

FORUM

54

The **WIRTGEN GROUP**
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Where quality originates

The brand headquarters and production facilities of the WIRTGEN GROUP.

WIRTGEN / VÖGELE / HAMM / KLEEMANN / BENNINGHOVEN

"I have known and admired the Wirtgen Group for more than 27 years. ... The Wirtgen Group has long been known for being 'close to our customers,' and together we will continue to work in close partnership with all of our customers to truly benefit their operations."



Dear employees, partners, customers and friends,

It's been a wonderful year for all of us. The Wirtgen Group has all but achieved €3 billion in sales (an all-time high) and experienced double-digit growth - and John Deere gained an invaluable partner.

The merger between the Wirtgen Group and John Deere is now official, and I couldn't be more excited.

I have known and admired the Wirtgen Group for more than 27 years. I have been inspired by how the company's unrelenting determination to produce quality products, to harness the talents of its experienced, knowledgeable employees and to constantly innovate to provide real value to its customers has made the Wirtgen Group an undisputed global leader in the construction industry.

We all know that the Wirtgen Group would not be what it is today without the dedication of the Wirtgen family, whose hard work over two generations has created a thriving, global enterprise. That dedication has continued during this time of transition, as Jürgen and Stefan Wirtgen have helped me become familiar with all aspects of their family's business and have played a major role in ensuring a smooth transition after the merger. They have my sincere gratitude.

I, along with the rest of the John Deere senior management team, have tremendous respect for the Wirtgen family and the values on which they built this great company - because these values have led to great success, and because we share them. Like the Wirtgen Group, John Deere believes in a grounded approach to business, in gratitude for all employees' contributions and in fostering sustainable, long-term growth for our company.

Most importantly, we all have a shared commitment to the customers who rely on us to provide exceptional products and services. The Wirtgen Group has long been known for being "close to our customers," and together we will continue to work in close partnership with all of our customers to truly benefit their operations.

Moving forward, these values will continue to be front and center as we work together to grow our enterprise. Our new, combined Construction & Forestry division will draw on our complementary product offerings and the expertise of both the Wirtgen Group and John Deere to deliver exceptional value to every one of our

customers. We will continue the Wirtgen Group's ongoing investments in new plants and maintain the corporate and sales structures that put customers first to best position ourselves - and our clients - for long-term growth and success. Our merged organization will also benefit from new efficiencies, such as the opportunity to jointly purchase raw materials and to combine forces in areas like research and development, machine technology and telematics.

Drawing on our strong foundations and invigorated by our new partnership, I am confident we can reach our next goal - \$10 billion in sales in the Construction & Forestry division.

We've all had a wonderful year. But together, I know that we can make the coming years even better.

All the very best,

Domenic G. Ruccolo



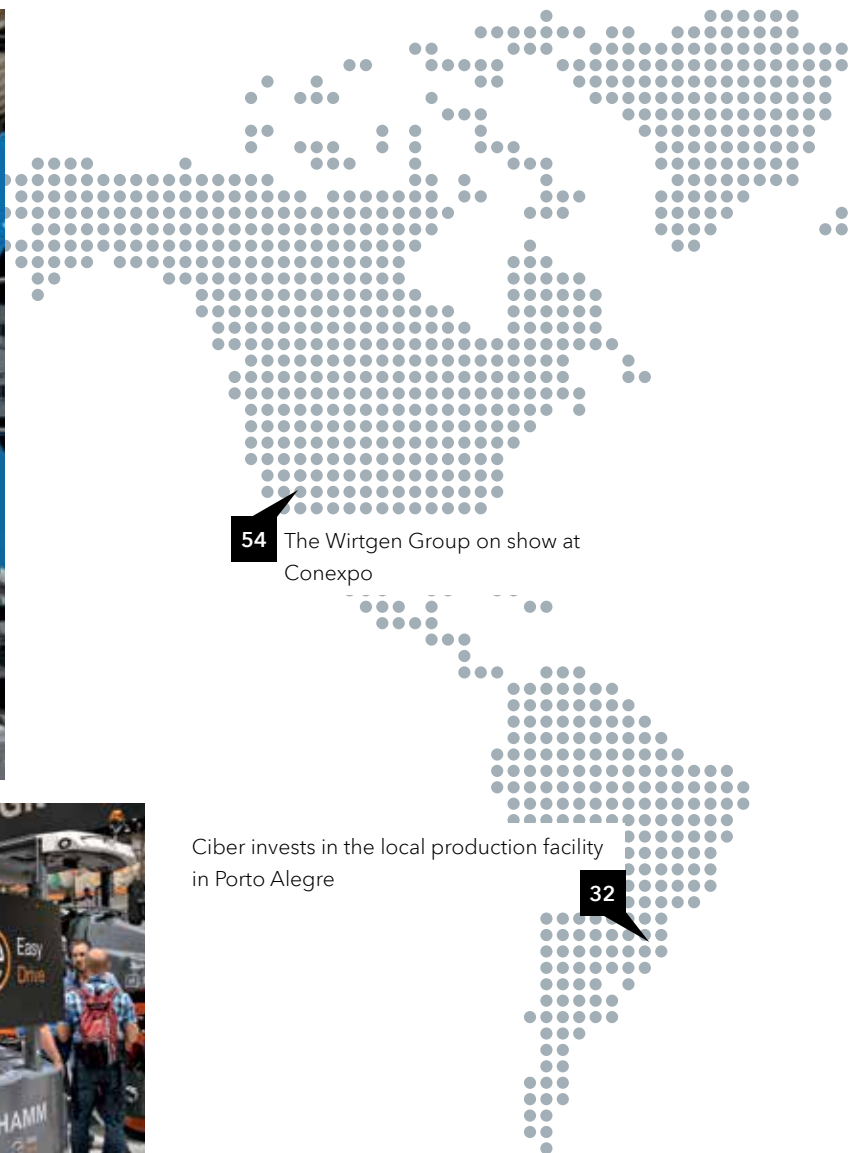
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WHERE QUALITY ORIGINATES

The product brands rely on state-of-the-art production conditions at their plants to make sure that Wirtgen Group machines stand out wherever they are in the world thanks to their quality and innovative technology.

WIRTGEN: MAXIMUM VERTICAL INTEGRATION - THE PERFECT BASIS FOR PREMIUM PRODUCTS

Perfection down to the last detail

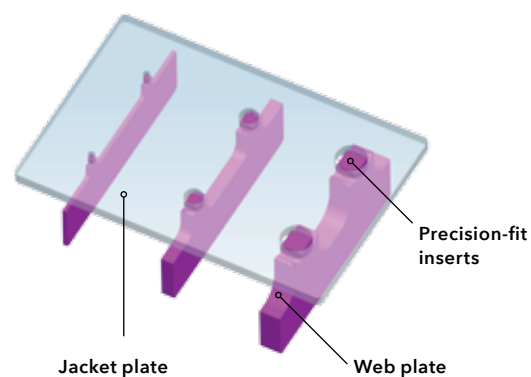
Over 150,000 different individual parts, 11,000 variations and special parts produced in-house and 820,000 job orders a year in prefabrication alone. The vertical integration in place at the brand headquarters in Windhagen is one of the keys to Wirtgen quality.





Precision and process reliability in laser processing result in optimum workpiece quality and save significant amounts of time.

CAD COMPONENT



The size of the inserts on the web plate (magenta) and the size of the bores in the jacket plate are determined by the thickness of each plate.

Whether it's cutting, welding or laser processing in the Cutting, Sheet-Metalworking or Steel Construction departments, everything has to fit perfectly if individual components are to be combined to form a premium product in final assembly. To this end, Wirtgen relies on advanced processing machines and its unique expertise. "We continuously invest in our fleet of machines and injected another €10 million in 2017. On top of that we adapted the existing building design to ensure an optimum flow of material," explains Plant Manager Norbert Dinspel.

However, Wirtgen also draws on the experience and know-how of its employees to continuously optimize production and logistics processes. One instrument it uses in this context is the continuous improvement process (CIP). "No one knows better than our own employees how to build Wirtgen road construction machinery. We are the market leader. No one else produces as many machines in this product segment." Targeted investments keep production conditions up-to-date at all times, but gen-



Andreas Wilsberg (l.), Dennis Kick and Michael Kirchbaum (r.) at one of the 33 new digital information points in the Wirtgen plant.

uine innovations are developed by Wirtgen on the basis of its unique expertise.

Increasing efficiency with the help of intelligent workflows

Wirtgen has installed 33 digital information points at its plant to exchange information with employees and establish a platform for CIP. Everyone can submit improvement suggestions. "The processing status of improvement suggestions is transparent within the respective department. Employees can look up the current status at an information point," explains Gerd Prassel of Job Scheduling at Wirtgen. The suggestions are processed by the plant's own technologists. They examine the individual topics, combine suggestions and decide if they are to be implemented. Furthermore, CIP meetings are held once a quarter in the individual departments, at which master craftsmen, shift foremen, staff members and technologists discuss measures for optimizing organization and productivity, generating invaluable fresh momentum.

The optimization of the in-house plug systems is a perfect example. These systems are used whenever two components need to be positioned on top of one another. Because of the variety of different assemblies, varying solutions exist throughout the industry. In contrast, Wirtgen uses a single system, defined by an in-house factory specification. This supports fast, reliable manufacturing when lasering workpieces thanks to standardized dimensions. The exact positioning of the components is specified for employees in production by a drawing with the defined dimensions. "Using additional 3D visualization, we can also generate a clear and precise image of a workpiece," says Christoph Günther, Engineering.

Developed in close collaboration between production specialists, engineering teams and technologists as part of the CIP, the factory specification delivers impressive results. Jürgen Schreer, technical specialist in sheet metalworking, summarizes the advantages: "Thanks to this precision system, the components can be perfectly positioned and the quality of the assembly optimized. We save a lot of time during welding or mechanical reworking."

Know-how promotes innovation

Focusing on both continuous optimization at the plant and the needs of customers is a key source of innovation and quality. □

✉ www.wirtgen.de/brand-headquarters

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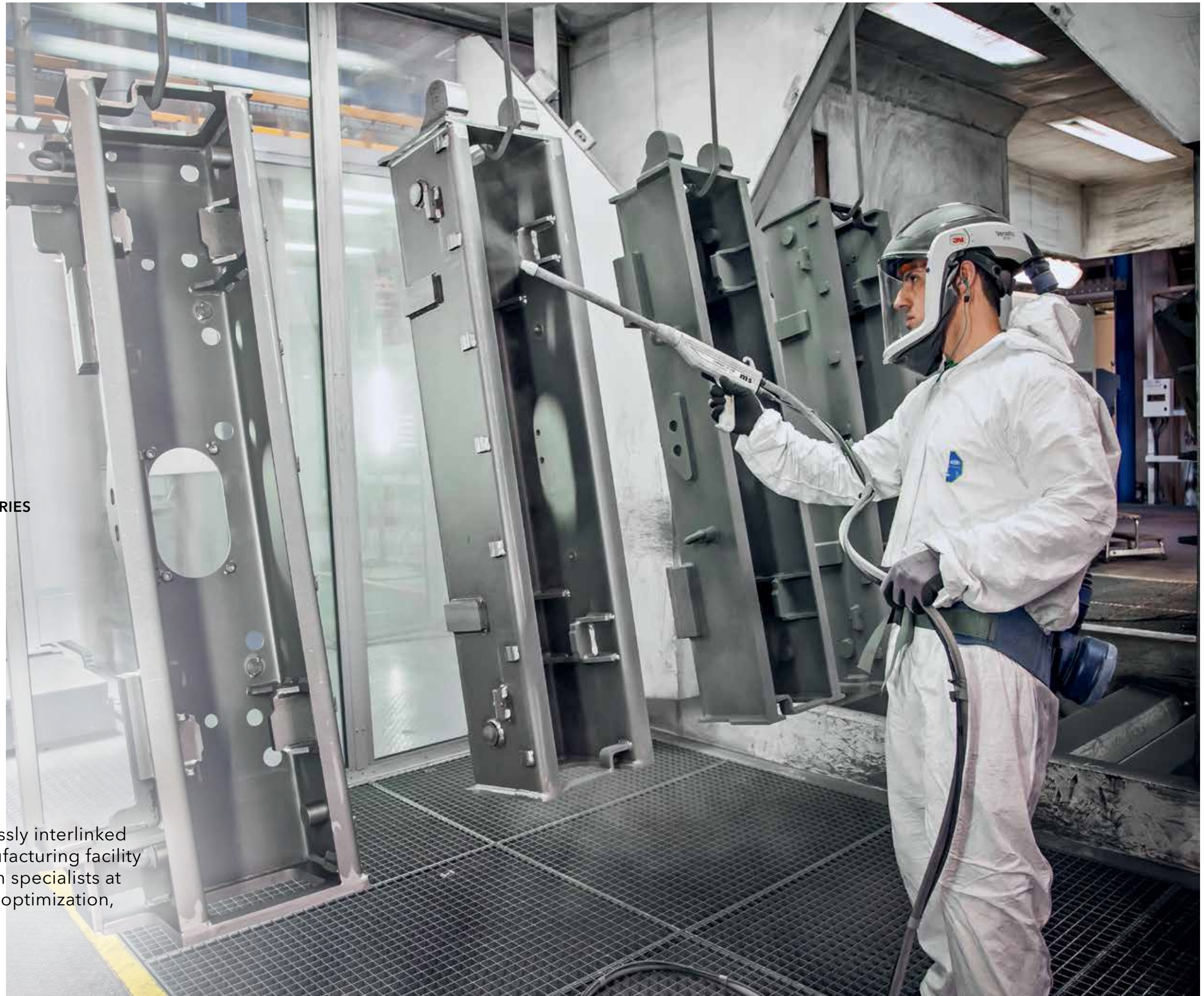
MILLION EUROS

is the amount invested by Wirtgen in production machinery at Wirtgen brand headquarters in 2017 alone. It additionally invested in modifications to the building itself.

VÖGELE: OPTIMIZED PROCESSES IN SERIES

All the right moves

Production processes are seamlessly interlinked at the world's most modern manufacturing facility for road pavers. When production specialists at Vögele identify new potential for optimization, they implement it immediately.





Assembly operator Thorsten Stoll showing the steps of assembly. Each one is individually confirmed and approved.

The paver is the pulse of any road construction job. Premium quality asphalt roads can only be built if this machine functions reliably and can be operated intuitively. At brand headquarters in Ludwigshafen, Germany, Vögele therefore puts tremendous emphasis on optimum production conditions. Continuous process optimizations and standardized workflows guarantee the high quality that these pavers require in order to achieve top results.

WIS - Industry 4.0

One critical module in ensuring quality even during the manufacturing process is the new SAP-based Worker Information System (WIS). Based on an optical touchscreen monitor, the system guides employees step-by-step through all stages of assembly. An employee-specific display makes sure that any changes are acknowledged and confirmed. Components or tightening torques relevant to safety and function are displayed and confirmed by a digital prompt function.

This method of guided assembly helps to avoid mistakes and supports a continuous and consistent process. Employees document any flaws or defective parts right on site, indicating that they need optimization. This ensures that every single product leaves the plant without any defects whatsoever. With the WIS, Joseph Vögele AG is well on its way to Industry 4.0.

The path of a screed frame

Series production of the screed frame, one of a screed's main components, shows how Vögele has integrated the Worker Information System into its production process and how additional process modifications optimize the quality of machine components. In this context, interdepartmental know-how is pooled long before the actual prototype phase. Technologists gather all the required information and document it for series production later on.

The screed frame's journey begins in the laser cutting facility, which is first fed with data collected in SAP. What is known as a nesting diagram precisely defines the breakdown of the components. The steel sheets are trimmed to size fully automatically in several steps, before they head to their next station: The MAK 4 EVO DU swivel bending machine. Machinist Martin Grund especially likes working with this tool, because "it can bend the edges up or down without having to re-mount the sheet. By eliminating a step, we avoid any potential complications involved in manual repositioning, but more importantly we accelerate the manufacturing process."

A1

QUALITY

Reliability and innovative force make Vögele the world's No. 1 in road pavers.

Process reliability thanks to high-tech

The robots in steel construction are all ready to go. Thanks to a precisely coordinated program sequence, they ensure that not only the specified welding sequence but especially the critical welding parameters are always adhered to, thus guaranteeing consistently high quality of weld seams.

The rough work on the steel body is followed by precision steps, in which the screed frame initially gets its colored exterior. The scene of the action this time is a high-tech powder coating system. It boasts not only rapid and uniform application of the powder, but also high environmental compatibility. But before the workpieces can be powder-coated, they must go through a cleaning process involving shot-blasting to remove any residues, such as scale, rust or lubricants. "Then they are electrostatically charged. Both steps are necessary for the powder to optimally adhere to the surface," explains Salvatore De Marco, Surface Technology Department, who is also responsible for the correct coating thickness on the screed frames.

Processes at the ovens are likewise precisely cycled, including the dwell times in the oven after coating application. The powder is melted at a temperature of 200 degrees Celsius. This curing step, which takes 25 to 90 minutes depending on material thickness, produces a tough surface coating. It is superior to conventional coatings in terms of hardness, elasticity, adhesion strength, light stability and corrosion resistance.

Assembled in ten steps

Quality testing of the screed frame is an important step on the way towards its final destination in the screed, the heart of a paver. The screed frame is first placed on the screed plate and then vibrated. This is followed by joining, meaning the mounting of the pre-assembled tamper unit on the screed frame and the installation of the electronic and hydraulic systems.



A quality-conscious team (from l. Thorsten Stoll, Marcus Krämer, Adam Matejczyk, Siegfried Köhler, Martin Krämer and Martin Gund) representing the entire Vögele workforce.

Final assembly takes place on height-adjustable, ergonomic assembly platforms at a total of ten work stations. The last four of them are equipped with testing systems that help the Vögele experts to set and check all the hydraulic and electronic screed functions before it advances to final quality control.

And here, too, absolutely nothing is left to chance. The list of test points must be signed or confirmed by the employee in charge. Finally, the technologist combines all of this into the documentation, which is displayed in the new Worker Information System for the start of series production. ■

➤ www.voegele.info



HAMM: EXPANSION OF BRAND HEADQUARTERS
IN TIRSCHENREUTH

Project 12,000

To reliably satisfy the consistently high demand for its earthwork and asphalt rollers and compactors, Hamm in late 2015 made preparations to expand production capacities to 12,000 machines a year.



In their new warehouse, Hamm employees manage some 15,000 different parts from 760 different suppliers.

The expansion of Hamm's brand headquarters is the largest single investment in its 140-year history, totaling over €30 million. It encompasses numerous new construction and renovation projects, including:

- Installation of a new flow assembly line and additional assembly stations,
- Construction of a new logistics center with 12,600 m² of space
- Enlargement of the spare parts warehouse by 60%,
- Expansion of the drum plant by 3,600 m²,
- Construction of a 2,000-m² building for training, and
- Construction of a second endurance test track for prototypes.

Expansion will also increase production efficiency, because as the technology leader, Hamm wants to continue to fabricate its premium rollers and compactors under optimum conditions in the future.

"We examined all our processes and questioned the status quo in many cases. By implementing optimizations, we are laying the groundwork to continue efficiently producing top quality into the future," explains Dr. Stefan Klumpp, Chief Technology Officer at Hamm.

In 2016, construction work began in many areas of the brand headquarters. "It caused numerous in-house relocations, because production continued at full capacity the entire time. It was a tremendous challenge, but working as a team, we have been able to adhere to the tight schedule," reports Construction Manager Michael Wegener.

New logistics center as a hub

The new logistics center, comprising 9,000 m² of enclosed space and another 3,600 m² of outdoor traffic and storage space, has been phased into operation. At a central location between the assembly building and drum plant, over 15,000 parts are now stored which Hamm needs regularly to build its roll-

100%

is Hamm's targeted increase in spare parts sales by 2020, compared to 2016.

50%

is the amount by which Hamm's assembly capacity will grow after all modernization work is completed.

56

KILOMETERS is the length of cabling and wiring installed in the new building in Tirschenreuth.

ers and compactors, including parts previously located in the outdoor area. Now they are protected against rain, snow and low temperatures.

What is more, delivery traffic is channeled more efficiently now thanks to optimized routing. Within the factory, too, transport paths to the flow assembly lines are significantly shorter. That increases efficiency, preserves resources and improves safety even more by reducing the number of transports. Production Manager Pressgott says: "Logistics is an important factor that greatly influences value creation. The better the logistics, the more efficiently all subsequent processes will run."

High-tech logistics

On a tour of the new logistics center, the first facility to catch the eye is the high-tech, automated small-parts store (German: "AKL"). Some 3,500 different containers for frequently-used, small parts are stored here in extremely space-saving fashion, and items are picked from them fully automatically at top speed. Another 5,750 parts are located at one of the 5,600 pallet locations in the "supermarket," where a new Warehouse Management System automatically calculates the demand for parts based on the production schedule. A tugger train delivers the components on customized picking trucks to the right place at the right time.

Construction of the new logistics center freed up space in the assembly building, which will now be used for another, fifth flow assembly line. And throughout the assembly facility, efficiency has been significantly increased in all areas thanks to a new Lean Production process design. For this purpose, Production Management and Controlling conducted intensive analyses and identified considerable potential for streamlining the flow assembly of rollers and compactors. "We eliminated the fixed assignment of product series to individual flow assembly lines and reorganized the flow assembly work cycles. By modifying these processes, we were able to increase capacity by as much as 50%," explains Dirk Pressgott.

More rollers and compactors require more drums

Another critical sub-project is the expansion of the drum plant by 3,600 m², enough space for an entire production line with advanced bending machines, welding robots, a new machining center and a coating facility. Günter Kolberg, Head of Drum Production, outlines the concept: "We restructured and expanded drum production. By changing the machine positions and production sequences, we succeeded in shortening manufacturing cycles, further increasing quality, improving material flow and enhancing flexibility." The growing global population



Production Manager Dirk Pressgott, BBA (left) and Construction Manager Michael Wegener: The men in charge of planning and implementation of the expansion project.

of Hamm rollers and compactors also means increased handling of spare and wear parts. Hamm expects sales to double by 2020 compared to 2016. To reliably meet this increased demand, Hamm has expanded its spare parts warehouse by 60% and invested heavily in new equipment.

Moving mountains

More machines and more customers also mean more training. To avoid being dependent on the weather for training courses and demonstrations, a new 2,000-m² building with annexed training room was built. To make room for it, Hamm spontaneously decided to move its "testing hill" and improve it at the same time. The new testing hill has not only various steep ramps, but also several types of soil.

All these measures show: Hamm is confident of a bright future. Board member Dr. Stefan Klumpp said of Project 12,000: "We invested strongly in our brand headquarters amid an uncertain economic environment. Developments however have shown that we bet on the right horse! Now we are working hard to quickly reach the 12,000 mark." ■



HAMM: CONSTRUCTION OF THE SECOND ENDURANCE TEST TRACK

Dual endurance tests

A second endurance test track for prototypes currently is under construction in Tirschenreuth. As leader in compaction technology, Hamm is taking product development to a new dimension with its new track.

Just 10 years ago, construction machines worldwide operated on the basis of the same drive technology. Today, virtually every region has its own engine and exhaust regulations. The upshot of this change for Hamm: "If we want to be in a position to offer solutions with the right engine technology to all markets, we have to build two to three versions

of every single machine. On account of this change alone, we now have more than twice as many machine types today than we did in our 2007 catalog," Dr. Axel Römer, Head of Research and Development, points out.

Because Hamm thoroughly tests all machine types before they are approved for series production, the demand for prototype endurance testing natural-

ly also increased. To meet it, the roller and compactor manufacturer developed an endurance test track. "On the track, we get reproducible results based on defined travel and compaction programs. The tests accelerate the development process, while at the same time supporting high-level quality assurance," explains Chief Technology Officer Dr. Stefan Klumpp.

10,000 hours of endurance testing since 2014

The endurance test track has been in around-the-clock operation since 2014. This is made possible because the machines drive, steer and compact without an operator. The rollers and compactors autonomously complete a prescribed travel and compaction program, pull over on their own to fuel up and automatically park after the specified time has lapsed. The great advantage: The prototypes can log a tremendous number of operating hours in a short period of time.

The tests focus above all on the performance of the engine and hydraulic systems. The machines compact a special type of soil using their oscillation and/or vibration functions, or subject their swivel joints to extreme loads on a bumpy surface. On a ramp, the performance of the assemblies on an incline can also be assessed.

"We have clocked a total of over 10,000 operating hours on this test track," says university-qualified engineer Hans-Peter Patzner, who developed its control system. Now it is to be greatly expanded, because a second endurance test track is to be built on the same spot. "To make sure the machines don't collide on shared sections of track, we need to expand monitoring above and beyond the existing sensor systems," reports automation specialist Patzner. For example, the position of the machines, their direction of travel and their distance from other objects must be monitored at all times.

New territory: Autonomous driving

Hamm is thus entering new territory: autonomous driving. The new endurance test track, apart from its expanded testing capacity, will also deliver valuable data on autonomous driving and compaction. Board member Dr. Klumpp already has a concrete vision of how the results can be exploited: "The expertise we gain will be introduced step-by-step into our rollers in the form of various driver assistant systems. They will relieve the burden on operators even more and add to the already high level of quality in the compaction process." ■

> www.hamm.eu



When the second endurance test track goes into operation, it will offer a zone for the heavy-duty testing of swivel joints in rollers and compactors for soil compaction, a jump mode testing area, a configurable bumpy surface for tandem rollers and an additional vibration zone.

"Since 2014, all newly developed rollers and compactors have undergone intensive testing on the endurance test track."



Engineer Hans-Peter Patzner, developer of the Hamm endurance test track's control system.

KLEEMANN: OPTIMIZING THE VALUE STREAM

More space for quality

Kleemann has expanded its brand headquarters in Göppingen, advancing both assembly processes and its logistics organization so that its team can concentrate more on what really matters: the quality of the machines.





Thanks to the sound insulation hall, extensive final inspection can be conducted without the noise disturbing assembly workers next door.

Three, at most four steps, and Michael Kirchhöfer already has the bolts he needs to hand and can climb back on the exposed chassis of a jaw crusher. As an assembly line worker at brand headquarters in Göppingen, he knows all the right moves to make. Because he no longer needs to search for parts, he can concentrate entirely on the actual assembly work. "In expanding the plant, we succeeded in storing around 80% of the parts we need right along the assembly lines, instead of having them delivered beforehand from the warehouse," says Rolf Fetzer, Head of Job Scheduling.

Kleemann had relocated to this site on the outskirts of Staufer Park in late 2009. Now the company has expanded assembly operations from four to six work cycles, increasing capacity by 50%. "This move puts us on a clear course for expansion," says Michael German, Head of Assembly. In addition to increasing production capacities, improving material flows was another main reason behind expansion. All frequently-used small parts are stored in the center between the lines, immediately adjacent to the work stations where they are needed. "That unclutters the work areas, avoids redundancies in inventory and shortens paths for our co-workers in assembly," says German.

Surgical assembly processes

To the right and left of the lines, other components are stored which are retrieved by the line logistics

workers. "They travel back and forth between the racks near the line and the warehouse to supply the assembly line team with material. They are like nursing assistants in an operating room, who support the surgeon so he can concentrate on essentials. You could call it the surgeon/nurse principle," adds Markus Heine, Head of Production. They retrieve parts from storage that are needed in assembly over the next four hours. Any large-sized parts are retrieved from the surrounding, open-air storage area



Michael Kirchhöfer, assembly worker, benefits from small parts storage directly along the line.

according to the just-in-time method. Robust and large parts are the only items left in storage at these locations. "Thanks to the expansion, we also were able to increase the amount of storage space inside, near the assembly lines. This way, weather-sensitive components can immediately flow into production upon delivery without exposure to the elements, instead of going into intermediate storage outside the gates," says Manuel Golker, Head of Logistics. Golker is responsible for operational logistics, including in-



An interdisciplinary team headed by Rolf Fetzer, Head of Job Scheduling, engineered the new processes at the plant.

coming goods, central warehousing and shipping. While storage space was being expanded, including the installation of a new space-saving mobile storage rack, the logistics team reorganized incoming goods workflows, linking them more closely to company systems to improve resource planning. "For example, employees who inspect and scan the contents of packages can immediately see which storage location the items have been assigned to," explains Golker. The software takes into account existing capacities on the racks, but also when and how often a component is required in assembly. In this way, the system optimizes transport paths, reduces error rates and increases stock quality. Another new feature in the warehouse is the quality management system. "We used to ask a co-worker when we noticed something unusual about incoming goods. Now they are integrated in the warehouse process. Incoming samples, for instance, are immediately sent for inspection without delay."

Detailed inspection and approval

This prevents incoming samples which fail to meet quality requirements from ending up in assembly. It does not, however, mean that assembly workers and production managers can get careless, believing that the system will take care of everything. Quality assurance is firmly anchored in the entire production process. On test benches, for example, Kleemann inspects all jaw and impact crushers and balances them prior to installation to ensure flawless operation. Even final machine inspection is a detailed process. "When I started working here 20 years ago, the final inspection report amounted to one sparsely filled sheet of paper (A4)," recalls German. "Today it comprises 20, closely typed large-sized sheets of paper (A3) that we go through step-by-step." To enable this kind of intensive final inspection, Kleemann also encased the testing zone at the end of Line 3 in soundproof walls. The other series assembly lines are to be equipped with the same kind of noise protection. "When the machines are tested there for one or two days, we can reduce the noise level for the rest of the assembly building by 15 decibels," explains Markus Huber, who is responsible for the needs of the assembly department within the overall expansion project. That translates into a perceived 60% noise reduction. "This solution really is a relief for our assembly team and it improves working conditions, which in turn supports our efforts to fulfil our high quality standards," says Fetzer. ■

► www.kleemann.info

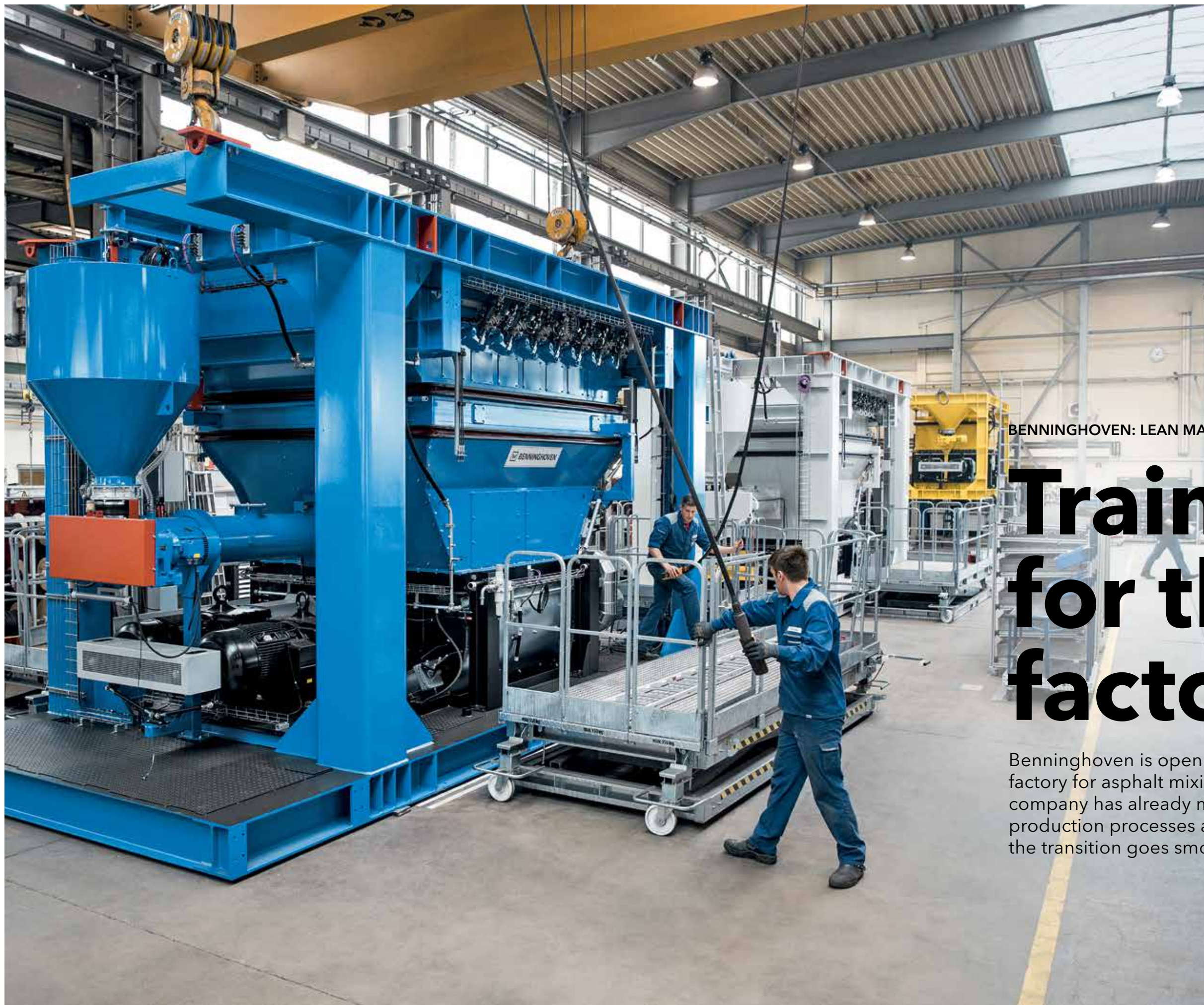
15

DECIBELS

is the drop in noise levels in assembly now that final inspection is conducted in a sound-proof space.

50%

is the increase in production capacity in Göppingen thanks to expansion and new structures.



BENNINGHOVEN: LEAN MANAGEMENT

Training for the new factory

Benninghoven is opening a new, state-of-the-art factory for asphalt mixing plants in 2018. The company has already made a start on converting production processes at its two sites to ensure that the transition goes smoothly.



Instead of fixed station assembly, burners will now be assembled in line in eight work cycles.



Precision work is called for, even on plants that tower over 30 m high.

Whether you are cramming for an exam, getting in shape for a sports event or getting ready to pitch a product to a customer, in many areas of life preparation is the key. "It's really no different when we build a new factory - apart from the dimensions, that is!" says Karl-Ewald Burg. He is responsible for the introduction of lean management at Benninghoven. And it's with lean management that the two sites in Mülheim an der Mosel and in Wittlich are making important preparations for the new plant, which will be opened in Wittlich in 2018. That's because during the construction work Benninghoven will already be converting the production of all core components of its asphalt mixing plants in the existing brand headquarters from fixed station to line assembly - an unusual approach in one-piece manufacturing, since the required unit volumes are relatively low.

The material supply control loops are also being redefined. This should ensure that operation at the new plant - which is geared towards newly designed production lines and material flows - gets off to a successful start with well-established processes and teams. Cross-departmental teams examined all stages of the respective value-added chain. "This

30%

INCREASE in demand was recorded by Benninghoven recently - the construction of the new headquarters could not be better timed.

20

KILOMETERS is the distance between Benninghoven's two brand headquarters. Merging them into one new, state-of-the-art plant will drive up production capacities and efficiency.

analysis enables us to calculate the work cycles required, for instance, or the number of workers per line or the required daily output. We are already factoring in our increasing production capacities, which we want to double by 2020." The focus in all considerations is on improving quality while adhering closely to deadlines.

Manufacturing in eight work cycles

The burner line in Mülheim was the pilot project. Instead of being assembled at a single fixed station as before, the burners now pass through eight work stations. While in work cycle 3, the worker now only has to assemble the pilot gas lines and the actuator, the logistics team provides all the necessary parts for the specific job on what are known as set carts. They supply small parts continually on a kanban basis. "Materials with an appropriate value classification that are consumed regularly are not picked singly from the warehouse for every job. Instead, a defined quantity is made available on the spot and continually replenished," explains production engineer Marvin Bischoff.

New auxiliary equipment will also help to improve ergonomics and workplace organization, among other benefits. Instead of being jacked up statically, the burners now stand on lift trucks. The workers in the new three-cycle line for mixing and weighing sections are also assisted by hydraulic tools. "The workers used to have to work lying on their backs underneath the plant parts or else on stepladders," Burg reports. Now they use cutting-edge lifting devices when they need to work under or on top of the gigantic components.

Whether they were selecting the right equipment or considering structural aspects such as the supply of materials, those in charge at Benninghoven also consulted regularly with the brand headquarters of the other companies in the Wirtgen Group. "Being the youngest member of the Group is an advantage for us, because it means we can profit from the experience of the others," says Sven Roth, Equipment Design Engineer, with conviction.

A welcome change

The adaptations came at a considerable investment cost and presented many challenges. "The existing organization was based on a handicraft structure that had evolved over time. But since it would not enable us to keep pace with our very pleasing growth, the process and location changes are vital," continues Dr. Martin Kühn, member of the Board of Management.

Streamlining production first is not the usual method when implementing far-reaching process changes. They normally begin in core and support processes allied to production. According to Burg: "We deliberately did it this way round because we wanted the heart of the value-added chain at our

new brand headquarters to be well prepared for a flying start. We had no desire to start hammering away at all the lines again in order to convert them subsequently."

Since changes of this magnitude never run without some teething problems, Benninghoven is working continuously on improvements. "It is important to keep on planning, to implement those plans, to reassess the strengths and weaknesses of the results and to take action accordingly. That ensures we keep the innovation process going," Burg explains. The workers at the two sites have an important role to play. "They bear the brunt in the conversion process and they really step up whenever the change in processes makes it difficult to handle demand spikes of more than 30%," says a proud Burg. The team is receiving training, and is not only able to implement the new processes quickly: "Our staff plays a key role in identifying weaknesses in the process and taking the initiative to resolve them with us."

This brought some important findings to light in the initial phase - findings which could be addressed early on, enabling optimizations to be incorporated into the new factory. Much can be planned in theory, Burg knows, "But the most important thing is that we investigate all cycles critically from the point of view of the customer." If the actual orders, for instance the proportion of standard to customized plants, does not match up with the calculations, this has an impact on the number of cycles within the lines. "We don't just get wrapped up in our own ideas; we are always trying to see the bigger picture from the customer's perspective as well." ■

➤ www.benninghoven.com

FACTS AND FIGURES Lean management

Lean management is the term that encompasses all the principles and procedures for efficiently structuring the entire value-added chain for industrial goods. "The aim is to avoid waste. That includes a zero-defect culture which is achieved with standardized and optimized processes, shorter routes, a seamless handover of jobs between departments and the avoidance of duplicated steps through defined responsibilities," Karl-Ewald Burg explains.



Uneven arable land was transformed into a stable base with sufficient load-bearing capacity for the new Benninghoven plant.

BENNINGHOVEN: JOB REPORT ON THE NEW BRAND HEADQUARTERS

Laying the perfect foundation

The new Benninghoven plant in Wittlich is being built over a sizable area of 310,000 m². One thing is sure: It will stand on a firm foundation, because Wirtgen soil stabilizers and Hamm rollers created the load-bearing base for it.

First up on the site were the civil engineers. A key part of their task was to create level and load-bearing surfaces for the 60,000-m² production and logistics hall, the 12,000-m² central building with offices and the traffic routes. The terrain was completely remodeled and stabilized to that end. "The height difference was originally around 8 - 9 m. Leveling the area required removing and replacing some 400,000 m³ of soil," explains Heinrich Plein,

Production Engineer at Benninghoven and member of the internal construction site management team. He is delighted that the site is getting a little bit closer to the desired form each day, because his sights are firmly fixed on the goal: "We are laying the ground for an advanced production facility that will enable us to manufacture premium mixing plants in higher quantities than before. That's why quality has been a key concern right from the start - and the base is where it all begins."



Teamwork on soil stabilization: Wirtgen soil stabilizers and Hamm compactors for soil compaction.

Quality from A-Z

Playing the main roles in this foundation work: Two Wirtgen soil stabilizers and up to six Hamm compactors. The team from EBS Bodenstabilisierungs GmbH used the soil stabilizers to expertly mix in a lime-cement mixture tailored to the soil quality in up to 12 layers, each 40 cm deep. EBS proprietor Jürgen Scharnbach specialized in soil stabilization and improvement 35 years ago - and is still successful and highly satisfied with Wirtgen equipment: "The Wirtgen soil stabilizers are the best on the market, particularly in terms of working speed, longevity and handling."

Once the binder had been mixed in, civil engineering general contractor Strabag AG had Hamm compactors waiting in the wings for the all-important compaction work. The first passes were completed by multiple compactors with pad-foot drums working in pairs or trios. Two further compactors with smooth drums then saw to the final compaction. The result was convincing: "All the load-bearing capacity and compaction values measured met the requirements of the construction contract. The individual layers are even, smooth and have no cracks - a textbook example," according to Eduard Weber, Building Material Inspector with sbt, the road and concrete construction lab charged with quality assurance.

Tried-and-tested brand duo hits the mark

Site Managers Kristina Fischer and Siena Schneider of Strabag AG are also highly satisfied with the work produced by the machines, because "so far only heavy frost and pouring rain have held up our plans. Unlike the stabilizing equipment from Wirtgen and Hamm. The machines work perfectly and reliably, so we don't need to worry. That's the way it should be." ■

► www.benninghoven.com/baufortschritt

"The unusual project is a complex and challenging task, but everyone in the plant knows that the end result is worth the effort."



Heinrich Plein,
Production Engineer
at Benninghoven

FACTS AND FIGURES

New Benninghoven plant

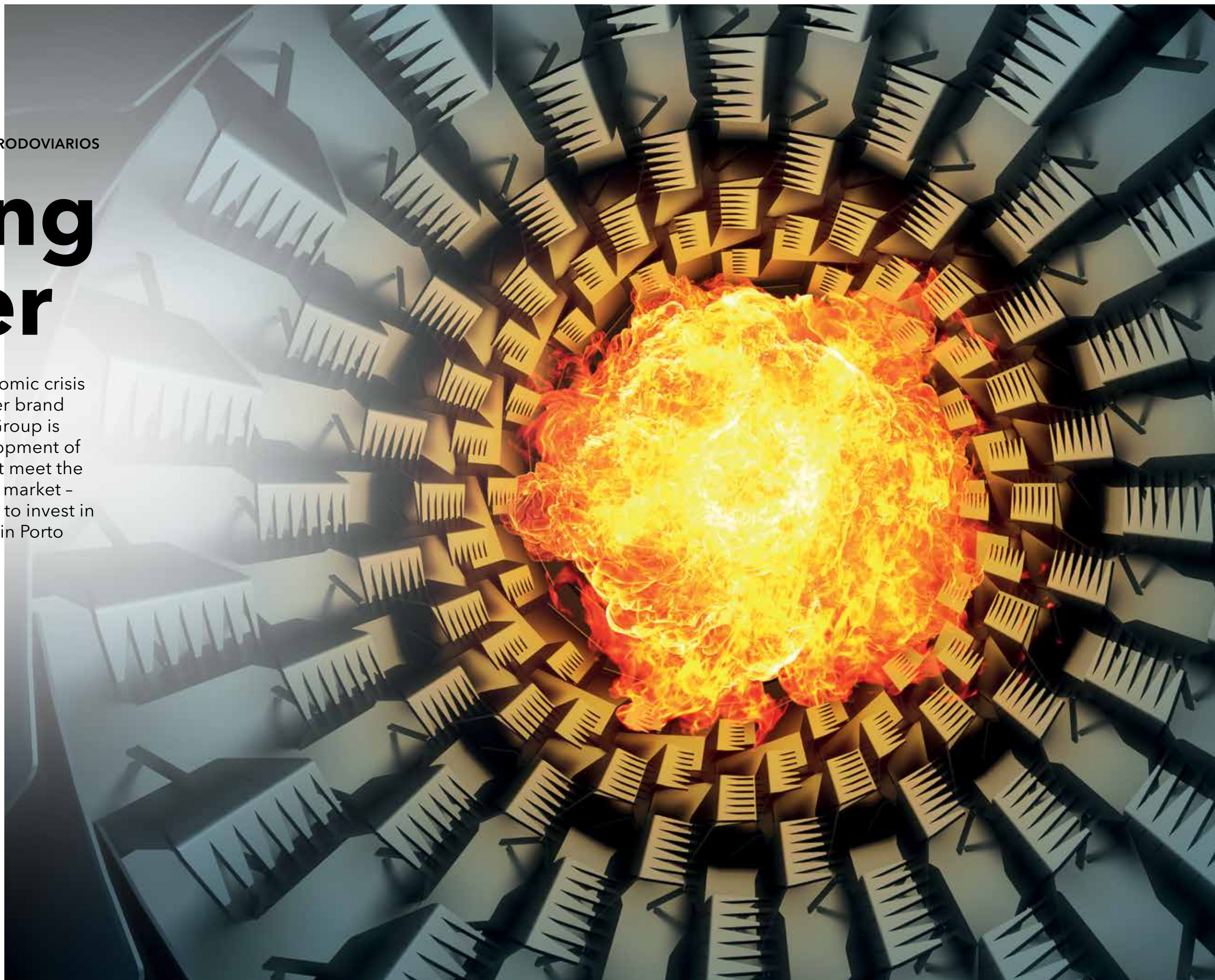


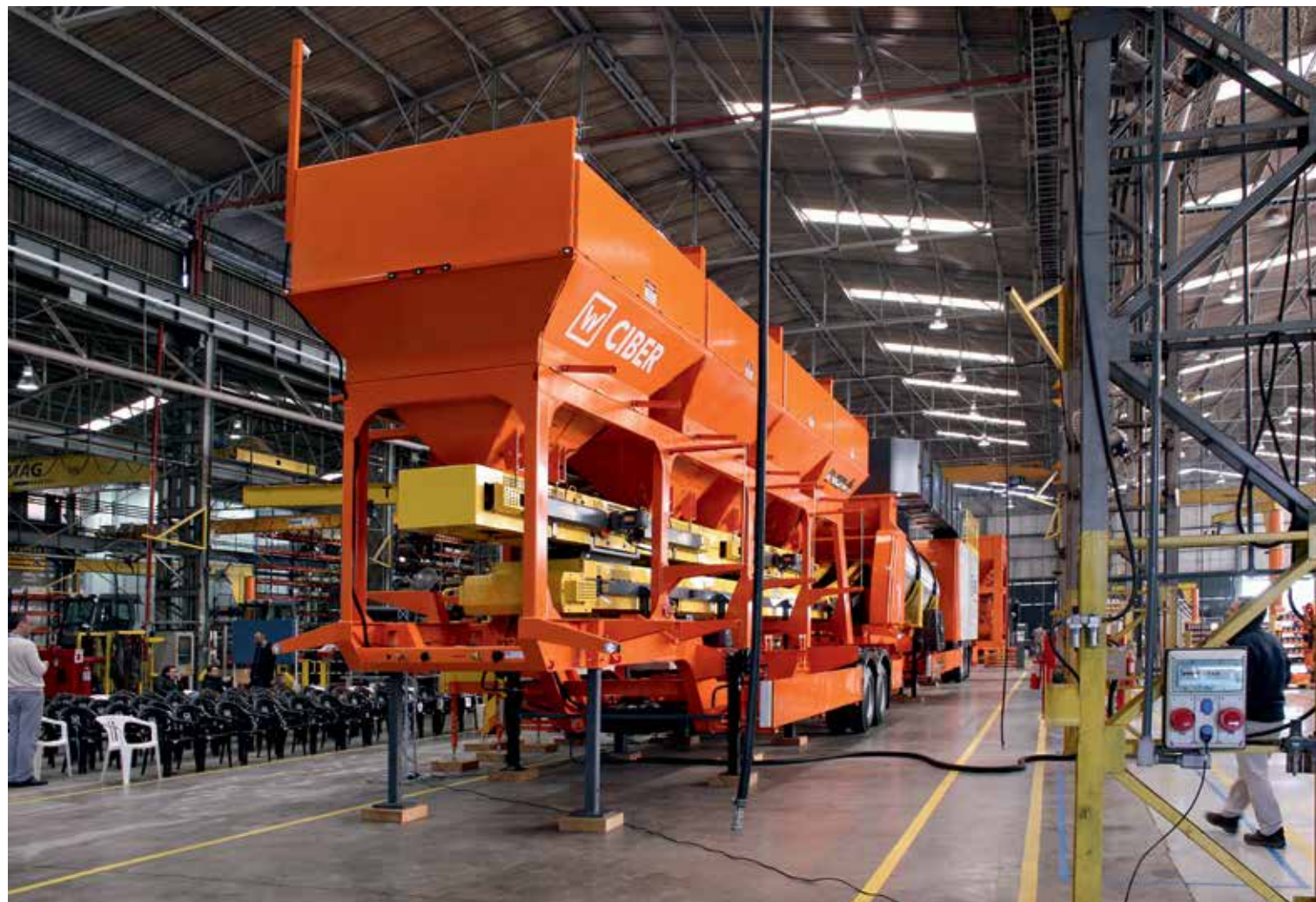
Area of grounds:	310,000 m ²
Soil removed:	400,000 m ³
Production area:	60,000 m ²
Area of central building:	12,000 m ² over 5 floors
Investment:	€130,000,000
Opening:	Summer 2018

BRAZIL: CIBER EQUIPAMENTOS RODOVIARIOS

Staying power

Even amid the current economic crisis in Latin America, at the Ciber brand headquarters the Wirtgen Group is concentrating on the development of innovative technologies that meet the needs of the price-sensitive market - which is why it is continuing to invest in the local production facility in Porto Alegre.





The Ciber asphalt mixing plant iNova 2000 combines mobility with high production capacity, hitting market requirements right on the nail.

Ciber complements the product portfolio of the Wirtgen Group for Latin America with its own brand. On five production lines covering an area of more than 48,000 m², the company manufactures not only Ciber asphalt plants; under license, it also produces road construction machines of the Wirtgen Group product brands Wirtgen, Vögele and Hamm that are specially modified for the market. The production facility in Rio Grande do Sul, in Brazil's most southerly state, offers outstanding production conditions for this task. Ciber has received ISO 9001 certification, demonstrating the ongoing optimization of production and compliance with the high international quality standards. That makes Ciber one of a select group of certified asphalt plant manufacturers.

Expansion despite the economic crisis

The corporate philosophy of investing both in lean production processes in the plant and in the development of innovative products has proved an excel-

lent approach – even and especially amid the economic crisis currently gripping Latin America in general and Brazil in particular. “Despite the inclement economic conditions, Ciber and the Wirtgen Group have taken the strategic decision to drive the expansion forward as planned,” says Luiz Tegen, summarizing the path they have taken together. “Last year we invested 25% more in research & development alone compared with 2015,” the Commercial Director of Ciber continued. The corporate structures of the after-sales service and the distribution network have also been broadened further with the two new Wirtgen Group subsidiaries Wirtgen Brasil Rio de Janeiro and Wirtgen Brasil São Paulo.

“With the support of the Wirtgen Group, we took appropriate action at an early stage, enabling us to significantly minimize the negative impact of the general economic situation compared with the industry as a whole,” Tegen adds.

The Director is now more optimistic about the future again. This can be attributed in part to the ris-

ing economic figures, but in particular to the fact that they have done their homework.

A stronger position for the future

“Cost-efficient production and innovative technologies mean we can service local market needs ideally. In fact, we’re anticipating growth of around 10% this year.”

The company's own asphalt plants have always been an important catalyst for its growth. Ciber has sold more than 1,800 of these plants since it began operations about 60 years ago. The product brand is well established throughout Latin America and has already tapped into new markets in Africa, South East Asia, Australia and New Zealand.

To win further market share, Ciber therefore is relying on its own asphalt plants, such as the new iNova 2000, in addition to the leading products from Wirtgen, Vögele and Hamm. It was in response to the requirements of the local market for high productivity alongside mobility that Ciber developed this mobile asphalt plant. The iNova 2000 is, for instance, the only plant on two chassis to achieve the high mixing capacities of between 100 and 200 t/h. The costs of transport and installation are also considerably lower than for plants with a comparable production capacity, which additionally require three or even more chassis.

New technologies on board

Daniel Siebrecht, Technical Director at Ciber, knows the strengths of the new model: “The plant enables us, firstly, to achieve the consistently high productivity that customers are looking for. Secondly, the large number of different aggregates allows a variety of asphalt mixes to be produced. That means maximum flexibility in application. What’s more, the iNova 2000 can be quickly and easily adapted to suit any job site situation.”

The new development rounds off the current Wirtgen Group product portfolio for the Latin American market, delivering tailor-made solutions that allow local civil engineers and road builders to reliably tackle the infrastructure projects that are currently in the pipeline. ■

➤ www.ciber.com/br

9001

ISO STANDARD

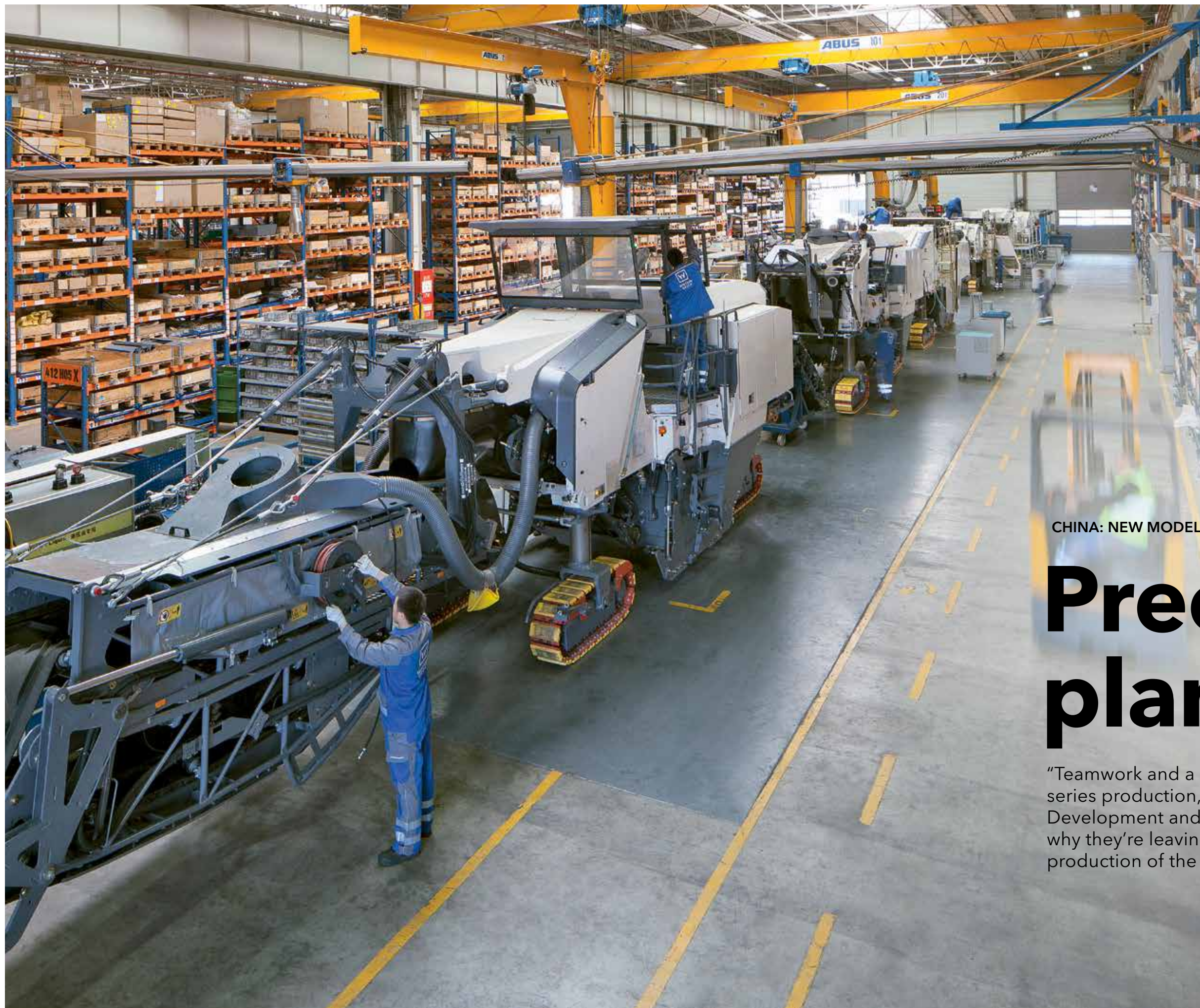
certifies compliance with the high international quality standards.



Licensed manufacture of market-specific Wirtgen cold milling machines.



The Ciber brand headquarters in Porto Alegre.



CHINA: NEW MODELS GO INTO SERIES PRODUCTION FOR ASIA

Precision planning

"Teamwork and a detailed concept are the key to series production," says Frank Jung, Project Manager Development and Design at Wirtgen GmbH. That's why they're leaving nothing to chance in China in the production of the W 215 large milling machine.



A special device helps to position the loading belt exactly.



As with the W 2000, flow assembly begins with the assembly of the hydraulic components on the chassis.

Manufacturing that's fun – not least thanks to optimum work processes.



From the right devices for the engine unit and loading belt to the new electrical concept – when it came to planning the flow assembly of the new flagship cold milling machine for Asia, no stone was left unturned. That's because the efficient production of the W 215 came high on the list of requirements of the German-Chinese project team alongside high quality standards. To the question of what came first – the chicken or the egg, or in this case the machine concept or the manufacturing process – Jung has a clear response: "Neither. We coordinated each of them step by step."

The team first adapted the standardized processes that have long been established in Windhagen for the production of the similarly designed W 200 and W 210 models, supplementing them with the local customizations of the Chinese W 215 model. The result? Greater process safety and efficiency for the production processes that assure quality even before the first parts are assembled.

Quality assurance from A to Z

One example of this is the device for the new engine unit, which enables the engine and chassis to be married without the need for an auxiliary frame. To ensure that every screw and bolt fit, the designers at brand headquarters simulated the assembly process in the design phase by means of a "dummy device". Every single parameter was defined exactly, allowing the corresponding components of the W 215 to be planned with precision. "That enables us to exclude the possibility of complications arising during the marriage," explains Fan Yunsheng, Development and Design, Wirtgen China.

Long before the go-ahead for production in Langfang was given, a number of Chinese fitters traveled to Germany in order to familiarize themselves with what were, for them, new process steps in standard operation so that they could subsequently pass this knowledge on to their local teams. Conversely, the German team traveled to Asia to consult with the Chinese experts on the subject of local suppliers. Here too, everything works hand in hand. The electronics, for instance – from the smallest lead in the

cable harness to every function in the control as a whole – already undergo a final inspection by the supplier. The suppliers were selected on the basis of long-standing partnerships with those German and Chinese companies which had been involved in the adaptation of existing procedures to the new production processes. "Again, this was an important factor in improving the efficiency of our series production," says Yunsheng, touching on the special challenges for the project in the price-sensitive Asian market.

The right recipe

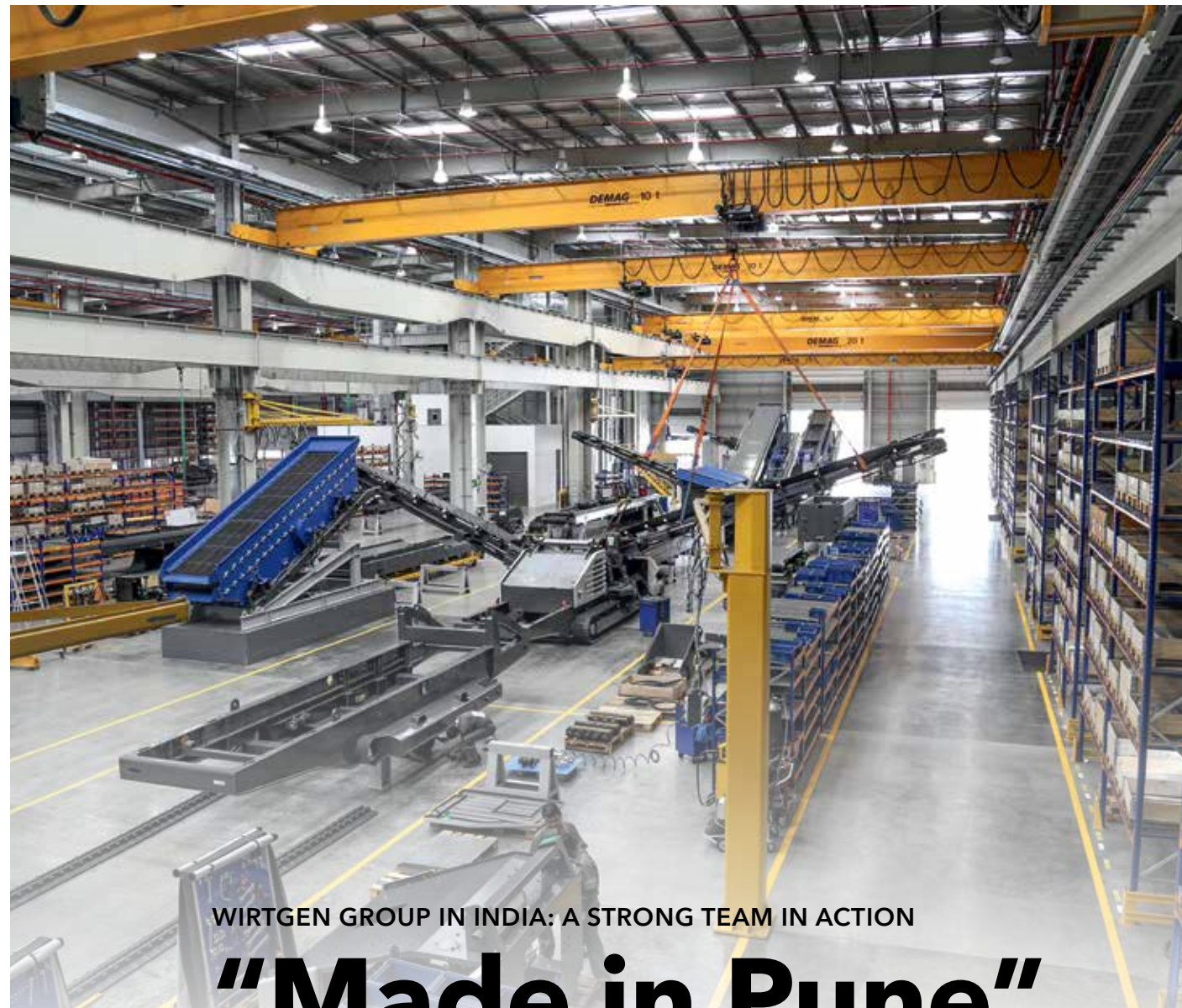
Like skilled chefs, the international project team from Wirtgen used only the very best ingredients, spicing things up with a local flavor. For Frank Jung, this is the right recipe: "Ultimately, the manufacturing process for the W 215 has much in common with the machine itself," the Project Leader says. "Both are robust, powerful and reliable." ■

> www.wirtgen-group.com/china

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DEVICES

– many of them specially developed for the W 215
– help make the assembly process efficient.



WIRTGEN GROUP IN INDIA: A STRONG TEAM IN ACTION

"Made in Pune" quality seal

In addition to the market-driven Vögele and Hamm products, Kleemann screening plants are also produced to German standards in India.

It's been a long road, but it was worth it," says a delighted Kirpal Singh Sian, Project Manager at Kleemann. He has shared responsibility for setting up the Kleemann production facility in Pune, in the west of India, over the last few years. On what was still flat countryside three years ago, Kleemann is now producing MS EVO classifying screens – to German quality standards.

At the Wirtgen Group production facility in Pune, Hamm has been producing rollers and compactors for the local market since as long ago as 2011. Covering a surface area of 129,000 m², Kleemann's purpose-built factory for screen production went into operation in 2015. "Hamm had already found production in Pune to be a positive experience. When combined with the established supplier base, it offers the best conditions for our screen production

facility," says Dr. Volker Nilles, Technical Director of Kleemann GmbH. Not only that, but key growth markets in Asia, the Middle East and Africa can be serviced effectively from the second Kleemann production site. The technical development of the screening plants continues to be the responsibility of the processing experts in Göppingen.

Teamwork is the key

"Despite these location advantages, we still had to put in a lot of work in order to be able to guarantee production to our high standards, particularly for the global market," Singh Sian reports. The most important aspects alongside the construction of the plant, which allows an annual production capacity of 500 screening plants to be achieved, are the establishment of the supplier network and the recruitment of a professional team.

Since many steel construction businesses and production sites of automotive suppliers are located in and around Pune, there are many possible suppliers to choose from. "To ensure we had access to a reliable network of suppliers in the long term, we audited all candidates according to the standard of the Wirtgen Group," explains Singh Sian, who was in charge of location setup. After countless analyses of material quality, welding seams and surface properties, a combination of Indian and European suppliers was put together. The engines and the hydraulic systems, for instance, come from European companies.

The team led by Singh Sian attached great importance to the qualifications of the workforce, who now produce four different types of plants in the MS EVO product series: the MS 702 EVO and MS 952 EVO double-deck classifying screens and the MS 703 EVO and MS 953 EVO triple-deck classifying screens. "We trained our Indian fitters locally. But it was important for them to spend a few months learning in Kleemann's production plant in Göppingen so that they could take our ways of working and quality standards thoroughly to heart as well. Since the skilled workers in Pune – which has outstanding universities for mechanical engineering and IT – are well educated, the trainers had no difficulties. "However, we needed to give them a little more depth in terms of the background so that the workers in India know all the components down to the last detail and understand how and where they fit in within the plants," Singh Sian reveals. They familiarized themselves with the entire production process and process control with SAP. The software is used to control the entire production chain both in Göppingen and in Pune – from production planning right through to ordering. It enables Kleemann to achieve low throughput times alongside optimum product quality in Pune, too. ■

► www.kleemann.info/products



Produced in Pune, the Vögele SUPER 1403 paver is tailored to the specific needs of the country.



The Hamm 311 compactor and the HD 99 tandem roller are series produced in Pune for the Indian market.

FACTS AND FIGURES

The Wirtgen Group plant in Pune



Area of grounds:	129,100 m ²
Plant types produced:	4
Sales and service bases:	22
Employees:	More than 500

► www.wirtgen-group.com/india

Future

Training is taken particularly seriously in the companies of the Wirtgen Group. The philosophy is that the know-how of the five specialized product brands needs to be passed on to the next generation in order to safeguard the premium quality of the products and services.



Eagle eye: The trainees cut the profiles to length before they are assembled.

Insight

Windhagen. A total of 33 new information points in the Wirtgen brand headquarters keep communication channels short. Who better to carry out this project than the trainees of Wirtgen GmbH? They got straight down to work with their trainer, Ewald Wittemann. The aluminum profiles for the information points were quickly built. Thanks to their clever design, the information points can be easily adapted to fit the different local circumstances in the plant. The results are certainly well worth seeing.

Information Day

Mülheim an der Mosel. For the trainees at Benninghoven, this was the second event of its kind – and another resounding success. As many as 170 interested visitors came to the Moselle on the trainee day to find out about the training opportunities offered by the specialist for asphalt mixing plants. The trainees set up a number of different stations to give the young people a better idea of the various trained professions. The highlight was a tour of the new plant under construction.



At the info stations: insights into the everyday life of a trainee.

Practical test

Tirschenreuth. At the “Work Experience Day” organized by Hamm, year nine students had an opportunity to get a feel for such trained professions as industrial mechanic, technical product designer, mechatronic or warehouse logistics specialist. Alongside exciting presentations and a tour of the plant – all organized by the trainees themselves – the highlight was the practical, hands-on experience. This gave the students a chance to put their skills to the test building electronic circuits, working with metal or creating technical drawings using a CAD program.



It's a wrap

Ludwigshafen. “Future Roads – Get Your Talent On The Road” was the title of the project that saw the Vögele trainees working hard on their completely new trainee branding. They can be particularly proud of their training videos, in which trainees of all vocations and their trainers played the main roles. Anyone keen to get a glimpse of the videos can view the result online. And... action!

Breakthrough

Göppingen. Kleemann is investing in training yet again. In addition to enlarging the surface area of the training department, the company has now also set up a “Production” service support point. This is where actual SAP orders, for instance from metal processing, are received, which are then processed by the trainees, enabling the next generation to provide quick and flexible support to the departments in the plant.



Training that's fun.

440

Trainees are currently employed by the Wirtgen Group at its five German brand headquarters.

1/3

of the workforce has been trained in-house.



Things run smoothly in the Vögele brand headquarters, thanks in no small part to the trainees.

Improved

Ludwigshafen. Vögele's Paul Herrwerth and Julian Hoffmann have been busy trying to optimize the process for filling the lubricating grease tanks. Accompanied by Dieter Kolba, who works in General Assembly, and their fellow trainees, they developed and produced what is known as the automatic lubricating grease system. Project duration: 12 months. The in-house development of the trainees, who have since qualified, is still proving its worth in the world's most modern paver factory. It offers time savings compared with the manual process, makes filling a clean process and reduces lubricant consumption thanks to an intelligent stop logic and innovative material recovery system. Brilliant!

➤ www.voegele.info/ausbildung



The young visitors excelled under the skilled eyes of the Wirtgen trainees.

Introduced

Windhagen. As many as 105 young people took the opportunity to find out about industrial training at Wirtgen at the 2017 Technical Day. Mechanical and technical careers took center stage at the event. The Wirtgen apprentices and their trainers were on hand to provide the interested youngsters with advice and answers to their questions. They were also willing to share their "wealth of experience" with the potential next generation in practical tasks such as tightening bolts using the torque wrench or building a small electronic circuit. This gave a realistic impression of the work that goes on in the Wirtgen training workshop.

➤ www.wirtgen.de/ausbildung

Think big

Göppingen. Up to 44 young people will be trained at Kleemann in 2019. They already have 34 of them - that's 13 more than two years ago. To give the industrial mechanics, steel assembly mechanics, mechatronics and electronic engineers of the future the best possible conditions for learning, the training workshop at the brand headquarters has been doubled in size and expanded to include the latest lathes, drill presses and milling equipment.



The trainees at Kleemann have plenty of space over two floors for practical and theory exercises.

12

recognized trained professions are offered by the Wirtgen Group.

Did you know ...

... that around 70% of the executives in Windhagen came through the training program there?



Proud young people with their roller models.

Strong together

Tirschenreuth. Five young people from the Lebenshilfe vocational training unit in Mitterteich, near Tirschenreuth, got together with Hamm trainees and Head of Vocational Training Josef Dill to design and to build small models of Hamm rollers. Together with the trainees, the youngsters were able to put their craft skills to the test in a wide variety of tasks. Showing independence and enthusiasm, they finished their models within five days.



Shah Mohammad Nasrullahi in conversation with a fellow trainee. He has been training as a metal technology specialist since August 2016.

Integration in practice

Windhagen. Wirtgen GmbH currently has 125 trainees learning 11 trained professions. Since August 1, 2016, this total has included four young men who came to Germany as refugees. Following a successful internship at Wirtgen, it quickly became clear that they would greatly enrich the company and that there was nothing to stop them receiving training. Thanks to their good knowledge of German, two of the young men were able to begin straight away with their training as metal technology specialists, while their two colleagues started training in August 2017 after an introductory qualification course and excellent performances. Respect!

➤ www.wirtgen.de/ausbildung

TRAINEE TECHNOLOGY DAYS 2017

Strong next generation

Every year, the trainees of the five Wirtgen Group brand headquarters meet to tackle a joint construction project as part of the Trainee Technology Days. This time, they paved a road on the grounds of the new Benninghoven brand headquarters and stabilized the future employee parking lot.

The Trainee Technology Days event celebrated its 10th birthday in 2017. The German Wirtgen Group brand headquarters take turns hosting the annual trainee event. A total of 63 trainees in the second year of their courses at Wirtgen, Vögele, Hamm, Kleemann and Benninghoven, accompanied by 20 trainers and fitters, came together at Benninghoven from June 21 to 23. This time, there were two group projects on the program. Workshops and tours also gave the trainees an insight into the product worlds of all Wirtgen Group brands.

On the first day, Benninghoven Managing Director, Dr. Martin Kühn, welcomed the group and told them about the construction of the new Benninghoven brand headquarters. After lunch they proceeded to Mülheim an der Mosel, where they were all able to tour the current plant and see a burner in action.

On the road

The project work started in the Rhineland-Palatinate village of Wittlich-Wengerohr early Thursday morning. This is where the world's biggest and most modern factory for the production of asphalt mixing plants is being built. The trainees were tasked with paving an access road to the new Benninghoven brand headquarters. A 210-m stretch of road with a width of 4 m was waiting to be paved by the trainees.

It was a match made in heaven for the 21 trainees from Vögele. Using the Vögele SUPER 1900-3i paver, they expertly laid the 14 cm-thick base course followed by the 4 cm-thick surface course. The 400 t of asphalt in total was then compacted by the eight Hamm trainees with the Hamm HD 14i and DV 65 VO

rollers. Together, they built the first road on the new grounds. "It's great for us to see for ourselves how a whole road can be built in such a short time by working together," said a delighted trainee, Sebastian Kaufmann from Benninghoven, of the successful project. "It was one of the hottest days of the summer, 35 degrees Celsius on the surface and over 160 degrees underneath – that teaches you respect for the day-to-day work of our customers and gives you a completely new outlook on it," he added.

The asphalt for the project came from the nearby Benninghoven mixing plant, the Ürzig Juchem asphalt mixing plant, which the group of trainees also visited as part of the Technology Days. There they also saw a Kleemann type MS 16 Z mobile screening plant in action, screening the recycled material reclaimed by Wirtgen milling machines so that it could later be added back to the new asphalt mix.

Laying a firm foundation

The second project for the Trainee Technology Days was to prepare the ground on the future parking lot of the new brand headquarters for further work. "We had to use the soil stabilizer with integrated binding agent spreader to stabilize the soil by adding cement so that the parking lot could be built on it later. I only knew the machine from production. But then when you get to work on it in a real project, it really makes you enjoy your job as a service engineer", explained trainee Alexander Scharfenstein. Together with his 18 other fellow trainees from Wirtgen, he delivered perfectly stabilized soil using the WR 240i S-Pack. The compaction work required more input from the Hamm trainees – this time with a Series 3000 compactor equipped with Hammtronic and vibratory padfoot drum, and an H 16i. "It's just great to see the trainees from across the whole group enthusiastically pulling together to tackle their task," said a delighted Martina Kappes, Head of Vocational Training at Benninghoven.

Not just strong in practice

Apart from the project work, there was also an extensive fringe program. The host, Benninghoven, had erected a tent on the grounds of its future brand headquarters in which the trainees learned more about the individual technologies at a number of presentations over the course of the Technology Days. "The theory part is important. Understanding the synergies between the individual product brands in the Wirtgen Group makes it much easier to identify with the company," said Boris Becker, Head of Vocational Training at Wirtgen.



1.



2.



3.



4.



5.

Hosting the event for the first time, Benninghoven excelled. "The whole team – trainees as well as trainers – was simmering with excitement about the event. That's because preparing for an event on a major construction site that is changing on a daily basis holds some surprises. I believe it was a successful, informative and unique few days in the everyday life of all the trainees," said Martina Kappes.

In addition to project work, tours and presentations, the trainees also had plenty of time at their lunchtimes and evening meals to get to know each other and swap stories about the training in the different brand headquarters and vocations. The three days saw everyone involved working hard, gaining new experience and making new friends. "The Trainee Technology Days were a resounding success, as they are every year. And the host Benninghoven did an excellent job of organizing the event," concluded Boris Becker. ■

► www.wirtgen-group.com/vocational-training

1. Thumbs up for the Trainee Technology Days! There would be no shortage of fun either. 2. Full roller power ahead: The trainees from Hamm ensured professional compaction with the HD 14i and the DV 65 VO. 3. Under the instruction of their trainers, the trainees from Wirtgen stabilized the soil of the future parking lot with a WR 240i S-Pack. 4. A total of 63 highly motivated trainees from all Wirtgen Group brand headquarters were able to put their expertise to the test at the event hosted by Benninghoven. 5. The trainees from Vögele laid the asphalt for an access road to the new Benninghoven brand headquarters with the SUPER 900-3i paver.

PART 1: WORKSHOP SERVICE

UP AND RUNNING

The Wirtgen Group's service philosophy offers maximum customer proximity, with service experts on hand locally to help customers with any machine-related concerns. A total of 55 Wirtgen Group subsidiaries and more than 150 contract dealers ensure geographical proximity in the markets.



Additional Customer Support topics:

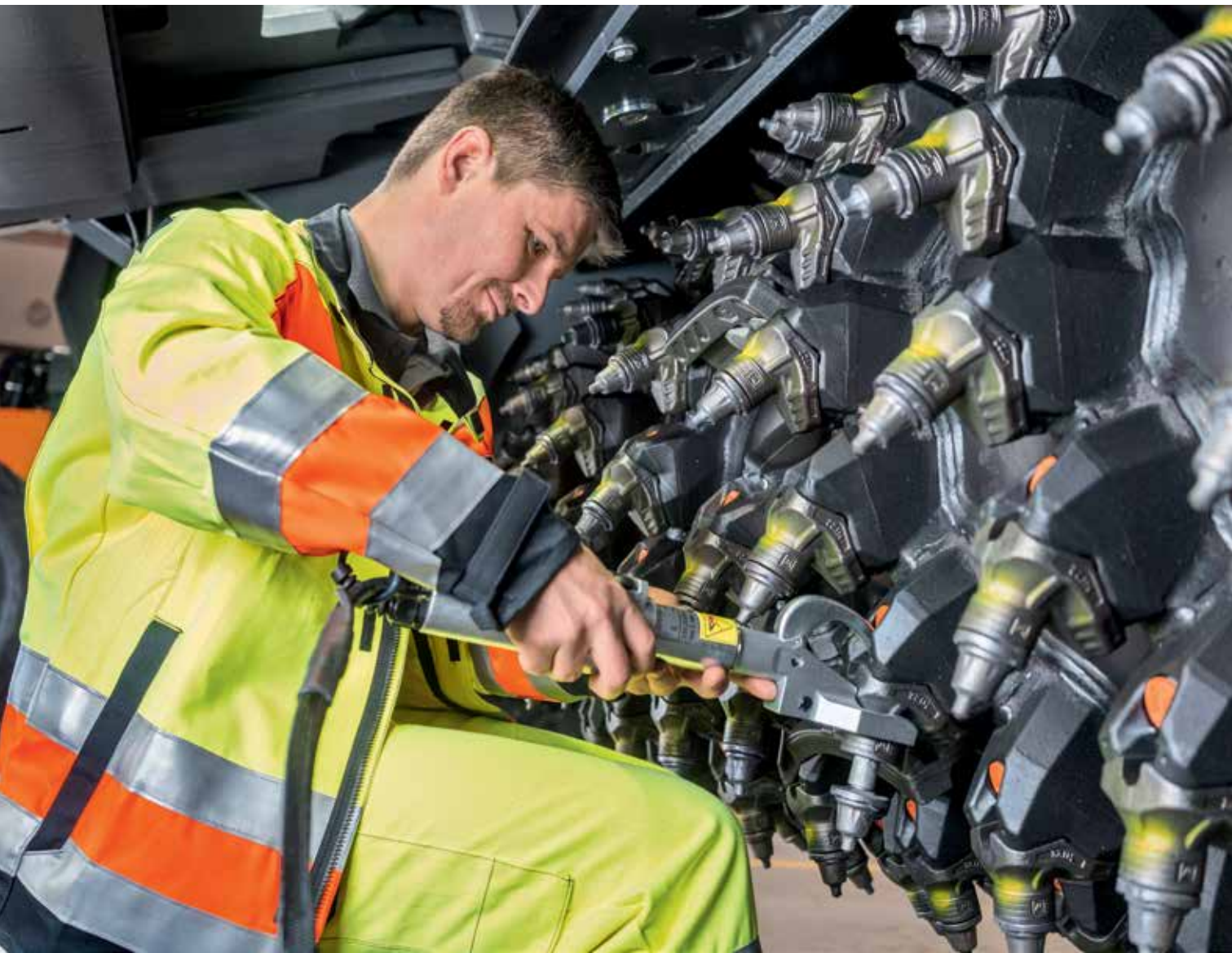
Part 2: Spare parts service

Part 3: Job-site service

Part 4: Applications consulting

Part 5: Training

Part 6: Service agreements



The workshop service organizes, prepares for and also carries out even comprehensive jobs.



Amplitude measurement:
A special tool enables faults and malfunctions to be located quickly.

“Regular workshop visits pay off in high machine availability and lower operating costs.”



Jochen Kohl,
Workshop Manager
at Wirtgen Windhagen

Customer support is where skilled craftsmanship meets high tech. “Our service team can be reached 24/7 and delivers a rapid solution in the event of emergencies,” says Jochen Kohl, Workshop Manager of the Wirtgen Group sales and service company Wirtgen Windhagen. But being “close to our customers” means providing a high level of technical expertise, too: the modern workshops offer the whole spectrum of a reliable workshop service, with the inspection, maintenance and overhauling of machines being just as much part of the service package as servicing and repairs. The workshops also ensure that auxiliary equipment is fitted properly in accordance with the manufacturer’s specifications.

Specialized and focused

“As a Wirtgen Group workshop, we have the huge advantage of being specialists in our own product range,” Kohl explains. Highly developed machines require qualified and specialized experts if they are to be maintained or repaired properly. That’s why the Wirtgen Group runs a dynamic training system that is constantly updated to take account of the latest developments. It means the workshop teams of the Wirtgen Group subsidiaries and dealers are given regular training by the brand headquarters so that they can offer customers in their markets a high quality of service across the entire spectrum. When new Wirtgen Group machines are launched, the response is immediate: “Along with our WIDOS information system and the WIDIAG diagnostic software, we have the right tools to get the machines straight back on the road.” In addition, the subsidiaries and dealers can call on support from the German brand headquarters when dealing with complex problems.

Decades of experience and a high number of machines in the market ensure a high level of

expertise in service issues. Every employee of the Wirtgen Group workshop service organization has access to the entire know-how of the group at any time. “This knowledge grows daily because new findings from the field are documented systematically and made available to all employees,” Kohl explains.

Workshop service at manufacturer level

Generously dimensioned indoor cranes in the four workshop bays, each of them 25 m long, and a well illuminated pit enable work to be performed quickly and safely, even on large machines such as Kleemann crushers or Wirtgen large milling machines. The workshops also have the very best equipment for repair work on electronic or precision mechanical components. Diagnostic computers and measuring instruments customized for Wirtgen Group machines help when it comes to troubleshooting. The vibration frequency and amplitude of vibratory rollers can be checked using the Hamm frequency and amplitude measuring device, for instance. Such special tools not only make it easier to locate faults, but also help with subsequent setting and adjustment work.

The work extends from careful inspection through immediate repair to general overhaul. New optional equipment can also be integrated

into the machine while it is in the workshop, such as retrofitting the AutoPilot Field Rover in an SP 25i slipform paver. All the necessary components are installed and inspected expertly. Once the work has been completed, the specialists subject the machine to rigorous quality checks.

A long service life is all part of the package

For the premium products, the workshops use only Wirtgen Group OEM spare and wearing parts. These are optimally tailored to the machines to exclude the possibility of fitting inaccuracies. The decades of experience in the field are also reflected in the high quality and long life of the original parts.

Oils and lubricants are no exception. “The lubricants are specially tailored to the core components of the machine. Together with high-grade basic oils and sophisticated additive technology, they improve efficiency and prolong the service life of the machine, offering the optimum protection against corrosion and wear. This means the machines can work to the max even in tough field conditions. In short, Wirtgen Group OEM parts and lubricants improve the efficiency and life of the machine over the long term while permanently reducing operating costs.

“We also recommend WIDOS in this regard,” Kohl continues. WIDOS offers comprehensive electronic documentation of all Wirtgen, Vögele, Hamm and Kleemann products combined in a single system. Regularly updated, the digital documentation includes the complete Parts and More spare parts catalog, instruction manuals, electrical, hydraulic and hosing diagrams, machine data and the safety manual. Components can be identified quickly and easily, for instance, and ordered at the press of a button. That makes WIDOS an indispensable tool for workshop personnel, service engineers, purchasers and technical managers.

With its SmartService, the Wirtgen Group also offers a flexible service agreement that is tailored to individual requirements. It includes maintenance in the workshops of the sales and service companies, visual inspections, checks for wear and tear, technical inspections and software updates. These measures help to avoid costly and unplanned machine breakdowns. “Another advantage is that the sales and service companies see to all the administrative and organizational tasks that

arise, leaving customers free to concentrate fully and entirely on their core business.” But that’s not all: Different requirements demand different solutions. “That’s why the SmartService has a modular structure and is tailored entirely to personal wishes,” Jochen Kohl adds. ■

➤ www.wirtgen-group.com/customer-support



Tailor-made: repair, care and maintenance for all Wirtgen Group machines.



We support the success of our customers with a comprehensive package of service agreements.

CONEXPO 2017

STRONG IN THE USA



Every three years the Las Vegas Convention Center plays host to Conexpo, the largest trade show for the American construction machinery industry. From March 7 through 11, the Wirtgen Group presented innovations from the Road and Mineral Technologies business sectors over an exhibition area of 3,712 m².



Vögele: New features galore

Vögele was a hit with the US public thanks to its new products. Whether a Mini Class paver (SUPER 700-3i), brand-new 8-foot machines making their world premiere (SUPER 1700-3i and SUPER 1703-3i) or 10-foot pavers (SUPER 2000-3i and SUPER 2003-3i), they're all ideally suited for both commercial and municipal projects. The SUPER 1800-3i SprayJet paver, the SUPER 2100-3i and the Vögele PowerFeeder MT 3000-2i Offset also were on display.



Wirtgen: Eight US premieres

Wirtgen presented new models in all performance classes for the efficient and economical repair of roads: the W 250i and W 220i large milling machines, the compact W 150 CFi and W 120 CFi and the W 60 Ri and W 35 Ri small milling machines. The concrete paving sector also saw premieres: the SP 64i slipform paver for economical paving in combination with the TCM 180i texture curing machine – the complete solution for highly durable concrete surfaces.



Hamm: New models

In addition to the tandem rollers in its Series DV+ with pivot steering, new to North America, Hamm presented further new models of its super-compact HD CompactLine and Series HD+. The successful Series H was rounded off with new models of the class up to 84 inches. Hamm also showcased a new rubber wheeled roller, the weight of which can be ballasted extremely easily.

Thanks to the innovative operating concept Easy Drive, all new machines are controlled the same way – creating ideal conditions for simple, reliable and ergonomically optimal operation.



Kleemann: Innovative crushing plants

Kleemann presented its latest development for efficient quarry applications: the MOBICONE MCO 11 PRO mobile cone crusher with low-consumption diesel-electric drive and Continuous Feed System (CFS), which can handle up to 470 t of material every hour.

Also on show were three representatives of the EVO series: the MOBICONE MCO 9 Si EVO cone crusher, the MOBIREX MR 130 Zi EVO2 impact crusher and the MOBICAT MC 110 Zi EVO jaw crusher. Intuitive control and the best options for interlinking machines ensure high outputs and good final product quality alongside economical operation in natural rock as well as recycling. ■

Trade fairs and events 2017

It wasn't only at Conexpo that the Wirtgen Group presented innovative technologies in 2017. All around the world, existing and prospective customers had the opportunity to find out about the latest products from the Mineral Technologies group in the Road and business sectors.



Steinexpo

Aug 30 - Sept 2, 2017
Homburg/Nieder-Ofleiden,
Germany
Exhibition area: 1,650 m²
Highlight: world premiere of
the Kleemann MC 120 Pro
jaw crusher



Nordbau

Neumünster, Germany
Sept 13 - Sept 17, 2017
Exhibition area: 643 m²
Approx. 60,000 visitors
Highlight: First unveiling of
the Kleemann MOBISCREEN
MS 702 mobile screen at a
trade fair



SaMoTer-Asphaltica

Verona, Italy
Feb 22 - Feb 25, 2017
Exhibition area: 670 m²
84,000 visitors from 86
countries



Komatek

Ankara, Turkey
May 3 - May 7, 2017
Exhibition area: 700 m²
369 exhibitors from 22
countries, 33,734 visitors



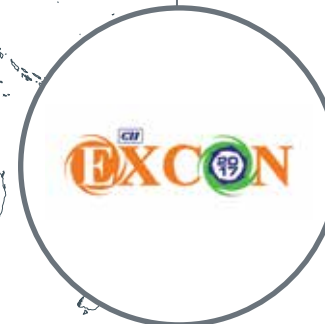
CTT

Moscow, Russia
May 30 - June 3, 2017
Exhibition area: 1,221 m²
700 exhibitors, approx.
27,000 visitors



Wirtgen Taicang Grand Opening and Technology Day

Sept 25 - Sept 28, 2017
Opening ceremony of the
new Regional Headquarters
of Eastern China in Taicang,
China



Excon

Bangalore, India
Dec 12 - Dec 16, 2017
Exhibition area: 2,499 m²
1,000 exhibitors,
approx. 40,000 visitors

Executive Hire Show

Coventry, Great Britain
08.02. - 09.02.2017
1.813 visitors

VDBUM Großseminar

Willingen, Germany
14.02. - 17.02.2017
845 participants

ConMac

Guwahati, India
16.02. - 19.02.2017
3.400 visitors

Beton Fuari

Istanbul, Turkey
13.04. - 15.04.2017
Approx. 7.000 visitors

Resta

Vilnius, Lithuania
26.04. - 29.04.2017
557 exhibitors
44.400 visitors

Recycling aktiv/Tiefbau Live

Karlsruhe, Germany
27.04. - 29.04.2017
Stand size 775 m²
200 exhibitors, approx. 12,000 visitors

Matexpo

Kortrijk, Belgium
06.09. - 10.09.2017
Stand size 1.126 m²

SMG (Symposium Mines Guinée)

Conakry, Guinea
09.05. - 11.05.2017
3.000 visitors

Grand opening

To bring us even closer to our customers, the Wirtgen Group has been opening its eighth site in China. Some 3,000 guests attended the official opening ceremony of the regional headquarters for eastern China in the city of Taicang.

The Wirtgen Group has invested some €6.6 million in the construction of its new regional headquarters. A three-story office building occupying a floor-space of 3,591 m² already has been completed on the 20,000-m² site. The new office premises not only offer adequate space for the local staff but also two classrooms to provide training in the operation of the machines. In addition, production halls extending over almost 2,500 m² also have been erected. They not only accommodate warehousing, a repair workshop, a paint shop and washing facilities, but also a dedicated training hall extending over 190 m². Expansion options were included in the planning from the outset – an important factor in the rapidly growing Chinese market.



The leading-edge facilities have been constructed in line with the latest European standards, as is common practice within the Wirtgen Group. This includes a borehole-based geothermal heating system, since the site is ideally located to tap into this power source.

The 3,000 invited guests were able to gain an impression of the new site during the three-day inauguration event. And they got to see a lot more than just buildings. True to the tradition of the Technology Days held at all the German Wirtgen Group brand headquarters, Wirtgen China hosted a comparable get-together for the industry in Taicang. The program



included a tour of the warehouses – where the Kardex system, which is not yet widely known in China, caused quite a stir – as well as a chance to see the workshop close up. Meanwhile, no less than 46 models from the four Wirtgen Group product brands distributed in China were showcased at a machine exhibition featuring machines for the Chinese market. In China, the only chance to see a machine exhibition of this high caliber is at the bauma China trade show. Needless to say, the “Wirtgen Taicang Grand



Opening and Technology Days 2017” would not have been complete without a live demonstration of the Wirtgen, Vögele and Hamm machines. Further information on machines and processes was provided in the well-attended expert lectures. The official grand opening not only featured speeches by Frank Betzelt (Senior Vice President Wirtgen Group), Ulrich Reichert (CEO Wirtgen China), Johnson Zong (Man-



aging Director at Taicang) and Wang Hongxing (Member of the Standing Committee of the CPC Taicang Municipal Committee and Director of the Administration Committee of Taicang New & HiTech Industrial Development Zone), but also a presentation of the product brands united under the umbrella of the Wirtgen Group.

The customers all agreed: The new location is a real asset to the Wirtgen Group's service in eastern China, because the service team can be on the spot sooner and provide more direct support in the form of machine training courses for customers. Johnson Zong, Managing Director of the new Wirtgen Taicang Regional Headquarters Eastern China, is looking forward to the new challenges ahead and was thrilled to earn all-round praise for the wonderful grand opening event. ■



DATEN UND FAKTEN Wirtgen Taicang in figures



Site:	19,886 m ²
Roofed area:	3,591 m ²
Office building:	1,859.7 m ² on three floors
Hall area:	2,461.9 m ²
Repair work shop:	946.9 m ²
Training hall:	189.4 m ²

➤ www.wirtgen-group.com/china

SOCIAL COMMITMENT: HELPING PEOPLE TO HELP THEMSELVES

Brighter prospects for those in need

The charity group „Kinder in Not“ supports boys and girls from poor families in the Philippines, India and Brazil, providing medical care, food and above all schooling and vocational training.



KINDER IN NOT E.V.

Social commitment

41

aid projects are currently being financed by the Charity Group „Kinder in Not“ which was founded by Gisela Wirtgen in 1983.

The focus of the commitment is on education and vocational training for children and young people - since this is the first step into a self-determined life. Projects concentrate on the following countries:

- Philippines: Here aid projects are located in cemeteries and on garbage dumps, in urban slums and rural, underdeveloped regions.
- India: In addition to children from the lowest classes, disabled girls and boys are also supported.
- Brazil: Three day-care centers for children, including street children and kids from HIV positive families, are a sign of hope.

▶ www.kinder-in-not.de





Gisela Wirtgen checks on the progress and 100% use of donations for the benefit of children.



The charity's focus is on schooling and career training.

For more than thirty-four years now the charity group "Kinder in Not" e.V., Windhagen, has been helping needy children, young people and families in the Philippines, India and Brazil through targeted donations and sponsoring. The focus of our work is on schooling and vocational training as the first step towards an independent and autonomous life. We build and operate kindergartens, preschools, daycare centers and secondary schools in the poorest regions, in slums, on garbage dumps and in cemeteries, and offer grants for vocational training. We also ensure the best possible basic medical care.

Our largest aid project is in Alegría, in the south of the island of Cebu in the Philippines. There we support three preschools with around 400 children and a junior and senior high school, currently with around 1,200 pupils from the poorest fishing and farming families. The Reinhard Wirtgen Memorial Clinic, which we established twenty years ago, is an invaluable aid for people in the town of Alegría and the surrounding area.

Our homes, daycare and vocational training centers in India, in which we look after children with disabilities, are very successful. Many of the 150 disabled girls and boys in Palamaner and Sendhwa have even had surgery thanks to the charity's financial support, which has brought about a vast improvement in their quality of life. The girls in our two homes for sexually abused girls between the ages of 4 and 18 and pregnant young women receive loving care and attention. We pay particular attention to good basic schooling and vocational training

to enable the victims of human trafficking to lead an independent life in the future.

Our street children projects in Brazil and the Philippines have been expanded. For the last few months two mobile school buses with teachers in Cebu City have been picking up street children at various collection points and providing them with schooling. The children were originally reluctant to take advantage of this offer, but more and more of them are venturing to join in, not least as they also receive drinks and snacks.

A large new aid project is in the offing. It is hard to imagine that many children aged 6 to 12 years are interned in prisons for months in the Philippines after being caught, for example, stealing fruit or bread from a supermarket, simply because they were hungry. Father Shay, who has already been nominated for the Nobel Peace Prize, helps children who have been in prison for months without anyone looking after them. We are planning with him to open a home for these prison children in Cebu City.

We currently have three preschools near the large garbage dump in Cebu City. Roy, our project

leader in the Philippines, asked one of the children from these garbage dumps to tell us her story.

Life on a garbage dump

"My name is Keith. I'm seven years old and I have a younger brother. Since 2010, we have been living on the Inayawan garbage dump with my father's grandmother and her family. We pay 500 pesos (8.25 euros) rent per month. We obtain water from a water pump not far from our shelter. It's not drinkable. We don't have a toilet.

My father worked for a few months on a building site but he was dismissed because there was no work for him. Now he collects garbage and looks after the neighbours' pigs. My mother also collects reusable garbage four days a week. She earns an average of 100 pesos (1.65 euros) a day. Two days a week she works as a washerwoman and earns around 400 pesos (6.60 euros). Our daily food consists mainly of rice. My parents dream of a better life for my brother and me. We need to finish school at least so that we can learn a trade later.

I'm in 2nd grade at the elementary school in Cebu. As my parents can't afford the bus fare, school uniform or books, we get help from the "Kinder in Not" from Germany. I love playing. I like dolls but don't have any of my own. My favourite subject is Filipino, and I would like to be a teacher. I like apples, but I only get them at Christmas. For me Christmas is the best time of the year. You can find lots of nice things on the dump, food but also toys.

My greatest wish is to have my own bed. We all sleep on the floor. When I'm a teacher I don't want to live on the garbage dump any more, and I would like a tap with running water in our room."

I'm sure everyone will be touched by this girl's story. The "Kinder in Not" charity will do

everything possible to make the dreams of this girl and her family come true.

I am often asked about the administrative cost of running "Kinder in Not". The board, members, helpers and companies support our work through their great voluntary commitment. All of the administrative and advertising costs are covered by targeted donations. All other donations are passed in their entirety to the desired aid project. ■



Best regards,

Gisela Wirtgen

Gisela Wirtgen
(Chairperson)
Charity Group
"Kinder in Not e.V."



AKTIONSGRUPPE „KINDER IN NOT“ E.V.

YOU TOO CAN HELP CHILDREN IN NEED!

Our projects are designed to provide long-term assistance. Every cent brings us closer to our goal.

Account for donations

Sparkasse Neuwied
Account number: 012 022 752
Sort code: 574 501 20
IBAN: DE87 5745 0120 0012 0227 52
SWIFT-BIC: MALADE51NWD

Raiffeisenbank Neustadt e.G.
IBAN: DE16 5706 9238 0100 0527 24
BIC: GENODE1ASN

The association

was founded in 1983 on the initiative of Gisela Wirtgen, is a non-profit organization helping children in need to help themselves, is non-political and non-confessional, maintains aid projects in the Philippines, India and Brazil.

Further information

➤ www.kinder-in-not.de



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