to 12,578 at the end of 2014 (11,498 excl. HR leasing). At the same time, the proportion of the Group workforce employed in Europe showed a slight increase, from 52.6% in 2014 to 53.0% in 2015. The workforce in Germany totaled 4,742 employees (4,416 excl. HR leasing), down from 4,846 in 2014 (4,427 excl. HR leasing).

The number of employees in the Americas fell in 2015, reaching 4,797 at year-end (4,644 excl. HR leasing), compared to 5,058 in 2014 (4,731 excl. HR leasing). The proportion of the Group workforce in the Americas stood at 19.7% (2014: 21.1%).

In Asia/Australia, the size of the workforce increased from 6,280 in 2014 (4,657 excl. HR leasing) to 6,620 in 2015 (5,189 excl. HR leasing). The proportion of the total headcount employed in the region rose from 26.3% in 2014 to 27.3% in 2015.



Structure of assets, liabilities, and finances of the Knorr-Bremse Group

In the Rail Vehicle Systems division, the number of employees rose from 14,484 in the previous year (12,116 excl. HR leasing) to 14,502 at year-end 2015 (12,600 excl. HR leasing). In the Commercial Vehicle Systems division too, the headcount rose from 9,012 employees in 2014 (8,358 excl. HR leasing) to 9,320 at year-end 2015 (8,734 excl. HR leasing). The holding companies employed an additional 453 staff (449 excl. HR leasing) compared to 420 employees (412 excl. HR leasing) in the previous year.

Knorr-Bremse would like to thank all of its employees for their commitment and hard work in 2015. Thanks also go to the employee representatives for their constructive collaboration.

Target quotas for the Company

In March 2015 a law was passed in Germany to ensure that men and women have an equal share of top management positions in industry and administrations. It obliges employers to give greater consideration to the underrepresented gender – usually women. Stock exchange-listed companies, and enterprises subject to co-determination regulations, have to establish their own flexible women's quotas for their executive board, supervisory board, and upper and middle management, and report on progress.

Knorr-Bremse supports the intention of this legislation to increase the proportion of women in top management positions. Moreover, in view of current demographic developments and the potential shortage of skilled workers, particularly in technical occupations, it is also important for the Company to recruit more well-trained and highly qualified women. Appropriate initiatives and programs already exist – one example being a trainee program specifically designed for young female recruits. At Knorr-Bremse the scope for balancing family and professional life has also been increased by the introduction of flexible working time models and tele-working.

However, increasing the proportion of women in management positions takes time. As Knorr-Bremse is a technology company operating in the B2B sector, it is mainly male applicants who perceive it to be an attractive place to work. Many management positions at Knorr-Bremse also call for technical training – in which women are still underrepresented. As a result, in some non-technical areas the proportion of women in management positions at Knorr-Bremse is substantially higher than in technical areas. While women account for a share of 11% of management positions across all areas of the Group worldwide, the proportion of women managers in non-technical areas such as Human Resources, Financial Controlling, and Purchasing stands at 32.5%. For Knorr-Bremse, the decisive recruitment criteria, regardless of gender, are the qualifications, track record, and personality of the respective candidates. From 2016 onward, however, Knorr-Bremse will be developing and implementing additional targeted programs and measures with the declared aim of increasing the proportion of women in management roles.

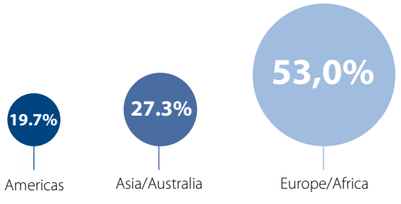
For the above reasons, in compliance with the legal requirements, Knorr-Bremse has laid down the following target quotas:

Knorr-Bremse AG: Supervisory Board and Executive Board 0%, both set by the Supervisory Board of Knorr-Bremse AG; Management Level II 15.4% and Management Level III 0%, both set by the Executive Board of Knorr-Bremse AG.

Knorr-Bremse Systeme für Schienenfahrzeuge GmbH: Supervisory Board and Executive Board 0%, both set by the shareholder; Management Level II 0% and Management Level III 5.9%, both set by the Executive Board.

Knorr-Bremse Systeme für Nutzfahrzeuge GmbH: Supervisory Board 12.5% and Executive Board 0%, both set by the shareholder; Management Level II 0% and Management Level III 5.1%, both set by the Executive Board.

Group workforce on Dec. 31, 2015



Group workforce by region on Dec. 31, 2015

Report on risks and opportunities

Risk management system

The Knorr-Bremse Group uses an established, multi-stage, worldwide planning, reporting, and controlling system in order to identify risks early on and be able to generate an appropriate response. Standard reporting periods and report contents have been defined across the Group. These formal reports are supplemented in greater depth by presentations on routine and special subjects at monthly review meetings.

In addition, there is a standardized risk management reporting system at top management level. This is based on a risk report that is regularly discussed by top management and the Executive Board, who determine the respective category and level of risk as well as the probability of the risk materializing, and define concrete measures.

This interplay of a risk management system anchored within the organization and strategic reporting has proven its worth over time. Knorr-Bremse thus has a reliable network in place for the early identification and remediation of potentially undesirable developments.

The findings of this risk assessment and management are also flowed into description, documenting, and continuous improvement of business processes within the Knorr Excellence model.

Business risks

Every entrepreneurial activity involves an element of risk. This is particularly the case for a globally active corporate group, as regional markets are subject to different and very irregular cycles. This can lead to market volatility or fluctuating growth affecting individual suppliers, market segments, or entire regions. The global rail and commercial vehicle markets are subject to this volatility, which means that Knorr-Bremse is operating in a fundamentally high-risk environment within the global economy.

The year under review was marked by a lack of stability in the development of the global economy. Among the drivers of this development were the highly volatile price of oil, a drop in Russian investment activity, and stagnant or shrinking economies in Asian and South American markets, with the Brazilian economy in particular hard hit by inflation and the troubled social and political situation. In addition, the economic crises in multiple Mediterranean countries and geopolitical conflicts in the Middle East and North Africa, with the resultant migration trends, destabilized the global economy, as did terrorist attacks. Political conflicts in Eastern Europe put the development of business in the Russian market at risk. In order to minimize and/or anticipate risks affecting its sales, the Group carefully monitored the economic development of the individual countries and regions, as well as the worldwide trade flows. At the same time, Knorr-Bremse's international presence rendered the Group largely immune to risks that are restricted to an individual region.

Knorr-Bremse operates in increasingly competitive markets, putting price stability at risk. A macroeconomic environment marked by uncertainty involves the risk that customer creditworthiness could fall, receivables outstanding could be lost and/or payments delayed. In the year under review, Knorr-Bremse was able to counter this risk successfully through effective receivables management.

A further risk for Knorr-Bremse results from its dynamic growth in recent years. In the course of this process, a number of companies or shareholdings had to be integrated into the Group. The financial and cultural risks associated with such integration processes were effectively minimized through the systematic analysis and assessment of the target companies. Knorr-Bremse's experience in successfully overcoming cultural barriers has been mapped in the form of structured processes, so that it can be utilized in future acquisitions and joint ventures in which the Company holds a majority stake.

Knorr-Bremse and its products and solutions are at the leading edge of technological development. This also engenders risks which, because of the safety-critical nature of the applications concerned, require particularly careful monitoring. To this end, Knorr-Bremse routinely employs comprehensive quality planning, quality assurance, and testing procedures. To ensure continuous improvement of its business processes, Knorr-Bremse takes its lead from international standards. The individual plants regularly undergo internal and external audits in this context. Both divisions work intensively and continuously to further improve the exceptionally high quality and safety level of their products.

Operational risks

For Knorr-Bremse, an operational risk is defined as the risk of incurring a financial loss due to procedural, technical, or human error. As there is clearly no means of entirely eliminating these risks, in the year under review the Group duly found itself confronted with operational risks.

Owing to the risk of delayed deliveries from suppliers, quality defects in the parts supplied, or supplier insolvency, Knorr-Bremse is exposed to the latent risk of lost production time, with a negative impact on profitability. In the year under review the Company was able to minimize this risk effectively through comprehensive supply chain management. This is founded upon careful supplier selection procedures and continuous technical and commercial supplier audits.

Another risk results from the possibility of unforeseen shifts in capacity. Flexible working hour models means that Knorr-Bremse was well prepared to counter this risk. If necessary these could have been deployed in an efficient response to shifts in capacity.

Given the dynamic development of the markets and regions of the world, Knorr-Bremse is constantly confronted with the challenge of relocating development and production capacities from one Group site to another, in order to respond flexibly to changing market and customer requirements.

In this context, development plans for the Munich site envision the expansion of the overarching systems competence located there, while at the same time relocating production, assembly, and production-related services of the Rail Vehicle Systems division to other sites, in order to boost local presence in growth markets and increase customer proximity. Inherent to these relocations is the risk of not being able to rapidly ensure the customary level of quality at the other sites. Knorr-Bremse is countering this risk through an extensive program of employee training.

Warranty risks for products already supplied are another ongoing consideration. If Knorr-Bremse is under contractual obligation to compensate the customer for damage or loss, this can have substantial financial consequences. In the year under review, Knorr-Bremse successfully kept these risks under control through systematic contract management.

Exchange rate risk is not of crucial importance for the Knorr-Bremse Group because geographic diversification over recent years has enabled the Group to establish a high proportion of local manufacturing and local suppliers within the respective currency zones. In order to limit the residual exchange rate risk related to transactions across different currency zones, Knorr-Bremse is increasingly identifying opportunities to exploit compensatory supply volumes within the Group. In selected cases, currency risks are hedged by means of derivatives. Such measures, however, serve exclusively to hedge basic transactions within the scope of normal business operations.

The basis for managing foreign exchange risks is provided by the Guideline on Managing Currency Exposure in the Knorr-Bremse Group, which sets out the procedures to be followed and the necessary scope of hedging transactions in binding form for all Group companies. The monitoring of compliance with this guideline is part of the relevant process. The risk of fluctuations in the price of commodities that are of relevance to Knorr-Bremse is also hedged to an appropriate extent by means of derivatives, insofar as these fluctuations could have a substantial impact on the Group's profitability.

In a globally networked business community a constantly updated and powerful IT landscape is a decisive factor in avoiding inefficient business processes and the resultant risk of losses. Consequently, in 2015 Knorr-Bremse attached great importance to harmonization of the hardware and software architecture, the integrity and security of existing data, appropriate back-up solutions, and careful management of access control. Compliance with the IT Security Guideline is comprehensively monitored with the aid of internal and external audits at many sites around the world. In this way, the necessary global transparency and the integration of all new sites are being further enhanced.

Another risk concerns possible failure to comply with increasingly stringent environmental requirements. To prevent this happening, Knorr-Bremse has aligned its worldwide activities with the international standard ISO 14001. The majority of the Company's sites around the world have already been certified or recertified accordingly.

The risk of exposure to financial losses as a result of imitation and counterfeit products persisted in 2015. In Asia in particular this remains a threat to business in the rail vehicle and commercial vehicle sectors. Knorr-Bremse counters this threat with its technical excellence and quality, which are recognized and duly appreciated by customers around the world.

In the high-tech environment in which Knorr-Bremse's products are used, there is a risk that products will reach their physical limits. By focusing on high quality in the research, development, and production sectors as well as on its comprehensive materials expertise and inspection technology, in the year under review Knorr-Bremse ensured that customers across the globe could rely on Knorr-Bremse products.

As a globally active enterprise, Knorr-Bremse operates in countries with complex fiscal regulations that are open to multiple interpretations. Future interpretations and/or changes in taxation systems could influence the Company's business, assets, financial status, and profitability. Knorr-Bremse is regularly inspected by the tax authorities in various jurisdictions and the Company identifies and assesses the relevant risks on an ongoing basis.

In sum, Knorr-Bremse was able to minimize the various operational risks in the year under review by means of comprehensive controlling and reporting systems. These will be duly continued and, where necessary, expanded.

Opportunities

The multi-stage, worldwide planning, reporting, and controlling system established at Knorr-Bremse identifies not only risks but also opportunities for the various business areas. Thus the Group was quick to recognize an incipient upward trend in investments in infrastructure measures and positioned itself accordingly. Knorr-Bremse benefited from the weakening of the euro against the U.S. dollar through improved sales opportunities compared to competitors outside the euro zone.

In general terms, Knorr-Bremse identified additional sales opportunities as a result of the continuing rise in worldwide transportation volumes in 2015. This led to investments in rail vehicles and commercial vehicles, which generated new business for Knorr-Bremse. The sustained low price of oil favored this development.

Targeted acquisitions and the establishment of joint ventures result in opportunities to enhance Knorr-Bremse's market position and expand its portfolio of products and services along the entire value chain. With this in mind, Knorr-Bremse continuously monitors current and future markets to identify suitable partners.

Knorr-Bremse invests in new technologies across a broad front in order to build on its technology leadership and thereby safeguard existing sales markets and access new ones. Increasing demand for high-quality technology in emerging countries leads to additional sales opportunities for the Company. Further growth potential for Knorr-Bremse results from revised regulatory requirements in its markets.

Within the framework of Knorr-Excellence, Knorr-Bremse works constantly to identify additional potential for cost cutting and process improvement, in order to further enhance the competitiveness of the Company's products and services.

General statement on the risk and opportunity situation

Careful analysis of the Group-wide risk profile has revealed that no identifiable risks exist that would threaten the survival of the Company or have a substantial impact on its assets, financial status, or profitability. Nor are any such risks currently expected to arise in the future.

Follow-up report

Effective January 1, 2016, through its subsidiary Microelettrica Power Pty. Ltd., Johannesburg, South Africa, Knorr-Bremse acquired a 60% stake in Semikron (Pty.) Ltd., Johannesburg, South Africa (since renamed Semiconductor Solutions (Pty.) Ltd., Johannesburg, South Africa). In addition, with effect from February 1, 2016, the Rail Vehicle Systems division acquired the brake pad specialist TMD Friction Group. Above and beyond this, no events with a material influence upon the assets, financial status, or profitability of the Knorr-Bremse Group have taken place since the balance-sheet date.

Outlook

For fiscal 2016, Knorr-Bremse is anticipating a highly volatile market environment, with the regional markets being impacted by great uncertainties. These include geopolitical uncertainties in various regions, economic crises in emerging countries, a decline in investment activity in certain parts of the world, and the development of the Chinese economy. Other factors include shifts in commodity prices and in the price of crude oil in particular, and the performance of the euro and the U.S. dollar.

In general, Knorr-Bremse expects to see a further slowdown in global economic growth. In terms of gross domestic product, Knorr-Bremse is reckoning with negative growth for Brazil and Russia, and with a sharp decline in the pace of growth in China. The expectation is that the transition from China being an export-driven economy to filling domestic demand could lead to turbulence, particularly in emerging nations. In Japan, Knorr-Bremse expects to see moderate market growth in the next few years, driven by anticipated modest growth in rail-borne mass transit and mainline traffic, as well as a similarly slight increase in local truck production. For Europe, India, and the USA, Knorr-Bremse is expecting positive but very slow economic growth.

For the Rail Vehicle Systems division, Knorr-Bremse is forecasting largely stable development of the OE market in all regions, accompanied by growth in the RailServices segment. The market looks set to be dominated by consolidation, as vehicle builders increasingly target growth through acquisitions.

For the Commercial Vehicle Systems division, Knorr-Bremse anticipates that the global commercial vehicle market will shrink in 2016. This will, however, be merely a temporary development. Long-term forecasts see worldwide truck production approaching its 2014 level again by 2018. This is mainly being driven by long-term growth in production output in North America and Asia.

In Europe/Africa the Rail Vehicle Systems division is anticipating modest growth. The Commercial Vehicle Systems division expects to see 1% year-on-year growth in the European market.

In the North American market, Knorr-Bremse Rail Vehicle Systems is anticipating a downturn in the freight car and locomotive segments. In the South American rail market, Knorr-Bremse expects to see a decline in passenger numbers on mainline routes. At the same time, the rail freight market is expected to return to normal. In the commercial vehicle sector, Knorr-Bremse anticipates a tougher market environment in North America, with no increase in truck production in 2016. In South America the difficult market environment is expected to lead to a sharp decline in commercial vehicle output. By 2018, however, the Company expects to see a marked recovery here.

For Asia/Australia the Rail Vehicle Systems division is anticipating a moderate recovery, with India playing a key part. The Commercial Vehicle Systems division is also expecting to see moderate growth in the Asia/Australia region. In China in particular, Knorr-Bremse is registering a similar downturn in the market for both divisions. The slowdown in economic growth in China, the growing pressure on prices, and low-price domestic suppliers are also impacting on business.

Based on the assumptions set out above, Knorr-Bremse is planning for sales to show a slight decline in 2016, with a matching downturn in earnings. The number of employees is expected to remain stable. Tied-up working capital, measured in days' sales, is expected to be approximately at the prior-year level. Despite the prevailing uncertain market environment and the challenges posed by the global market, Knorr-Bremse is planning a further marked increase in capital expenditure. In line with expectations in terms of profits, working capital, and investments, Knorr-Bremse is reckoning with a further slight improvement in net liquidity.

Given the positive development of the Group, Knorr-Bremse AG is anticipating stable income from investments in 2016 that will safeguard its future ability to pay dividends. Based on the assumptions made for the Group, the assets, financial status, and profitability of Knorr-Bremse AG can be expected to show further moderate positive development.

With an extra-wide load to transport safely through the night, Mike can depend on the electronic leveling system from Knorr-Bremse.

Consolidated Financial Statements

1 Principles and methods

The consolidated financial statements have been drawn up in accordance with generally accepted accounting principles, complying with the accounting requirements of the German Commercial Code (HGB) and additional statutory provisions. Figures in the consolidated financial statements are shown in thousands of euros (TEUR). Certain items on the balance sheet and in the statement of income are combined for the sake of greater clarity. These items are explained separately in the Notes to the Consolidated Financial Statements. For the first time, the Cash Flow Statement has been drawn up in compliance with the new German Accounting Standard GAS (DRS) 21, making use of the option to dispense with figures for the previous year.

Accounting and valuation

The financial statements of the companies included in the consolidated financial statements are prepared according to uniform principles of accounting and valuation applied to the Group. For the purposes of consolidation according to the equity method, any valuations in the financial statements of associated companies that deviate from the uniform principles applied to the Group are retained. Purchased intangible assets are valued at acquisition cost less scheduled depreciation; additional depreciation is taken where necessary.

Fixed assets are recorded at acquisition or production cost, less scheduled depreciation in the case of items subject to wear and tear; additional depreciation is taken where necessary. Depreciation on fixed assets is generally applied using the linear method, based on useful life. In the case of German companies included in consolidation, additions prior to January 2008 and after January 2009 are for the most part depreciated using the declining balance method, switching over to the linear method as soon as the latter results in higher depreciation. Minor fixed assets are depreciated to the maximum extent permissible under the respective countries' tax provisions.

Interests in affiliated and associated companies and miscellaneous investments are stated at cost or, in the event of a probable sustained diminution in value, at fair value (where the latter is lower). Materials and supplies are carried in inventories at the lower of average acquisition cost or replacement cost. Provision against realization risks is made where necessary.

Work in process and finished products are stated at production cost, but in no case higher than the projected sales revenues less any costs accruing prior to sale. Production cost includes direct cost of materials and labor, as well as material and production overhead. A reasonable allowance is made where there is a risk of a decline in inventory values. Receivables are stated at their nominal value, less any necessary provisions against specific debts. Receivables bearing no or low interest are stated at their net present value. General charges have been made to cover the general credit risk. Other assets are stated at the lower of average acquisition cost, net present value or fair value. Cash at banks and in hand is stated at par value. Bank balances in foreign currencies are stated at the mean spot exchange rate at the balance sheet date. Earnings or disbursements prior to the balance sheet date are shown as prepaid income or prepaid expenses where they represent revenues or expenses for a certain period after the balance sheet date.

Foreign currency items are valued at the rate existing at the transaction date or – if less favorable – at the rate at the balance sheet date. Where foreign currency items have been hedged, they are valued at the corresponding hedging rate. Where the remaining term is one year or less, foreign currency items are valued at the mean spot rate at the final balance sheet date.

Rate-hedging and option transactions are performed selectively and exclusively for hedging purposes. Wherever possible, financial derivatives covering assets, borrowings, open contracts or transactions with a high probability of closure are bundled together as single items for valuation purposes ("hedging relationships").

Accrued liabilities include reasonable and sufficient allowance for all perceivable risks and any contingent liabilities. Accruals are valued in accordance with § 253 (1) and (2) of the German Commercial Code (HGB), whereby use has been made of the options for retention of control within the meaning of Article 67 (1) clause 2 and (3) clause 1 of the Act Introducing the German Commercial Code (EGHGB). Transfers to accrued liabilities are made using the net method.

In Germany, pension plan accruals and similar commitments are set up according to actuarial principles based on realistic assumptions. Assumptions included in the calculations include future salary increases and future pension adjustments (within the meaning of § 16 of the German Law on Occupational Pensions [BetrAVG]), as well as assumptions relating to staff turnover. The calculations are based on the biometric reference values devised by Klaus Heubeck (mortality tables RT 2005 G). The Company has taken advantage of the option provided under § 253 (2) clause 2 of the German Commercial Code (HGB) whereby the discounting rate may be applied with an assumed remaining term of 15 years. The following parameters were used to calculate pension plan accruals in Germany:

Interest rate:	3.89% p.a. (2014: 4.54%)
Salary increases:	3.00% p.a. (2014: 3.00%)
Annuity trend:	1.50% p.a. (2014: 1.50%)
Fluctuation:	1.80% p.a. on average (2014: 1.80%)

Pension plan accruals are determined using the modified discount value method. Our foreign subsidiaries cover pension plans and similar commitments by accruals that are calculated according to principles similar to those used in Germany.

Liabilities are stated at their settlement value.

Consolidated companies

In addition to Knorr-Bremse AG, 23 German and 105 foreign subsidiaries over which Knorr-Bremse AG can exert a direct or indirect controlling influence are included in the consolidated financial statements. Investments in 3 German and 3 foreign companies are shown in the consolidated financial statements as investments in associated companies. 6 foreign subsidiaries and one German subsidiary have not been included in consolidation because of their minor significance in relation to the net worth, financial position, and results of the Group. Two German companies are not shown as associated companies, but instead are stated at acquisition cost.

During fiscal year 2015, the Group acquired or founded the following companies, which are included in consolidation:

Knorr-Bremse DETC Commercial Vehicle Braking Technology Co., Ltd., Shiyan/China
Knorr-Bremse DETC Commercial Vehicle Braking Systems (Shiyan) Co., Ltd., Shiyan/China (consolidated using the equity method)
Knorr-Bremse Systems for Rail Vehicles Kazakhstan LLP, Astana/Republic of Kazakhstan
Selectron Systems AG, Lyss/Switzerland
Selectron Systems Pvt. Ltd., Gurgaon/India
Selectron Systems (Beijing) Co., Ltd., Beijing/China

The following companies have been merged or wound up:

Knorr-Bremse Rail Systems (Burton) Ltd., Stretton, Burton upon Trent/United Kingdom
(merged with Knorr-Bremse Rail Systems (UK) Ltd., Melksham, Wiltshire/United Kingdom)
Knorr-Bremse Rail Systems (Machining) Ltd., Melksham, Wiltshire/United Kingdom
(merged with Knorr-Bremse Rail Systems (UK) Ltd., Melksham, Wiltshire/United Kingdom)
Sigma Coachair (UK) Holdings Ltd., Newhall, Swadlincote/United Kingdom (wound up)
Sigma Coachair Group (China) Co., Ltd., Changzhou/China (wound up)
Westinghouse Brakes Ltd., Melksham, Wiltshire/United Kingdom (wound up)
Westinghouse Platform Screen Doors Ltd., Walsall/United Kingdom (wound up)

The following company has been renamed:

Knorr-Bremse Systèmes pour Véhicules Utilitaires France S.A.S., Lisieux/France
(formerly Knorr-Bremse Systèmes pour Véhicules Utilitaires France S.A., Lisieux/France)

This means that there is no change in the number of companies included in consolidation compared to the previous year. On the following pages, a detailed list of affiliated and associated companies appears in a separate breakdown of the Group's shareholdings.

The above-mentioned changes in the scope of consolidation had no significant impact on the Group's net assets, financial position, and operating results. The newly consolidated companies caused the balance sheet total to increase by TEUR 32,218.

Principles of consolidation

Until December 31, 2009, the book value method was used to consolidate investments in subsidiaries. This entailed offsetting book values against the value of our interests in the shareholders' equity of the subsidiaries at the time of the initial consolidation. Companies were included in consolidation at the date of acquisition or at the balance sheet date. Since fiscal year 2010, investments in subsidiaries have been consolidated using the revaluation method. This entails reporting shareholders' equity at the value corresponding to the market value of the assets and borrowings to be included in the consolidated financial statements. Companies are included in consolidation at the date of acquisition. Since 2002, any resulting goodwill has been capitalized in compliance with GAS standards. Scheduled depreciation is applied using the linear method on the basis of operational considerations relating to useful life; within the Group, this may not exceed 20 years. The useful life of goodwill is determined using the subsidiaries' longer-term, strategic business models.

Wherever possible, a negative goodwill resulting from the consolidation of investments is released for the year in which it arises, as permitted by German commercial law and accounting standards.

Associated companies are consolidated using the equity method, with goodwill generally included as part of the cost of acquiring interests in associated and related companies. Associated companies acquired prior to January 2010 were consolidated at the date of acquisition or the balance sheet date. As from fiscal year 2010, companies are included in consolidation at the date of acquisition. The Knorr-Bremse Group's share in the annual results of companies consolidated in accordance with this method, including amortization on goodwill, is shown in the statement of income under Financial results. The overall valuation of associated companies has not been adjusted by applying the valuation methods used in the consolidated financial statements.

Receivables and payables between consolidated companies are netted. Unrealized intercompany profits resulting from intercompany trade in goods and services are eliminated in the consolidated statements. In the consolidated statement of income, revenues from intercompany sales and other intercompany income are offset against the corresponding expenses.

Foreign currency translation

The individual financial statements of the foreign companies included in consolidation are translated into euros at the mean spot rate at the balance sheet date, with the exception of shareholders' equity, which is translated into euros at the historic rate. Income statement items are translated into euros at the mean rate. Any resulting translation difference is reported under Group equity and noted in the statement of changes in Group equity.

Deferred taxes

Deferred taxes as defined under §§ 274 and 306 of the German Commercial Code (HGB), resulting from temporary differences between the amount stated in the tax accounts of individual group companies and the amount stated in the consolidated balance sheet (including differences arising as a result of accounting and valuation adjustments or during the consolidation process), are netted wherever possible, as permitted by law. In the individual balance sheets prepared according to the uniform principles of accounting and valuation applied to the Group (Financial statements II), the option to capitalize assets to the amount of probable tax relief in subsequent years is used in individual cases. The calculation of deferred taxes is based on the tax rates that, according to current legislation, are expected to be valid at the time of their realization.

Deferred taxes on losses carried forward are capitalized in individual cases, where there is sufficient probability that the tax benefits can be realized. At each balance sheet date, the book value of deferred tax assets is reviewed and, if necessary, adjusted as appropriate.

2 Changes in intangibles, fixed assets, and investments

Acquisition or production cost

Additions to purchased fixed and intangible assets amounted to TEUR 328,130 in fiscal year 2015. This figure includes investments (but excludes changes in the scope of consolidation and goodwill) in the amount of TEUR 210,155.

In EUR thousands (TEUR)	Carried forward Jan. 1, 2015*	Additions*	Reclassifications*	Disposals*		Currency differences*	Balance Dec. 31, 2015*	Accrued depreciation/ amortization	Net value Dec. 31, 2015	Net value Dec. 31, 2014	Depreciation/ amortization during the fiscal year
Industrial property rights/trademarks	319,453	15,109	235	(3,243)		16,930	348,484	(290,093)	58,391	56,832	16,819
Goodwill	341,399	108,882	0	(633)		7,795	457,443	(339,159)	118,284	68,800	60,239
Purchased intangibles	**660,852**	**123,991**	**235**	**(3,876)**		**24,725**	**805,927**	**(629,252)**	**176,675**	**125,632**	**77,058**
Land, equivalent rights to real property, and buildings, including buildings on land not owned	395,870	7,313	3,266	(6,113)		4,393	404,729	(149,423)	255,306	256,377	12,462
Technical equipment and machinery	618,050	50,898	21,921	(45,941)		11,829	656,757	(424,905)	231,852	218,229	54,420
Other equipment, plant, and office equipment	549,430	42,668	15,713	(13,314)		15,253	609,750	(470,440)	139,310	132,477	54,593
Advances to suppliers and construction in progress	102,591	103,260	(41,135)	(5,773)		1,346	160,289	(4,664)	155,625	96,629	338
Fixed assets	**1,665,941**	**204,139**	**(235)**	**(71,141)**		**32,821**	**1,831,525**	**(1,049,432)**	**782,093**	**703,712**	**121,813**
Investments in affiliated companies	50,484	109	0	0		5,854	56,447	(99)	56,348	50,403	0
Investments in associated companies	3,617	5,984	0	(2,185)		0	7,416	0	7,416	3,617	0
Miscellaneous investments	19,547	3,007	0	(25)		(1,991)	20,538	(4,207)	16,331	15,303	0
Investments	**73,648**	**9,100**	**0**	**(2,210)**		**3,863**	**84,401**	**(4,306)**	**80,095**	**69,323**	**0**
Intangibles, fixed assets, and investments	**2,400,441**	**337,230**	**0**	**(77,227)**		**61,409**	**2,721,853**	**(1,682,990)**	**1,038,863**	**898,667**	**198,871**

* valued at acquisition or production cost.

3 Intangibles

This heading includes the acquisition of goodwill, patents, rights to the use of names and trademarks, and IT software. IT software and goodwill account for the majority of additions. Additions to goodwill relate primarily to the acquisition of Selectron Systems AG, Lyss/Switzerland. The purchase agreement for Selectron Systems AG, Lyss/Switzerland, includes an earn-out clause. Depending on the profitability of the newly acquired company, this could result in a retroactive purchase price increase for 2015 and 2016. The total increase over both years is limited to a maximum of CHF 5.0 million, and is already reflected in the cost of acquisition. Depreciation on goodwill for the fiscal year includes additional (unscheduled) depreciation of TEUR 13,739.

Any goodwill resulting from the consolidation of investments is subject to linear depreciation over a period not exceeding 20 years. Other intangibles are subject to scheduled depreciation over periods of between 3 and 10 years. All intangible assets have a limited useful life.

4 Fixed assets

Movements of fixed assets are presented in the compilation on the preceding pages. To take technical and economic factors into account, scheduled depreciation was applied to acquisition costs. Depreciation on fixed assets includes TEUR 8,619 in additional depreciation.

5 Investments

Investment movements are set out in the compilation above. Miscellaneous investments consist of miscellaneous loans (TEUR 14,102), long-term investments (TEUR 2,080), and investments in other companies (TEUR 149).

List of shareholdings

1 Consolidated affiliated companies	Share in capital in %
Albatros GmbH, Munich/Germany	100.0
Anchor Brake Shoe Company LLC, West Chicago, Illinois/USA	100.0
BCVS Canadian Holdings LLC, Anjou, Quebec/Canada	100.0
BCVS Mexican Holdings LLC, Cd Acuña, Coah/Mexico	100.0
Bendix Commercial Vehicle Systems LLC, Elyria, Ohio/USA	100.0
Bendix CVS Canada Inc., Anjou, Quebec/Canada	100.0
Bendix CVS de Mexico SA de CV, Cd Acuña, Coah/Mexico	100.0
Bendix Spicer Foundation Brake Canada, Inc., Kingston, Ontario/Canada	100.0
Bendix Spicer Foundation Brake LLC, Elyria, Ohio/USA	80.0
Bost Ibérica S.L., San Fernando de Henares/Spain	100.0
BSFB Holdings, Inc., Elyria, Ohio/USA	100.0
Casram Rail S.p.A., Crimido/Italy	60.0
Comet Fans S.r.l., Solaro, Milan/Italy	100.0
Distribuidora Bendix CVS (de) Mexico SA de CV, Cd Acuña, Coah/Mexico	100.0
Dr. techn. Josef Zelisko Ges.m.b.H., Mödling/Austria	100.0
Hasse & Wrede CVS Dalian, China Ltd., Dalian/China	70.0
Hasse & Wrede GmbH, Berlin/Germany	100.0
Heine Resistors GmbH, Dresden/Germany	100.0
IFE-ČR a.s., Brno/Czech Republic	100.0
IFE North America LLC, Westminster, Maryland/USA	100.0
IFE-Tebel Technologies B.V., Leeuwarden/The Netherlands	100.0
IFE-VICTALL Railway Vehicle Door Systems (Qingdao) Co., Ltd., Qingdao/China	59.0
IGE-CZ s.r.o., Brno/Czech Republic	100.0
Kalmar Tågkompetens AB, Kalmar/Sweden	100.0
KB Gamma Beteiligungs GmbH, Munich/Germany	100.0
KB Lambda Beteiligungs GmbH, Munich/Germany	100.0
KB Media GmbH Marketing und Werbung, Munich/Germany	100.0
KB Omikron Beteiligungs GmbH, Munich/Germany	100.0
KB Sigma Beteiligungs GmbH, Munich/Germany	100.0
Knorr-Amabhiliki (Pty.) Ltd., Kempton Park/South Africa	74.0
Knorr Brake Company LLC, Westminster, Maryland/USA	100.0

1 Consolidated affiliated companies (continued)	Share in capital in %
Knorr Brake Corporation Canada Holdings Ltd., Montreal, Quebec/Canada	100.0
Knorr Brake Holding Corporation, Watertown, New York/USA	89.3
Knorr Brake Ltd., Kingston, Ontario/Canada	100.0
Knorr Brake Realty LLC, Westminster, Maryland/USA	100.0
Knorr Brake Truck Systems Company, Watertown, New York/USA	100.0
Knorr-Bremse 1520 OOO, Burashevskoe/Russia	60.0
Knorr-Bremse/Nankou Air Supply Unit (Beijing) Co., Ltd., Nankou/China	55.0
Knorr-Bremse Asia Pacific (Holding) Ltd., Hong Kong/China	100.0
Knorr-Bremse Australia Pty. Ltd., Granville/Australia	100.0
Knorr-Bremse Benelux B.V.B.A., Heist-op-den-Berg/Belgium	100.0
Knorr-Bremse Beteiligungsgesellschaft mbH, Munich/Germany	100.0
Knorr-Bremse Brake Equipment (Shanghai) Co., Ltd., Shanghai/China	100.0
Knorr-Bremse Braking Systems for Commercial Vehicles (Dalian) Co., Ltd., Dalian/China	100.0
Knorr-Bremse Brasil (Holding) Administração e Participação Ltda., Itupeva/Brazil	100.0
Knorr-Bremse CAFF Systems for Commercial Vehicles Chongqing Ltd., Chongqing/China	66.0
Knorr-Bremse CARS LD Vehicle Brake Disc Manufacturing (Beijing) Co., Ltd., Daxing/China	50.0
Knorr-Bremse Commercial Vehicle Systems Japan Ltd., Tokyo/Japan	80.0
Knorr-Bremse DETC Commercial Vehicle Braking Technology Co., Ltd., Shiyan/China	51.0
Knorr-Bremse España, S.A., Getafe/Spain	100.0
Knorr-Bremse Fékrendszerek Kft., Kecskemét/Hungary	100.0
Knorr-Bremse Ges.m.b.H., Mödling/Austria	100.0
Knorr-Bremse India Pvt. Ltd., Faridabad/India	100.0
Knorr-Bremse Investment GmbH, Munich/Germany	100.0
Knorr-Bremse IT-Services GmbH, Munich/Germany	100.0
Knorr-Bremse KAMA Systems for Commercial Vehicles OOO, Naberezhnye Chelny/Russia	50.0
Knorr-Bremse Nordic Rail Services AB, Lund/Sweden	100.0
Knorr-Bremse Pensionsgesellschaft mbH, Munich/Germany	100.0
Knorr-Bremse Polska SfN Sp. z o.o., Warsaw/Poland	100.0
Knorr-Bremse Rail Systems CIS Holding OOO, Moscow/Russia	100.0
Knorr-Bremse Rail Systems Italia S.r.l., Campi Bisenzio/Italy	100.0
Knorr-Bremse Rail Systems Japan Ltd., Tokyo/Japan	94.0
Knorr-Bremse Rail Systems Korea Ltd., Seoul/South Korea	100.0
Knorr-Bremse Rail Systems OOO, Moscow/Russia	100.0
Knorr-Bremse Rail Systems Schweiz AG, Niederhasli/Switzerland	100.0
Knorr-Bremse Rail Systems (UK) Ltd., Melksham, Wiltshire/United Kingdom	100.0
Knorr-Bremse RailServices (UK) Ltd., Melksham, Wiltshire/United Kingdom	100.0
Knorr-Bremse Railway Technologies (Shanghai) Co., Ltd., Shanghai/China	100.0
Knorr-Bremse Raylı Sistemler Turkey Sanayi ve Ticaret Limited Şirketi, Ankara/Turkey	100.0
Knorr-Bremse S.A. Holding Company (UK) Ltd., Melksham, Wiltshire/United Kingdom	100.0
Knorr-Bremse S.A. (Pty.) Ltd., Kempton Park/South Africa	75.0
Knorr-Bremse S.R.L., Bucharest/Romania	100.0
Knorr-Bremse Sistemas para Veículos Comerciais Brasil Ltda., Itupeva/Brazil	100.0
Knorr-Bremse Sistemas para Veículos Ferroviários Ltda., Itupeva/Brazil	100.0
Knorr-Bremse Sistemi per Autoveicoli Commerciali S.p.A., Arcore/Italy	100.0

1 Consolidated affiliated companies (continued)	Share in capital in %
Knorr-Bremse System för Tunga Fordon AB, Malmö/Sweden	100.0
Knorr-Bremse Systeme für Nutzfahrzeuge GmbH, Munich/Germany	80.0
Knorr-Bremse Systeme für Nutzfahrzeuge Pensionsgesellschaft mbH, Munich/Germany	100.0
Knorr-Bremse Systeme für Schienenfahrzeuge GmbH, Munich/Germany	100.0
Knorr-Bremse Systeme für Schienenfahrzeuge Ibero Holding GmbH, Munich/Germany	100.0
Knorr-Bremse Systèmes Ferroviaires France S.A., Reims/France	100.0
Knorr-Bremse Systèmes pour Véhicules Utilitaires France S.A.S., Lisieux/France	100.0
Knorr-Bremse Systems for Commercial Vehicles India Pvt. Ltd., Pune/India	100.0
Knorr-Bremse Systems for Commercial Vehicles OOO, Moscow/Russia	100.0
Knorr-Bremse Systems for Commercial Vehicles Ltd., Bristol/United Kingdom	100.0
Knorr-Bremse Systems for Rail Vehicles Kazakhstan LLP, Astana/Republic of Kazakhstan	100.0
Knorr-Bremse Systems for Rail Vehicles (Suzhou) Co., Ltd., Suzhou/China	100,0
Knorr-Bremse Systemy dla Kolejowych Środków Lokomocji PL Sp. z o.o., Cracow/Poland	100.0
Knorr-Bremse Systémy pro užitková vozidla ČR s.r.o., Stráž nad Nisou/Czech Republic	100.0
Knorr-Bremse Technology Center India Pvt. Ltd., Pune/India	100.0
Knorr-Bremse Ticari Arac Fren Sistemieri Limited Şirketi, Istanbul/Turkey	100.0
Knorr-Bremse US Beteiligungs GmbH, Munich/Germany	100.0
Knorr-Bremse US Investment GmbH, Munich/Germany	100.0
Knorr-Bremse Vasúti Jármű Rendszerek Hungária Kft., Budapest/Hungary	100.0
Knorr-Bremse Verwaltungsgesellschaft mbH, Munich/Germany	100.0
Merak Jinxin Air Conditioning Systems (Wuxi) Co., Ltd., Wuxi/China	51.0
Merak Knorr Climatización S.A., Buenos Aires/Argentina	100.0
Merak North America LLC, Westminster, Maryland/USA	100.0
Microelettrica do Brasil Comercialização e Importação de Produtos Eletromecânicos Ltda., Barueri, São Paulo/Brazil	100.0
Microelettrica Heine (Suzhou) Co., Ltd., Suzhou/China	100.0
Microelettrica Power Devices (Pty.) Ltd., Johannesburg/South Africa	100.0
Microelettrica Power (Pty.) Ltd., Johannesburg/South Africa	74.0
Mircoelettrica Scientifica (Pty.) Ltd., Johannesburg/South Africa	100.0
Microelettrica Scientifica S.p.A., Buccinasco/Italy	100.0
Microelettrica USA LLC, Randolph, New Jersey/USA	100.0
MST Electroteknik Sanayi ve Ticaret Limited Şirketi, Şerifali, Istanbul/Turkey	100.0
M.S. Resistances S.A.S., Saint Chamond/France	51.0
New York Air Brake LLC, Watertown, New York/USA	100.0
PCS Power Converter Solutions GmbH, Berlin/Germany	100.0
Selectron Systems AG, Lyss/Switzerland	100.0
Selectron Systems Pvt. Ltd., Gurgaon/India	100.0
Selectron Systems (Beijing) Co., Ltd., Beijing/China	100.0
Sigma Air Conditioning Pty. Ltd., Granville/Australia	100.0
Sigma Coachair Systems (US) Inc., Chicago, Illinois/USA	100.0
Sigma Transit Systems Pty. Ltd., Granville/Australia	100.0
Skach Ges.m.b.H., Mödling/Austria	100.0
STE Schwingungs-Technik GmbH, Klieken/Germany	100.0
Swedtrac RailServices AB, Solna/Sweden	100.0

1 Consolidated affiliated companies (continued)	Share in capital in %
Swedtrac Trafik AB, Solna/Sweden	100.0
SWT Swedtrac Svets & Smide AB, Solna/Sweden	100.0
Sydac Ltd., Manchester/United Kingdom	100.0
Sydac Pty. Ltd., Granville/Australia	100.0
Technologies Lanka Inc., La Pocatière, Quebec/Canada	100.0
Transtechnik Asia Pacific Pty. Ltd., Sydney/Australia	100.0
Transtechnik Corporation, Atlanta/USA	100.0
Transtechnik GmbH & Co. KG, Holzkirchen/Germany	100.0
Transtechnik Verwaltungs GmbH, Holzkirchen/Germany	100.0
Unicupler GmbH, Niederurnen/Switzerland	100.0

2 Associated companies valued using the equity method	Share in capital in %
Alltrucks GmbH & Co. KG, Munich/Germany	33.3
Alltrucks Verwaltungs GmbH, Munich/Germany	33.3
Knorr-Bremse DETC Commercial Vehicle Braking Systems (Shiyan) Co., Ltd., Shiyan/China	49.0
Icer Rail S.L., Pamplona/Spain	50.0
Webasto Kiekert Bustüren GmbH (in liquidation), Karlsfeld/Germany	50.0
Westinghouse Platform Screen Doors (Guangzhou) Ltd., Guangzhou/China	35.0

3 Affiliated companies not included in consolidation	Share in capital in %
Black River Air Logistics Company LLC, Watertown, New York/USA	100.0
Di-Pro LLC., Fresno, California/USA	100.0
EKA d.o.o., Skopje/Macedonia	75.5
Foro Verwaltungs GmbH & Co. KG, Munich/Germany	100.0
KB Investment UK Ltd., Chippenham/United Kingdom	100.0
Metco Technical Consulting AG, Zug/Switzerland	100.0
SCI pour l'Industrie, Pau/France	100.0

4 Associated companies valued without using the equity method and other shareholdings	Share in capital in %
IFB Institut für Bahntechnik GmbH, Berlin/Germany	6.7
Megalith Grundstücksverwaltungsgesellschaft mbH & Co. Vermietungs KG, Mainz/Germany (Deutsche-Anlagen-Leasing GmbH holds majority voting rights)	100.0
MORCAR Grundstücksgesellschaft mbH & Co. oHG, Munich/Germany	5.0
Sanctor Grundstücks-Vermietungsgesellschaft mbH & Co. Objekt Marzahn KG, Düsseldorf/Germany (Deutsche-Immobilien-Leasing GmbH holds majority voting rights)	99.0

Shareholdings in associated companies correspond to voting rights.

The subsidiaries listed in section 3 of the above table (under "Affiliated companies not included in consolidation") have not been included in consolidation because of their minor significance in terms of providing a true and fair view of the Group's net assets, financial position, and operating results.

6 Inventories

	2015 TEUR	2014 TEUR
Materials and supplies	268,189	299,018
Work in process	92,049	88,321
Finished products, merchandise	246,699	273,934
Less advances received on orders	(189,146)	(216,014)
Total	**417,791**	**445,259**

7 Receivables and other assets

	2015 TEUR	2015 TEUR	2014 TEUR
	Remaining term more than 1 year	in total	in total
Accounts receivable, trade	8,573	939,763	891,625
Other assets	16,155	144,978	120,538
Total	**24,728**	**1,084,741**	**1,012,163**

8 Cash and cash equivalents

This item includes cash at bank, checks, and cash in hand.

9 Prepaid expenses

Group prepaid expenses amounted to TEUR 23,731 (2014: TEUR 21,033).

10 Deferred taxes

At the balance sheet date, deferred tax assets amounted to TEUR 76,695 (2014: TEUR 79,160). No deferred tax liabilities were reported for the current or previous years.

In compliance with legal requirements, deferred tax assets and liabilities are stated at the netted amount. Of the deferred tax assets, TEUR 21,678 (2014: TEUR 24,254) relate to deferred taxes on individual balance sheets of group companies and TEUR 55,017 (2014: TEUR 54,906) relate to consolidation entries affecting net income. Deferred tax assets on individual balance sheets result primarily from temporary differences in accrued liabilities, receivables, and other assets. Deferred tax assets relating to consolidation adjustments are primarily the result of eliminating unrealized intercompany profits. Deferred tax liabilities relate solely to deferred taxes on individual balance sheets of group companies.

At individual Company level and at Group level, deferred taxes are stated at the projected tax rate in the respective countries at the time of realization. Tax rates range from 0% to 40%, while the rate on consolidation activities is approx. 35%.

11 Capital stock

The capital stock of Knorr-Bremse AG is divided up into 2,600,000 bearer shares, each with a par value of EUR 26. Stella Vermögensverwaltungs-GmbH, TIB Vermögens- und Beteiligungsholding GmbH and KB Holding GmbH, all based in Grünwald/Germany, have informed Knorr-Bremse AG that directly or indirectly, they hold a majority interest in Knorr-Bremse AG.

12 Capital reserves

Capital reserves are unchanged from the previous year. Like the legal reserve, they are subject to the restrictions of § 150 of the German Corporation Law (AktG).

13 Retained earnings

In addition to the legal reserve, Retained earnings include the accumulated earnings of the companies included in consolidation, where these have not been distributed. Furthermore, this heading reflects all Group items that exert an influence on shareholders' equity.

The legal reserves amounted to TEUR 8,726 (2014: 8,725). The statutory reserves increased to TEUR 7,453 (2014: TEUR 7,307). Miscellaneous retained earnings amounted to TEUR 818,878 (2014: TEUR 663,619) at the balance sheet date.

14 Pension plan accruals

Pension plan accruals are valued in accordance with § 249 (1) of the German Commercial Code (HGB) in conjunction with Article 67 (1) clause 1 of the Act Introducing the German Commercial Code (EGHGB).

	2015 TEUR	2014 TEUR
Pension plan accruals	240,587	223,409

15 Other accrued liabilities

	2015 TEUR	2014 TEUR
Provisions for taxes	146,314	140,590
Miscellaneous accruals	853,530	812,444
Total	**999,844**	**953,034**

The taxation provisions include projected income tax payments for the year under review or, where the fiscal year diverges from the financial year, an income tax charge allocated on an accrual basis. Tax charges are also shown for preceding assessment periods. Miscellaneous accruals relate primarily to warranty and product liability commitments at TEUR 410,722 (2014: TEUR 398,704), personnel costs, restructuring activities at TEUR 173,547 (2014: TEUR 133,511), anticipated losses on contracts and other risks in connection with current operations, as well as invoices outstanding at TEUR 19,288 (2014: TEUR 20,717).

16 Liabilities

	2015 TEUR	2015 TEUR	2014 TEUR
	Remaining term less than 1 year	in total	in total
Accounts payable, banks	**20,688**	**160,585**	**142,579**
Accounts payable, trade	**687,845**	**688,147**	**644,322**
Other liabilities:			
Liabilities from accepted bills	4,798	4,798	5,540
Miscellaneous liabilities	156,078	163,946	119,518
(thereof for taxes)	(51,303)	(51,303)	(26,011)
(thereof for social security)	(14,545)	(14,545)	(12,025)
	95,028	**168,744**	**125,058**
Total liabilities	**803,561**	**1,017,476**	**911,959**
(thereof with a remaining term of more than 5 years)		(12,092)	(117,693)

17 Contingencies and miscellaneous financial commitments

	2015 TEUR	2014 TEUR
Warranties	19,662	12,638
Guarantees	25,996	20,456
Leasing commitments	235,013	205,733

The Knorr-Bremse Group has entered into leasing contracts primarily for office buildings and production facilities in which the leased asset is assignable to the lessor. These off-balance-sheet leasing transactions represent an alternative form of finance to borrowing. Commitments associated with these leasing agreements are carried under Miscellaneous financial commitments and amount to TEUR 235,013; maturities range from 1 year or less (TEUR 36,851), to between 1 and 5 years (TEUR 119,325), to over 5 years (TEUR 78,837). The agreements do not include any unusual termination or renewal options.

Thanks to the risk management system in place, the risk of a claim arising on contingent liabilities is rated as minimal.

18 Other operating income

Other operating income consists primarily of gains on currency exchange, income from the reversal of reserves, income from disposals of fixed assets, and rental income. The heading also carries gains on currency differences amounting to TEUR 111,181 (2014: TEUR 98,333).

Income relating to other accounting periods in the amount of TEUR 65,947 (2014: 32,333), generated primarily from the reversal of reserves, is also shown under Other operating income.

19 Cost of materials

	2015 TEUR	2014 TEUR
Expenditure on materials, supplies, and merchandise	2,563,210	2,353,663
Expenditure on services purchased	167,413	152,881
Total	**2,730,623**	**2,506,544**

20 Personnel expenses/employees

	2015 TEUR	2014 TEUR
Wages and salaries	984,572	831,107
Statutory social welfare contributions and expenses relating to pensions and employee benefits	228,650	207,075
Personnel costs	**1,213,222**	**1,038,182**
(thereof for retirement benefits)	54,931	52,804
Average number of employees during the fiscal year	**Number**	**Number**
Wage earners	10,167	9,310
Salary earners	11,334	10,367
Apprentices and trainees	237	273
Total	**21,738**	**19,950**

21 Depreciation

	2015 TEUR	2014 TEUR
Depreciation and amortization on purchased intangibles and on fixed assets	198,871	169,103

In addition, rental and leasing expenses totaling TEUR 70,050 (2014: TEUR 64,878) were incurred during the reporting period. For more details of additional depreciation, please see Notes 3 and 4 of these Notes to the Consolidated Financial Statements.

22 Other operating expenses

Other operating expenses consist primarily of maintenance costs, direct sales costs, legal and consulting fees, commissions, travel expenses, and miscellaneous administrative expenses. Other taxes for the Group amount to TEUR 30,794 (2014: TEUR 20,840). Expenses resulting from foreign exchange fluctuations during the fiscal year amounted to TEUR 130,832 (2014: TEUR 82,142). The fee paid to the independent auditors, KPMG AG Wirtschaftsprüfungsgesellschaft and their affiliates, amounted to TEUR 484 for fiscal year 2015. Of this, TEUR 462 was paid out for audit services and TEUR 22 for other services.

23 Financial results

	2015 TEUR	2014 TEUR
Miscellaneous interest and similar income	17,359	13,629
Interest and similar expenses	(18,930)	(17,571)
(thereof for discounts on accruals)	(11,424)	(11,183)
Income from associated, affiliated, and other companies	815	(288)
Total	**(756)**	**(4,230)**

24 Taxes on income

Taxes on income and earnings amounted to TEUR 331,791 (2014: TEUR 253,422), and included a deferred tax charge of TEUR 3,443 (2014: deferred tax income of TEUR 16,712).

25 Net income

	2015 TEUR	2014 TEUR
Net income	**644,762**	**560,036**
Minority interests in earnings of consolidated subsidiaries	(76,521)	(76,092)
Retained earnings brought forward from the previous year (after distribution of dividends)	178,777	75,231
Transfers to (-)/withdrawals from (+) retained earnings	(128,762)	(68,398)
Unappropriated consolidated net income (Knorr-Bremse AG unappropriated retained earnings)	**618,256**	**490,777**

26 Financial derivatives

Financial instruments are not held for trading purposes.

Underlying transactions and their derivatives are bundled together as single items for valuation purposes ("hedging relationships"). These hedging relationships are netted out without affecting net income wherever the respective impact on income of the underlying transaction (hedged item) and the related hedge offset each other (net hedge presentation method).

Forward exchange and option transactions are performed purely and exclusively in order to hedge current and future foreign currency receivables and payables from the sale and purchase of goods and services and the elimination of exchange rate risk for selected assets. The aim of hedging operations at Knorr-Bremse is to reduce the risks posed by foreign exchange fluctuations to the ordinary course of business. Currency hedging is based on the volume of open commitments arising or expected to arise from core business activities. Maturities are based on the lifespans of the underlying business transactions, whereby highly probable transactions are hedged over a rolling 3-year planning period. Because the conditions and parameters of the hedges match those of the hedged items, any payment flows or changes in value are offset in full. Wherever possible, the effectiveness of hedging relationships is tested using the critical terms match method, otherwise with the help of hypothetical derivatives. The Knorr-Bremse Group uses forward exchange contracts, currency options, interest rate swaps, and cross currency swaps as hedging instruments.

Hedging relationships have not been set up for currency option derivatives with a nominal value of EUR 36.0 million or forward exchange derivatives with a nominal value of EUR 67.5 million. Hedging relationships have been set up for financial instruments amounting to EUR 686.5 million in total (representing the hedged risks). Of this amount, EUR 162.1 million is attributable to the hedging of assets (portfolio hedges), EUR 39.2 million to the hedging of open contracts (portfolio hedges), and EUR 485.2 million to the hedging of high-probability transactions (macro hedges).

Commodity futures contracts are used exclusively to hedge price risks arising on fluctuations in the purchase prices of raw materials used in Knorr-Bremse Group products (macro hedges). The volume of underlying transactions (hedged items) is calculated on the basis of high-probability requirements for raw materials over a rolling 2-year planning period. The derivatives are based on reference indices traded on commodity futures exchanges. The effectiveness of this hedging approach is retrospectively analyzed using statistical correlation techniques, showing a correlation in excess of 80%. Concluded contracts with a total nominal value of EUR 2.3 million are carried in full in hedging relationships.

The nominal and market values of financial instruments as at December 31, 2015 break down as follows:

	Total for 2015	Total for 2015	Total for 2014	Total for 2014
in EUR millions	Nominal value	Market value	Nominal value	Market value
Foreign exchange contracts				
Forward exchange transactions	713	(18)	574	(12)
Currency options	46	0	62	(1)
Interest rate contracts				
Interest rate swaps	36	(8)	36	(9)
Commodity-related contracts				
Swaps	2	(0)	3	(1)

Negative market values correspond to the risks associated with financial derivatives. Positive market values are offset by risks associated with the underlying transactions (hedged items) in the respective hedging relationships.

The market value of financial derivatives is best defined as the price one party is prepared to pay in order to assume the rights and/or obligations of another party. Market values are calculated on the basis of market information available at the balance sheet date and by applying standard market valuation methods as follows:

- Currency hedging contracts are valued on the basis of reference rates, taking account of forward premiums and discounts.
- Commodity contracts are used to hedge risks associated with steel and aluminum price fluctuations. The contracts are valued at market price.
- Options are valued using recognized models for calculating option prices (e.g. Black-Scholes).

Paid option premiums are carried under Other assets. As at the balance sheet date, the book value of call option premiums paid out amounted to EUR 0.5 million.

27 Research and development expenditure

In fiscal year 2015, Group expenditure on research and development amounted to TEUR 347,341 (2014: TEUR 295,523).

28 Miscellaneous

The Group financial statements are published in the official Federal Gazette and in the Commercial Register at the local first-instance court in Munich, Germany. Under the terms of § 264 (3) of the German Commercial Code (HGB), the subsidiary companies Knorr-Bremse Systeme für Nutzfahrzeuge GmbH, Munich/Germany, Knorr-Bremse Systeme für Schienenfahrzeuge GmbH, Munich/Germany, Knorr-Bremse IT-Services GmbH, Munich/Germany, Heine Resistors GmbH, Dresden/Germany, and Hasse & Wrede GmbH, Berlin/Germany, are exempt from the obligation to publish their figures pursuant to § 325 of the German Commercial Code.

29 Total remuneration of the Supervisory Board and Executive Board

The total remuneration of members of the Supervisory Board amounted to TEUR 236 and the total remuneration of the Executive Board to TEUR 6,157. Pension commitments to former members of the Executive Board and their surviving dependents are covered by an accrual of TEUR 32,016; payments in the fiscal year amounted to TEUR 3,252.

Munich, March 1, 2016

Knorr-Bremse AG
Executive Board

Klaus Deller | Dr. Peter Laier | Dr. Dieter Wilhelm | Dr. Lorenz Zwingmann

Consolidated Cash Flow Statement in Compliance with GAS 21 (German Accounting Standard)

	2015 TEUR
Result for the period (including minority interests in consolidated results)	644,762
Depreciation and amortization on/Additions to intangibles and fixed assets	198,861
Increase in accruals	39,498
Increase in inventories, trade receivables, and other assets not related to investing or financing activities	-53,009
Increase in trade payables and other liabilities not related to investing or financing activities	52,720
Losses on disposals of intangibles, fixed assets, and investments	5,414
Interest expenses	1,571
Other income from shareholdings	-815
Subsidies received	-3,543
Income tax charge	331,792
Income tax paid	-304,584
Cash flows from operating activities	**912,667**
Proceeds from disposals of intangible assets	34
Disbursements for investments in intangible assets	-12,417
Proceeds from disposals of fixed assets	8,191
Disbursements for investments in fixed assets	-197,738
Proceeds from disposals of financial assets	2,890
Disbursements for investments in financial assets	-8,798
Disbursements for the acquisition of consolidated companies and other business units	-102,305
Interest received	26,611
Cash flows from investing activities	**-283,532**
Proceeds from borrowings	34,773
Disbursements for the redemption of borrowings	-16,798
Proceeds from grants/subsidies received	3,543
Interest paid	-21,848
Dividends paid to parent Company shareholders	-312,000
Dividends paid to minority shareholders	-83,969
Cash flows from financing activities	**-396,299**
Change in cash funds resulting from exchange rate and valuation-related movements	21,406
Change in cash funds resulting from changes in Group structure	778
Changes in cash funds resulting from cash-relevant transactions	**255,020**
Cash funds at the beginning of the period	1,086,741
Cash funds at the end of the period	1,341,761

Cash funds are comprised of the Group's cash and cash equivalents, marketable securities, and short-term bank debt.

Segment Report in Compliance with GAS 3 (German Accounting Standard)

In order to comply with GAS 3, Knorr-Bremse AG has compiled the following report on three segments that are subject to reporting requirements. The breakdown by segment is based on the Group's activities in the three major geographical regions that provide the geographical framework for the Group's internal organizational and reporting structures. The operating segments cover three regions: Europe, the Americas, and Asia/Australia, each of which is characterized by different market and customer demands. The Knorr-Bremse Group's main product lines – braking systems for rail and commercial vehicles – are represented in all three regions.

Fiscal year 2015	Europe	Americas	Asia/ Australia	Knorr-Bremse Group
in EUR thousands				
Sales by region	3,142,665	1,544,679	1,829,462	6,516,806
thereof net sales with third parties	2,617,797	1,432,719	1,780,096	5,830,612
thereof net sales with other segments	524,868	111,960	49,366	686,194
Net income	228,870	143,793	272,099	644,762
Income tax charge	117,776	73,995	140,020	331,791
Investments (excluding financial investments)	128,136	42,794	39,225	210,155
Depreciation (excluding financial investments)	140,858	35,089	22,924	198,871
Result for associated companies	2,356	0	(1,554)	802
Result for affiliated and other companies	13	0	0	13
Assets	1,985,667	713,232	1,302,996	4,001,895

Fiscal year 2014	Europe	Americas	Asia/ Australia	Knorr-Bremse Group
in EUR thousands				
Sales by region	3,079,827	1,260,847	1,612,528	5,953,202
thereof net sales with third parties	2,454,443	1,163,644	1,587,918	5,206,005
thereof net sales with other segments	625,384	97,203	24,610	747,197
Net income	202,243	103,482	254,311	560,036
Income tax charge	91,517	46,826	115,079	253,422
Investments (excluding financial investments)	104,202	30,762	25,619	160,583
Depreciation (excluding financial investments)	122,869	29,597	16,637	169,103
Result for associated companies	(308)	0	0	(308)
Result for affiliated and other companies	20	0	0	20
Assets	1,806,032	690,384	1,046,607	3,543,023

Fiscal year 2015	Net sales	Investments (excluding financial investments)	Depreciation (excluding financial investments)	Assets
in EUR thousands (TEUR)				
Rail vehicle systems	3,341,069	117,596	120,972	2,559,973
Commercial vehicle systems	2,491,839	81,137	68,430	1,528,136
Miscellaneous/consolidations	(2,296)	11,422	9,469	(86,214)
Knorr-Bremse Group	5,830,612	210,155	198,871	4,001,895

Fiscal year 2014	Net sales	Investments (excluding financial investments)	Depreciation (excluding financial investments)	Assets
in EUR thousands (TEUR)				
Rail vehicle systems	2,981,990	93,715	99,766	2,299,450
Commercial vehicle systems	2,227,722	57,674	60,064	1,374,187
Miscellaneous/consolidations	(3,707)	9,194	9,273	(130,614)
Knorr-Bremse Group	5,206,005	160,583	169,103	3,543,023

The analysis does not show borrowings or interest payable by region, because these items are controlled centrally across the Group by the parent Company and thus are not dependent on regional decisions associated with day-to-day business operations.

The usual prices apply as agreed between counterparties.

Statement of Changes in Group Equity in Compliance with GAS 7 (German Accounting Standard)

Changes in group equity 2015	Capital stock	Capital reserves	Retained earnings	Net income	Minority interests	Knorr-Bremse Group
in EUR thousands (TEUR)						
As at Dec. 31, 2014	67,600	153	679,651	490,777	205,027	1,443,208
Dividend payments				(312,000)	(83,969)	(395,969)
Net income 2015				568,241	76,521	644,762
Transfers to retained earnings			128,762	(128,762)		0
Currency fluctuations			28,558		5,792	34,350
Other fluctuations			(1,914)		11,292	9,378
As at Dec. 31, 2015	67,600	153	835,057	618,256	214,663	1,735,729

Changes in group equity 2014	Capital stock	Capital reserves	Retained earnings	Net income	Minority interests	Knorr-Bremse Group
in EUR thousands (TEUR)						
As at Dec. 31, 2013	67,600	153	584,599	283,231	171,254	1,106,837
Dividend payments				(208,000)	(46,965)	(254,965)
Net income 2014				483,944	76,092	560,036
Transfers to retained earnings			68,398	(68,398)		0
Currency fluctuations			26,487		2,276	28,763
Other fluctuations			167		2,370	2,537
As at Dec. 31, 2014	67,600	153	679,651	490,777	205,027	1,443,208

Group equity includes capital differences arising on foreign currency translation in the amount of TEUR -8,311, of which TEUR 531 relates to minority interests.

Other changes in minority interests result primarily from new acquisitions or capital increases in companies with minority interests.

Independent Auditor's Report

We have audited the consolidated financial statements prepared by Knorr-Bremse Aktiengesellschaft, Munich – comprising the balance sheet, income statement, notes to the financial statements, cash flow statement, statement of changes in equity, and segment report – as well as the group management report for the business year from January 1 to December 31, 2015. The preparation of the consolidated financial statements and the group management report in accordance with German commercial law is the responsibility of the parent company's management. Our responsibility is to express an opinion on the consolidated financial statements and on the group management report based on our audit.

We conducted our audit of the consolidated financial statements in accordance with § 317 HGB (German Commercial Code) and German generally accepted standards for the audit of financial statements promulgated by the Institut der Wirtschaftsprüfer (IDW). Those standards require that we plan and perform the audit such that misstatements materially affecting the presentation of the net assets, financial position, and results of operations in the consolidated financial statements in accordance with German principles of proper accounting and in the group management report are detected with reasonable assurance. Knowledge of the business activities and the economic and legal environment of the Group and expectations as to possible misstatements are taken into account in the determination of audit procedures. The effectiveness of the accounting-related internal control system and the evidence supporting the disclosures in the consolidated financial statements and the group management report are examined primarily on a test basis within the framework of the audit.

The audit includes assessing the annual financial statements of those entities included in consolidation, the determination of entities to be included in consolidation, the accounting and consolidation principles used, and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements and group management report. We believe that our audit provides a reasonable basis for our opinion.

Our audit has not led to any reservations.

In our opinion, based on the findings of our audit, the consolidated financial statements comply with the legal requirements and give a true and fair view of the net assets, financial position, and results of operations of the Group in accordance with these requirements. The group management report is consistent with the consolidated financial statements and as a whole provides a suitable view of the Group's position and suitably presents the opportunities and risks of future development.

Munich, March 1, 2016

KPMG AG
Wirtschaftsprüfungsgesellschaft

signed Rupprecht
Independent auditor

signed Annast
Independent auditor

Consolidated Balance Sheet as at December 31, 2015

Assets	Notes	Dec. 31, 2015 TEUR	Dec. 31, 2014 TEUR
Purchased intangibles	(3)	176,675	125,632
Fixed assets	(4)	782,093	703,712
Investments	(5)	80,095	69,323
Intangibles, fixed assets, and investments		**1,038,863**	**898,667**
Inventories	(6)	417,791	445,259
Accounts receivable, trade	(7)	939,763	891,625
Other assets	(7)	144,978	120,538
Other marketable securities		11	16
Cash and cash equivalents	(8)	1,360,063	1,086,725
Current assets		**2,862,606**	**2,544,163**
Prepaid expenses	**(9)**	**23,731**	**21,033**
Deferred tax assets	**(10)**	**76,695**	**79,160**
Balance sheet total		**4,001,895**	**3,543,023**

Equity and liabilities	Notes	Dec. 31, 2015 TEUR	Dec. 31, 2014 TEUR
Capital stock	(11)	67,600	67,600
Capital reserves	(12)	153	153
Retained earnings	(13)	835,057	679,651
Unappropriated consolidated net income	(25)	618,256	490,777
Minority interests		214,663	205,027
Group equity		**1,735,729**	**1,443,208**
Pension plan accruals	(14)	240,587	223,409
Other accrued liabilities	(15)	999,844	953,034
Accruals		**1,240,431**	**1,176,443**
Accounts payable, banks		160,585	142,579
Accounts payable, trade		688,147	644,322
Other liabilities		168,744	125,058
Liabilities	**(16)**	**1,017,476**	**911,959**
Deferred income		**8,259**	**11,413**
Balance sheet total		**4,001,895**	**3,543,023**

Consolidated Statement of Income for the Fiscal Year from January 1 to December 31, 2015

	Notes	2015 TEUR	2014 TEUR
Net sales		5,830,612	5,206,005
Changes in inventories		(35,521)	(24,644)
Own work capitalized		630	678
Total operating performance		**5,795,721**	**5,182,039**
Other operating income	(18)	293,912	241,900
Cost of materials	(19)	(2,730,623)	(2,506,544)
Personnel expenses	(20)	(1,213,222)	(1,038,182)
Depreciation and amortization on purchased intangibles and fixed assets	(21)	(198,871)	(169,103)
Other operating expenses	(22)	(969,608)	(892,422)
Financial results	(23)	(756)	(4,230)
Income before taxes		**976,553**	**813,458**
Taxes on income	(24)	(331,791)	(253,422)
Net income	**(25)**	**644,762**	**560,036**
Minority interests in results of consolidated subsidiaries		76,521	76,092

Main Majority-owned Subsidiaries of Knorr-Bremse AG

The Americas

Knorr Brake Holding Corporation, Watertown, New York (US)*

- Anchor Brake Shoe Company LLC (US)
- Bendix Commercial Vehicle Systems LLC (US)
- Bendix Spicer Foundation Brake LLC (US)*
- IFE North America LLC (US)
- Knorr Brake Company LLC (US)
- Knorr Brake Ltd. (CA)
- Merak North America LLC (US)
- New York Air Brake LLC (US)
- Technologies Lanka Inc. (CA)

Knorr-Bremse Brasil (Holding) Administração e Participação Ltda., Itupeva (BR)

- Knorr-Bremse Sistemas para Veículos Comerciais Brasil Ltda. (BR)
- Knorr-Bremse Sistemas para Veículos Ferroviários Ltda. (BR)

* Minority holding in subsidiary by non-Group companies
** 20% stake held by Robert Bosch GmbH, Stuttgart (DE)
*** Shareholders: 50% Knorr-Bremse Systeme für Schienenfahrzeuge GmbH, Munich (DE); 50% Knorr-Bremse Systeme für Nutzfahrzeuge GmbH, Munich (DE)

As at December 31, 2015.

Asia – Australia

Knorr-Bremse Asia Pacific (Holding) Ltd., Hong Kong (HK)

- Hasse & Wrede CVS Dalian, China Ltd. (CN)*
- IFE-VICTALL Railway Vehicle Door Systems (Qingdao) Co., Ltd. (CN)*
- Knorr-Bremse Australia Pty. Ltd. (AU)
- Knorr-Bremse Brake Equipment (Shanghai) Co., Ltd. (CN)
- Knorr-Bremse Braking Systems for Commercial Vehicles (Dalian) Co., Ltd. (CN)
- Knorr-Bremse CAFF Systems for Commercial Vehicles Chongqing Ltd. (CN)*
- Knorr-Bremse CARS LD Vehicle Brake Disc Manufacturing (Beijing) Co., Ltd. (CN)*
- Knorr-Bremse Commercial Vehicle Systems Japan Ltd. (JP)**
- Knorr-Bremse DETC Commercial Vehicle Braking Technology Co., Ltd. (CN)*
- Knorr-Bremse India Pvt. Ltd. (IN)
- Knorr-Bremse/Nankou Air Supply Unit (Beijing) Co., Ltd. (CN)*
- Knorr-Bremse Rail Systems Japan Ltd. (JP)*
- Knorr-Bremse Rail Systems Korea Ltd. (KR)
- Knorr-Bremse Systems for Commercial Vehicles India Pvt. Ltd. (IN)
- Knorr-Bremse Systems for Rail Vehicles (Suzhou) Co., Ltd. (CN)
- Knorr-Bremse Technology Center India Pvt. Ltd. (IN)***
- Merak Jinxin Air Conditioning Systems (Wuxi) Co., Ltd. (CN)*
- Sigma Transit Systems Pty. Ltd. (AU)
- Sydac Pty. Ltd. (AU)

Europe – Middle East – Africa

Knorr-Bremse Systeme für Schienenfahrzeuge GmbH, Munich (DE)

- Dr. techn. Josef Zelisko Ges.m.b.H. (AT)
- Heine Resistors GmbH (DE)
- IGE-CZ s.r.o. (CZ)
- Knorr-Bremse 1520 OOO (RU)*
- Knorr-Bremse Ges.m.b.H. (AT)
- Knorr-Bremse España, S.A. (ES)
- Knorr-Bremse Nordic Rail Services AB (SE)
- Knorr-Bremse Rail Systems Italia S.r.l. (IT)
- Knorr-Bremse Rail Systems OOO (RU)
- Knorr-Bremse Rail Systems (UK) Ltd. (UK)
- Knorr-Bremse Rail Systems Schweiz AG (CH)
- Knorr-Bremse RailServices (UK) Ltd. (UK)
- Knorr-Bremse S.A. (Pty.) Ltd. (ZA)*
- Knorr-Bremse Systèmes Ferroviaires S.A. (FR)
- Knorr-Bremse Systemy dla Kolejowych Środków Lokomocji PL Sp. z o.o. (PL)
- Knorr-Bremse Vasúti Jármű Rendszerek Hungária Kft. (HU)
- Microelettrica Scientifica S.p.A. (IT)
- PCS Power Converter Solutions GmbH (DE)
- Selectron Systems AG (CH)
- Swedtrac RailServices AB (SE)
- Transtechnik GmbH & Co KG (DE)

Knorr-Bremse Systeme für Nutzfahrzeuge GmbH, Munich (DE)**

- Bost Ibérica S.L. (ES)
- Hasse & Wrede GmbH (DE)
- Knorr-Bremse Benelux B.V.B.A. (BE)
- Knorr-Bremse Fékrendszerek Kft. (HU)
- Knorr-Bremse KAMA Systems for Commercial Vehicles OOO (RU)*
- Knorr-Bremse Polska SfN Sp. z o.o. (PL)
- Knorr-Bremse Sistemi per Autoveicoli Commerciali S.p.A. (IT)
- Knorr-Bremse System för Tunga Fordon AB (SE)
- Knorr-Bremse Systèmes pour Véhicules Utilitaires France S.A.S. (FR)
- Knorr-Bremse Systems for Commercial Vehicles Ltd. (UK)
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An Overview of 2015

JANUARY

Klaus Deller is appointed Chairman of the Executive Board of Knorr-Bremse AG. He had been a member of the Executive Board since 2009, and was responsible for the worldwide activities of Knorr-Bremse Commercial Vehicle Systems.

FEBRUARY

Knorr-Bremse provides insights into its testing activities under extreme conditions. The Company invites customers and journalists to its own proving grounds on the Arctic Circle in Arjeplog, Sweden. New commercial vehicle braking and driver assistance systems from Knorr-Bremse have to demonstrate their reliability on icy surfaces and at extremely low temperatures.

MARCH

140 top managers meet up at the World Meeting and set the stage for the future by formulating the Knorr-Bremse 2020 strategy. In the evening, a gala dinner is held to celebrate 110 years of Knorr-Bremse – 30 of them shaped by Heinz Hermann Thiele.

APRIL

The Suzhou plant in China celebrates its tenth anniversary. In this milestone year, Knorr-Bremse invests in the extensive expansion of this Rail Vehicle Systems site with state-of-the-art production equipment and structures, with a special focus on the research and development sector.

MAY

In China the Knorr-Bremse DETC Commercial Vehicle Braking Technology Co. Ltd. joint venture starts production. In Shiyan, roughly 1,000 kilometers west of Shanghai, 460 employees manufacture components and systems for commercial vehicles.

JUNE

At an employee open day to celebrate the Company's 110th anniversary, Knorr-Bremse welcomes some 6,000 visitors to its Munich site, where they can learn about recently developed products and tour the Test and Development Center that is under construction.

JULY

At the 9th World Congress on High Speed Rail in Tokyo, Knorr-Bremse demonstrates how trains can be brought safely to a standstill from speeds of over 300 km/h. The 1,000 or so participants at what is the largest international forum in the industry then have the chance to learn more about components for the Japanese Shinkansen high-speed train.

AUGUST

For the tenth time in succession, readers of trade journals from publishers EuroTransportMedia (ETM) vote Knorr-Bremse "Best Brand" in the commercial vehicle industry in the "Brakes" category.

SEPTEMBER

The German-Brazilian Chamber of Commerce and Industry and the Association of German Chambers of Commerce and Industry name Heinz Hermann Thiele 2015 German-Brazilian Personality of the Year in recognition of his exceptional engagement in Brazil – both in the business sector and in social projects. Thiele has maintained close relations with Brazil for over 40 years.

OCTOBER

Knorr-Bremse strengthens its commitment to the Chinese rail vehicle sector by founding another company in China. The new joint venture, Guangdong Knorr-Bremse Guo Tong Railway Vehicle Systems Equipment Co., is based in Jiangmen in southern China.

NOVEMBER

Knorr-Bremse presents its portfolio of climate-compatible products on Deutsche Bahn's special "Train to Paris," which also carries German Federal Minister of the Environment Barbara Hendricks to the 21st UN Climate Change Conference. Among the products on show is a leading-edge system that helps drivers operate their trains in a very energy-efficient way.

DECEMBER

The Supervisory Board of Knorr-Bremse AG appoints Dr. Peter Laier to the Executive Board with responsibility for the Commercial Vehicle Systems division. From January 1, 2016 he succeeds Klaus Deller, who has filled this position in an interim capacity in addition to his role as Chairman of the Executive Board.

Knorr-Bremse Headquarters in Munich.