

SHAPING MOBILITY

Annual Report 2017

KNORR-BREMSE



THE YEAR 2017 FOR KNORR-BREMSE



DECEMBER

In fiscal 2017, Knorr-Bremse posts record sales of more than EUR 6 billion.



JANUARY

Knorr-Bremse completes the acquisition of Kiepe Electric, a supplier of electrical equipment for rail and commercial vehicles.



FEBRUARY

The Digital Days held in Munich with 120 participants from all regions and parts of the Company raise awareness of the opportunities presented by digital technologies.



MARCH

Knorr-Bremse holds its Financial Statements Press Conference and sets the stage for growth.



APRIL

Knorr-Bremse Japan begins the integration of the Transmission Control unit.



NOVEMBER

Handover: Ralph Heuwing (r.) succeeds Dr. Lorenz Zwingmann as new Chief Financial Officer (CFO) on the Executive Board.



MAY

Braking and steering systems from Knorr-Bremse feature in the new Iveco race truck driven by European Champion Jochen Hahn in the FIA European Truck Racing Championship.



OCTOBER

In Budapest, Knorr-Bremse opens a new production facility and one of the most advanced training centers in Hungary for 60 apprentices.



SEPTEMBER

Knorr-Bremse withdraws its offer to the shareholders of Haldex.



AUGUST

Dongfeng Motor Group Corporation Ltd. opts to partner with Knorr-Bremse in the development of transmission control units for its new generation of heavy-duty trucks.



JULY

In the reader survey conducted by publishers ETM, Knorr-Bremse is voted "Best Brand 2017" for the twelfth time in a row.



JUNE

Heinz Hermann Thiele is honored as an influential leading figure in the German business sector through election to the Manager Magazin Hall of Fame.

CONTENTS

The Year 2017 for Knorr-Bremse

- 01 Contents
- 02 Heinz Hermann Thiele in the Business-Hall of Fame
- 04 The Executive Board
- 06 The Supervisory Board
- 08 Report of the Supervisory Board

At a Glance

KNORR-BREMSE GROUP		2013	2014	2015	2016	2017
Sales	EUR mill.	4,303	5,206	5,831	5,494	6,236
Net income	EUR mill.	367	560	645	550	580
Employees (as per Dec. 31)*	Number	20,833	23,916	24,275	24,565	27,705
Personnel costs	EUR mill.	907	1,038	1,213	1,197	1,336
Balance-sheet total	EUR mill.	2,869	3,543	4,002	4,604	4,800
Equity	EUR mill.	1,107	1,443	1,736	1,819	1,859
Capital expenditure**	EUR mill.	159	161	210	195	186
Depreciation**	EUR mill.	125	169	199	179	208
Incoming orders	EUR mill.	4,752	5,510	5,668	5,723	6,657
Research and development expenditure	EUR mill.	253	296	347	328	359

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

Company Profile

► Knorr-Bremse is the leading manufacturer of braking systems and supplier of additional sub-systems for rail and commercial vehicles, with sales totaling over EUR 6 billion in 2017. In 30 countries, some 28,000 employees develop, manufacture, and service braking, entrance, control, and energy supply systems, HVAC and driver assistance systems, as well as steering systems, and powertrain and transmission control solutions. As a technology leader, through its products the company has been making a decisive contribution to greater safety by road and rail since 1905.

1 2 3

Shaping Mobility

- 10 Shaping Mobility
- 12 Our Daily Mission: Making Mobility Safe
- 16 The Road to Fully Automated Driving
- 20 Electrification and E-mobility
- 24 The Digital Evolution: Courage and Start-up Spirit
- 28 Sustainability Is Good for Business
- 32 Apprenticeships at Knorr-Bremse: Quality worldwide
- 36 Volunteering Project: Help on Location
- 40 Knorr-Bremse Global Care: Cambodia Project

Management Report

- 45 About the Group
- 46 Development of the Knorr-Bremse Group in 2017
- 50 Financial and Non-financial Performance Indicators
- 50 Assets, Financial Status, and Profitability
- 52 Overall Assessment of the Financial Position of the Group
- 53 Appropriation of Retained Earnings
- 53 Relations with Affiliated Companies
- 54 Acquisitions, Additions, and Joint Ventures
- 54 Quality and Processes; Research and Development
- 56 Sustainability and Social Responsibility
- 57 Human Resources
- 58 Report on Risks and Opportunities
- 62 Outlook

Consolidated Financial Statements

- 64 Notes to the Consolidated Financial Statements
- 84 Consolidated Cash Flow Statement
- 85 Breakdown of Sales Revenues
- 86 Statement of Changes in Group Equity
- 86 Independent Auditors' Report
- 88 Consolidated Balance Sheet
- 89 Consolidated Statement of Income
- 90 Main Majority-owned Subsidiaries
- 92 Credits



Heinz Hermann Thiele in the Business-Hall of Fame

Every year since 1992, Manager Magazin has elected outstanding figures from the German business sector to its Business-Hall of Fame.

Heinz Hermann Thiele is an exceptional entrepreneur and driving force, said Klaus Mangold, Co-Chairman of Rothschild investment bank, in his speech commending the newly elected member of the Hall of Fame. Thiele, the pilot and proprietor of Knorr-Bremse AG, a world-leading manufacturer of braking systems and supplier of additional sub-systems for rail and commercial vehicles, had established an impressive record of corporate growth, Mangold said.

Under Thiele's aegis, he added, the company had seen sales soar from EUR 180 million to EUR 6 billion, driven by sheer power of innovation. In the Thiele Era spanning 30 years (1985-2015), Knorr-Bremse had grown from a medium-sized enterprise in a precarious commercial situation into a globally successful corporate group which continues to deliver pioneering technology that makes for greater safety by rail and road.

Also remarkable, Mangold said, was Thiele's generous support of cultural and charitable initiatives, an expression of a sense of responsibility not restricted to the development of his company. Thus, in 2005 he cleared the way for the founding of the charitable association Knorr-Bremse Global Care to provide targeted and effective aid for the victims of the disastrous tsunami that struck Southeast Asia in December 2004. Ever since, the goal of Global Care has been to provide enduring support for people who, through no fault of their own, are victims of environmental catastrophes, accidents, armed conflict, poverty, or illness. Since the association was founded it has provided almost EUR 18 million to support more than 250 aid projects, reaching out to more than 680,000 people in 59 countries. Above and beyond this, Thiele also personally supports cultural institutions such as Deutsches Museum in Munich.

Member of the Hall of Fame: Heinz Hermann Thiele receives his certificate from the Editor-in-Chief of Manager Magazin, Stefan Klusmann.

The Executive Board of Knorr-Bremse AG



Dr. Peter Laier

Klaus Deller

Ralph Heuwing

Shaping Mobility

Sound business management lays the foundations for Knorr-Bremse to develop trailblazing ideas and products – and thereby shape mobility.

Knorr-Bremse closed its books on fiscal 2017 with record sales. After adjustment for foreign exchange effects, both divisions achieved their highest ever revenues. Knorr-Bremse was able to further consolidate its worldwide position as the leading manufacturer of braking systems and increasingly a supplier of additional sub-systems for rail and commercial vehicles – thereby making mobility safer, more comfortable, and more environmentally compatible.

The basis for this success is excellent performance in the Group's core business. Other key success factors include customer appreciation of our local presence, which we drive forward through systematic localization. In addition, through successfully concluded acquisitions we were able to continue the expansion of our portfolio in the best interests of our customers.

The decisions taken in the past are clearly paying dividends, and this is opening up new opportunities for us to play our part in shaping the fundamental transformation of the mobility of the future.

Influential factors in this change process will include further advances in connectivity and digitalization, as well as automated driving and electrification. These topics have more than just a technological dimension, because with them the very nature of our business is changing: More and more companies are entering the market; the pace of technological change is rapidly increasing, and trailblazing new concepts are totally transforming the value chains between supplier, manufacturer, and operator.

In this volatile environment, we are sticking to our chosen course: Knorr-Bremse is a family-owned company that targets sustainable commercial success and is focused on maintaining its long-term competitiveness and future viability. As a responsible entrepreneur, the proprietor of our company is constantly reviewing strategic options in respect of the long-term positioning of Knorr-Bremse. A stock market listing is one of several conceivable options in this respect.

So Knorr-Bremse can look to the future with confidence, a future that the Company with its approximately 28,000 employees worldwide is determined to master, backed up by an IT and digitalization strategy that safeguards our agility and momentum.

We are interested in acquiring companies if they make a good strategic match for the areas in which we work. Any acquisitions must add value for our customers and expand our technological competence. At the same time, we are investing in state-of-the-art development and production facilities in growth markets around the world. This not only boosts our production capacity but also strengthens our local presence and secures our future success. Based on this success, we will continue to shape mobility going forward.

We hope you find that our 2017 Annual Report makes informative reading.

The Executive Board of Knorr-Bremse AG

Klaus Deller
Chairman of the Executive Board,
also responsible for the
Rail Vehicle Systems division

Ralph Heuwing
Member of the Executive Board
responsible for Finance,
Controlling, and IT

Dr. Peter Laier
Member of the Executive Board
responsible for the
Commercial Vehicle Systems division

Dr. Lorenz Zwingmann
Member of the Executive Board
until December 31, 2017

The Supervisory Board of Knorr-Bremse AG



Werner Ratzisberger*

Project engineer
Knorr-Bremse Systeme
für Nutzfahrzeuge
GmbH,
Munich

Erich Starkl*

Deputy Chairman of the
IG Metall Trade Union,
Passau Office,
Passau

Wolfgang Tölsner

Management
consultant,
Uetersen

Günter Wiese*

Chairman of the Works
Council of Knorr-Bremse
Systeme für Schienen-
fahrzeuge GmbH,
Berlin

Michael Jell*

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

Georg Weiberg

Retired Head of
Development,
Daimler Trucks,
Stuttgart

Julia Thiele-Schürhoff

Chair of the Executive Board
of Knorr-Bremse Global Care,
Munich

Hans-Georg Härter

Chairman of the Supervisory
Board, former Chairman
of the Executive Board of
ZF Friedrichshafen AG,
Munich

Franz-Josef Birkeneder*

1st Deputy Chairman of
the Supervisory Board,
Plant Manager Aldersbach

Dr. Wolfram Mörsdorf

Retired Member
of the Executive Board
of Thyssen-Krupp AG,
Essen

Sebastian Roloff*

Attorney-at-law with IG Metall
Trade Union, Munich Office,
Munich

*Employee representative.

Report of the Supervisory Board

In the course of fiscal 2017, 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, the Supervisory Board also considered 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, the compliance management system and the internal audit system, as well as the work of the auditors.

In fiscal 2017, the Knorr-Bremse Group posted record sales of EUR 6.24 billion. This represents a 13.5% increase over the prior year (2016: EUR 5.49 billion). Both divisions,

Rail Vehicle Systems and Commercial Vehicle Systems, contributed equally to this achievement. The Rail Vehicle Systems division posted total sales of EUR 3.33 billion in 2017 (2016: EUR 2.99 billion). The Commercial Vehicle Systems division reported sales of EUR 2.93 billion in 2017, up from EUR 2.52 billion in the previous year.

In respect of the Knorr-Bremse Group's shareholdings, 2017 was marked by two acquisitions and one sale. In the commercial vehicle sector the Company acquired the on-highway commercial vehicle transmission components business of Bosch in Japan. In the rail vehicle sector the acquisition of the Electrical Systems business unit (Vossloh Kiepe) from Vossloh AG was completed, based on the contracts signed in December 2016. In addition, at the end of 2017 the sale of the Swedish vehicle service business (Swedtrac) was initiated. The sales agreement was signed in January 2018.

In September 2017, Knorr-Bremse withdrew its offer for the listed automotive supplier Haldex of Sweden and terminated the ongoing anti-trust clearance proceedings. The withdrawal followed a decision by the Swedish Securities Council not to extend the acceptance period of the bid, which was about to expire. Previously, and contrary to a resolution of their shareholders' meeting, the Haldex Board of Directors had already denied Knorr-Bremse the support required to obtain anti-trust clearance. Without this support it was not possible to obtain the clearance required to complete the takeover bid.

Knorr-Bremse was again certified "Top Employer for Engineers in Germany". In addition, the Commercial Vehicle Systems division won the accolade of "Best Brand" in the "Brakes" category for the twelfth time in succession. Bendix Commercial Vehicle Systems, a subsidiary of the Knorr-Bremse Group, was again named a Diamond Supplier by Navistar. The leading U.S. commercial vehicle manufacturer presents this award to its top suppliers in recognition of their advanced technology, high quality, and on-time delivery. Bendix also received a "Supplier Performance Achievement Award" from Paccar, another leading U.S. commercial vehicle manufacturer. The Rail

Vehicle Systems division was presented with the "Hitachi Rail Best Contribution to Value Generation Award" for the supply and support of systems for Hitachi Rail's global rail vehicle projects.

The 2017 Financial Statements and the Management Report on Knorr-Bremse AG, the 2017 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 5, 2018.

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. In the future, the plan is to draw up and audit the consolidated financial statements in line with the International Financial Reporting Standards (IFRS). The Executive Board of Knorr-Bremse AG initiated the necessary migration work early in 2017.

The Financial Statements Committee also examined the Financial Statements for fiscal 2017, 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 14, 2018, the Supervisory Board approved the Financial Statements of Knorr-Bremse AG and the Consolidated Financial Statements. The Executive Board and the Supervisory Board decided to leave final approval of the 2017 Financial Statements to the Annual Shareholders' Meeting. The Supervisory Board concurred with the Executive Board's proposal for the allocation of unappropriated retained earnings. At the Annual Shareholders' Meeting on March 14, 2018, the Financial Statements were given final approval, thereby becoming legally binding. The auditors attended the meeting of the Financial Statements Committee on March 2, 2018 as well as the financial statements meeting of the Supervisory Board and the Annual Shareholders' Meeting on March 14, 2018, 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: "In our opinion, based on the findings of our audit, the annual financial statements comply with the legal requirements and give a true and fair view of the net worth, financial position and operating results of the Company in accordance with the principles of proper accounting. The management report is consistent with the annual financial statements, complies with the statutory and legal requirements, and as a whole provides a suitable view of the Company's position and suitably presents the opportunities and risks of future development." 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.

Effective December 31, 2017, Dr. Lorenz Zwingmann, who had been Executive Board member responsible for Finance, Controlling, and IT since December 1, 2008, resigned from his position by full mutual agreement with the Company. In addition to his role on the Executive Board, Dr. Zwingmann was also Deputy Chairman of the Supervisory Board of Knorr-Bremse Systeme für Schienenfahrzeuge GmbH, a position from which he also resigned, effective December 31, 2017. On behalf of Knorr-Bremse AG, the Supervisory Board wishes to thank Dr. Zwingmann for his many years of successful work for the Company.

Effective November 1, 2017, Ralph Heuwing was elected to the Executive Board and, following the departure of Dr. Zwingmann, took charge of Finance, Controlling, and IT. Mr. Heuwing was also appointed to the Supervisory Board of Knorr-Bremse Systeme für Schienenfahrzeuge GmbH and, at its meeting on March 12, 2018, was elected its Deputy Chairman.

Munich, March 14, 2018

The Supervisory Board


Hans-Georg Härter
Chairman



SAFE

Assistance systems like ABS or automatic emergency braking, together with predictive maintenance, simply make driving safer.



ECO-FRIENDLY

Quiet, efficient, and sustainable: Knorr-Bremse helps make rail and road transportation more eco-friendly.



AUTOMATED

Smart, networked assistance systems combined with technically mature braking and steering systems are paving the way for fully automated drive mode for trucks.



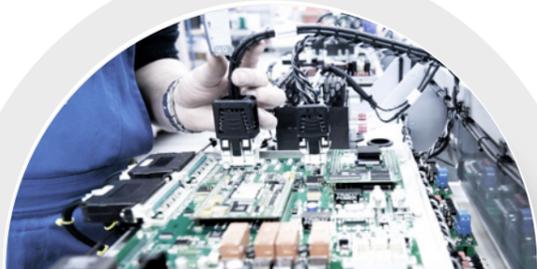
WELL-TRAINED

Top-quality training provisions around the world prepare a new generation of skilled workers and managers for working at Knorr-Bremse.

SHAPING MOBILITY

We create solutions for safe, comfortable, and sustainable mobility on rail and road.

Drawing on our core competences, we develop pioneering digitalization and networking solutions that pave the way for automated driving and electrification. Thus we are actively helping to shape tomorrow's mobility.



ELECTRIFIED

Electrical systems from Knorr-Bremse enable emission-free operation of buses and rail mass transit systems.



HELPFUL

Knorr-Bremse Local Care encourages voluntary work by employees at all sites.



DIGITAL

Digitalization is part and parcel of Knorr-Bremse's strategy.



RESPONSIBLE

In 2017, Knorr-Bremse Global Care helped more than 36,000 people in 60 projects.



Our Daily Mission: Making Mobility Safe

All over the world, leading-edge technologies from Knorr-Bremse make a vital contribution towards ensuring the safety of people and freight on rail and road. Safety and quality are in our DNA, and both our divisions work tirelessly to further improve their outstanding performance in this respect. This means Knorr-Bremse is well positioned to respond to the latest megatrends such as automated driving, electrification, and digital connectivity.

Our strength lies in our cross-divisional collaboration – as is demonstrated by the record speed with which the Knorr-Bremse e-compressor was brought to maturity. Based on the screw compressors used in the rail industry, Knorr-Bremse now offers an e-compressor for urban buses that significantly reduces noise and vibration – an important step towards e-mobility.

ABS for rail vehicles

An ABS system for rail vehicles – referred to as a ‘wheel slide protection system’ – reacts within thousandths of a second to regulate the braking force and prevent wheel lock that would otherwise result in a longer braking distance. It also helps prevent wheel flats, which generate unnecessary noise and are expensive for train operators to remedy.

The new MGS3 – a significant development of Knorr-Bremse’s tried-and-tested wheel slide protection system – is suitable for installation in all vehicle types and operates faster and with greater precision, reducing braking distances by applying braking force sooner to the point of wheel-rail contact. The system’s new, streamlined wheel slide protection valve reacts rapidly to differences in adhesion between wheel and rail, improving braking performance even on extremely slippery track.

Predictive maintenance with Platform 4.0

Platform 4.0 provides a basis for collecting data on the condition of rail vehicle systems, helping fleet operators save costs through predictive maintenance. In creating

With the help of the Blind Spot Assistant’s radar sensor and video camera, a truck driver can monitor the nearside and rear of his vehicle. The system warns him if there is a danger of collision.

the platform, Knorr-Bremse has effectively transferred the idea behind smartphones and their apps to rail vehicles. Although it is currently largely confined to this sector, the system can easily be extended to others. The basic principle is this: the more data on vehicle sub-systems the operator puts on the platform, the more useful it becomes.

A classic receives a makeover

The KE control valve – which regulates the braking force by varying the air pressure in the brake cylinder – is a classic on European railroads, with 60 years of successful operation under its belt. Now Knorr-Bremse has given its most important control valve a thorough engineering makeover: It has become lighter, with hot-pressed aluminum parts replacing heavy sandcast ones, clever standardization reducing the number of variants from some 500 to a mere ten, and bulky control elements neatly accommodated in the rack. The overall effect is to make the KE significantly lighter and more compact. Even the standard version fits into a confined space, for example in low-floor vehicles, without any modification being required.

Pneumatics – still a role to play

Despite the advances made in digitalization, traditional mechanical devices still play an essential role in the rail sector. Because freight cars have neither an electrical supply nor a wireless communication system, end-of-train devices (ETDs) have to rely on an entirely mechanical/pneumatic solution. The original role of ETDs was to

indicate the rear of the train, usually with a red light, and for this reason they were attached to the end of the main pneumatic pipe. But if they are supplied with a pneumatic brake module, they can also provide an important additional braking function that enables operators to run longer, heavier or faster trains. Tests carried out with a Scandinavian operator showed that the braking distance could be reduced by some 25% – a convincing demonstration as a result of which the system can now also be found in operation inside the Arctic Circle.

Faster braking for trucks

Synact is a new generation of braking system that weighs 10% less and yet delivers more than 10% extra torque, even during long periods of braking. The brake caliper is more rigid, the clearance is reliably kept within a narrow tolerance band, and the internal mechanics are very smooth-running and ideally geared. Synact thus offers excellent responsiveness and enhanced braking torque regulation.

These characteristics mean the new brake offers a good basis for further improving road safety, and for the development of automated driving – for which braking systems will have to cope with extremely short gaps between vehicles.

Safe platooning

To take full advantage of platooning, there have to be very short gaps between vehicles. Current regulations require trucks traveling at full speed to maintain a safety gap of 50 meters to the vehicle in front. Platooning will reduce this to between 10 and 15 meters. With their enhanced responsiveness, modern braking systems like Synact help ensure the safety of the vehicles involved. Another requirement of platooning is inter-vehicle communication to ensure that emergency braking can occur more or less simultaneously for them all. Platooning can cut fuel consumption by 10 to 15% – which not only reduces environmental pollution but also saves costs, with fuel typically accounting for 40% of a truck's overall running costs.

Emergency braking: preventing rear-end collisions

Driver assistance systems from Knorr-Bremse are set to make a crucial contribution to preventing collisions. By integrating the radar, video camera, and braking system, Wingman Fusion not only warns the driver when his truck comes too close to a forward vehicle – it even recognizes stationary objects in its path and reliably applies the brakes. This can help prevent rear-end collisions in tailbacks. If there is no longer enough room for effective emergency braking, the next generation of assistance systems will also automatically steer the vehicle into the adjacent lane, provided it is empty.

By contrast, the Blind Spot Assistant is designed to significantly reduce the number of accidents occurring at urban intersections. Serious incidents involving cyclists and pedestrians frequently occur when a truck is turning off to the nearside, because the driver has difficulty in identifying other road users close to his vehicle, despite having several side mirrors. This is where the Blind Spot Assistant comes in: A combination of video and radar monitoring of the area to the side of the vehicle warns the driver of possible collisions. The next stage of development will be a system that actively intervenes in the steering in such critical situations.

Other, less obvious assistance systems also contribute to road safety, including Safety Direct and the Event Recorder. The former stores images from a video camera in the driver's cab in the crucial moments before and after an accident, providing video evidence in the case of a dispute or damages claim. The Event Recorder has a positive impact on general driving behavior, recording unusually heavy braking and other changes in vehicle dynamics. Fleet operators can use this information for regular driver training. In addition, the TruckServices ProFleet Connect telematics system can use vehicle data to give the driver tips on fuel-efficient gear changes or to alert him to speed restrictions.

Safer tipping

Knorr-Bremse has also enhanced the safety of trailers and semi-trailers. Particularly in the case of fully-laden dump trucks operating on terrain that slopes to the side, such as on construction sites, there is a danger that when the body is lifted, the center of gravity changes and the vehicle rolls over. The automatic intelligent Trailer Access Point (iTAP) system can stop such a critical point being reached and prevent rollover. iTAP also offers safety functions such as a reversing camera or a camera that allows monitoring of the cargo container via the cellphone app.

Fast forward

The next generation of brake control – Global Scalable Brake Control (GSBC) – not only creates a standardized basis for the various requirements made of braking systems around the world, but also cuts the cost of individual safety functions. New system layouts reduce the cost when it is used on various vehicle configurations, with a self-learning function facilitating adaptation to different vehicle geometries, thus reducing complexity.



Every day, passengers all over the world enjoy safe travel by train – thanks in no small measure to Knorr-Bremse.



The Road to Fully Automated Driving

2017 was an exciting year for the automotive industry. We are witnessing evolutionary advances in the industrial production of sophisticated driver assistance systems, and systems for enabling conditionally automated and fully automated driving are now attaining a high level of technological maturity.

Advanced driver assistance systems (ADAS) and telematics have become standard features on today's commercial vehicles. Many vehicles on our roads are already capable of semi-automated driving (autonomous driving Level 2) thanks to a variety of electronic assistance systems ranging from lane departure warning to congestion assist. The technology has now advanced to the point where it is capable of conditionally automated driving (Level 3), while the first fully automated functions (Level 4) are already being tested on public roads where this is allowed by law. Examples include driverless parking (valet parking) for passenger cars and the Autonomous Yard Maneuvering system for commercial vehicles demonstrated so successfully by Knorr-Bremse at the 2016 IAA Commercial Vehicles trade fair.

In view of these developments, Knorr-Bremse acquired the steering specialists tedrive Steering Systems in 2016 and has rapidly integrated them into the Group. As a result, Knorr-Bremse as a supplier is now a leading developer of connected chassis and safety systems that efficiently integrate all the brake, steering system, and driving dynamics interfaces.

Truck Motion Controller connects subsystems

The Truck Motion Controller (TMC) developed by Knorr-Bremse provides the basis for automated driving functions in trucks. Various individual driver assistance systems such as lane departure warning, adaptive cruise control, and emergency brake assist are already standard as discrete systems on trucks, while blind spot and congestion assist systems have now been successfully tested. Knorr-Bremse's Truck Motion Controller (TMC) connects the different sub-systems and synchronizes braking and steering maneuvers to create an even safer overall system as vehicles move towards highly and fully automated driving functionality. The TMC analyzes a wealth of sensor data and camera feedback in different driving situations and uses the results to make driving dynamics decisions. The data is sent to the GSBC (Global Scalable Brake Control) platform and the iHSA (intelligent Hydraulic Steering Assist), which are the sub-systems responsible for executing the relevant maneuvers. The iHSA's torque overlay feature provides safety, comfort, and an interface with modern driver assistance systems that enables integration of lane departure warning, side wind compensation, and many other assistance functions.

Knorr-Bremse acquired the steering specialists tedrive Steering Systems and has rapidly integrated them into the Group.

Paving the way for fully automated functionality

Together, the GSBC and iHSA form a reliable control network for coordinated longitudinal and lateral control of automated vehicles. In an emergency, the braking system can take over the steering of the vehicle. In other words, if the steering system fails during automated driving, the braking system acts as a backup. This will be key to realizing fully automated functionality in the commercial vehicle sector. Other systems include the EPB electronic parking brake, transmission, and clutch control, and the trailer EBS. Knorr-Bremse's dedicated development teams cooperate closely with the truck OEMs,

whose experts get to experience the technology for themselves in a test track environment so that they can learn all about Knorr-Bremse's automated driving prototypes.

Test track demonstrations for our customers

It's something you hope you'll never experience. The truck approaches a bend on an icy road, traveling far too fast. But in this case, the vehicle is actually being driven fully automatically. To make matters worse, just at this moment, the steering fails completely. What happens next? "We drift into the bend, the truck stabilizes itself

and makes it round safely, even though the whole scenario plays out under extreme physical conditions", says function developer Tobias Edel. He demonstrates the latest automated driving prototypes to customers on test tracks at Arjeplog in Sweden and Boxberg in Germany. He has a switch that he can use to deactivate the steering. "Customers are particularly impressed by our Truck Motion Controller and the associated redundancy concept. If the steering fails, the vehicle can still be steered by applying the brakes on one side. No one else can offer this steer-by-brake functionality – after all, brake control is in our DNA."

The Highway Pilot: a long-term goal

Knorr-Bremse has a clear roadmap setting out its path towards automated driving. As well as the Truck Motion Controller, the Group will also soon be offering complete systems such as Highway Assist, which enables automated driving on motorways/freeways. In this instance, the driver must still be ready to intervene in the event of a malfunction. The long-term goal, however, is the Highway Pilot, which will allow drivers to engage in other activities for long periods during the journey.



The latest automated driving prototypes are pushed to their limits on test tracks at Arjeplog in Sweden.



Electrification and E-mobility

With the acquisition of Kiepe Electric, Knorr-Bremse has added energy-efficient electrical systems for rail vehicles and buses to its portfolio. This will open up new growth opportunities and potential applications for the Group as the electrification of rail and road mass transit continues to gather pace.

Düsseldorf-based Kiepe Electric was acquired by Knorr-Bremse in January 2017, expanding the Group's portfolio with a range of products comprising complete electrical systems for light rail vehicles, metros, and regional trains, as well as for battery-powered buses, trolley buses, and In Motion Charging (IMC) buses, which run on battery power on parts of the route where there are no overhead lines. IMC buses can cover up to 25 kilometers in this mode, depending on the system design and the exact nature of the route. Their electric batteries are then recharged using fast-charging technology on the sections of the route where overhead lines are present. This technology massively extends the buses' range. At the same time, the acquisition of Kiepe Electric expands Knorr-Bremse's traction business – the part of the system that drives the vehicle – which until now had been a relatively minor part of the Group's portfolio.

Customized energy management systems

"We don't do one-size-fits-all", says Kiepe Electric's Managing Director Dr.-Ing. Ludger Schülting. "Instead, we tailor our energy management systems to the specific operating conditions of each individual rail vehicle or e-bus." Vehicles used on routes with a lot of uphill sections have different traction system requirements to those employed on flat parts of the network. You need

more power available for hill starts, and this has implications for the system's overall design. The company's portfolio encompasses everything from heating, air conditioning, ventilation, and cooling systems to traditional rail components such as on-board auxiliary power converters and traction converters, battery chargers, energy storage systems, and even small electrical equipment for rail vehicles. As well as control, signaling, and safety units, this includes relays and switches. In short, Kiepe Electric supplies everything needed to keep pace with the transportation sector's inexorable transition to e-mobility. "We are clearly addressing the market's demand for future mass transit to be almost entirely electric", adds Kiepe Electric Managing Director Jürgen Völkner. As far as transportation experts are concerned, there is no doubt that electric mass transit has a promising future, not least because electric drives will be key to complying with mandatory particulate limits in inner cities.

Precision testing

Kiepe Electric carries out pre-production testing on its systems at its in-house systems testing facility, which comprises nine test stations that can handle voltages of up to 30,000 V. Huge dynamometers of up to 1.4 megawatts run in the basement, firmly anchored in concrete bases weighing several tons. But for all the immense

Kiepe Electric tailors its energy management systems to the specific operating conditions of each individual rail vehicle or e-bus.

power at its disposal, the testing facility is capable of extreme precision. The dynamometers allow the engineers to make minute adjustments to the speed and torque of the products and systems they are testing. "We use them to run specific driving profiles with different loads", explains the head of the systems testing facility, Holger Stiber. Every single product that comes off Kiepe Electric's production lines, be it electrical equipment, complete drive trains or roof containers, has undergone rigorous testing in the systems testing facility. The new roof containers being developed by Kiepe Electric for a project in Gothenburg, Sweden, combine the company's core competencies: perfectly integrated traction, on-board power supply, and control systems in a housing with such a low profile that vehicle manufacturers can save space by mounting it on the roof of the vehicle.

Synergies for Rail and Truck

There was much more to the acquisition of Kiepe Electric than simply expanding Knorr-Bremse's portfolio – the whole integration process was very carefully planned. Examples include the combination of Kiepe Diagnostic Help with the Knorr-Bremse Connected Systems strategy to create a powerful diagnostics tool, and the integration of the purchasing and distribution organizations, providing Kiepe Electric with access to the established channels of Knorr-Bremse's global distribution network. The intention is also to introduce the globally standardized Knorr-Bremse Production System (KPS) at Kiepe Electric's production facilities. Best practices from Kiepe Electric will also be fed back into the Group-wide KPS.

Preparations are already underway for the next phase, which involves the adaptation of Kiepe Electric's systems for electric commercial vehicle applications. "We have taken the first steps and made the initial key decisions", says Dr.-Ing. Ludger Schülting.

Kiepe Electric was already directly responsible for bringing new business to Knorr-Bremse during the year under review. For instance, Bielefeld utilities subsidiary moBiel ordered 24 Vamos GTZ8-B high-floor light rail vehicles from a consortium between Kiepe Electric and Leipzig-based vehicle manufacturer Heiterblick. The City of San Francisco is also expanding its fleet of zero-emission transit buses. After procuring 93 articulated Xcelsior XT60 electric buses, San Francisco Municipal Transportation Agency (SFMTA) has placed an order for 185 New Flyer XT40 buses equipped with In Motion Charging technology from Kiepe Electric – now one of the leading suppliers of traction systems for electric buses in the USA.

Kiepe Electric is also involved in a major project to refurbish Vienna Stadtbahn's rolling stock. The main part of the refurbishment involves completely replacing the drive units of 78 low-floor articulated multiple units. In addition to modern, air-cooled converters, Kiepe Electric is installing its new 600 generation on-board power converters, featuring a new control technology. As part of the package, the Group will also be supplying a new control system and equipping 468 doors with new electric door drives, to be supplied by Knorr-Bremse subsidiary IFE. Kiepe Electric has well and truly arrived in the Knorr-Bremse family.



Kiepe Electric was acquired by Knorr-Bremse in January 2017. It supplies complete electrical systems for light rail vehicles, metros, and regional trains as well as for battery-powered buses.



In many cities around the world, mass transit rail vehicles are powered by electrical systems made by Knorr-Bremse.



The Digital Evolution: Courage and Start-up Spirit

Knorr-Bremse continued to accelerate its activities in the field of digitalization during 2017. A number of new initiatives are strengthening cooperation with start-ups and promoting the development of new business models. Although it is a traditional company, Knorr-Bremse is successfully finding its feet in this world of hackathons and bright young entrepreneurs. The future of mobility is coming and we have every reason to be genuinely excited about it.

The pace of change in the mobility sector continues to accelerate, with debates on banning vehicles in inner cities, a whole range of electrification initiatives, and the consolidation of car sharing providers. In addition to these momentous changes, the complex topic of digitalization can also sometimes be accompanied by overblown expectations and a degree of hype. It is essential to remain focused and flexible – many of the themes that will play a key role in years to come have already been part of Knorr-Bremse's strategies for quite some time. However, the speed at which things are changing and the appearance of new competitors in the market mean that the challenges are greater than ever.

"As a global organization, we must become more agile and connected", says Patrick Härter, who has been tasked by the Executive Board with consolidating and expanding a selection of activities in the field of digitalization. "Knorr-Bremse is always looking for ways to add value to its products. Digital technology allows us to enhance our systems with new functions such as predictive maintenance. Both of our divisions have already taken the first

steps with solutions such as ProFleet Connect or iCOM in the rail vehicles business."

Digital Days provide a kick-start

The Digital Days held in Munich in February 2017 gave 120 employees from every region – from Executive Board members to trainees – the chance to immerse themselves in the topic of digitalization through technology marketplaces, workshops, and motivational speeches given by external experts. In the words of the Chairman of the Executive Board, Klaus Deller, "By strengthening our internal connections even further, we are driving continued progress in the field of connectivity both in our in-house cooperation and in our products. This is fully in keeping with the systemic approach to which Knorr-Bremse is committed."

Start-ups as technology and cultural accelerators

Knorr-Bremse is strengthening its cooperation with start-ups through various channels, from incubators at universities to partnerships with accelerators that bring together established companies and suitable start-ups. It is

In the rail transportation sector, the iCOM diagnostics system monitors and analyzes vehicle sub-system data and signals, optimizing the systems' operation and allowing operating costs to be reduced.

a mutually beneficial relationship – the start-ups have the agility and the ability to think out of the box, while the more established companies bring their industry know-how to the table. In 2018, Knorr-Bremse will be taking part in the TechFounders accelerator program in Munich. This is a win-win partnership that also gives Knorr-Bremse the opportunity to demonstrate its credentials as an innovative employer to those involved in the start-up scene. “It’s a great fit – our values of entrepreneurship, technological excellence, and passion are shared by the vast majority of young experts and entrepreneurs”, says Härter.

TechFounders: the start-up scouts

Every six months, TechFounders conduct a search for start-ups that match Knorr-Bremse’s criteria. The first batch comprised 35 companies in 13 different countries that are active in technology areas key to Knorr-Bremse’s business such as connectivity, Industry 4.0 and artificial intelligence. Some of these start-ups then gave presentations pitching their solutions and technologies. The best get to participate in a 20-week project work program where they collaborate and help to develop technologies with Knorr-Bremse’s innovation and development departments, for instance during the winter testing schedule in Arjeplog.

Getting inspired with TechFest

Our involvement with the start-up scene also encompasses new formats such as the Technical University of Munich’s TechFest hackathon. Held in Garching, the TechFest is an excellent example of the new thinking that is also transforming the mobility and mechanical engineering industries. After participating as a sponsor in 2017, Knorr-Bremse will be actively engaging as a partner in the 2018 event. The TechFest brings together approximately 300 students and tech enthusiasts. 60 teams spend 72 hours working on creative solutions to challenges set and guided by partners from industry. Their goal is to develop functional prototypes that can be built in a fully-equipped on-site workshop, and to formulate initial business model ideas.

New ways of thinking required

The start-up scene is all about innovation and experimentation, so it is hardly surprising that there is a clash of cultures when start-ups come into contact with a traditional company like Knorr-Bremse whose business is centered on safety-critical products. Andreas Wimmer, head

of R&D for Commercial Vehicle Systems, and Dr. Stephen Bradley, head of innovation for Rail Vehicle Systems, share the same view on this issue: “For digital solutions, the rapid development and testing of prototypes is key – often in cooperation with other business partners. However, we still have to take all the necessary steps to ensure the safety and profitability of the solutions and products.”

Digitalization is a challenge and a risk – but above all a source of innovation. Knorr-Bremse is fully conscious of this, which is why it is bringing in fresh methods and approaches to managing its business. New business partners and third-party start-ups can act as important drivers of these changes.



Collaborative robotics: This easy-to-train robot was piloted at the Aldersbach facility.



3D printing could potentially be of value to Knorr-Bremse for supplying spares and parts subject to wear.



Sustainability Is Good for Business

Knorr-Bremse is helping to make trains and trucks more efficient and more sustainable. For years, the company's investment in sustainability strategies has gone well beyond what is required by legislation or customers.

The importance of energy efficiency as a competitive factor is set to grow over the next years. "As a technological pioneer, Knorr-Bremse's many innovations make a significant contribution towards protecting the climate and conserving natural resources," says Klaus Deller, Chairman of the Executive Board and responsible for the Rail Vehicle Systems division. Knorr-Bremse, he adds, is also concerned to raise awareness amongst its business partners and suppliers of the need for more efficient, environmentally-friendly processes. For commercial vehicles, a central goal is reducing fuel consumption, whereas in the case of rail vehicle products, reducing noise is also an important factor.

Greener transportation – rail

In the rail sector, weight reduction is an important method of saving energy, especially in metro trains, with their constant alternation of acceleration and braking. Here, Knorr-Bremse has developed a special solution: brake discs made of cast aluminum. Hong Kong Metro has already taken up the idea and opted to use the aluminum version for its new trains. Compared with traditional cast iron, this reduces the overall weight of each car by up to 400 kg – and there is a further advantage: Mounted

directly on the axles, the aluminum brake discs require less energy for rotational acceleration. Although aluminum discs are more expensive and more difficult to manufacture than conventional ones, their operating life is at least three times longer. A further advantage is the fact that brake pads matched with aluminum discs do not wear as fast, reducing the amount of dust pollution.

Smart HVAC systems

Modern air-conditioning systems from Knorr-Bremse can switch from their cooling function and use ambient warmth to generate heat when required, reducing annual energy consumption per railcar by up to 32 MWh. The technology is particularly effective in cooler regions of the world. It also uses recuperative energy from the brakes, and adjusts output when, for example, there is only a small number of passengers on board. Lightweight components and clever design mean that Knorr-Bremse HVAC systems also weigh some 400 kg less – helping to further reduce CO₂ emissions.

Retrofitting 'whisper' brake pads

Residents in the vicinity of freight train routes can now look forward to less noise pollution. The rumbling sound

Trains symbolize energy-efficient mobility like no other transport mode.

of passing trains is mainly caused by brake shoes made of cast iron, which roughen the surface of the wheel, causing unevenness that generates noise by triggering vibrations at the wheel-rail interface. Organic brake pads can effectively halve noise levels, reducing them by approximately 10 dB(A). In this context, Knorr-Bremse has made a major contribution with its retrofittable LL pads and K pads for new vehicles – so-called ‘whisper brakes’. In Germany alone, DB Cargo will have re-equipped its fleet of some 55,000 freight cars with LL composite pads by 2020. And for some years now, organic brake pads have been mandatory for new vehicles in the EU.

Greener transport – trucks

Most road freight is carried by long-distance trucks. Fuel costs account for some 35% of an operator’s budget, so in a bid to reduce these, Knorr-Bremse is working on optimizing combustion engine and powertrain operation by developing more precise electric actuators and valves, for example for the exhaust gas recirculation system. Another area is the further development of electrically driven compressors. For this, the ProFleet Connect fleet management software continuously analyses vehicle data and provides the driver with visual tips on how to drive safely and more fuel-efficiently. Additional fuel savings and reductions in time spent behind the wheel can be achieved through improved route planning, with a system that updates routing instructions during the course of a journey. And intelligent integration of logistics modules helps reduce empty journeys, as every kilometer not driven reduces costs, emissions, and wear and tear.

Driver assistance systems

Increasingly smart driver assistance systems also contribute towards the greening of transport systems. When, for example, trucks are able to safely operate an automatic platooning system on motorways/freeways, this will result in fuel savings of up to 15% for the vehicles involved. This is above all due to the lower air resistance, but the stabilization brought about by platooning, with less braking and acceleration, will also cut fuel consumption and reduce wear and tear. Knorr-Bremse has already successfully carried out initial testing of its own platooning system.

Reduced vehicle weight for increased payload

Every pound of a vehicle’s unladen weight that does not have to be shifted helps save money. At the time of its introduction, the ST7 disc brake from Knorr-Bremse was the lightest twin-piston trailer brake in the market, weighing 10% less than its predecessor. This meant that the trailer’s payload could be increased, and fuel consumption with part-loads was reduced. In the case of the latest generation of Synact brakes for heavy-duty trucks, the engineers have again been able to reduce the weight by 10% and at the same time increase braking torque by 10%.

Longer operating life, less frequent replacement

Increasing the operating life of a product reduces the need to replace it, cuts overall costs, and helps conserve resources. The new Clutch Servo Longlife lasts twice as long as its predecessor – instead of two million operating cycles, it manages four – and significantly reduces the likelihood of it needing to be replaced during a truck’s life.

Knorr-Bremse is also pursuing a strategy of conserving resources with its EconX portfolio, which re-uses a large proportion of existing material. The industrially remanufactured components are subjected to the same end-of-line test criteria as new ones – which only an OEM can ensure.

Sustainable supply chain

Whatever division is involved, Knorr-Bremse supports its customers and partners in strengthening the sustainability of the entire supply chain. A new Supplier Code of Conduct is intended to ensure that the same environmental and social standards are met in all countries of the world. As a member of Railponsible for example – an initiative launched by manufacturers and operators such as DB, SNCF, Alstom and Bombardier – Knorr-Bremse is playing a pioneering role in the rail sector. And the Company also gives due recognition to suppliers’ commitment to sustainability: In May 2017, the Commercial Vehicle Systems division named Federal-Mogul Bremsbelag GmbH ‘Supplier of the Year 2017’ in the ‘Sustainability’ category.



Most road freight is carried by long-distance trucks.



Apprenticeships at Knorr-Bremse: Quality worldwide

Knorr-Bremse apprenticeship programs span the globe and reflect the diversity of a global organization that operates both in regions with high levels of youth unemployment and those where there is fierce competition for talented apprentices. Knorr-Bremse is just as committed to providing apprenticeships for young people heading for skilled shop floor roles as it is to training its high potentials and older employees. All our apprentices have one thing in common: They will help shape the future of Knorr-Bremse and the mobility of tomorrow.

Why do young people around the globe choose apprenticeship programs at Knorr-Bremse? When you talk to apprentices and their trainers in Europe, Mexico, and South Africa, a clear pattern of similar reasons emerges. Whether they are working on the shop floor, learning a trade, or enrolled in an academic program, an apprenticeship at Knorr-Bremse offers them the best vocational training – and the opportunity to apply their competencies and give back to Knorr-Bremse and its customers. High quality standards are a common thread running through all Knorr-Bremse apprenticeship programs. No matter where they are in the world, apprentices at Knorr-Bremse value our international outlook, modern training centers, program content, benefits packages, and creative initiatives to foster individual talent.

International outlook attracts apprentices

"At Knorr-Bremse, it's the international dimension that attracts young people. They are interested in working with our advanced processes and contributing to our best practices." Carole Lescouet, HR Administrator at Knorr-Bremse Systèmes Ferroviaires France SA in Tinquex (near Reims), knows the importance of the company

being an attractive employer. Knorr-Bremse vocational programs take high-school graduates and transform them into highly qualified employees working as warehouse operators or maintenance specialists, for example, or as quality and sustainability experts. Antoine Godfroy is currently taking part in one such program: "I wanted to learn more about the rail sector. My previous training experience was in a large automobile factory. It is interesting to compare these two different sectors, and it will help me in my career." With his interest in other countries, Antoine Godfroy loves exploring quality-related topics that also have an international aspect. "It is great to learn more about other work cultures, and it helps me improve my English language skills. I also get to take part in international meetings like the recent HSE conference that we organized at our site."

Training centers boost performance

"One of the things I like best is Knorr-Bremse's well-equipped training center. Most of my classmates at my vocational-technical school work on the shop floor of their companies. Knorr-Bremse gives us the opportunity to learn our trade without stress and time pressure."

At Bendix in Acuña, Mexico, the "Light Manufacturing Skills for Youth at Risk" program is helping 226 young people prepare for the world of work.

Sebastian Klingsporn, apprentice cutting machine operator in his third year, appreciates the great working conditions at Knorr-Bremse in Berlin, which in 2017 received the Chamber of Industry and Commerce (IHK) quality seal for an “excellent apprenticeship program” – as did the Munich site. Balázs Krisztián Vác, an apprentice lathe/drill operator in Hungary, feels the same. “We are part of a well-organized, cooperative team and work with modern machines. For me this means a great apprenticeship program and the opportunity to become a good skilled worker.” Featuring six training rooms and a machine shop measuring 600 square meters, the training center in Budapest is one of the best-equipped in the country. Sixty-two apprentices are scheduled to begin a one or two year dual vocational training program in 2018, learning trades such as lathe/drill operator, mechatronics technician, or welder. As part of its efforts to recruit qualified young people, Knorr-Bremse works closely with local vocational-technical schools in Hungary – just as it does in other parts of the world.

Benefits package seals the deal

In addition to the quality of the working environment, the trainers, and the career opportunities, the excellent benefits offered by Knorr-Bremse also are widely appreciated. According to Bernd Graubaum, training supervisor in Berlin: “As competition for high-performing apprentices grows, a good benefits package is an effective way to make our company even more attractive.” The benefits package offered to apprentices varies from one country to the next in keeping with regional needs and legal requirements. In addition to financial benefits such as vacation allowances, pension contributions, travel expenses, and provision of schoolbooks, the package also includes company medical provisions and statutory care. The cutting machine operator Sebastian Klingsporn: “I also like the fact that at least one trainer always is available to give me the guidance I need, answer my questions, and help me with any problems. I think the support we receive in preparing for exams, in addition to what we get from the vocational-technical school, is important.”

Programs benefit local community

In Acuña, Mexico, Knorr-Bremse Global Care has joined forces with the local labor institute ICATEC to support vocational training and education initiatives. The Light Manufacturing Skills for Youth at Risk program has provided vocational training to 226 young people aged between 18 and 25 who never completed school or who graduated near the bottom of their class. The four-week, full-time program alternates between four days of theoretical instruction and one day of hands-on learning in the Bendix training center. Participants study topics such as safety, quality, and measurement technology, as well as practical skills such as forklift operation and assembly work. Those who successfully complete the program receive an ICATEC certificate and an offer of work from Bendix. Most recently, 60% of those who successfully completed the program were offered regular employment. As Maria Gutierrez, Director of Corporate Responsibility & Sustainability at Bendix, says, “This program is focused on a local social need, but also helps address an internal Bendix challenge – employee turnover – by working with a local community organization.”

November 2017 saw the launch of a pilot project for 30 apprentices that included a “platinum course” for adults aged up to 60. The idea is to apply their experience in the assembly shop.

Training actively fosters potential

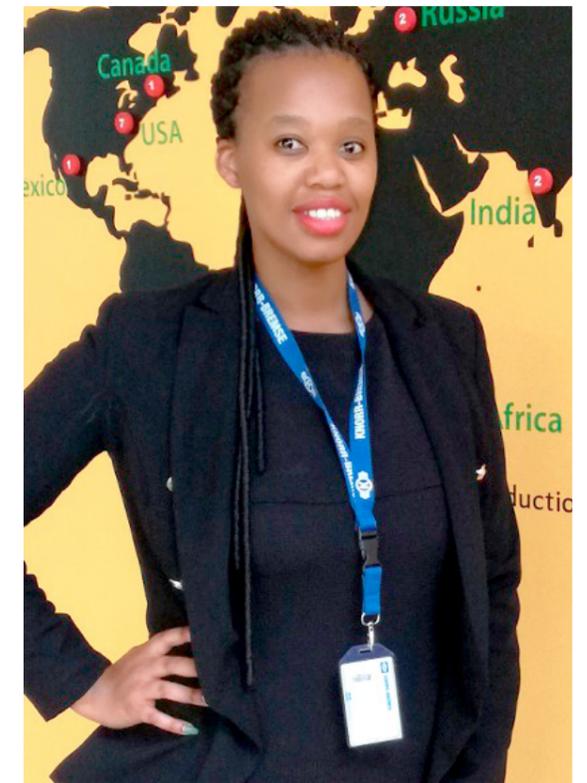
“I have learned that employees are the heart of any organization,” says Andisiwe Tola, which means she is in exactly the right place, gaining work experience as an HR Specialist at Knorr-Bremse South Africa, in Kempton Park near Johannesburg. Tola, 26, is in a two-year program, training to become an HR officer. “I realize the importance of HR in achieving the goals of the company; I can analyze trends, contribute to employee motivation, and recruit and train the right employees to take the business forward,” she says. She joined the program after graduating from university – an example of the effective partnership between Knorr-Bremse South Africa and the South African government. In this country, “employment equity” aims at equal opportunities and fair treatment in the workplace, promoting vocational training and affirmative action hiring for formerly disadvantaged groups.



The training center in Budapest sets new standards.



In conversation with a young trainee at Knorr-Bremse, Aldersbach, Germany.



Andisiwe Tola loves the variety offered by her training program at Knorr-Bremse South Africa.



Volunteering Project: Help on Location

Knorr-Bremse is very proud of the social engagement of its employees and actively encourages their efforts, not least through the current Volunteering project, which involves Knorr-Bremse Local Care providing financial and moral support for social initiatives around the world in which Company employees are involved as volunteers.

They coach youth teams in various sports, serve meals to the needy, and organize equipment for voluntary fire services – working with non-governmental organizations (NGOs) and supported by Knorr-Bremse Local Care, Knorr-Bremse employees volunteer for a wide range of projects. What motivates them to do so? High up on the list of factors are the rewarding nature of the work, the social contacts, and their involvement in the local community. At the same time, the company benefits from their heightened sense of social responsibility and their personal development, which also feed into their work.

Knorr-Bremse Local Care: helping hands on the ground

Voluntary work doesn't always make the headlines and yet it's important. More than one person in three in Germany engages in voluntary work, and the picture in other industrialized nations is similar. Companies like Knorr-Bremse demonstrate a strong engagement and have set themselves the goal of being a good corporate citizen by exerting a positive impact on their social environment. Knorr-Bremse's social engagement is broken down into two areas: On the one hand there is Knorr-Bremse Global Care, the organization that provides support for people in need worldwide. And on the other hand there is Knorr-Bremse Local Care: This local engagement by the company's sites is built around a range of elements such as donations of money or in kind;

'matched giving' whereby the company tops up donations from employees; and corporate volunteering. The commitment of the employees was well illustrated back in 2015 when Global Care celebrated its tenth birthday: 226 projects were implemented with the help of Knorr-Bremse employees at 22 sites in eleven countries, funded to the tune of more than half a million euros. Core fields of activity were education, healthcare, the environment, and social cohesion. This is where the Volunteering project comes in: Employees can apply for funding for a project close to their heart that they are already supporting in a voluntary capacity.

Danke! Successful projects in Munich

Dr. Martin Schmid and Stefan Kwaß, two employees at the company's Munich site, were recently able to support Munich's voluntary fire service and youngsters in the local handball community. No matter if they're training or responding to an emergency, when the Munich Fire Service Aircrew Team are deployed in helicopters up in the sky, they now wear customized work vests that give them enhanced mobility, enabling them to work more effectively. The man responsible for procuring the new vests, funded by Knorr-Bremse Local Care, is Dr. Martin Schmid (32), a structural engineer who, for the past three years, has been working on the rail vehicle side at the Knorr-Bremse Development Center in Munich. Acting in a voluntary capacity, Dr. Schmid is in charge of organiza-

Courtesy of Dr. Martin Schmid and Knorr-Bremse Local Care, the high-vis vest for the Munich Fire Service's Aircrew Team is custom-designed and manufactured and perfectly tailored to the job.

tion in the Aircrew section of the Munich Fire Service. Wherever life has taken him, since the age of ten his loyalty to the fire service has never been in doubt. Captivated in his early teens by the service's motto themed around "games, excitement, technology, and fun" and always a fan of those big red fire engines, he later identified another dimension in the societal impact of the service's work: "Playing a leadership role in terms of organization and when responding to a call is very attractive, and I really enjoy being responsible for our people and their equipment," he says. Every year, Schmid has to volunteer 150 hours of training and operations, a similar period of work in the operational departments, and countless hours of organizational work. It's a huge task, because the Aircrew team do a great job: With their helicopters they support the fire service and/or the general public from the air. Often enough they are dealing with out-and-out emergencies and hazardous situations during natural disasters, such as floods or forest fires, with many people needing assistance.

Stefan Kwaß's teams can also be found up in the air – leaping up to fling the ball at their opponents' goal. An Internal Audit Officer with Knorr-Bremse, Kwaß is a passionate handball player, and as a volunteer coach over the past four years has instilled a love of the sport into many young people. Two or three times a week during the season he joins with a few other experienced hand-

ball players to train youth teams at TS Jahn München. One highlight of 2017 was the summer handball training camp – a genuine alternative vacation for many of the youngsters. Funding from the Knorr-Bremse Local Care program covered the cost of their stay at a youth camp, their train tickets, and a souvenir T-shirt. Over a period of four days, the 20 youngsters benefited from intensive training.

"For some of them, these few days represent a rare opportunity to get away from home in the summer vacation and spend some carefree time with friends and teammates," Kwaß explains. Working with the youngsters is a great motivator for him. He's good at it, and he knows that "a sports club can provide young people with an anchor point in life and be good for their self-esteem. Here they can earn the recognition that they sometimes look for in vain at school. As a coach, I'm particularly concerned to ensure that bullying has no place in our set-up. The youngsters in our handball teams have taken that on board and treat one another with respect."

Gracias: Local Care in Spain launches volunteering project

Knorr-Bremse is keen to establish its volunteering program at international level. It has already taken off in the USA, while on the Iberian Peninsula, Knorr-Bremse Spain, a leading supplier of HVAC systems, is now also

helping improve the social climate. As Mario Peña, Engineering Services Manager at Knorr-Bremse Spain, explains: "Inspired by Global Care, our employees recognized the need to become active themselves and help other people. And Local Care is helping them to do so." Recently, Knorr-Bremse Global Care has also supported a large number of individual projects with up to 3,000 EUR each in Spain – projects to which local employees made a voluntary commitment. Examples of initiatives recently supported are inclusion projects such as an exercise and games room for young children with and without hearing impairments. The hearing aids of the hearing-impaired children are held firmly in place by special mounts so they can enjoy romping around with the others and are better equipped to explore their surroundings together. Another inclusion project supported was run by the Numen charity: This provided a specially equipped playground swing that can be enjoyed by children in wheelchairs and children without disabilities alike. Therapy dogs helping children with autism or Christmas parties for socially disadvantaged groups – the funded projects, each coordinated by a Merak employee, were highly diverse.

Thank you: Bendix demonstrates engagement

"Get Involved" is the motto and call-to-action of the volunteering program run by Bendix Commercial Vehicle Systems, Elyria/Ohio. Paula Novak, Manager Management

Systems and Processes, has worked at Bendix for more than 23 years, and since 2015 has volunteered as a member of the board of directors of the Citizens Ambulance Service, which provides emergency first aid. Novak currently serves on the finance committee and also provides input to the bylaws committee. So what drives her? "It provides me with an opportunity to take an active role in the governance of an important service and to give back to the community," she says. One of the underlying aims of the Citizens Ambulance Service is increasing the number of people who can save lives in an emergency. With this in mind the association is also heavily involved in providing training – an area where Local Care has lent a helping hand. This has enabled Citizens Ambulance Service to give its gear a much-needed safety update and purchase new training equipment. The focus of the Citizens Community Training Program has been teaching cardiopulmonary resuscitation (CPR) and automated external defibrillator (AED) use. Qualified paramedics and emergency medical technicians serve as trainers for the community. For example, training is being provided to 70 teachers in the local school district. "Further training will be scheduled for interested citizens and organizations in the community like churches and service groups," adds Novak, eager to see these future activities get underway.



Knorr-Bremse has launched its volunteering project in Spain, where funding had already been provided for numerous social projects, including therapy dogs working with autistic children.



The Citizens Ambulance Service in the small community of Wakeman, Ohio, was able to buy new equipment to provide first aid training in the local community.



Volunteer handball coach Stefan Kwaß organizes kit and equipment for his teams, arranges transport to away matches, and sets up a training camp.



Knorr-Bremse Global Care: Cambodia Project

Knorr-Bremse Global Care is supporting a kindergarten project for the children of waste-pickers in Phnom Penh, the capital of Cambodia, to offer them a chance of a better life.

The temperature is between 30 and 40 degrees Celsius and it stinks to high heaven. Children suffering from eczema, eyes stinging from smoke and toxic fumes, are playing in the dirty water among the rats. Around 200 families of waste-pickers work and live in these conditions on Smokey Mountain, the massive rubbish dump in the Cambodian capital of Phnom Penh. The waste-pickers look for useable waste materials and barely earn more than one euro per family per day. It is an extremely laborious job and the children help – which means they cannot escape the vicious cycle of no education and poverty.

A holistic approach

In order to offer these children a chance of education and some kind of normality away from the rubbish dump, Knorr-Bremse Global Care has been supporting the Somersault kindergarten in Phnom Penh since 2015. Four well-trained staff members pick up around 35 children by bus every morning. The children can use the washing facilities at the kindergarten and are given balanced meals. Until 4 p.m. they are allowed to be children – to play free from worries and to learn. Comped, the local organization implementing the project, uses a holistic approach to teach basic knowledge about hygiene and nutrition and impart an awareness of the importance of education. “We are trying to encourage the parents to let their children come to kindergarten regularly,” says Kim Heng, the Comped project manager. “It can be difficult

sometimes, even though they can see for themselves that the children are becoming stronger and healthier. As soon as a special load of rubbish arrives, it’s often more important for the family income to have everyone there to help.”

Breaking out of the poverty cycle

Some of the older children now go to school, where they struggle with the social stigma – in their dealings with other children and with the school authorities. Unfortunately, many schools are unwilling to accept the children, claiming that they are worried they might miss too many classes. However, since the schools are required by law to teach all pupils, the local organization is confident that its protégés will eventually be able to start school.

An after-school club has been added onto the kindergarten to give the schoolchildren a safe place to go. Here, they can get help with homework and are given schoolbags and uniforms. “Our aim and our hope is that access to a good education, a child-friendly environment, and better health will enable the children to break out of the poverty cycle one day,” said Sylvia Bytow-Weissheimer, who works for Knorr-Bremse Global Care, following a visit to Phnom Penh. The program will continue – the few hours the children enjoy at the kindergarten, happy and free from worries, are worth a lot.

Free to be children: The 4- to 6-year-olds still know how to play. And they learn plenty of useful social skills at the kindergarten.

Knorr-Bremse Global Care

Knorr-Bremse Global Care was set up at the beginning of 2005, following the tsunami in South-East Asia, to provide unbureaucratic, effective help to the flood victims. Having successfully implemented its first selected aid projects, the organization continued its work, constantly expanding and professionalizing its activities. In 2017, Knorr-Bremse Global Care ran 60 aid projects in 28 countries on four continents.

The financial assistance provided by Knorr-Bremse Global Care in 2017 reached over 36,000 people. The organization's key project support areas are education and WASH (water, sanitation, and hygiene). In the event of humanitarian disasters, it also supports emergency relief measures all over the world.

Local Care

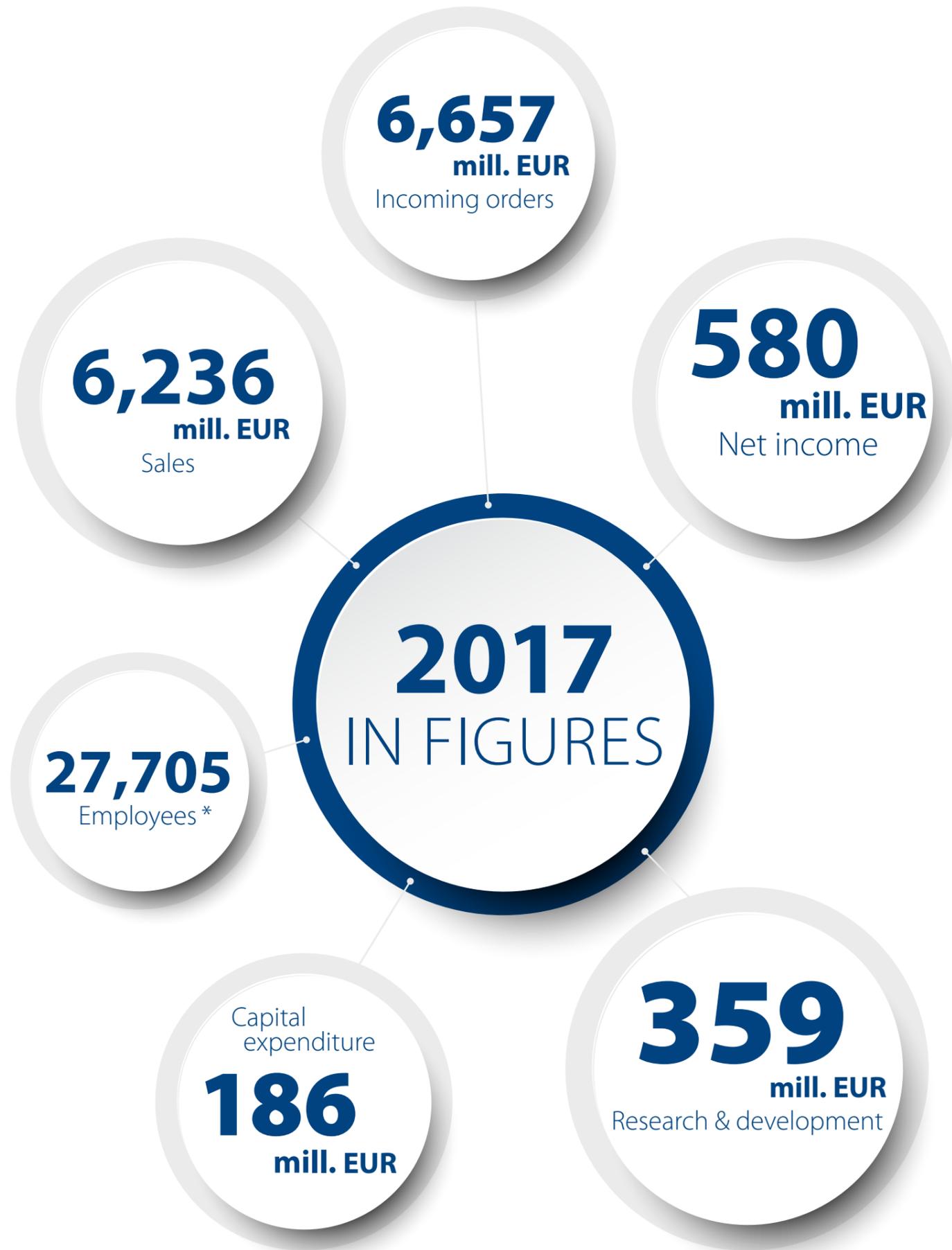
Local Care is the community work carried out by employees at the local Knorr-Bremse sites. It covers donations and projects that are selected, funded, and supervised autonomously by the employees at the site in question. The main Local Care support categories are education, health, the environment, and social cohesion. In 2017, Local Care supported over 600 projects at Knorr-Bremse sites. Knorr-Bremse places a special emphasis on networked projects that involve both Local Care and Knorr-Bremse Global Care.



A kindergarten education can represent the first step out of the poverty cycle.



Hygiene can be fun: Every morning, the children get to wash before eating a healthy breakfast. The rubbish mountain of Phnom Penh is home to an estimated 200 families. Everyone helps with the task of collection.



* Incl. HR leasing.

Combined Management Report Knorr-Bremse AG and Group

Status and Development

In fiscal 2017, Knorr-Bremse posted record sales of EUR 6.24 billion (2016: EUR 5.49 billion). On the back of positive developments in the markets and despite negative foreign exchange effects, sales revenues showed a 13.5% increase over 2016. In the Rail Vehicle Systems division, growth was supported by buoyant market demand in Europe, as well as by the Kiepe Electric companies acquired in February 2017. In the Commercial Vehicle Systems division, along with Europe, North America and China were the main growth drivers. Incoming orders rose from EUR 5.72 billion in the previous year to EUR 6.66 billion in 2017.

About the Group

An Overview of the Knorr-Bremse Group

The structure of the Knorr-Bremse Group is based on two divisions: Rail Vehicle Systems and Commercial Vehicle Systems. The divisions are geared to meeting the specific requirements of markets and customers in the regions Europe/Africa, North America/South America, and Asia/Australia. The Group's regional structure is designed to offer globally active customers uniform technical platforms which also 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

Global developments

Since mid-2016 a buoyant global economy has progressively picked up speed. Worldwide GDP growth in 2017 reflected the broadest upswing in global economic growth since 2010. This momentum was maintained throughout the year under review, with Germany, South

Korea, Japan, and North America in particular benefiting strongly. China and South Africa, the key nations among the emerging and developing economies, also posted strong growth.

The Rail Vehicle Market

Competitive environment and market position

In a highly competitive market environment, Knorr-Bremse is one of the world's leading companies in the key markets, not least for braking, entrance, and HVAC systems for rail vehicles. Knorr-Bremse is active in the regions Europe/Africa, North and South America, and Asia/Australia. The Company's leading position in its traditionally strongest markets in Europe forms the basis for future growth. Other drivers include a strong market position in Asia, and in China and India in particular. In North America, Knorr-Bremse is a successful player in both the passenger and freight sectors.

The worldwide rail vehicle market showed largely upbeat development. In Europe/Africa the market moved slightly ahead of the previous year, while in Asia/Australia it remained stable. Tangible growth was generated by investments in the North American passenger transportation sector. South America – due to the state of the Brazilian economy – generated no impetus of note.

Europe/Africa

According to data compiled by Knorr-Bremse, the rail vehicle market in Europe experienced moderate positive development overall. While original equipment business in Germany and the UK showed clear growth, in Turkey it was in decline. The RailServices aftermarket business also showed positive development.

North America/South America

Driven by the ongoing expansion of the mass transit networks in North America, the market situation proved highly satisfactory. After starting the year at a relatively low level, the freight market returned to growth in the second half-year. The Brazilian economy remained crisis-hit with knock-on effects for neighboring countries. Against this backdrop, sales in the South American rail vehicle sector again declined.

Asia/Australia

China witnessed resurgent demand for high-speed trains, while India made substantial investments in the expansion of its passenger fleets. The mass transit sector in Australia generated tangible impetus for growth, while the freight sector there remained subdued.

The Commercial Vehicle Market

Competitive environment and market position

With its product portfolio in the commercial vehicle braking system segment, Knorr-Bremse is one of the world's leading companies. Its principal competitor alongside smaller vendors in this market is Wabco.

In the Company's core regions, North America and Europe, Knorr-Bremse ranks as the market leader for air brake systems. Its leading position in the fields of disc brakes and driver assistance systems in highly regulated markets forms the basis for further potential growth in Asia and Australia.

The global commercial vehicle market showed positive development across the board in the year under review. The truck and trailer business in North and South America picked up speed, while business in Europe and Asia remained buoyant.

Europe/Africa

In both Eastern and Western Europe the commercial vehicle market saw substantial growth in 2017. According to data compiled by Knorr-Bremse, following on from 2% growth in 2016, truck production in Europe moved ahead by a total of 10% in 2017.

North America/South America

The commercial vehicle market in North America showed dynamic growth, particularly in the second half of 2017. This development benefited from two trends: Truck

manufacturers are adding more and more advanced collision mitigation systems to their vehicles as standard, while air disc brakes are increasingly replacing drum brakes as the standard on all axles.

After a slow start to the year, the Brazilian auto industry as a whole embarked on a gradual process of recovery, driven by strong exports. According to data compiled by Knorr-Bremse, truck market growth totaled 10% in North America and 28% in South America.

Asia/Australia

The commercial vehicle market in China in particular displayed exceptionally positive development, reaching a record output level of 1.6 million units. Overall, the Asian commercial vehicle market moved ahead by 28%.

Development of the Knorr-Bremse Group in 2017

Developments by Division

Rail Vehicle Systems

By securing important and substantial orders, Knorr-Bremse was again able to further reinforce its healthy market position across the globe and posted sales growth of 11.2%.

Europe/Africa

Knorr-Bremse recorded a stable level of incoming orders from the European passenger and freight transportation sectors.

The national rail operating company in The Netherlands is engaged in expanding and modernizing its intercity fleet with Coradia Stream trains from Alstom. Knorr-Bremse develops and manufactures the entire braking system for these trains, including the sanding system, as well as the entrance and HVAC systems. UK-based rail operator Abellio Greater Anglia Ltd. ordered trains from Bombardier's Aventura platform. Here, based on platform agreements, Knorr-Bremse supplies the braking and entrance systems. Microelettrica provides the energy metering system and Knorr-Bremse PowerTech an innovative auxiliary energy management system.

Vehicle manufacturer Stadler placed orders in various segments of the Group's portfolio, including braking, entrance and HVAC systems, the train control management system (TCMS) from Selectron, and an energy metering system from Microelettrica. Major orders for multiple units came from Italy, with Knorr-Bremse contributing braking, entrance, and HVAC systems, as well as numerous systems and components from the power supply segment.

In the European light rail vehicle segment, Knorr-Bremse won orders for braking and entrance systems for low-floor light rail vehicles in Gothenburg, Sweden. As a consortium partner to Bombardier, Kiepe Electric was responsible for the HVAC system, the electrical installation work and the commissioning of the vehicle control system, the onboard power supply system, passenger information system, and CCTV system.

The Company benefited extensively from the ongoing process of upgrading to 'whispering' brakes in Europe, with two major orders for more than 600,000 units of these low-noise freight car brake pads made of organic material.

In line with the Trans-European Railway Interoperability Ordinance, as well as handling the vehicle modernization concept, design, and modifications, in the year under review for the first time Knorr-Bremse also managed the entire homologation process for the modernized vehicle.

North America/South America

With incoming orders 25% up year-on-year, Knorr-Bremse clearly benefited from the positive market development in North America.

Knorr-Bremse developed the braking systems for Alstom's first high-speed project in the USA. The contract also included a service agreement for the braking systems for a minimum of 15 years.

An order from a leading North American operator for 200 units of the new LD-1000 air dryer marked the market launch of the latest product from the Air Supply segment at New York Air Brake Corp. (NYAB). In addition, a major mass transit operator introduced a sophisticated measuring and analysis process with automated diagnostics that provides live insight into the condition of its fleets – meeting one of the preconditions for ensuring maximum vehicle availability and low maintenance costs. Installed in streetcars in a U.S. city, this app monitors not only braking, HVAC, and entrance systems but also systems not supplied by Knorr-Bremse.

Also in the year under review, Technologies Lanka, the North American specialist for linear door technology within the Knorr-Bremse Group, won one of the largest orders in its corporate history. The company is to upgrade the entrance systems on double-decker trains operated by GOtransit in Toronto with its new, extremely robust linear door drive.

In Brazil, Knorr-Bremse is participating in an extensive modernization program for South America's largest logistics company RUMO/ALL.

Asia/Australia

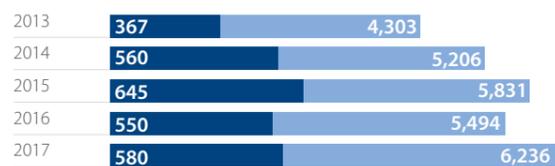
In China, Knorr-Bremse was able to benefit from the resurgent high-speed train and locomotive market, while in Australia the Company secured a share of several mass transit projects.

In the Chinese high-speed segment Knorr-Bremse received orders for almost 1,500 cars, in part concerning IFE entrance systems and HVAC systems from Merak. Following on from the large volume of systems supplied in recent years, the number of vehicles coming up for overhauls has begun to increase. In this segment, Knorr-Bremse RailServices is handling maintenance work on the Knorr-Bremse braking systems of more than 2,000 cars.

Knorr-Bremse also secured high market shares in China in the metro, tramcar/monorail, and locomotive sectors.

India Railways commissioned vehicle manufacturer ICF Chennai with the development and production of a new multiple unit, for which Knorr-Bremse India is to supply braking systems as well as automated plug sliding doors with sliding steps.

In Australia, Knorr-Bremse is involved in a milestone project in the freight market: In the year under review, for the first time ever, mining company Rio Tinto operated one of its freight trains entirely without a driver. The Auto-Haul concept in use here is based on the LEADER driver assistance system. In the past, the company had used the system only with a driver on board. In the mass transit sector, Knorr-Bremse received orders for smaller expansion projects as well as securing two major metro projects.



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

■ Sales
■ Net income

Commercial Vehicle Systems

As a whole, the commercial vehicle segment at Knorr-Bremse benefited from the positive development of the majority of regional markets in 2017. Overall, Knorr-Bremse posted growth of just under 23%, slightly outpacing global truck production, which was 21.9% up year-on-year.

Europe/Africa

In Europe, the Commercial Vehicle Systems division posted sales growth of 12%, well ahead of overall market growth of 10%. This was due in particular to the expansion of the Company's new fields of activity: Engine Air, Steering Systems, and Transmission Control.

Knorr-Bremse concluded supply contracts and long-term agreements with several European vehicle manufacturers, governing disc brakes, dampers, electronic brake control systems, compressors, valves, and air treatment systems, thereby safeguarding the long-term future of the business. Products successfully launched included the electrically powered screw-type compressor for the all-electric and hybrid drive models of a major customer based in Europe. Another customer is preparing to adopt this technology in 2018. In this way, Knorr-Bremse is making an important contribution to reducing emissions in downtown areas.

Knorr-Bremse successfully concluded the integration of two companies acquired in 2016 – the GT Group, a specialist in exhaust gas recirculation (EGR) valves and exhaust brakes, and steering systems specialist tedrive Steering Systems, since renamed Knorr-Bremse SteeringSystems. The conclusion of long-term supply agreements for exhaust brakes with renowned European manufacturers has secured the long-term future for the GT Group.

By accessing the steering sector, Knorr-Bremse has become the world's first vendor to be able to offer a combination of braking and steering systems from a single source. The smart connectivity of the two systems fulfils one of the preconditions for the development of complex driver assistance systems, all the way to fully autonomous driving. The great potential for mid-term growth that Knorr-Bremse has identified here is reflected in the numerous inquiries received from international customers in 2017.

In the trailer segment, Knorr-Bremse concluded new, long-term agreements with the leading European trailer and axle manufacturers. The Company continued to build on its strategic partnerships for the development of the next generation of brake control and chassis management systems, as well as wheel-end solutions.

One key product in the trailer segment is Trailer EBS (TEBS). This system integrates all braking functions, the ABS system, the load sensing, and the stability program (RSP), and regulates all processes electronically.

In conjunction with iLvl electro-pneumatic air suspension, this system impressed customers from segments including car transporters, dump trucks, and refrigerated vehicles – market segments that are widely considered trailblazers in the trailer sector. Here, Knorr-Bremse was able to substantially enhance its market position. With iLvl, the driver can control the pneumatic suspension electronically, from the cab if required, making for added safety in the driver's everyday work.

In recognition of its systematic customer focus and resultant leading position in the market, in 2017 TruckServices was awarded the European Frost & Sullivan Award for Customer Value Leadership. Along with the telematics solution ProFleet Connect, in the year under review the Company also launched a new service concept for its EAC 2.5 Electronic Air Control system, which delivers a blend of economical service and timely replacement. In addition, the EconX portfolio was extended to include further disc brake and electronic clutch actuator applications. In conjunction with tooling specialist Gedore, TruckServices also introduced new special-purpose tools.

During the year under review, Alltrucks, a joint venture between the leading automotive and commercial vehicle suppliers Bosch, Knorr-Bremse, and ZF, expanded in France, Poland, Portugal, and Norway. By the end of 2017, more than 500 cross-brand commercial vehicle service workshops had joined the Alltrucks network, clearly evidencing the success of this concept.

In September 2016, Knorr-Bremse had announced its intention to acquire Haldex, based in Landskrona, Sweden, one of the leading suppliers of braking systems and air spring modules for commercial vehicles. The planned combination of Knorr-Bremse and Haldex was based on a convincing strategic rationale: It would have given rise to one of the leading system suppliers with a clear focus on the commercial vehicle business. The Haldex shareholders were also of this opinion and in December 2016 a majority of 86.1% opted to take up Knorr-Bremse's bid.

In order to obtain anti-trust clearance, the support and cooperation of the Haldex Board of Directors were indispensable and a central precondition. Regrettably, and contrary to a resolution previously passed by their shareholders at an extraordinary general meeting in August 2017, the Haldex Board of Directors decided not to support Knorr-Bremse's bid.

Without the support of Haldex, it was not possible to obtain anti-trust clearance, as this had always been intended as a friendly takeover. After carefully reviewing all its options, in September 2017 Knorr-Bremse decided not to pursue the acquisition of Haldex any further.

North America/South America

In North America, truck production increased by 9.5% in 2017. Growth at the Commercial Vehicle Systems division was more than twice as high at more than 26%. This was based above all on strong demand for disc brakes and electronics. In South America, the Company kept pace with a market that showed signs of recovery after a relatively long recession.

In the year under review, the Knorr-Bremse Group's North American subsidiary, Bendix Commercial Vehicle Systems, achieved a number of major market successes with its Wingman Fusion and Wingman Advanced collision mitigation systems. These integrate radar, camera, and the vehicle's brake system into a high-precision system that delivers driver alerts and interventions to help mitigate rear-end collisions, rollovers, sideswipe crashes, and loss-of-control situations. As a result of these market successes, Bendix achieved a 70% increase in collision mitigation and driver coaching system sales compared to the prior year. Thanks to high continued demand for the Bendix ESP full stability system, the total number of systems sold grew to almost 600,000 units.

To further improve the safety and stopping power of their on-highway trucks, two truck manufacturers elected to fit air disc brakes as standard on all wheel-ends. Overall, the sustained adoption of air disc brakes helped propel a 50% increase in the adoption rate of Bendix disc brakes against the previous year. Bendix Spicer Foundation Brake – the joint venture of Bendix Commercial Vehicle Systems LLC and Dana Commercial Vehicle Products, LLC – responded to these changing market developments by expanding production capacity at its Bowling Green facility in Kentucky, USA.

As the business environment in the commercial vehicle sector shows signs of recovery, Knorr-Bremse Brazil is placing the new Global Scalable Brake Control (GSBC) as original equipment in numerous models. In addition, Knorr-Bremse is to supply the engine brake for the Euro VI engines of a major manufacturer. The technology is being supplied by the GT Group. The engine brake is to be localized in the course of 2018 and in subsequent years will form part of products destined for other countries as well.

Asia/Australia

Posting growth of 33%, Knorr-Bremse above all reported increased market shares in China and benefited from the expansion its new field of business – Transmission Control – in Japan.

In China, a leading truck manufacturer commissioned Knorr-Bremse to supply compressors and dampers, while another placed orders for compressors and air treatment systems for its wide range of trucks and buses. As a strategic partner, Knorr-Bremse is also heavily involved in the development of the future vehicle platform of a leading manufacturer.

The adaptation of the SC7 air disc brake for the local market received official approval. In addition, a new production line for air disc brakes came on line at the Company's Dalian site. The line will manufacture SN5 and SB7 brakes, optimizing both costs and availability for local market customers.

In Japan, Knorr-Bremse secured its future electronic brake control and electronic leveling control business with a local company, the subsidiary of a major commercial vehicle manufacturer based in Europe.

The largest single order for Knorr-Bremse Australia was concluded with one of the country's major bulk goods forwarders. The order covers the installation of EBS and brake valves for trailers that enable the brake control system to take account of the vehicle's current load status.

Financial and Non-financial Performance Indicators

The most important financial performance indicators for the Knorr-Bremse Group are sales and EBITDA margin. The EBITDA margin is defined as the ratio between sales and earnings before interest, taxes, depreciation, and amortization and is reported for the first time for fiscal 2017. Other important performance indicators are working capital, expressed in days' sales, and net liquidity, defined as the balance of cash and cash equivalents, other marketable securities, receivables from unconsolidated affiliates, as well as bonds and payables to financial institutions.

Working capital in days' sales is defined as the tie-up period resulting from the sum of net inventories after advance payments plus trade receivables, minus trade payables. By way of non-financial indicators, the average number of FTE (full-time equivalent) employees is applied. The key financial indicator with reference to the separate financial statements of Knorr-Bremse AG is income from investments.

For the management of Knorr-Bremse AG, monthly financial reporting is a key element in the ongoing analysis and control of Group companies, divisions, and business units, as well as the Group as a whole. This reporting includes consolidation and analysis of the financial statements drawn up by the Group companies included in consolidation, as well as their key performance indicators and monthly annual forecasts. Budget variances are reviewed in terms of their impact on financial targets.



Consolidated sales by region

Risk reporting complements monthly and quarterly annual forecasts by taking account of potential asset disposals or additions. The effectiveness of measures taken to ensure that targets are met is subject to continuous analysis. The financial performance of the operating units is discussed in depth by their management teams and the Executive Board. The close links between the Executive Board of Knorr-Bremse AG and the Management Boards of the operating units in this respect ensure the rapid flow of information and also enable fast responses.

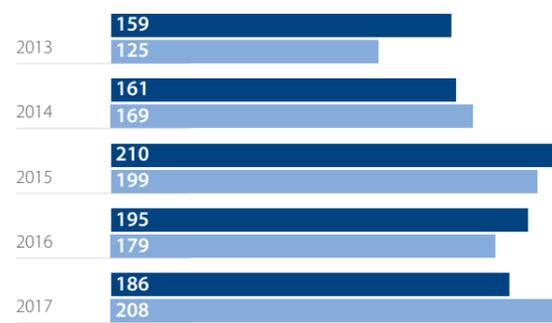
Assets, Financial Status, and Profitability

Profitability

At a new record level of EUR 6,235.7 million, in the year under review consolidated sales were 13.5% up on the prior year (2016: EUR 5,494.3 million), far exceeding the Group's own forecasts for 2017. Adjusted for foreign exchange effects at actual 2016 rates, the increase in sales amounted to 15.6%.

At the Rail Vehicle Systems division, sales moved ahead 11.2% to EUR 3,325.2 million (2016: EUR 2,990.3 million). Of this increase, EUR 213.4 million was accounted for by Kiepe Electric, which was acquired during the year under review. The remainder of the sales growth mainly concerned developments in the RailServices sector and the maintenance business.

The Commercial Vehicle Systems division posted a 16.0% upturn in sales in the year under review, with revenues



Consolidated capital expenditure and depreciation in EUR millions

■ Capital expenditure
■ Depreciation

totaling EUR 2,928.0 million (2016: EUR 2,532.2 million). The increase was largely due to a sharp rise in sales in China, as well as to truck production rates that exceeded expectations. After adjustment for foreign exchange effects, both divisions posted new record sales figures.

In Europe/Africa, sales climbed 15.9% to EUR 3,162.2 million (2016: EUR 2,728.2 million), which corresponds to 50.7% of the consolidated total (2016: 49.7%). In North and South America, sales were up 13.2% to EUR 1,379.7 million (2016: EUR 1,219.2 million), contributing 22.1% (2016: 22.2%) to the consolidated total. In the Asia/Australia region, sales moved ahead 9.5% to EUR 1,693.8 million (2016: EUR 1,546.8 million), which equates to 27.2% (2016: 28.1%) of the consolidated total.

Incoming orders were valued at EUR 6,656.6 million (2016: EUR 5,723.4 million), 16.3% up on the previous year.

Orders on the books at the Knorr-Bremse Group on December 31, 2017 were up 19.8% at EUR 4,977.0 million (2016: EUR 4,154.2 million). This equates to a calculated range of 9.6 months (2016: 9.1 months). While the cost of materials ratio was higher than in the previous year, primarily owing to changes in the product mix, the personnel cost ratio showed a slight decline.

Net income for the Knorr-Bremse Group rose in 2017 to EUR 579.8 million (2016: EUR 549.7 million). As a result of positive contributions to earnings generated by sales growth in both divisions, the Group's own net income forecast for 2017 was exceeded. Negative impacts totaling approximately EUR 75 million resulted from foreign exchange effects as well as extraordinary expenditures in the context of the attempted acquisition of Haldex and the conversion of Group accounting to IFRS. Net return on sales reached 9.3% (2016: 10.0%). Despite substantial extraordinary expenses, EBITDA for 2017 totaled EUR 1.06 billion (2016: EUR 1.01 billion). In line with IFRS, adjusted EBITDA reached EUR 1.14 billion (unaudited).

	2017	2016
EBITDA margin	17.0%	18.4%
EBITDA	1,060.3	1,011.5
EBIT	852.5	832.0
PBT	841.1	829.5
Net income	579.8	549.7

Key earnings indicators in EUR millions

The Rail Vehicle Systems segment contributed EUR 659.1 million to EBITDA, which equates to 19.8% of sales. The Commercial Vehicle Systems segment returned an EBITDA of EUR 475.4 million, corresponding to 16.2% of sales. The Miscellaneous category including consolidations accounted for EBITDA of -EUR 74.2 million.

Assets

The consolidated balance sheet total rose 4.2% in 2017 to EUR 4,799.7 million (2016: EUR 4,604.2 million). At year-end 2017, total assets represented 77.0% of sales. As a proportion of the balance sheet total, intangibles, fixed assets, and investments fell from 27.0% in the prior year to 26.5%. Working capital, defined as the sum of inventories and accounts receivable, minus accounts payable trade, stood at EUR 760.3 million at year-end (2016: EUR 666.8 million) or 44 days' sales (2016: 44 days), which was below expectations as a result of the growth of the Group. The equity ratio fell by 0.8 percentage points from 39.5% to 38.7% due to the simultaneous increase in assets and liabilities.

Financial Status

Cash and cash equivalents declined to EUR 1,581.2 million (2016: EUR 1,716.2 million), largely made up of the positive balance of inflow of funds from operating activities (EUR 634.6 million), outflow of funds to investments (-EUR 231.5 million), and disbursements to company owners and minority shareholders (-EUR 433.1 million). Net liquidity fell from EUR 1,071.4 million in the previous year to EUR 946.1 million in the year under review. This represents a clear shortfall compared to the forecast for 2017.

The ratio of net liquidity to shareholders' equity stood at 50.9%, compared to 58.9% in 2016. The Group has committed credit facilities in place in the amount of EUR 1.954 billion, of which EUR 1.164 billion remained untapped at the end of the financial year. 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 creditworthiness since 2000. The ratings have been of investment grade status from the outset and they have improved continuously over time. Based on the results of fiscal 2017, Standard & Poor's and Moody's retained their 2016 ratings for the Knorr-Bremse Group of "A" and "A2" respectively, both with "Outlook stable". This represents an upgrade of one increment in each case over the previous "A-" and "A3" ratings. Through their ratings, the agencies recognized the stable ongoing quality of the Group's results, the continuity of its management performance and its stronger competitive position, particularly as a result of high investments in research and

development. They also emphasize the Knorr-Bremse Group's substantial growth through acquisitions and the establishment of joint ventures.

The current ratings put Knorr-Bremse among the top-placed automotive, commercial vehicle, and rail vehicle suppliers worldwide.

In 2016 Knorr-Bremse AG issued a corporate bond with a volume of EUR 500 million. The bond bears interest at a fixed rate of 0.50% p.a. and has a five-year term. The bond serves to finance the growth of the Knorr-Bremse Group while at the same time optimizing the ratio of equity to outside capital in its financing structure. In addition, in fiscal 2017 the current debt issuance program from 2016 was extended by a further year. This opens up the opportunity for Knorr-Bremse AG to issue bonds on the Luxembourg Stock Exchange's Euro MTF market with a volume of up to EUR 1 billion in 2018, based on standardized documentation.

Investments

The Knorr-Bremse Group's investments in fixed and intangible assets reflect the importance assigned to growth and innovation across the Group. In the year under review, these totaled EUR 185.6 million, which is 4.6% down on the previous year owing to several shifts in timing. The allocation of capital expenditure was such that the Rail Vehicle Systems segment benefited in the amount of EUR 71.8 million (38.7%) and the Commercial Vehicle Systems segment in the amount of EUR 98.3 million (53.0%).

Investment activity focused primarily on machines and equipment related to the introduction of new product generations, as well as on expanding capacity in high-growth fields of business and locations. Investments were also made in the establishment of the Guo Tong site in China, the new Business Services Center in Liberec, Czech Republic, and IT infrastructure projects worldwide. Replacement investments were also regularly undertaken.

Depreciation on intangible and fixed assets (excl. goodwill) increased across the Group, rising from EUR 141.4 million in 2016 to EUR 159.0 million in the year under review. The larger proportion of depreciation in the amount of EUR 78.0 million was accounted for by the Rail Vehicle Systems division, while depreciation at the Commercial Vehicle Systems division totaled EUR 68.4 million.

Overall Assessment of the Financial Position of the Group

Within the general economic environment described above, the Knorr-Bremse Group was able to post higher earnings than were forecast in the budget for fiscal 2017. The Group's assets position showed extremely stable development, although several indicators were slightly down on the forecast values due to special effects. The Group's financial status improved against the previous year. Liquidity remains at a high level.

The Group's profitability was strengthened through rigorous cost management and continuous improvements to internal processes and structures. With an equity ratio of 38.7% and net liquidity of EUR 946.1 million, the structure of the Group's assets is extremely stable. The overall development of the Knorr-Bremse Group was positive.

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, 2017.

Development of Knorr-Bremse AG in fiscal 2017

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. Compared to the previous year, across all regions income from investments in associated and related companies increased sharply to a total of EUR 733.8 million (2016: EUR 442.4 million). This led to a substantial increase in income before taxation, which totaled EUR 644.7 million in the year under review (2016: EUR 469.1 million). On account of income from special dividends from Asia and the USA, and higher transfer of profits from Knorr-Bremse Systeme für Schienenfahrzeuge GmbH, income from investments in associated and related companies was higher than forecast for 2017.

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.

The balance sheet total of Knorr-Bremse AG amounted to EUR 2,211.0 million (2016: EUR 1,958.7 million). Equity increased from EUR 751.1 million in the previous year to EUR 1,019.2 million.

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 residual net 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 its associated and related companies. The overall development of Knorr-Bremse AG was positive.

Appropriation of retained earnings

Knorr-Bremse AG posted unappropriated retained earnings of EUR 944.3 million in fiscal 2017 (2016: EUR 676.1 million). The Annual Shareholders' Meeting will be asked to approve the proposal that an amount of EUR 850.2 million from these unappropriated retained earnings be used to pay a dividend of EUR 327 (2016: EUR 140) per dividend-bearing share with a par value of EUR 26. This amount is made up of a regular dividend of EUR 350 million and a special dividend of EUR 500.2 million. The balance is to be carried forward to new account.

Relations with affiliated companies

In the view of the Executive Board, Knorr-Bremse AG constitutes a company directly dependent on KB Holding GmbH, Grünwald, Germany, pursuant to Section 312 German Corporation Law (AktG). The Executive Board understands that the shares in KB Holding are held by TIB Vermögens- und Beteiligungsholding GmbH, Grünwald, a majority of whose shares are in turn held by Stella Vermögensverwaltungs GmbH, Grünwald. The Company is therefore indirectly dependent on TIB and Stella

pursuant to Section 17 in conjunction with Section 16, Subsection 4 AktG. The Executive Board understands that a majority of the shares in Stella have, since July 6, 2017, been held by Mr. Heinz Hermann Thiele. The Executive Board assumes that, through the intermediary of the respective majority shareholdings in KB Holding, TIB, and Stella, the Company is indirectly dependent on Mr. Thiele. As a result, the companies dependent upon the Company pursuant to Section 17 AktG are also dependent upon Mr. Heinz Hermann Thiele.

KB Holding GmbH, Grünwald, 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:

"We declare that in the legal transactions and measures shown in the Report on Relations with Affiliated Companies, in accordance with the circumstances known to us at the time at which the said transactions took place or measures were taken or refrained from, in each case Knorr-Bremse AG received appropriate consideration and was not placed at a disadvantage through measures being taken or refrained from. In the legal transaction shown in the Report on Relations with Affiliated Companies, in accordance with the circumstances known to us at the time at which the said transaction took place, our Company paid appropriate consideration." The report was verified by the Auditors and received their unqualified opinion.

Assets	Balance sheet total in EUR millions	2016	4,604.2	2017	4,799.7
Fixed assets/Intangibles		25%		25%	
Investments		2%		2%	
Current assets/Prepaid expenses/Deferred taxes		36%		40%	
Liquid assets		37%		33%	
Liabilities	Balance sheet total in EUR millions	2016	4,604.2	2017	4,799.7
Shareholders' equity		40%		39%	
Pension accruals		5%		5%	
Short-term debt		41%		42%	
Borrowings		14%		14%	

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

Acquisitions, additions, and joint ventures

Effective February 1, 2017, Knorr-Bremse Systeme für Schienenfahrzeuge GmbH acquired the Electrical Systems business unit (Vossloh Kiepe) from Vossloh AG. With this acquisition, Knorr-Bremse added advanced drive technologies for rail and commercial vehicles to its portfolio. Closure of the purchase agreement signed on June 22, 2016 between Knorr-Bremse Commercial Vehicle Systems Japan Ltd. and Bosch Corporation Japan, governing acquisition of all of the assets of the Bosch Transmission Systems division (TRS) in Japan, was effected on March 31, 2017. TRS develops, manufactures, and markets systems and components for manual and automated manual transmissions for on-highway commercial vehicles in Asia.

Quality and processes

In the Knorr Excellence management system that has been rolled out worldwide, Knorr-Bremse has brought together its initiatives targeting continuous improvement of its business processes. The focus here is increasingly on IT-assisted process organization and execution. This digitalization enables more intensive development collaboration between the various sites around the world. It also contributes to the continuous improvement of production processes. Knorr-Bremse uses pilot projects to study the efficiency potential that results from data connectivity and analytics, for example when using augmented reality technologies to optimize the supply of media and materials to production lines.

Knorr-Bremse examines and enhances the implementation of its quality management system through internal quality audits and assessments that are conducted worldwide, and has these validated by external IRIS and/or IATF 16949 certification audits. In September 2017, the Rail Vehicle Systems division began migration to the new ISO TS 22163 standard – a process due for completion by September 2018. The Commercial Vehicle Systems division has migrated to the new IATF 16949 standard including various more rigorous requirements. In all, 24 sites have been certified. In 2017, sites in Germany, Turkey,

Russia, the UK, and Sweden were additionally certified in line with different standards (ISO 9001, ISO TS 22163, ISO 14001, OHSAS 18001, and ISO 50001).

In the year under review, one focus of activities at Knorr-Bremse was on reducing the cost of quality. In the Rail Vehicle Systems division, the positive trend established in 2016 continued. As in 2016, the cost of quality in the Commercial Vehicle Systems division remained at a low level. As part of its ongoing process improvement efforts, in 2017 the Company streamlined its purchasing and HR processes. Knorr-Bremse works to raise awareness of quality among its partners and suppliers. To this end, Supplier Days with the presentation of awards were staged in the year under review, as well as training courses for suppliers.

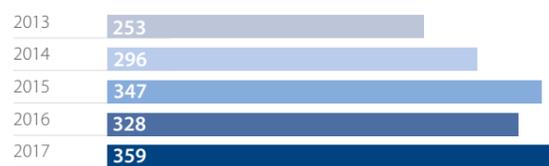
Product safety is one of Knorr-Bremse's core competencies and is assured through regular audits, as well as coaching and training sessions. To support the continuous improvement of processes and products, Six Sigma methodology is applied throughout the product life cycle from development to monitoring in the field. To reinforce the teams, in 2017 numerous employees around the world benefited from Green Belt and Black Belt training sessions, as well as training in specific quality methods. The systematic improvement of warranty processes and the application of a field evaluation tool made for greater transparency. Through involvement in working groups of the Association of the German Automobile Industry (VDA) or of UNIFE and VDB in the rail vehicle sector, Knorr-Bremse plays a trailblazing role in the introduction of current standards.

Research and development

Knorr-Bremse expanded 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 358.8 million in 2017 (2016: EUR 328.4 million), which equated to approximately 6% of sales. The services of external third parties were also called upon in this respect.

Rail Vehicle Systems

As part of its digitalization strategy, Knorr-Bremse offers manufacturers and operators safe and efficient solutions by delivering smart sub-system connectivity through the technical interconnection of systems in rail vehicles. Knorr-Bremse also supports the digitalization of the rail industry through driver assistance systems and solutions for condition-based maintenance, built on a universally applicable digitalization platform that is suitable for both retro-fitting and for installation as original equipment.



Consolidated research and development expenditure in EUR millions

Going forward, the integration of Kiepe Electric will open up additional ways of optimizing the transmission of forces between wheel and rail across the entire control range, from drive system to brakes. In this context, the Advanced Test Laboratory for Adhesion-based Systems (ATLAS), commissioned in 2016, will provide valuable support in the development of advanced brake control systems.

In the conventional air brake sector, Knorr-Bremse is setting new standards with the latest generation of its KE control valve (KfE), which offers enhanced functionalities and substantial reductions in size and weight. In addition, the new MGS3 wheel slide protection system is now fully developed and has obtained international approval. The adaptive control of the MGS3 adapts to the degree of adhesion between wheel and rail and, through application of a patented process, achieves optimum braking distances under the widest range of weather conditions.

In the field of entrance systems, Group subsidiary IFE brings new impetus to the market through its innovative products. Its fourth-generation (E4) entrance system, developed for regional multiple units and S-Bahn commuter trains, has gained a firm foothold in the market and has been ordered by five customers for twelve projects in Europe. Customers have been particularly impressed by the high reliability, low weight, quick and easy installation, and integration into the vehicles. On June 1, 2017, Deutsche Bahn (DB) awarded the entrance system its highest level (Stage 9) certificate of maturity – the first time an entrance system has received this accolade from DB. A new FLEX NANO module has been added to the family of FLEX door control units. FLEX NANO can be used as an individual control unit for the modernization of entrance systems or seamlessly integrated into the FLEX control system. The first order for this control unit came from Swiss national rail operator SBB for modernization of the doors in the IC2000.

The EU-funded Shift2Rail program, providing a framework for rail transportation projects to the value of almost EUR 1 billion, kicked off in September 2016. A second batch of innovation projects were launched in October 2017. Ultimately, the solutions developed are to be demonstrated in a real vehicle. To this end, a series of Technical Demonstrators (TD) are planned, not least for innovative braking systems. Within this program, Knorr-Bremse is lead managing the "TD Brakes" and will be executing development projects on a significant scale.

Commercial Vehicle Systems

In the Commercial Vehicle Systems segment, the focus of development activities was on the megatrends of automated driving, electrification, and connectivity.

A separate Center of Competence (CoC) is now responsible for the topic of automated driving. Along with the further development of driver assistance functionalities, the focus here was on the development of concepts for overall vehicle control in automated operation (Truck Motion Control), stabilizing the vehicle through the braking and steering systems in critical dynamic situations, and on the design of redundancy concepts for the steering and brakes. In-vehicle system connectivity – enabling, for example, the multiple utilization of sensors for different functionalities – and connectivity between vehicles and the infrastructure form the basis for efficient new functionalities. By way of example, in platooning, where several vehicles communicate with and drive close behind one another in a coordinated "platoon", fuel savings of up to 15% can be achieved.

In the wheel-end segment, activities focused on the further development of the new NexTT trailer brake, with a new, modular single-piston design that can generate up to 19 kNm of braking torque. The resultant weight savings bring the total weight of NexTT below 30 kg – a new benchmark in its class.

Against the backdrop of climate change, as transport volumes increase, reducing emissions remains a top priority for the years ahead. Along with overarching global or regional emissions requirements, there are also municipal demands for zero-emission zones in city centers for example. The same applies to noise emissions in residential areas or near hospitals; this will require a transition to electric drive and thus also electrification of other vehicle components. For these vehicles, Knorr-Bremse is offering suitably adapted or new solutions. For instance, the Company is working on high-precision electric actuators that will help optimize internal combustion engines and powertrains, as well as on the further development of electric compressors.

The smart fleet management software ProFleet Connect continuously analyzes vehicle data and provides the driver with visual hints on how to drive more safely and save fuel. Further savings in fuel and time at the wheel can be generated by optimized route planning, which is updated online while the vehicle is on the road. Through smart integration of logistics modules, empty runs can be avoided, and every kilometer saved brings a reduction in costs, emissions, and wear.

In the predevelopment and technology research sector Knorr-Bremse is working on solutions for the upcoming shift to electric mobility and autonomous driving functionalities as the ultimate stage of automated driving. The focus of development activities is on new systems for enhanced object recognition, expanded functionalities for automated lateral and longitudinal guidance, as well as new electrical/electronic architectures.

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. That is why, since 2010, it has been committed to the principles of the United Nations Global Compact. Knorr-Bremse's own Corporate Responsibility Guideline (CR policy) is based on these principles. Annual focus areas are laid down in a CR Roadmap. In 2017 these included in particular environmentally friendly product development, environmental protection and climate action, sustainability in the supply chain, and societal engagement.

Knorr-Bremse systematically integrates aspects of sustainability into the product creation process – from the initial vision, via product development and manufacturing, all the way to sales, product maintenance, and remanufacturing. Knorr-Bremse applies sustainability criteria when evaluating product ideas and also takes the results of life cycle analyses into account, so that negative environmental impacts can be avoided as far as possible. The Eco-Design cross-divisional working group formed in 2017 aims to integrate environmentally relevant aspects into the product creation process at an early stage.

Knorr-Bremse subjects its production-related health & safety and environmental performance to a process of

continuous improvement, submitting it for external certification in line with the international ISO 14001 environmental management standard where possible. At the end of 2017, 40 Rail Vehicle Systems production sites and 19 Commercial Vehicle Systems production sites had achieved such certification. In addition, at its energy-intensive production sites Knorr-Bremse aims to implement energy management systems in line with the international ISO 50001 standard. Twenty-five Rail Vehicle Systems production sites and nine Commercial Vehicle Systems production sites are already certified to this standard.

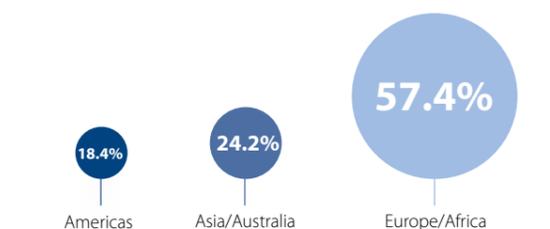
This also helps realize the corporate climate action goal pursued through the initiative Efficient Cut of CO₂ (ECCO₂). In line with this initiative, by 2020 production-related CO₂ emissions from the current production sites should be no higher than their 2015 levels, despite a marked increase in production capacities. In an annual analysis, the Company's largest sources of CO₂ emissions are identified and a catalogue of short-, mid- and long-term measures is drawn up to reduce their carbon footprint.

In the context of its CR strategy, Knorr-Bremse aims to live up to its responsibility in procurement- and supplier management as well. Along with a Supplier Code of Conduct, rolled out in 2017, Knorr-Bremse has also surveyed and assessed the sustainability performance of its strategic and preferred suppliers. The findings are flowed into the supplier selection process. In addition, the Company has conducted independent sustainability audits at an initial two high-risk suppliers, and further audits are planned.

For many years now, Knorr-Bremse has assumed responsibility for dealing with societal tasks. Its commitment is based on two pillars: Knorr-Bremse Global Care and Knorr-Bremse Local Care. In 2017, both divisions supported the independent charitable organization Knorr-Bremse Global



Group workforce (incl. HR leasing) on Dec. 31, 2017



Group workforce (incl. HR leasing) by region on Dec. 31, 2017

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. Projects are implemented in countries where there are Knorr-Bremse sites, as well as in developing countries around the world. 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, 60 aid projects were realized in a total of 28 countries on four continents.

In 2017, funding of EUR 2 million provided by Knorr-Bremse Global Care reached a total of 36,310 people. The organization's key project areas are education and WASH (water, sanitation, and hygiene), but it also continues to provide global emergency disaster relief.

At Knorr-Bremse, the local engagement of the Company's employees at their respective sites falls under the heading of Local Care. This includes donations and projects that the individual sites select, finance, and monitor for themselves in fields such as education, health, the environment, and social solidarity. In 2017, more than 600 Local Care projects were implemented on all continents, with the emphasis on education and social solidarity. Where possible, in the countries where the Company has its own sites, Knorr-Bremse Local Care and Knorr-Bremse Global Care aim to leverage synergies. Sometimes, for example, corporate volunteering at the sites will support projects funded by Knorr-Bremse Global Care.

Human resources

At year-end 2017, the Knorr-Bremse Group employed a total of 27,705 persons (24,925 excluding HR leasing). This equates to a year-on-year increase of 12.8% (12.2% excl. HR leasing). The increase is due to the growth of the Knorr-Bremse Group: Without the acquisition of Kiepe Electric, employee numbers would have risen 9.5% to 26,901, which was above expectations. Knorr-Bremse AG had 92 employees at year-end 2017 (2016: 95).

In the Rail Vehicle Systems division, the number of employees rose from 14,440 in the previous year (12,843 excl. HR leasing) to 16,051 (14,169 excl. HR leasing) at year-end 2017.

In the Commercial Vehicle Systems division, the headcount rose from 9,674 employees in 2016 (8,930 excl. HR leasing) to 11,082 (10,189 excl. HR leasing) at year-end 2017.

The holding companies employed an additional 572 staff (568 excl. HR leasing) compared to 451 employees (448 excl. HR leasing) in the previous year.

In the Europe/Africa region, there were 15,905 employees on the Knorr-Bremse payroll at year-end 2017 (14,579 excl. HR leasing), compared to 14,055 at the end of 2016 (12,975 excl. HR leasing). This meant that, at 57.4%, the proportion of the Group workforce employed in Europe was higher than in the previous year (57.2%). The workforce in Germany totaled 5,663 employees (5,238 excl. HR leasing), up from 5,044 in 2016 (4,661 excl. HR leasing).

The number of employees in the North America/South America region rose in 2017, reaching 5,108 at year-end (4,866 excl. HR leasing), compared to 4,428 in 2016 (4,134 excl. HR leasing). The proportion of the Group workforce in the Americas stood at 18.4% (2016: 18.0%).

In Asia/Australia, the number of employees picked up again in 2017, rising to 6,692 at year-end (5,480 excl. HR leasing) compared to 6,082 at year-end 2016 (5,112 excl. HR leasing). The proportion of the total headcount employed in the region fell from 24.8% in the previous year to 24.2%.

In view of demographic trends and a foreseeable shortage of specialists in technical professions, it is important for Knorr-Bremse to recruit increasing numbers of well-trained and highly qualified women. However, raising the proportion of women in management roles will take time. Knorr-Bremse makes targeted use of programs that aim to increase the proportion of women in management roles. These include the Knorr-Bremse management trainee program MEP. On this program the proportion of female trainees in 2017 was 36% (2016: 42%). While the proportion of women in management roles across all fields of activity stands at 11.2% (2016: 11.6%), in non-technical fields women fill 32.3% of management positions (2016: 32.8%).

In its efforts to meet the target quotas set in fiscal 2015, in the year under review Knorr-Bremse achieved the following quotas – changes are accounted for by shifts in management personnel, up to Supervisory Board level:

Knorr-Bremse AG:

Supervisory Board target quota 0%, actual quota 9.1%
Executive Board target quota 0%, actual quota 0%
Management Level II target quota 15.4%, actual quota 0%
Management Level III target quota 0%, actual quota 12.5%

Knorr-Bremse Systeme für Schienenfahrzeuge GmbH:

Supervisory Board target quota 0%, actual quota 0%
Management Board target quota 0%, actual quota 0%
Management Level II target quota 0%, actual quota 0%
Management Level III target quota 5.9%, actual quota 5%

Knorr-Bremse Systeme für Nutzfahrzeuge GmbH:
 Supervisory Board target quota 12.5%, actual quota 16.7%
 Management Board target quota 0%, actual quota 0%
 Management Level II target quota 0%, actual quota 11.8%
 Management Level III target quota 5.1%, actual quota 5.7%

Knorr-Bremse would like to thank all of its employees for their commitment and hard work in fiscal 2017. Thanks also go to the employee representatives for their constructive collaboration.

Report on Risks and Opportunities

Risk Management System

Principles and goals

As an international corporate group with a global presence, Knorr-Bremse encounters both risks and opportunities in the course of its entrepreneurial activities. The goal of risk management is to identify risks and minimize their potential consequences, as well as leveraging opportunities to generate a lasting increase in stakeholder value. The focus is on early identification of potential risks in order to offer scope for effective risk engineering. The risk management system established at the Group is subject to continuous improvement and was brought into line with the latest requirements in 2017.

Organization and process

The risk management structures and procedures are aligned with the overall organizational structures and anchored in a corporate policy including clear definition of responsibilities and reporting structures. The systematic identification of potential risks takes place quarterly in the course of a worldwide bottom-up risk inventory covering all Group companies. Here, both divisions as well as other holding companies report to the Global Risk Management function assigned to Corporate Controlling, in line with a defined risk identification and evaluation system. The identified risks are assigned to one of 14 risk categories which are aligned with the value chain. In all, the risk management process comprises six stages, from identification and evaluation, mitigation and aggregation, to reporting and monitoring. The identified risks are evaluated in terms of their impact on earnings and probability of occurrence. The focus is on a transparent representation of the risk portfolio, including the appraisal of effective risk limitation measures. The risk managers provide quantitative and qualitative assessments of these measures in their reports. Possible measures include the avoidance,

reduction, transfer or acceptance of the respective risk. Risk mitigation measures are taken into account as a reduction of the potential loss, leading to the net risk before allowing for probability of occurrence. After factoring in the probability of occurrence, the residual net risk quantifies the potential impact on earnings of each risk. In response to this, by way of risk provisioning and in line with accounting regulations, appropriate provisions or value adjustments can be made in the annual financial statements. In the subsequent risk aggregation phase, the individual risks are aggregated based on identity of cause and allowing for possible interdependence. In addition, in conjunction with the divisions and those responsible for risk management, a plausibility check is run on the net risk calculation and compliance with guidelines is validated.

Risk reporting

In the course of regular risk reporting, the Executive Board of the Knorr-Bremse Group receives a quarterly risk report summary which is explained at the appropriate meeting of the Executive Board. This report contains a TOP 10 risk assessment for the two divisions as well as for the holding companies, including a comparison with the previous quarter. The risk reporting permits the Executive Board to arrive at an effective evaluation of the risk position within the Group and serves as a basis for risk management decisions. In addition, both divisions discuss their risk position in the course of monthly reviews.

To ensure that risks of substantial importance are identified as early as possible, above and beyond the regular reporting periods there is also an internal ad-hoc reporting process. This prescribes immediate reporting if a reporting threshold defined by the Executive Board is crossed, in order to enable a timely response. The sequence of the various risks set out below reflects their importance for the Knorr-Bremse Group and thus also for Knorr-Bremse AG.

The Executive Board informs the Supervisory Board and the relevant committees in a timely and comprehensive manner of all risks and opportunities that are of relevance for the Group. Examining and monitoring the risk management process is the task of the Internal Audit function. Thus, Knorr-Bremse has in place a modern, globally valid reporting and monitoring system, enabling it to implement efficient and effective risk monitoring and management.

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 regions. The global rail and commercial vehicle markets are subject to volatility, which means that Knorr-Bremse is operating in a fundamentally high-risk environment within the global economy. In the year under review, Knorr-Bremse was able to minimize the various operational risks by means of its comprehensive controlling and reporting systems. These will be duly continued and, where necessary, expanded.

In 2017, in all of its core regions Knorr-Bremse benefited from the overall positive development of the global economy. Nevertheless, there were diverse business risks in the year under review which will continue to need monitoring going forward. Along with an adjustment in market structures with associated shifts in product demand above all in Europe and China, competition became more intense.

MACROECONOMIC RISKS

Also in focus were macroeconomic factors such as the growing strength of the euro versus the U.S. Dollar as the year progressed. Political impacts, for example as a result of decisions by the new U.S. government such as "America First", all the way to potential consequences of Brexit and the development of trouble spots worldwide, in the Middle East for instance or North Korea, added to the economic uncertainties. The Group carefully monitored the economic development of the individual countries and regions, as well as the worldwide trade flows. This enabled risks affecting its sales to be minimized and/or anticipated. At the same time, Knorr-Bremse's international presence rendered the Group largely immune to crises that are restricted to individual regions.

Knorr-Bremse operates in increasingly competitive markets, which leads to risks in terms of price stability. 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 countered 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. Knorr-Bremse effectively minimized the financial and cultural risks associated with such integration processes through the systematic

analysis and assessment of the target companies. The Company'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 Knorr-Bremse holds a majority stake.

TECHNOLOGICAL RISKS

Knorr-Bremse and its products and solutions are at the leading edge of technological development. This 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.

If Knorr-Bremse's products are used in high-tech environments, 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 2017 Knorr-Bremse ensured that customers across the globe could rely on Knorr-Bremse 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 potential supplier insolvency, Knorr-Bremse is exposed to the latent risk of lost production time and loss of earnings. 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.

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

Another risk results from the possibility of unforeseen shifts in capacity. Flexible working hour models and a good balance between in-house and outsourced production mean that Knorr-Bremse is well prepared to counter this risk and generate an efficient response, should the need arise.

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.

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 its quality management system and systematic contract management.

IT RISKS

The IT sector is caught up in far-reaching change. Digitalization in the shape of Industry 4.0 and the Internet of Things (IoT) are driving a rethink of IT strategies and a remodeling of IT systems and applications, not least with a view to preventing cyberattacks. The ongoing trend is toward mobility and the Cloud, opening the door to the utilization of technologies such as augmented reality, Big Data, and machine learning.

Pilot projects in the fields of augmented reality and data- and process analytics are designed to lead short-term to projects themed around customer training and service, as well as connectivity of factories and their production systems. In this context, the IT organization is increasingly taking on a regulatory role, facilitating a clear focus on data security, the standardization of processes and applications, and digitalization. In 2017, Knorr-Bremse worked intensively on IT governance topics to make this remodeling possible.

2017 witnessed the first edition of the Digital Days. The participants, a team of 120 managers from different countries, were familiarized with the topics on the agenda through technology- and pilot projects and drew up a plan of action in workshops. In addition, Design Thinking Workshops will be staged in 2018 together with strategic partners and customers, in order to define concrete projects and plans for implementation. A newly established expert PMI team supports the IT integration of acquired companies, added to which the Company is also progressively standardizing the processes involved in integration.

The speed of the remodeling process was boosted by the fact that security and data management systems are centralized. The further integration of partners in shared process chains and the optimization of these chains are being driven forward by the reduction of complexity and by clear alignment with standard software.

In 2017, acting as a Shared Services Center, Knorr-Bremse Business Services in Liberec, Czech Republic, assumed responsibility for process support and process harmonization for Accounting, HR, Indirect Purchasing, and IT for the European sites. Along with efficiency gains through standardized processes, this also enables best practices to be applied at all Knorr-Bremse companies. The Asia and America regions are to be integrated in 2018.

IP RISKS

The risk of exposure to financial losses as a result of imitation and counterfeit products persisted in 2017. 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. 2017 was characterized by the worldwide battle against copycats and product pirates. In addition, in the course of further acquisitions the respective intellectual property portfolios were integrated into the Knorr-Bremse portfolio, providing additional support for Knorr-Bremse's strategic orientation as a systems supplier.

LEGAL RISKS

As a globally active enterprise, Knorr-Bremse operates in countries with complex fiscal and judicial regulations that are open to multiple interpretations. Future interpretations and/or changes in taxation or legal 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 in line with the focus of the inspections the Company identifies and assesses the relevant tax risks on an ongoing basis. The monitoring and control of risks related to competition and anti-trust law form part of the Company's compliance management activities.

In the course of the further expansion of the Compliance organization, a web-based whistleblower system has been set up. This can be used to report irregularities, anonymously if required. Knorr-Bremse has also rolled out a Group-wide eLearning course for employees on its Code of Conduct.

In fiscal 2016, the U.S. Department of Justice (DOJ), Anti-trust Division, brought two non-public, civil investigations against Knorr-Bremse and two competitors. In November 2017 the DOJ submitted a proposal for an out-of-court settlement in one of the cases. Both cases are currently still ongoing.

RISK REPORTING ON THE UTILIZATION OF FINANCIAL INSTRUMENTS

The risk of exchange rate and interest rate volatility from operational transactions is not of decisive 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 regions, on the one hand Knorr-Bremse makes use of opportunities for compensatory supply volumes within the Group. On the other hand, the risk portfolio extending above and beyond this is, to an appropriate extent, hedged by means of derivatives. Such measures, however, serve exclusively to hedge basic transactions within the scope of normal business operations and on the balance sheet are largely subsumed within valuation units.

The basis for managing foreign exchange risks is provided by the "Guideline to Managing Market Price 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 strategic allocation of cash on hand to the Group's main currencies can potentially give rise to foreign exchange effects. Insofar as fluctuations in the price of commodities could have a substantial impact on the Group's profitability and are not otherwise secured against, this risk is hedged to an appropriate extent by means of derivatives.

By way of hedging instruments, the Knorr-Bremse Group makes use of currency futures contracts, currency options, and interest rate swaps. Commodity derivatives are utilized exclusively to hedge against risks due to fluctuations in the purchase prices of commodities that are used in Knorr-Bremse Group products (portfolio hedging). The volume of underlying transactions is determined by the Group's highly probable commodity requirements over a rolling two-year planning period. The derivative contracts are based on reference indices traded on commodity futures exchanges.

Opportunities

The multi-stage, worldwide planning, reporting, and controlling system established at Knorr-Bremse regularly identifies risks and 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. In general terms, Knorr-Bremse identified additional sales opportunities as a result of the continuing rise in worldwide transportation volumes. This led to investments in rail vehicles and commercial vehicles, which generated new impetus for Knorr-Bremse.

Targeted acquisitions and the establishment of joint ventures result in opportunities to access new fields of business and add to Knorr-Bremse's portfolio of systems, not least for vehicles capable of automated and/or autonomous driving. This approach plays a key part in the rigorous implementation of Knorr-Bremse's growth strategy. 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 and market leadership and thereby safeguard existing sales markets and access new ones. This is supported not least by expansion of the Company's development competence: Growing demand for high-quality technology in emerging countries leads to additional sales opportunities for Knorr-Bremse.

Further potential for growth results from revised regulatory requirements in the Company's markets. Within the framework of Knorr Excellence, Knorr-Bremse works constantly to optimize its cost management and boost its process efficiency, in order to further enhance the competitiveness of the Company's products and services.

General statement on the risk and opportunity situation

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

On January 12, 2018, Knorr-Bremse sold the Swedtrac service business to Stadler Sweden AB. Closure of this transaction is anticipated for the end of the first quarter of 2018. 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

Global economic developments

For fiscal 2018, Knorr-Bremse is anticipating a continuing volatile market environment. Major influential factors include political developments such as the final form taken by Brexit or potential impacts of "America First" and the new U.S. Corporate Tax Law. Other important factors include the ongoing performance of the euro against the U.S. dollar, which strengthened over the previous year, as well as the development of commodity prices.

Overall, Knorr-Bremse expects to see further moderate global economic growth in 2018, supported not only by the major economies but also by emerging nations. Along with the USA, India and Brazil are expected to post stronger growth than in 2017. Europe and Russia are forecast to continue to grow at approximately the same rate as in 2017. From the current perspective, while still at a high level, China will witness a slight decline in its growth rate, year-on-year.

Market developments

The years ahead can be expected to bring a further increase in the volumes handled by parcel and courier services, driven mainly by online retailing. This will be accompanied by a rise in freight traffic by road and rail. Vehicle manufacturers can be expected to step up their investments in connected services and digitalization, with a concomitant shift in sales to software-driven components.

This will lead to a transformation of the competitive landscape and to the market entry of other players such as IT corporations. The topics of automated driving, electrification, and connectivity will continue to dominate business in both segments for the next decade and beyond.

Rail Vehicle Systems

For 2018, Knorr-Bremse is forecasting further moderate growth in the global rail vehicle market, benefiting the OE market and RailServices to an equal extent. In the longer term, growing demand from the European and Asian passenger transportation sectors looks set to be a major driving factor.

In the next few years, Knorr-Bremse is anticipating further overall market growth in Europe. The UK market will probably see the high level of previous years fade. The future looks bright for the RailServices sector, with Knorr-Bremse expecting to see growth driven by impetus from Germany, France, and Russia in particular.

Growth is on the cards for the passenger and freight sectors in North America, with further investments in passenger transportation in the pipeline. Thanks to rising demand along the transportation chain, Knorr-Bremse is expecting the rail freight market to show further recovery. For the South American rail market, by contrast, Knorr-Bremse is anticipating a difficult year in 2018, despite significant market shares, probably accompanied by a decline in sales.

In the Chinese rail market, Knorr-Bremse expects to see relatively stable development of both OEM and RailServices business. Ever since the advent of high-speed trains in China, Knorr-Bremse has been one of the leading suppliers of braking, entrance, and HVAC systems in the country. The Company's products can be found in every Chinese high-speed platform. The trains are ordered centrally by China Railway Corporation, the country's national rail operator. In terms of incoming orders, this can lead to fluctuation in the numbers of trains called up. A review of recent years reveals that in 2014, the Chinese high-speed market showed exceptional growth, with this trend continuing in 2015. Following the high investments of the previous years, in 2016 the market showed a general downturn, before 2017 brought a tangible recovery.

The Indian market looks to be heading for sustained growth, driven by the passenger sector, while in Australia the combination of a gradual recovery in the freight sector and sound demand in both OEM business and RailServices can be expected to generate growth for the rail market in the coming year.

Commercial Vehicle Systems

Knorr-Bremse is anticipating further growth in the global commercial vehicle market in 2018. In the mid-term, the Company expects to see worldwide truck production exceed its 2014 level with more than 2.5 million units. The European market also looks set for overall growth in 2018, with Knorr-Bremse expecting to see a further 4% upturn year-on-year.

Knorr-Bremse is expecting further growth in the North American market. For South America, starting from a relatively low level, the Company is anticipating a further increase in truck production, with a 10% rise looking possible. However, with presidential elections scheduled for 2018 in Brazil, Costa Rica, Columbia, Cuba, Mexico, Paraguay, and Venezuela, precise predictions are hard to make.

For the Asia/Australia region as a whole, Knorr-Bremse expects to see a slowdown in growth, although the

importance of China as by far the world's largest commercial vehicle market remains unbroken. Australia can be expected to post a further steady increase in commercial vehicle production, with road freight transportation probably heading for a 5% increase in 2018.

Developments at Knorr-Bremse

Based on the assumption of further moderate global economic growth in 2018, the Knorr-Bremse Group is aiming for a modest rise in sales to between EUR 6.4 billion and EUR 6.6 billion, with a targeted EBITDA margin of 17 to 19%. This does not take account of future acquisitions where closing has not taken place by the balance sheet date.

The number of employees across the Group and at Knorr-Bremse AG is expected to remain approximately at the prior-year level. Tied-up working capital, measured in days' sales, is expected to show between stable development and slight improvement. Despite the prevailing challenging market environment, Knorr-Bremse is planning a marked increase in capital expenditure compared to 2017. Based on expectations in terms of profits, working capital, and investments, 2018 is expected to bring a slight improvement in net liquidity before acquisitions and thus in the position of the Knorr-Bremse Group.

Knorr-Bremse AG is expecting a marked downturn in income from investments in 2018. This will not, however, affect 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 remain stable.

Consolidated Financial Statements

Notes to the 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 Articles 290 ff.) 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.

As permitted under HGB Article 297 (1) clause 2, the annual financial statements will no longer include a segment report for fiscal year 2017 or subsequent years.

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 as a whole. 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. The Group has made use of the option not to capitalize intangible assets produced internally.

Fixed assets are valued at acquisition or production cost, without interest on debt capital, 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. Minor fixed assets are depreciated to the maximum extent permissible under the respective countries' tax provisions.

Interests in affiliated 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). Pursuant to HGB Article 312 (1), associated companies are stated at book value. 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, but does not include interest on debt capital. 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 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 Article 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. The company has made use of the option not to discount the interest on accruals with a term of one year or less.

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 Article 16 of the German Law on Occupational Pensions (BetrAVG), as well as assumptions relating to staff turnover. The calculations are based on biometric reference values devised by Klaus Heubeck (mortality tables RT 2005 G). The company has taken advantage of the option provided under HGB Article 253 (2) clause 2, 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:	3.68% p. a. (2016: 4.01%)
Salary increases:	3.00% p. a. (2016: 3.00%)
Annuity trend:	1.50% p. a. (2016: 1.50%)
Fluctuation:	1.80% p. a. on average (2016: 1.80%)

Pension plan accruals are valued using the projected unit credit (PUC) method. Foreign subsidiaries cover pension plans and similar commitments by making accruals.

Liabilities are stated at their settlement value.

Consolidated companies

The parent company of the Knorr-Bremse Group is Knorr-Bremse AG, Moosacher Strasse 80, 80809 Munich, Germany. The individual and consolidated financial statements are filed with the local first-instance court in Munich under Commercial Register number HRB 42031. In addition to Knorr-Bremse AG, 25 German and 117 foreign subsidiaries over which Knorr-Bremse AG can exert a direct or indirect controlling influence are included in the consolidated financial statements. Investments in 2 German and 2 foreign companies are shown in the consolidated financial statements as investments in associated companies. 16 foreign subsidiaries and 6 German subsidiaries have not been included in consolidation because of their minor significance in relation to the Group's net worth, financial position, and operating results. 2 German companies are not shown as associated companies, but instead are stated at acquisition cost. During fiscal year 2017, the following companies were acquired, founded, and/or included in consolidation for the first time:

APS electronic AG, Niederbuchsiten/Switzerland
 Kiepe Electric Ges.m.b.H., Vienna/Austria
 Kiepe Electric GmbH, Düsseldorf/Germany
 Kiepe Electric Inc., Alpharetta, Georgia/USA
 Kiepe Electric Ltd., Birmingham/United Kingdom
 Kiepe Electric UK Limited, Birmingham/United Kingdom
 Knorr-Bremse Services Europe s.r.o., Stráž nad Nisou/Czech Republic
 (previously not included in consolidation)

During fiscal year 2017, the following companies were acquired or founded but not included in consolidation, pursuant to HGB Article 296 (2):

Dyno-Inno Test Center for Brake Equipment (Suzhou) Ltd., Suzhou/China
 Freios Bre Coahuila, S.A. de C.V. , Cd. Acuña, Coahuila/Mexico
 Heiterblick Projektgesellschaft mbH, Leipzig/Germany
 Kiepe Electric Corporation, Vancouver/Canada
 Kiepe Electric d.o.o., Niš/Serbia
 Kiepe Electric (Pty.) Ltd. South Africa, Woodstock/South Africa
 Kiepe Electric S.r.l., Cernusco sul Navigilio/Italy
 Knorr-Bremse Systems for Rail Vehicles Enterprise Management (Beijing) Co., Ltd., Beijing/China
 Sichuan Knorr-Bremse Guo Tong Railway Transportation Equipment Co., Ltd., Chengdu/China
 Sydac Simulation Technologies India Private Limited, Pune/India

The following companies were merged, wound up or sold:

Microelettrica Power Devices (Pty.) Ltd., Johannesburg/South Africa
 Swedtrac Trafik AB, Solna/Sweden
 SWT Swedtrac Svets & Smide AB, Solna/Sweden
 Transtechnik Asia Pacific Pty. Ltd., Sydney/Australia

The following companies were renamed:

Black River Logistics Company LLC, Watertown, New York/USA
 (formerly Black River Air Logistics Company LLC, Watertown, New York/USA)
 Knorr-Bremse Services GmbH, Munich/Germany
 (formerly Knorr-Bremse IT-Services GmbH, Munich/Germany)
 Knorr-Bremse SteeringSystems GmbH, Wülfrath/Germany
 (formerly tedrive Steering Systems GmbH, Wülfrath/Germany)
 Knorr-Bremse Systems for Commercial Vehicles (Chongqing) Ltd., Chongqing/China
 (formerly Knorr-Bremse CAFF Systems for Commercial Vehicles Chongqing Ltd., Chongqing/China)

This means that compared to the previous year, the number of fully consolidated companies has increased by 2. On pages 70-74, 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 worth, financial position, and operating results.

The acquisition of the Kiepe Electric Group had an impact on the balance-sheet and income-statement headings listed below, as follows:

Intangibles TEUR 55,694; fixed assets TEUR 36,339; financial investments TEUR 572; receivables and other assets TEUR 75,439; cash and cash equivalents TEUR 862; consolidated net income -TEUR 10,212; sales revenues TEUR 213,387; cost of materials TEUR 116,179; personnel expenses TEUR 56,423

In an asset deal, the Group also acquired the Bosch Transmission Systems division (TRS) in Japan; this had the following effect on the consolidated balance sheet at the time of the acquisition:

Intangibles TEUR 55,356; fixed assets TEUR 2,154; inventories TEUR 4,183

Principles of consolidation

Since fiscal year 2010, investments in subsidiaries have been consolidated using the revaluation

method. This method is used in the same way for asset deals. 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 difference on the assets side (goodwill) has been capitalized in compliance with German accounting standards (GAS). Companies are included in consolidation at the date on which the Group gains control over them. 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. The opinions of independent experts are used to value the capital allocated to each purchase.

Until December 31, 2016, the acquisition of indirect non-controlling shares was based on the group share method. Since January 1, 2017, the relevant principles of the principles of capital consolidation described above have been applied, and any resulting goodwill attributable to minority interests is stated as a liability under Non-controlling interests.

Wherever possible, a negative difference resulting from the consolidation of investments within the meaning of HGB Article 309 (2) and German accounting standards (GAS) is released for the year in which it arises.

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 according to this method, including amortization of goodwill, is shown in the statement of income under Financial results. The overall valuation of associated and related companies has not been adjusted by applying the valuation methods used in the consolidated financial statements. Receivables, payables, and accruals 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 EUR at the mean spot rate at the balance sheet date, with the exception of shareholders' equity, which is translated into EUR at the historic rate. Income statement items are translated into EUR 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 within the meaning of HGB Articles 274 and 306, 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. Tax relief is calculated on the basis of the tax rate that, according to current legislation, is expected to be valid at the time of realization. Deferred taxes on losses carried forward are capitalized in individual cases, where there is sufficient probability that the tax benefits can be realized in each case. 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 374,035 in fiscal year 2017 (2016: TEUR 410,519). This figure includes investments (but excludes changes in the scope of consolidation and goodwill) in the amount of TEUR 185,592 (2016: TEUR 194,576).

in EUR thousands (TEUR)	Acquisition or production cost						Depreciation/amortization						Accrued depreciation/amortization/Dec. 31, 2017	Net value Dec. 31, 2017	Net value Dec. 31, 2016	Depreciation/amortization during the fiscal year
	Carried forward Jan. 1, 2017	Additions incl. changes in scope of consolidation	Reclassifications	Disposals	Currency differences	Balance Dec. 31, 2017	Depreciation/amortization carried forward Jan 1, 2017	Currency difference	Additions incl. changes in scope of consolidation	Disposals	Reclassifications	Write-ups				
Industrial property rights/trademarks	367,207	73,490	(3,865)	(7,739)	(22,884)	406,209	(308,550)	18,056	(25,925)	6,485	1,953	0	(307,981)	98,228	58,657	20,045
Goodwill	564,886	51,904	0	(331)	(15,261)	601,198	(378,202)	13,227	(50,023)	264	0	0	(414,734)	186,464	186,684	48,670
Intangible assets	932,093	125,394	(3,865)	(8,070)	(38,145)	1,007,407	(686,752)	31,283	(75,948)	6,749	1,953	0	(722,715)	284,692	245,341	68,715
Land, equivalent rights to real property, and buildings, including buildings on land not owned	483,682	52,398	5,576	(13,453)	(17,860)	510,343	(160,981)	4,961	(31,028)	8,565	2	0	(178,481)	331,862	322,701	13,657
Technical equipment and machinery	760,890	47,182	42,374	(24,294)	(32,194)	793,958	(482,179)	17,650	(62,459)	21,757	(952)	0	(506,183)	287,775	278,711	59,890
Other equipment, plant, and office equipment	735,571	82,524	23,048	(54,462)	(38,030)	748,651	(559,044)	28,313	(83,094)	51,728	(1,017)	0	(563,114)	185,537	176,527	65,367
Advances to suppliers and construction in progress	127,822	66,537	(67,133)	(7,646)	(5,033)	114,547	(4,759)	(6)	(84)	3,940	14	134	(761)	113,786	123,063	84
Fixed assets	2,107,965	248,641	3,865	(99,855)	(93,117)	2,167,499	(1,206,963)	50,918	(176,665)	85,990	(1,953)	134	(1,248,539)	918,960	901,002	138,998
Investments in affiliated companies	682	7,786	0	0	(385)	8,083	(105)	15	(169)	0	0	0	(259)	7,824	577	20
Investments in associated companies	2,009	1,269	0	(1,798)	481	1,961	0	(1)	0	0	0	0	(1)	1,960	2,009	0
Miscellaneous investments	99,189	46	0	(36,942)	(449)	61,844	(4,370)	0	(74)	0	0	0	(4,444)	57,400	94,819	74
Investments	101,880	9,101	0	(38,740)	(353)	71,888	(4,475)	14	(243)	0	0	0	(4,704)	67,184	97,405	94
Intangibles, fixed assets, and investments	3,141,938	383,136	0	(146,665)	(131,615)	3,246,794	(1,898,190)	82,215	(252,856)	92,739	0	134	(1,975,958)	1,270,836	1,243,748	207,807

3 Intangible assets

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 to the acquisition of Kiepe Electric GmbH, Düsseldorf/Germany. This resulted in goodwill of TEUR 25,362, which according to best estimates is being amortized over 10 years. This resulted in a residual book value of TEUR 23,037 at December 31, 2017. The purchase agreement signed on June 22, 2016, between Knorr-Bremse Commercial Vehicle Systems Japan Ltd. and Bosch Corporation, Japan, for the acquisition of all assets of the Bosch Transmission Systems division (TRS) in Japan, was concluded as an asset deal on March 31, 2017. This resulted in goodwill in the amount of TEUR 24,652, which is being amortized over 15 years based on the useful lives of the intangible assets identified. The residual book value at December 31, 2017 was TEUR 22,055.

In determining the useful life of goodwill additions during the fiscal year, the impact on the acquired firms of underlying economic conditions and changes in sales and procurement markets is taken into account.

Other intangibles are subject to scheduled amortization 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 is applied to acquisition costs.

5 Investments

Investment movements are set out in the compilation above.

Miscellaneous investments consist of TEUR 0 in loans to affiliated companies (2016: TEUR 173), TEUR 1,352 in miscellaneous loans (2016: TEUR 13,409), TEUR 55,945 in long-term investments (2016: TEUR 81,088), and TEUR 103 in investments in other companies (2016: TEUR 149).

Long-term investments are carried at a book value of TEUR 55,945. These include securities with a book value of TEUR 53,836 (2016: TEUR 78,987), valued at the balance-sheet date above the fair value of TEUR 39,842. No unscheduled depreciation or writedown was applied at the balance-sheet date because the impairment involved was temporary.

List of shareholdings

1 Consolidated affiliated companies	Share in capital in %
Albatros GmbH, Munich/Germany	100.0
Aldona Seals Ltd., Peterlee/United Kingdom	100.0
Alpha Process Controls (International) Ltd., Peterlee/United Kingdom	100.0
Anchor Brake Shoe Company LLC, West Chicago, Illinois/USA	100.0
APS electronic AG, Niederbuchsiten/Switzerland	100.0
BCVS Canadian Holdings LLC, Anjou/Canada	100.0
BCVS Mexican Holdings LLC, Cd. Acuña, Coahuila/Mexico	100.0
Bendix Commercial Vehicle Systems LLC, Elyria, Ohio/USA	100.0
Bendix CVS Canada Inc., Anjou/Canada	100.0
Bendix CVS de Mexico SA de CV, Cd. Acuña, Coahuila/Mexico	100.0
Bendix Spicer Foundation Brake Canada, Inc., Kingston/Canada	100.0
Bendix Spicer Foundation Brake LLC, Elyria, Ohio/USA	80.0
Black River Logistics Company LLC, Watertown, New York/USA	100.0
BSFB Holdings, Inc., Elyria, Ohio/USA	100.0
Casram Rail S.p.A., Crimido/Italy	100.0
Comet Fans S.r.l., Solaro, Milan/Italy	100.0
Distribuidora Bendix CVS (de) Mexico SA de CV, Cd. Acuña, Coahuila/Mexico	100.0
Dr. techn. Josef Zelisko Ges.m.b.H., Mödling/Austria	100.0
G.T. Group Ltd., Peterlee/United Kingdom	100.0
GT Emission Systems Ltd., Peterlee/United Kingdom	100.0
GT Project Engineering Ltd., Consett/United Kingdom	100.0
Guangdong Knorr-Bremse Guo Tong Railway Vehicle Systems Equipment Co., Ltd., Jiangmen, Guangdong/China	49.0

1 Consolidated affiliated companies (continued)	Share in capital in %
Hasse & Wrede CVS Dalian, China Ltd., Dalian/China	70.0
Hasse & Wrede GmbH, Berlin/Germany	100.0
Heine Resistors GmbH, Dresden/Germany	100.0
Icer Rail S.L., Pamplona/Spain	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
I GE-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
Kiepe Electric Ges.m.b.H., Vienna/Austria	100.0
Kiepe Electric GmbH, Düsseldorf/Germany	100.0
Kiepe Electric Inc., Alpharetta, Georgia/USA	100.0
Kiepe Electric Ltd., Birmingham/United Kingdom	100.0
Kiepe Electric UK Limited, Birmingham/United Kingdom	100.0
Knorr-Amabiliki (Pty.) Ltd., Kempton Park/South Africa	100.0
Knorr Brake Company LLC, Westminster, Maryland/USA	100.0
Knorr Brake Corporation Canada Holdings Ltd., Montreal/Canada	100.0
Knorr Brake Holding Corporation, Watertown, New York/USA	89.3
Knorr Brake Ltd., Kingston/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	100.0
Knorr-Bremse/Nankou Air Supply Unit (Beijing) Co., Ltd., Nankou/China	55.0
Knorr-Bremse Asia Pacific (Holding) Limited, 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 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 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 Commercial Vehicle Systems (Shanghai) Co., Ltd., Shanghai/China	100.0
Knorr-Bremse DETC Commercial Vehicle Braking Technology Co., Ltd., Shiyao/China	51.0
Knorr-Bremse España, S.A., Getafe/Spain	100.0
Knorr-Bremse Fékrendszerek Kft., Kecskecsémét/Hungary	100.0
Knorr-Bremse Ges.m.b.H., Mödling/Austria	100.0
Knorr-Bremse Ibérica S.L., San Fernando de Henares/Spain	100.0
Knorr-Bremse India Pvt. Ltd., Faridabad/India	100.0
Knorr-Bremse Investment GmbH, Munich/Germany	100.0

1 Consolidated affiliated companies (continued)	Share in capital in %
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 SIn Sp. z o.o., Warsaw/Poland	100.0
Knorr-Bremse Powertech Corporation USA, Atlanta, Georgia/USA	100.0
Knorr-Bremse Powertech GmbH, Berlin/Germany	100.0
Knorr-Bremse Powertech Verwaltungs GmbH, Berlin/Germany	100.0
Knorr-Bremse Powertech GmbH & Co. KG, Holzkirchen/Germany (unlimited liability shareholder: Knorr-Bremse Powertech Verwaltungs GmbH, Berlin/Germany)	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/United Kingdom	100.0
Knorr-Bremse RailServices (UK) Ltd., Melksham/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/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 Services Europe s.r.o., Stráž nad Nisou/Czech Republic	100.0
Knorr-Bremse Services GmbH, Munich/Germany	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
Knorr-Bremse SteeringSystems GmbH, Wülfrath/Germany	100.0
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 S.A., Tinquieux/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 (Chongqing) Ltd., Chongqing/China	66.0
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/Kazakhstan	100.0
Knorr-Bremse Systems for Rail Vehicles (Suzhou) Co., Ltd., Suzhou/China	100.0
Knorr-Bremse Systemy Kolejowe Polska Sp. z o.o., Cracow/Poland	100.0

1 Consolidated affiliated companies (continued)	Share in capital in %
Knorr-Bremse Systémy pro užitková vozidla ČR s.r.o., Stráž nad Nisou/Czech Republic	100.0
Knorr-Bremse Technology Center India Private Limited, Pune/India	100.0
Knorr-Bremse Ticari Arac Fren Sistemleri 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 (Pty.) Ltd., Johannesburg/South Africa	74.0
Microelettrica 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 Elektrotechnik 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
Selectron Systems AG, Lyss/Switzerland	100.0
Selectron Systems Pvt. Ltd., Gurgaon/India	100.0
Selectron Systems (Beijing) Co., Ltd., Beijing/China	100.0
Semiconductor Solutions (Pty.) Ltd., Pretoria/South Africa	60.0
Sigma Air Conditioning Pty., Ltd., Granville/Australia	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
Sydac Ltd., Manchester/United Kingdom	100.0
Sydac Pty. Ltd., Granville/Australia	100.0
Technologies Lanka Inc., La Pocatière/Canada	100.0
tedrive Yönlendirme Sistemleri Sanayi ve Tic. Ltd. Şti., Istanbul/Turkey	100.0
Unicupler GmbH, Niederurnen/Switzerland	100.0
Zelisko Elektrik Sanayi ve Ticaret Limited Şirketi, Istanbul/Turkey	100.0
2 Associated companies valued using the equity method	Share in capital in %
Alltrucks GmbH & Co. KG, Munich/Germany (unlimited liability shareholder: Alltrucks Verwaltungs GmbH, 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
Westinghouse Platform Screen Doors (Guangzhou) Limited, Guangzhou/China	15.0

3 Affiliated companies not included in consolidation	Share in capital in %	Currency	Equity	Result	Balance sheet total
Di-Pro LLC., Fresno, California/USA	100.0	TUSD	0	0	0
Dyno-Inno Test Center for Brake Equipment (Suzhou) Ltd., Suzhou/China	100.0	TCNY	3,500	0	3,500
EKA DOOEL, Skopje/Macedonia	100.0	TMKD	22,400	653	39,093
Foro Verwaltungs GmbH & Co. KG, Munich/Germany (unlimited liability shareholder: Knorr-Bremse Systeme für Schienenfahrzeuge Ibero Holding GmbH, Munich/Germany)	100.0	TEUR	6	0	6
Freios Bre Coahuila, S.A. de C.V., Cd. Acuña, Coahuila/Mexico	100.0	TUSD	7,473	-27	7,473
Heiterblick Projektgesellschaft mbH, Leipzig/Germany	49.0	TEUR	25	512	40,795
KB Investment UK Ltd., Chippenham/United Kingdom	100.0	TGBP	0	6,759	22,000
Kiepe Electric Corporation, Vancouver/Canada	100.0	TCAD	1,260	487	2,512
Kiepe Electric d.o.o., Niš/Serbia	100.0	TRSD	1,703	-299	1,794
Kiepe Electric (Pty) Ltd. South Africa, Woodstock/South Africa	100.0	TZAR	-283	-96	41
Kiepe Electric S.r.l., Cernusco sul Naviglio/Italy	100.0	TEUR	267	40	1,006
Knorr-Bremse Systems for Rail Vehicles Enterprise Management (Beijing) Co., Ltd. Beijing/China	100.0	TCNY	4,645	0	4,645
Metco Technical Consulting AG, Zug/Switzerland	100.0	TCHF	71	-17	1,582
SCI pour l'Industrie, Pau/France	100.0	TEUR	93	0	93
Sichuan Knorr-Bremse Guo Tong Railway Transportation Equipment Co., Ltd., Chengdu/China	100.0	TCNY	10,000	0	10,000
Sydac Simulation Technologies India Private Limited, Pune/India*	100.0				
tedrive Steering Systems Inc., Wixom, Michigan/USA (company was wound up with effect from February 2, 2018)	100.0	TUSD	0	-29	0
RBL-Technologie Ltd., Naberezhnye Chelny/Russia	100.0	TRUB	5,073	5,230	14,304

4 Associated companies valued without using the equity method and other shareholdings	Share in capital in %	Currency	Equity	Result	Balance sheet total
IFB Institut für Bahntechnik GmbH, Berlin/Germany	6.7	TEUR	181	73	456
Megalith Grundstücksverwaltungsgesellschaft mbH & Co. Vermietungs KG, Mainz/Germany (unlimited liability shareholder: Knorr-Bremse AG, Munich/Germany; Deutsche-Anlagen-Leasing GmbH holds majority voting rights)	100.0	TEUR	-33	14	2,590
MORCAR Grundstücksgesellschaft mbH & Co. oHG, Munich/Germany (unlimited liability shareholder: Knorr-Bremse Beteiligungsgesellschaft mbH, Munich/Germany)	5.0	TEUR	6,082	0	51,600
Sanctor Grundstücks-Vermietungsgesellschaft mbH & Co. Objekt Marzahn KG, Düsseldorf/Germany (unlimited liability shareholder: Knorr-Bremse AG, Munich/Germany; SABIS Grundstücks-Vermietungsgesellschaft mbH, Düsseldorf/Germany, holds majority voting rights)	99.0	TEUR	-4,651	-229	31,908

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 worth, financial position, and operating results.

* Due to the lack of material influence on the net worth, financial position, and operating results of Knorr-Bremse AG, no information is provided on this company's capital or results.

6 Inventories

	Dec. 31, 2017 TEUR	Dec. 31, 2016 TEUR
Materials and supplies	311,104	268,570
Work in process	249,811	103,291
Finished products, merchandise	271,381	234,612
less advances received on orders	(422,804)	(192,840)
plus prepayments on inventories	46,739	5,853
Total	456,231	419,486

7 Receivables and other assets

	Dec. 31, 2017 TEUR	Dec. 31, 2017 TEUR	Dec. 31, 2016 TEUR
	Remaining term more than 1 year	in total	in total
Accounts receivable, trade	1,038	1,156,588	961,414
Receivables from affiliated companies not included in consolidation	0	163	140
Other assets	41,579	246,602	173,609
Total	42,617	1,403,353	1,135,163

In addition, Other assets include receivables from affiliated companies totaling TEUR 22,635 (2016: TEUR 0), of which those with a remaining term of more than 1 year account for TEUR 18,611 (2016: TEUR 0).

8 Cash and cash equivalents

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

9 Prepaid expenses

Group prepaid expenses amounted to TEUR 24,373 (2016: TEUR 23,529). Prepaid expenses include a discount of TEUR 1,374 (2016: TEUR 1,723) on the issuance of a bond, accrued over the 5-year term of the bond.

10 Deferred taxes

At the balance sheet date, deferred tax assets amounted to TEUR 45,374 (2016: TEUR 62,171). No deferred tax liabilities were reported for the current or previous years.

Of the deferred tax assets, TEUR 13,541 (2016: TEUR 18,129) relate to deferred taxes on individual balance sheets of Group companies and TEUR 31,833 (2016: TEUR 44,042) 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. To the Executive Board's knowledge, Heinz Hermann Thiele has held the majority of shares in Stella since July 6, 2017.

12 Capital reserves

Capital reserves are unchanged from the previous year. Like the legal reserve, they are subject to the restrictions of Article 150 of the German Corporation Act (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.

Legal reserves amount to TEUR 6,607 (2016: TEUR 6,607). Including differences on currency translation, other retained earnings amounted to TEUR 628,291 (2016: TEUR 870,985) at the balance sheet date.

14 Pension plan accruals

Pension plan accruals are valued in accordance with HGB Article 249 (1) in conjunction with EGHGB Article 67 (1) clause 1.

	Dec. 31, 2017 TEUR	Dec. 31, 2016 TEUR
Pension plan accruals	248,206	242,851

Applying the statutory 10-year average interest rate when calculating German pension plan accruals results in accruals that are TEUR 23,060 less than they would be if the 7-year average interest rate for the Group were applied.

15 Other accrued liabilities

	Dec. 31, 2017 TEUR	Dec. 31, 2016 TEUR
Provisions for taxes	126,796	131,169
Miscellaneous accruals	859,863	878,830
Total	986,659	1,009,999

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 394,554 (2016: TEUR 430,722), personnel costs, and restructuring activities at TEUR 186,428 (2016: TEUR 185,786), as well as anticipated losses on contracts and other risks in connection with current operations at TEUR 26,690 (2016: TEUR 14,103).

16 Liabilities

	Dec. 31, 2017 TEUR	Dec. 31, 2017 TEUR	Dec. 31, 2017 TEUR	Dec. 31, 2017 TEUR	Dec. 31, 2016 TEUR
	Remaining term less than 1 year	Remaining term 1 to 5 years	Remaining term more than 5 years	in total	in total
Bonds		500,000		500,000	500,000
Accounts payable, banks	31,764	121,617	241	153,622	148,823
Accounts payable, trade	852,184	293	83	852,560	714,064
Other liabilities:					
Liabilities from accepted bills	4,479			4,479	4,751
Miscellaneous liabilities	184,051	1,643	306	186,000	156,454
(thereof for taxes)	(60,877)			(60,877)	(39,792)
(thereof for social security)	(15,787)			(15,787)	(16,181)
	188,530	1,643	306	190,479	161,205
Total liabilities	1,072,478	623,553	630	1,696,661	1,524,092

With effect from December 8, 2016, Knorr-Bremse AG issued a bond with a volume of EUR 500 million at a fixed coupon rate of 0.5% p.a. over a 5-year term (to maturity) on the Euro MTF stock exchange in Luxembourg. Revenue from the bond will serve to finance the growth of the Knorr-Bremse Group. In addition, the existing debt issuance program launched in 2016 was extended by another year. This gives Knorr-Bremse AG an opportunity to issue new bonds on Luxembourg's Euro MTF stock exchange in 2018, based on standardized documentation, with a total volume of up to EUR 1 billion.

17 Contingencies and miscellaneous financial commitments

	Dec. 31, 2017 TEUR	Dec. 31, 2016 TEUR
Warranties	14,869	19,074
Guarantees	26,950	21,082
Leasing commitments	313,490	277,105

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 313,490 (2016: TEUR 277,105); commitments with terms of 1 year or less total TEUR 41,491 (2016: TEUR 65,262); commitments with terms ranging from 1 to 5 years amount to TEUR 117,256 (2016: TEUR 145,001), and commitments with terms of over 5 years total TEUR 154,743 (2016: TEUR 66,842).

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 (accruals), and income from disposals of fixed assets. The heading also carries gains on exchange differences amounting to TEUR 138,543 (2016: TEUR 123,974), plus extraordinary income totaling TEUR 3,347.

Income relating to other accounting periods in the amount of TEUR 88,109 (2016: TEUR 48,593) is also shown under Other operating income. This is generated primarily from the reversal of accruals.

19 Cost of materials

	2017 TEUR	2016 TEUR
Expenditure on materials, supplies, and merchandise	2,739,522	2,378,636
Expenditure on services purchased	280,057	182,229
Total	3,019,579	2,560,865

20 Personnel expenses/staff

	2017 TEUR	2016 TEUR
Wages and salaries	1,102,515	996,776
Statutory social welfare contributions and expenses relating to pensions and employee benefits	233,603	199,816
Personnel costs	1,336,118	1,196,592
(thereof for retirement benefits)	(42,191)	(25,655)
Average number of employees during the fiscal year	Number	Number
Wage earners	11,451	10,247
Salary earners	12,360	11,532
Apprentices and trainees	198	190
Total	24,009	21,969

The interest portion of transfers to pension plan accruals is reported under Net interest income.

21 Depreciation/amortization

	2017 TEUR	2016 TEUR
Depreciation and amortization on purchased intangibles and on fixed assets	207,713	179,450

In addition, rental and leasing expenses totaling TEUR 75,840 (2016: TEUR 74,183) were incurred during the reporting period.

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 operating expenses also include extraordinary expenses amounting to EUR 75 million for the attempted acquisition of Haldex, and for adapting the Group's accounting processes to comply with International Financial Reporting Standards (IFRS). Miscellaneous taxes for the Group amount to TEUR 20,536 (2016: TEUR 22,755). Expenses resulting from foreign exchange fluctuations during the fiscal year amounted to TEUR 184,373 (2016: TEUR 136,164). The fee paid to the independent auditors, KPMG AG Wirtschaftsprüfungsgesellschaft and their affiliates, amounted to TEUR 13,436 for fiscal year 2017 (2016: TEUR 629). Of this, TEUR 2,083 (2016: TEUR 500) was paid out for audit services and TEUR 11,353 (2016: TEUR 129) for other services.

23 Financial results

	2017 TEUR	2016 TEUR
Miscellaneous interest and similar income	16,368	10,031
Interest and similar expenses	(27,264)	(15,282)
(thereof for discounts on accruals)	(9,223)	(9,411)
Income from associated, affiliated, and other companies	(532)	2,666
Total	(11,428)	(2,585)

24 Taxes on income

Taxes on income and earnings amounted to TEUR 261,340 (2016: TEUR 279,775), and included a deferred tax charge of TEUR 5,821 (2016: TEUR 10,697).

25 Net income

	2017 TEUR	2016 TEUR
Net income	579,769	549,685
Non-controlling interests	(79,237)	(64,897)
Retained earnings brought forward from the previous year (after distribution of dividends)	312,137	254,256
Withdrawals from/transfers to retained earnings	131,589	(62,907)
Unappropriated consolidated net income (Knorr-Bremse AG unappropriated retained earnings)	944,258	676,137

Appropriation of retained earnings

Knorr-Bremse AG posted unappropriated retained earnings of EUR 944.3 million in fiscal 2017 (2016: EUR 676.1 million). The Annual Shareholders' Meeting will be asked to approve the proposal that an amount of EUR 850.2 million from these unappropriated retained earnings be used to pay a dividend of EUR 327 (2016: EUR 140) per dividend-bearing share with a par value of EUR 26, with the balance to be carried forward to new account.

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 from intercompany services within the Knorr-Bremse Group; they are also used to eliminate exchange rate risk for selected assets and projected cash flows. The aim of hedging operations at Knorr-Bremse AG is to reduce the risks posed by foreign exchange fluctuations. Currency hedging is based on the volume of open commitments or projected cash flows arising or expected to arise from core business activities. Maturities are based on the lifespans of the underlying business transactions, whereby high-probability transactions are hedged over a rolling 3-year planning period. Because the conditions and parameters of the hedges match those of the hedged items, payment flows and/or changes in value largely offset each other. In the case of currency hedges, this is done through the use of hedging relationships over periods of 1-3 years, depending on the parameters and structures of the underlying transactions. Wherever possible, the effectiveness of the hedging relationships is verified using the critical terms match method, or else by setting up hypothetical derivatives.

The Knorr-Bremse Group uses forward exchange contracts, currency options, and interest rate swaps as hedging instruments. The lease payments for one real estate leasing contract were hedged by an annual interest rate swap. Here, due to the identical conditions and parameters of the underlying and hedging transactions, the payment flows will be fully offset after 6.5 years, based on the term of the finance underlying the leasing agreement.

Hedging relationships have not been set up for currency option derivatives with a nominal value of EUR 47.3 million and a net market value of TEUR 26.9, or forward exchange derivatives with a nominal value of EUR 82.8 million and a net market value of EUR 0.2 million. Hedging relationships have been set up for financial instruments with a total volume of EUR 483.5 million and a net market value of EUR 9.5 million (representing the level of hedged risks). Of this amount, EUR 111.2 million (market value: -EUR 6.48 million) is attributable to the hedging of assets (micro hedges), EUR 55.0 million (market value: EUR 1.84 million) to the hedging of open contracts (micro hedges), and EUR 317.3 million (market value: EUR 13.4 million) to the hedging of high-probability transactions (portfolio hedges).

The nominal and market values of financial instruments as at December 31, 2017 break down as follows:

Financial derivatives	Total as at Dec. 31, 2017		Total as at Dec. 31, 2016	
	Nominal value	Market value	Nominal value	Market value
in EUR millions				
Foreign exchange contracts:				
Forward exchange transactions	507.8	15.0	633.2	-11.4
Currency options	70.3	1.1	76.0	0.2
Interest rate contracts:				
Interest rate swaps	35.5	-6.4	35.5	-7.7
Commodity-related contracts:				
Commodity swaps	0.0	0.0	1.9	-0.1

Negative market values correspond to the risks associated with the various 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.
- Options are valued using recognized models for calculating option prices (e.g. Black-Scholes).

Paid and received option premiums are carried under Miscellaneous liabilities. The book value of paid and received option premiums amounted to EUR 1.0 million at the balance sheet date.

27 Research and development expenditure

In fiscal year 2017, Group expenditure on research and development amounted to TEUR 358,827 (2016: TEUR 328,449).

28 Disclosure

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 HGB Article 264 (3), the subsidiary companies Knorr-Bremse Systeme für Nutzfahrzeuge GmbH, Munich/Germany, Knorr-Bremse Systeme für Schienenfahrzeuge GmbH, Munich/Germany, Knorr-Bremse Services GmbH, Munich/Germany, Hasse & Wrede GmbH, Berlin/Germany, Kiepe Electric GmbH, Düsseldorf/Germany, KB Media GmbH, Munich/Germany, and Knorr-Bremse SteeringSystems GmbH, Wülfrath/Germany, are exempt from the obligation to publish their figures pursuant to HGB Article 325.

29 Total remuneration of the Supervisory Board and Executive Board

The total remuneration of members of the Supervisory Board amounted to TEUR 620 (2016: TEUR 720) and the total remuneration of the Executive Board to TEUR 6,306 (2016: TEUR 5,976). Pension commitments to former members of the Executive Board and their surviving dependents are covered by an accrual of TEUR 37,163 (2016: TEUR 34,921); payments in the fiscal year amounted to TEUR 3,376 (2016: TEUR 3,221).

30 Executive Board of Knorr-Bremse AG

Klaus Deller, Chairman of the Executive Board, responsible for the Rail Vehicle Systems division.

Ralph Heuwing, member of the Executive Board since November 1, 2017, responsible for Finance, Controlling and IT.

Dr. Peter Laier, member of the Executive Board, responsible for the Commercial Vehicle Systems division.

Dr. Lorenz Zwingmann, member of the Executive Board until December 31, 2017, responsible for Finance, Controlling and IT.

31 Supervisory Board of Knorr-Bremse AG

Heinz Hermann Thiele, Munich/Germany
Honorary Chairman
Entrepreneur

Hans-Georg Härter, Munich/Germany
Chairman of the Supervisory Board
Former Chief Executive Officer of ZF Friedrichshafen AG

Franz-Josef Birkeneder*, Aldersbach/Germany
First Deputy Chairman of the Supervisory Board
Plant Manager Aldersbach

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

Dr. Wolfram Mörsdorf, Essen/Germany
Retired member of the Executive Board of ThyssenKrupp AG

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

Sebastian Roloff*, Munich/Germany
Attorney at law with IG Metall trade union, Munich office

Erich Starkl*, Passau/Germany
Second authorized representative of IG Metall trade union, Passau office

Julia Thiele-Schürhoff, Munich/Germany
Chairperson of the Executive Board of Knorr-Bremse Global Care

Wolfgang Tölsner, Uetersen/Germany
Management consultant

Georg Weiberg, Stuttgart/Germany
Retired Head of Development, Daimler Trucks

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

*Employee representative.

32 Events of particular significance after the end of the fiscal year

On January 12, 2018, Knorr-Bremse sold the Swedtrac services business to Stadler Service Sweden AB. The transaction is due to be finalized at the end of the first quarter of 2018. No events took place after the balance sheet date that had a material impact on the net worth, financial position or operating results of the Knorr-Bremse Group.

Munich, March 2, 2018

Knorr-Bremse AG
Executive Board



Klaus Deller



Ralph Heuwing



Dr. Peter Laier

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

	2017 TEUR	2016 TEUR
Result for the period (including minority interests in consolidated results)	579,769	549,685
Depreciation and amortization on intangibles and fixed assets (excl. financial investments)	207,713	179,450
Decrease (2016: increase) in accruals	-16,492	15,433
Increase (2016: decrease) in inventories, trade receivables, and other assets not related to investing or financing activities	-286,551	7,547
Increase (2016: decrease) in trade payables and other liabilities not related to investing or financing activities	131,233	-21,447
Losses (2016: profits) on disposals of intangibles, fixed assets, and investments	3,909	-13,601
Net interest expenses	10,896	5,251
Other investment expenses (2016: income from equity investments)	532	-2,666
Grants and subsidies received	-3,372	-9,735
Income tax charge	261,340	279,775
Income tax paid	-254,389	-280,290
Cash flows from operating activities	634,588	709,402
Proceeds from (2016: disbursements for) disposals of intangible assets	429	-298
Disbursements for investments in intangible assets	-14,938	-21,039
Proceeds from disposals of fixed assets	18,472	18,762
Disbursements for investments in fixed assets	-170,654	-173,537
Proceeds from disposals of financial assets	18,448	2,548
Disbursements for investments in financial assets	-8,379	-78,759
Disbursements for the acquisition of consolidated companies and other business units	-91,588	-179,183
Interest received	16,717	8,308
Cash flows from investing activities	-231,493	-423,198
Proceeds from equity contributions by minority shareholders	151	2,428
Proceeds from the issuance of bonds and (financial) borrowings	6,982	501,916
Disbursements for the redemption of bonds and (financial) borrowings	-15,690	-8,700
Proceeds from grants/subsidies received	3,372	9,735
Interest paid	-27,720	-18,057
Dividends paid to parent company shareholders	-364,000	-364,000
Dividends paid to minority shareholders	-69,090	-64,298
Cash flows from financing activities	-465,995	59,024
Net change in cash funds	-62,900	345,228
Change in cash funds resulting from exchange rate and valuation-related movements	-72,174	9,532
Change in cash funds resulting from changes in Group structure	0	19,339
Change in cash funds resulting from cash-relevant transactions	-135,074	374,099
Cash funds at the beginning of the period	1,716,241	1,341,761
Cash funds at the end of the period	1,581,167	1,716,241
Cash funds are comprised as follows:		
Cash and cash equivalents	1,599,513	1,720,060
Short-term marketable securities	51	51
Short-term bank debt (term less than 3 months)	-18,397	-3,870
	1,581,167	1,716,241

Breakdown of Sales Revenues

Fiscal year 2017	Europe/Africa	Americas	Asia/ Australia	Knorr-Bremse Group
in EUR thousands (TEUR)				
Sales revenue by region	3,791,677	1,451,451	1,730,774	6,973,902
thereof sales revenue from third parties	3,162,186	1,379,733	1,693,806	6,235,725
thereof sales revenue from other segments	629,491	71,718	36,968	738,177

Fiscal year 2016	Europe/Africa	Americas	Asia/ Australia	Knorr-Bremse Group
in EUR thousands (TEUR)				
Sales revenue by region	3,304,846	1,291,195	1,585,285	6,181,326
thereof sales revenue from third parties	2,728,247	1,219,219	1,546,826	5,494,292
thereof sales revenue from other segments	576,599	71,976	38,459	687,034

Fiscal year 2017	Sales revenues
in EUR thousands (TEUR)	
Rail Vehicle Systems	3,325,213
Commercial Vehicle Systems	2,927,967
Miscellaneous/consolidations	(17,455)
Knorr-Bremse Group	6,235,725

Fiscal year 2016	Sales revenues
in EUR thousands (TEUR)	
Rail Vehicle Systems	2,990,341
Commercial Vehicle Systems	2,523,183
Miscellaneous/consolidations	(19,232)
Knorr-Bremse Group	5,494,292

Statement of Changes in Group Equity in Compliance with GAS 22

Changes in Group equity 2017	Equity of the parent company							Non-controlling interests				Group equity		
	Total capital stock (common stock)	Accruals					Profits/losses brought forward	Consolidated net income attributable to the parent company	Total consolidated net income	Non-controlling interests before equity differences on currency translation and net result for the year	Equity differences on currency translation attributable to non-controlling interests	Profits/losses attributable to non-controlling interests	Total non-controlling interests	Total
		Total capital reserves (HGB Article 272 (2) clauses 1-3)	Retained earnings			Total								
			Legal reserve	Other retained earnings	Equity differences on currency translation									
in EUR thousands (TEUR)														
As at Dec. 31, 2016	67,600	153	6,607	865,280	5,705	877,592	254,256	421,881	676,137	127,088	5,345	64,897	197,330	1,818,812
Additions/disposals	0	0	0	0	0	0	57,881	-57,881	0	64,897	0	-64,897	0	0
Distribution	0	0	0	0	0	0	0	-364,000	-364,000	-69,090	0	0	-69,090	-433,090
Currency translation	0	0	0	0	-85,364	-85,364	0	0	0	0	-8,989	0	-8,989	-94,353
Other changes	0	0	0	-19,120	0	-19,120	0	0	0	12,618	0	0	12,618	-6,502
Changes in the scope of consolidation	0	0	0	-7,457	836	-6,621	0	0	0	578	139	0	717	-5,904
Consolidated net income	0	0	0	-131,589	0	-131,589	0	632,121	632,121	0	0	79,237	79,237	579,769
As at Dec. 31, 2017	67,600	153	6,607	707,114	-78,823	634,898	312,137	632,121	944,258	136,091	-3,505	79,237	211,823	1,858,732

Independent Auditors' Report

We have audited the annual financial statements – comprising the balance sheet, income statement, and notes to the financial statements – and accounting practices of Knorr-Bremse Aktiengesellschaft, Munich, as well as the report on the position of the Company and the Group for the fiscal year from January 1 to December 31, 2017. The accounting and preparation of the annual financial statements and management report in accordance with German commercial law are the responsibility of the Company's management. Our responsibility is to express an opinion on the annual financial statements, including the Company's accounting practices, and on the management report.

We conducted our audit of the annual financial statements in accordance with HGB (German Commercial Code) Article 317, applying the German principles for the proper 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 worth, financial position, and operating results in the annual financial statements according to German principles of proper accounting and in the management report are detected with reasonable assurance. Knowledge of the business activities and the economic and legal environment of the Company as well as expectations of possible errors are taken into account when determining appropriate audit procedures. The effectiveness of the accounting-related internal control system and the evidence supporting the disclosures in the accounting system, annual financial statements, and management report are examined primarily on a test basis within the framework of the audit. The audit includes assessing the accounting principles used and significant estimates made by the Executive Board, as well as evaluating

the overall presentation of the annual financial statements and 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 annual financial statements comply with the legal requirements and give a true and fair view of the net worth, financial position, and operating results of the Company in accordance with the principles of proper accounting. The management report is consistent with the annual financial statements, complies with the statutory and legal requirements, and as a whole provides a suitable view of the Company's position and suitably presents the opportunities and risks of future development.

Munich, March 5, 2018

KPMG AG
Wirtschaftsprüfungsgesellschaft

signed Rupprecht
Independent auditor

signed Engelmann
Independent auditor

Consolidated Balance Sheet as at December 31, 2017

Assets	Notes	Dec. 31, 2017 TEUR	Dec. 31, 2016 TEUR
Intangible assets	(3)	284,692	245,341
Fixed assets	(4)	918,960	901,002
Investments	(5)	67,184	97,405
Intangibles, fixed assets, and investments		1,270,836	1,243,748
Inventories	(6)	456,231	419,486
Accounts receivable, trade	(7)	1,156,588	961,414
Receivables from affiliated companies not included in consolidation	(7)	163	140
Other assets	(7)	246,602	173,609
Other marketable securities		51	51
Cash and cash equivalents	(8)	1,599,513	1,720,060
Current assets		3,459,148	3,274,760
Prepaid expenses	(9)	24,373	23,529
Deferred tax assets	(10)	45,374	62,171
Balance sheet total		4,799,731	4,604,208
Equity and liabilities	Notes	Dec. 31, 2017 TEUR	Dec. 31, 2016 TEUR
Capital stock	(11)	67,600	67,600
Capital reserves	(12)	153	153
Retained earnings	(13)	634,898	877,592
Unappropriated consolidated net income	(25)	944,258	676,137
Non-controlling interests		211,823	197,330
Group equity		1,858,732	1,818,812
Pension plan accruals	(14)	248,206	242,851
Other accrued liabilities	(15)	986,659	1,009,999
Accruals		1,234,865	1,252,850
Bonds		500,000	500,000
Accounts payable, banks		153,622	148,823
Accounts payable, trade		852,560	714,064
Other liabilities		190,479	161,205
Liabilities	(16)	1,696,661	1,524,092
Deferred income		9,473	8,454
Balance sheet total		4,799,731	4,604,208

Consolidated Statement of Income for the Fiscal Year from January 1 to December 31, 2017

	Notes	2017 TEUR	2016 TEUR
Sales revenues		6,235,725	5,494,292
Changes in inventories		(11,496)	(6,806)
Own work capitalized		610	390
Total operating performance		6,224,839	5,487,876
Other operating income	(18)	287,596	248,461
Cost of materials	(19)	(3,019,579)	(2,560,865)
Personnel expenses	(20)	(1,336,118)	(1,196,592)
Depreciation and amortization on purchased intangibles and fixed assets	(21)	(207,713)	(179,450)
Other operating expenses	(22)	(1,096,488)	(967,385)
Financial results	(23)	(11,428)	(2,585)
Income before taxes		841,109	829,460
Taxes on income	(24)	(261,340)	(279,775)
Net income	(25)	579,769	549,685
Non-controlling interests		79,237	64,897

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, 2017.

Asia – Australia

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

Guangdong Knorr-Bremse Guo Tong Railway Vehicle Systems Equipment Co., Ltd. (CN)*
 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 Braking Systems for Commercial Vehicles (Dalian) Co., 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 Railway Technologies (Shanghai) Co., Ltd. (CN)
 Knorr-Bremse Systems for Commercial Vehicles (Chongqing) Ltd. (CN)*
 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)

APS electronic AG (CH)
 Dr. techn. Josef Zelisko Ges.m.b.H. (AT)
 Heine Resistors GmbH (DE)
 IGE-CZ s.r.o. (CZ)
 Kiepe Electric GmbH (DE)
 Kiepe Electric Ges.m.b.H. (AT)
 Kiepe Electric Ltd. (GB)
 Kiepe Electric UK Limited (GB)
 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 Powertech GmbH (DE)
 Knorr-Bremse Powertech GmbH & Co. KG (DE)
 Knorr-Bremse Rail Systems Italia S.r.l. (IT)
 Knorr-Bremse Rail Systems OOO (RU)
 Knorr-Bremse Rail Systems (UK) Ltd. (GB)
 Knorr-Bremse Rail Systems Schweiz AG (CH)
 Knorr-Bremse RailServices (UK) Ltd. (GB)
 Knorr-Bremse S.A. (Pty.) Ltd. (ZA)*
 Knorr-Bremse Systèmes Ferroviaires S.A. (FR)
 Knorr-Bremse Systemy Kolejowe Polska Sp. z o.o. (PL)
 Knorr-Bremse Vasúti Jármű Rendszerek Hungária Kft. (HU)
 Microelettrica Scientifica S.p.A. (IT)
 Selectron Systems AG (CH)
 Swedtrac RailServices AB (SE)

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

GT Emission Systems Ltd. (GB)
 Hasse & Wrede GmbH (DE)
 Knorr-Bremse Benelux B.V.B.A. (BE)
 Knorr-Bremse Fékrendszerek Kft. (HU)
 Knorr-Bremse Ibérica S.L. (ES)
 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 SteeringSystems GmbH (DE)
 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. (GB)
 Knorr-Bremse Systémy pro užitková vozidla ČR s.r.o. (CZ)
 tedrive Yönlendirme Sistemleri Sanayi ve Tic. Ltd. Şti. (TR)

Credits

Publisher

Knorr-Bremse AG
 Moosacher Str. 80
 80809 Munich
 Germany
 public.relations@knorr-bremse.com
 www.knorr-bremse.com

Responsible for the content

Alexandra Bufe, Knorr-Bremse AG

Concept

Eva Doppler, Knorr-Bremse AG

Copy editing

Onno Budelmann, Hanover
 Volker Joksch, Munich
 Thorsten Rienth, Munich
 Ingo Woelk, Munich

Layout, design, and production management

KB Media GmbH

Photo credits

Jann Averwerser, Munich
 Tobi Bohn, Berlin
 Caroline Gräther, Munich
 Andreas Pohlmann, Munich
 Loredana La Rocca, Munich

Additional image rights

Cover: Andre & Wolfgang Bartscher – www.truckracing.de
 Cover: Nishiki, Tokyo
 Cover: Peter Meszaros, Budapest
 Cover + p. 10, 20, 23: Kiepe Electric, © Markus-Steuer.de
 Cover: Becker Joest Volk
 p. 02: Wolfgang von Brauchitsch for Manager Magazin
 p. 12: Sándor Benkó
 p. 15: iStock © Imgorthand
 p. 28: Oleh Slobodeniuk/istockphoto.com
 p. 32-35: Daniel Samer, Munich
 p. 36-39: Markus Laudенbach, Munich; Yaracan, Madrid;
 Citizens Ambulance, Lucas Palm, Wakeman, Ohio
 p. 40-43: © Thüringisch Kambodschanische Gesellschaft e.V.

English translation

Paul Boothroyd, Schorndorf
 Hugh Keith, Edinburgh
 Bill Maslen, Cluny

Printing

Weber Offset, Munich
 Paper: Lessebo smooth white

ClimatePartner[®]
 climate neutral

Print | ID 11666-1801-1001

