

# RoadNews

for new roads

The WIRTGEN GROUP User Magazine // N° 03

 WIRTGEN

 VÖGELE

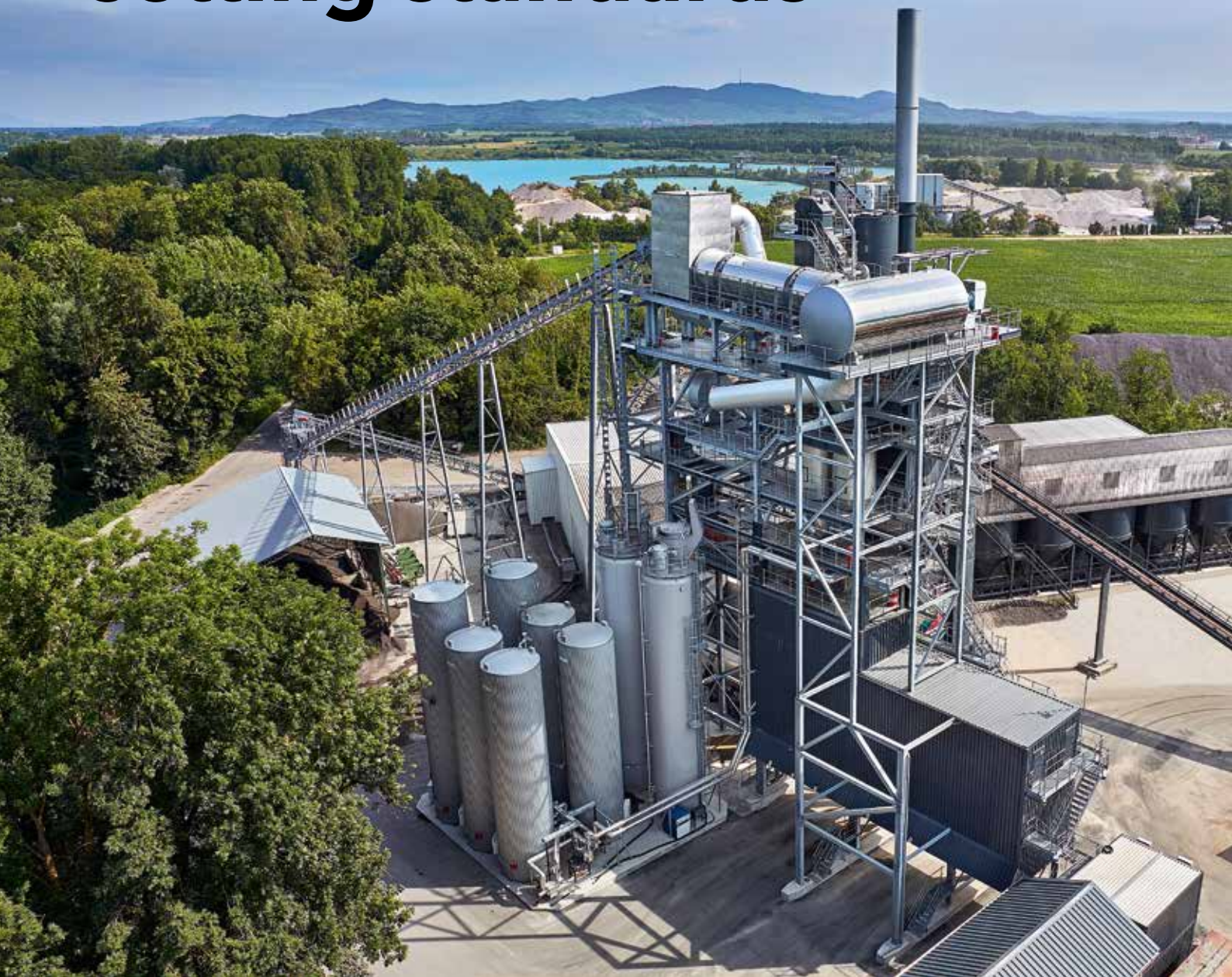
 HAMM

 KLEEMANN

 BENNINGHOVEN

Innovations from the WIRTGEN GROUP prove themselves in the field:

## Driving progress, setting standards





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The title image shows a BENNINGHOVEN asphalt mixing plant of type BA 4000 RPP with hot gas generator – read more from page 38.

Dear Reader,

When the WIRTGEN GROUP develop new products and technologies, this is never an end in itself. It is always about taking our customers forward, speeding up job site processes, improving methods and boosting cost-efficiency. Or, to put it briefly, setting new standards.

That's why this issue of RoadNews investigates a key question: how have the innovations we unveiled at Bauma 2016 been measuring up in practice? To answer this, we followed up the first projects tackled by our latest generation of plants and machinery, spoke to users and documented the results.

Of course, on job sites it is not just technical progress that counts: reliability and durability are at least as important. A job on one of Germany's busiest motorways demonstrated that construction companies supported by the WIRTGEN GROUP excel in these respects, too: the rehabilitation of the A1 was completed way ahead of schedule.

We hope you enjoy reading this third edition of the WIRTGEN GROUP RoadNews.

Best wishes,



Stefan Wirtgen



Jürgen Wirtgen

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# High-tech ensures high-speed

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In Austria, a WIRTGEN W 100 CFI compact milling machine with deep milling unit is being used for trenching prior to the laying of broadband cables – just before it sets to work milling off entire pavements.

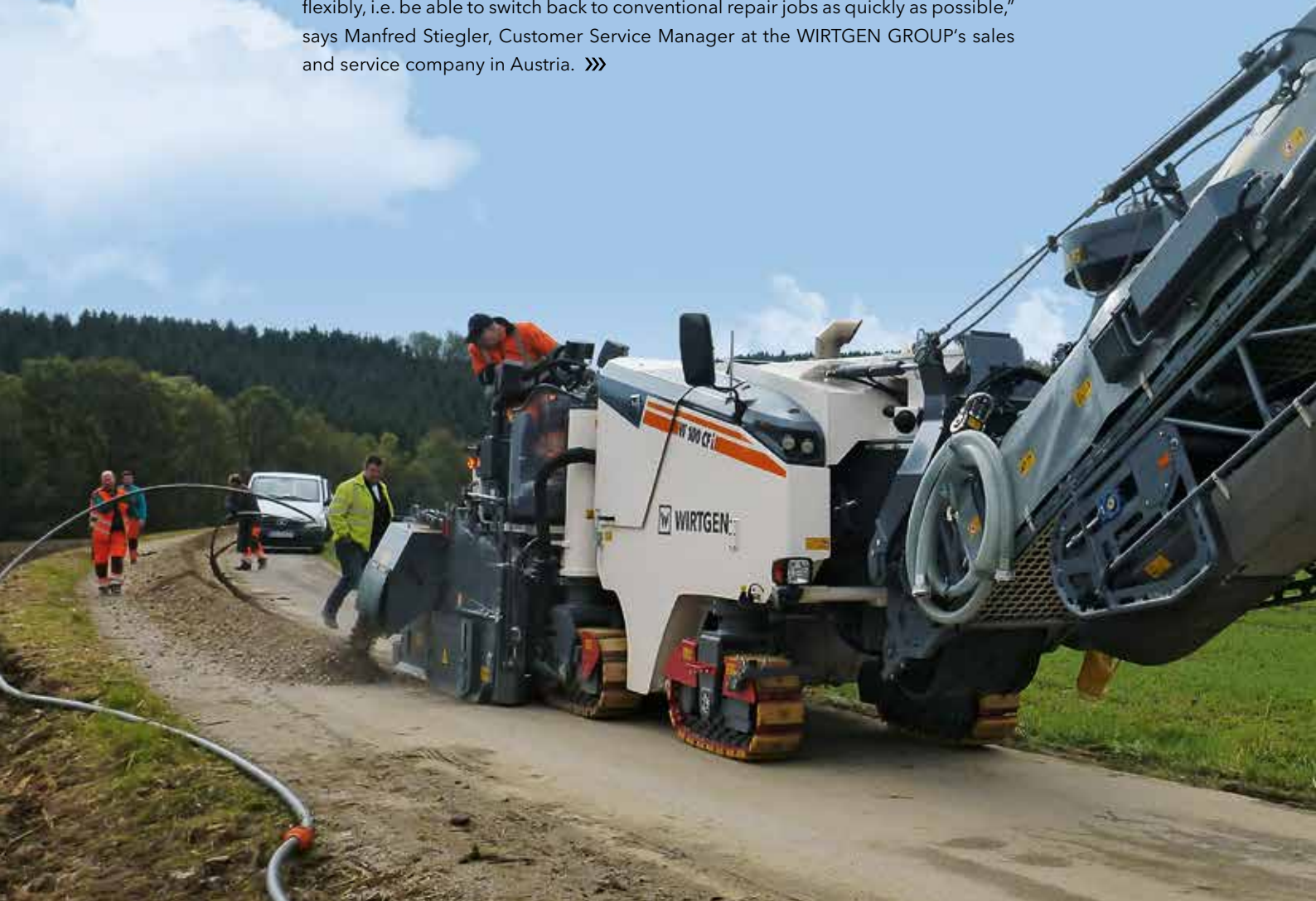
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The spread of fibre-optic cables is advancing rapidly across the world, and the Upper Austrian district of Schärding, not far from the German border, is no exception. Here, too, communities are being given broadband internet access. Engelhartzell is the second community to benefit from this technology of the future. And the contractor, Hemelmair Frästechnik GmbH from Linz, is also making use of cutting-edge technology, in this case made from steel and carbide. For local roadworks, the milling service provider is using the W 100 CFI, a model from the latest generation of compact milling machines featuring a deep milling unit that WIRTGEN have developed especially for this application. >>>

**With a powerful cold milling machine and a customized deep milling unit fitted with a narrow cutting wheel, WIRTGEN offer a cost-effective solution for the laying of broadband cables.**

## Rapid change between trenching and repair

“We have 15 WIRTGEN cold milling machines in operation. In the course of our long-standing collaboration, we have come to prize the solutions expertise of the company, and this prompted us to turn to the WIRTGEN GROUP in Austria in this case, too,” explains Manfred Grössing, Managing Director of Hemmelmair. Once the requirements had been discussed with WIRTGEN’s product management team, the design department at the brand headquarters in Germany was given the development order. “We wanted our customer to be able to use the milling machine flexibly, i.e. be able to switch back to conventional repair jobs as quickly as possible,” says Manfred Stiegler, Customer Service Manager at the WIRTGEN GROUP’s sales and service company in Austria. >>>





**From the speed and the side plate to the scraper, the functions were integrated into the existing operating concept.**

**Andreas Salz, responsible for design and development of cutting technology  
WIRTGEN GmbH**

”

### **Line construction by trenching: Improving cost effectiveness with narrow channels**

The modern trenching method for laying pipes and cables is rapidly gaining ground. This is because it helps cut costs and particularly because it accelerates the expansion of broadband with fibre-optic cables. A distinction is made between micro, mini and macro-trenching, depending on the depth and width of the trench and the cutting and milling technology used.

Because microtrenching, in particular, offers great potential, it has been enshrined in Germany's telecommunications legislation. The German road and transportation research association, FGSV, has published a paper both explaining the general provisions and detailing the method for executing the works - preparing the channel, laying the empty pipes, backfilling the channel and restoring the surfacing.







Once the empty pipes have been laid, the adjacent surface course is usually milled before the channel is backfilled and overlaid with a new overlapping layer of asphalt.





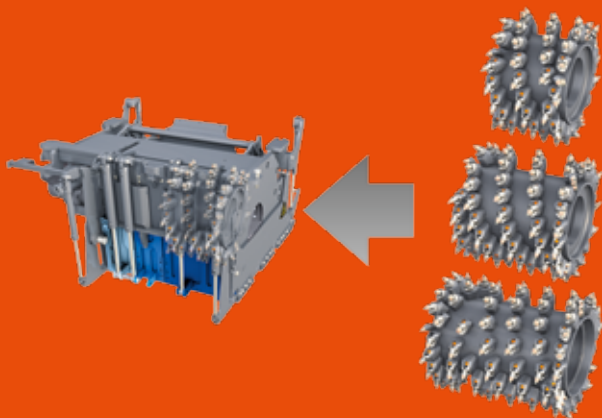
## Solution for trenching: New cutting wheel from WIRTGEN

The W 100 CFI was the ideal candidate for the job in Upper Austria. One of the new generation of WIRTGEN compact milling machines, it integrates many innovative added and automated functions that give highly effective support to users when operating the machine and optimize work processes. WIRTGEN developed a special solution for the trenching method. A housing containing a narrow cutting wheel fitted with standard W6 picks is mounted behind the folded-in crawler track on the right. With a very large cutting diameter of 1,620mm, it can mill channels up to 600mm deep and 300mm wide. The rotary milling motion conveys the milled material upwards, where it is discharged via a baffle plate and chute. The deep milling unit is controlled from the traditional control panel of the W 100 CFI. "This means that the machine operator can operate his milling machine in the usual way," explains Andreas Salz, responsible for design and development of cutting technology.

## Flexible in standard and special applications

Manfred Grössing, Managing Director of Hemmelmair, was immediately won over by the WIRTGEN trenching solution: "The easy assembly and dismantling of the deep milling unit and the straightforward transport of the W 100 CFI allows us to use the milling machine flexibly and thus optimally." That was also the case with the job in Upper Austria: shortly after the trenching job, the W 100 CFI compact milling machine was being used to repair a country road. Here, too, the W 100 CFI hit the spot with its cost effectiveness, in this case mainly thanks to the Flexible Cutter System. ///

## Flexible Cutter System: Maximum range of use



The WIRTGEN Flexible Cutter System, or FCS for short, delivers the optimum solution for high machine capacity utilization: milling drums with a variety of tool spacings or working widths can be replaced in a short space of time. It takes only 0.5 to 1.5 hours to replace the drum, depending on the machine - converting the cold milling machine from a standard to a fine milling machine, for instance.

Removing ruts from a country road, preparing a carriageway for a thin overlay using a fine milling drum or removing coatings on asphalt or concrete surfaces with a micro fine milling drum - all of these tasks can be handled with one and the same cold milling machine. The range of FCS milling drums is large, opening up a vast array of applications for cold milling machines.

# Quality through

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A job site in South Africa has demonstrated that the VÖGELE MT 3000-2 Offset PowerFeeder improves pavement quality. Proof comes from the University of Twente, Netherlands, which monitored the project from a scientific perspective - and their equipment included RoadScan, the innovative temperature-measurement system from VÖGELE.

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# innovation

**A phenomenal performance on South Africa's N14 national route near Johannesburg: the VÖGELE MT 3000-2 Offset PowerFeeder supplies a VÖGELE tracked paver of type SUPER 1800-2 with mix to ensure uninterrupted paving.**





**Job site details**

Pavement rehabilitation on a section of the N14 national route near Johannesburg, South Africa

Length of section: 2 x 4km  
Width of section: 10.6m

**Working parameters**

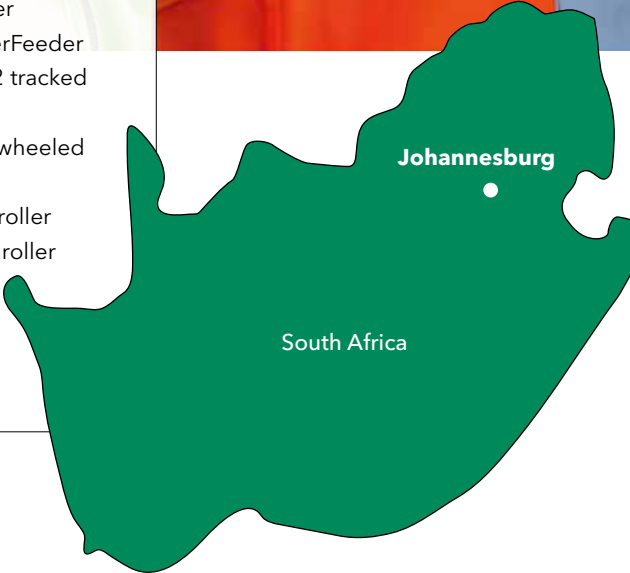
Pave width: 4m  
Pave speed: 4-6m/min  
Layer thickness  
Surface course: 4cm

**Material**

Surface course: AE-2, comparable with asphaltic concrete (AC)

**Equipment**

VÖGELE material feeder  
MT 3000-2 Offset PowerFeeder  
VÖGELE SUPER 1800-2 tracked paver  
2 HAMM GRW rubber-wheeled rollers  
HAMM HD 90 tandem roller  
HAMM HW 90 tandem roller  
WIRTGEN W 200 cold milling machine







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**With the MT 3000-2 Offset, the temperature of the asphalt immediately after paving never fell below 120°C, which left a huge window of time for final compaction.**

**Dr Seirgei Miller,  
University of Twente**

”

### **Johannesburg // South Africa**

Organizing paving work so that it can proceed without interruption in order to enhance quality is one of the key reasons for using material feeders. And it's why in South Africa there is a strong focus on the decoupled transfer of mix from feed lorry to paver. Indeed, for major construction projects, SANRAL, the national roads agency, insists on the use of material feeders. An advanced VÖGELE MT 3000-2 Offset PowerFeeder with a VÖGELE SUPER 1800-2 paver was used for the rehabilitation of a 4km-long stretch of the N14 national route near Johannesburg by the South African construction company Power Construction (Pty) Ltd. On the job site, scientists

from the University of Twente investigated whether the innovative VÖGELE material feeder improved the quality of the paved binder and surface courses. One of the crucial factors was the temperature of the asphalt immediately after paving. The temperature was measured using two mutually independent systems, one of which was RoadScan, the non-contacting temperature-measurement system from VÖGELE. To provide a comparison, some sections were also completed without using a material feeder. »»

There are many different and compelling reasons for using material feeders – the first and foremost being quality and cost efficiency. It is hence in the interests of construction companies to opt for decoupled material transfer: while the road paver can focus entirely on paving, the material feeder handles the transfer of mix from the feed lorry, allowing both quality and productivity to be increased. The number of feed lorries and their waiting times can also be reduced, because material feeders buffer paving material, prolonging the window of time for continuous material supply. This, in a nutshell, is the theory. On the N14 job site, the aim was to see what impact the use of the VÖGELE material feeder had on pavement quality.

**PowerFeeder ensures uninterrupted paving process**

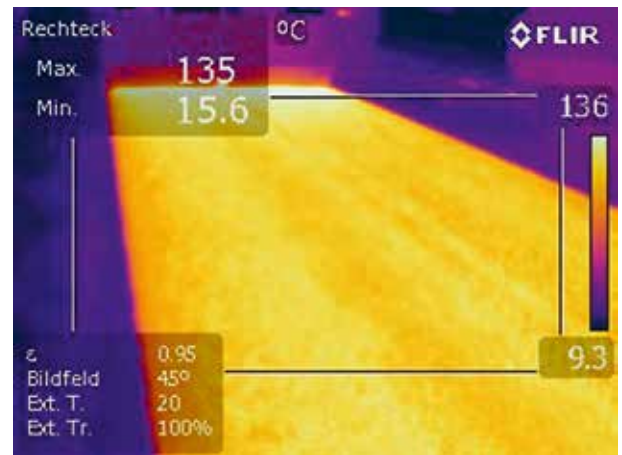
The MT 3000-2 Offset PowerFeeder features an intelligent material transport and storage concept with a total capacity of 43t. Lorries carrying 25t of mix can be unloaded within 60 seconds. That enabled paving on the job site located on the outskirts of Johannesburg to proceed without interruptions. This is of central importance to pavement quality, because interruptions cause a wide range of problems, the main one being the cooling of the mix and the associated reduction in compactability, not to mention the loss of time involved. Undesired side-effects such as these occurred on sections where the paving work was carried out without a material feeder for the purposes of comparison.



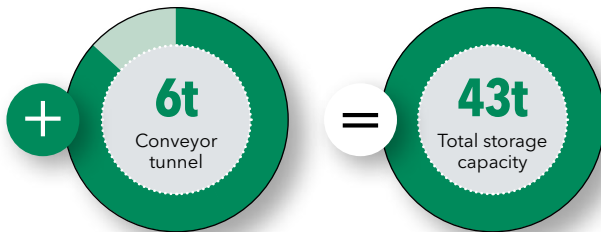


## Homogenization of the mix temperature

The study by the University of Twente also revealed that the VÖGELE material feeder contributed to the homogeneity of the mix and hence improved pavement quality. In the VÖGELE MT 3000-2 Offset, conical augers in the receiving hopper ensure a uniform withdrawal of the mix from all areas of the receiving hopper and blending of the colder and warmer material. This reduces temperature fluctuations caused by transport. When combined with a trough-shaped conveyor, the VÖGELE design reliably prevents both mechanical and thermal segregation. »»



**The MT 3000-2 Offset PowerFeeder improves pavement quality by ensuring good thermal homogenization of the mix.**



### Highlights of the VÖGELE MT 3000-2 Offset PowerFeeder

- › Uninterrupted paving thanks to a total storage capacity of 43t with a maximum conveying capacity of 1,200t/h
- › Non-contacting material transfer makes for maximum pavement quality
- › Homogenized material in the receiving hopper of the material feeder due to conical augers
- › Wide range of applications thanks to the pivoting and inclining conveyor
- › Reliable material transfer based on automatic distance control and collision protection
- › Optimum overview and safety thanks to the convenient and practical ErgoPlus operating concept



**Animations on the machine technology explain more about the VÖGELE PowerFeeder generation**  
[www.voegel.info/webspecial/powerfeeder](http://www.voegel.info/webspecial/powerfeeder)

## Exclusive solution from VÖGELE: Material feeder with innovative heating

One of the main advantages of the VÖGELE PowerFeeder over conventional paving is its integrated heating system. The powerful infrared heating with non-contacting panels over the conveyor is a solution offered only by VÖGELE. It actively counteracts the temperature drop that arises in the transport chain between the mix leaving the mixing plant and being compacted, vastly improving pavement quality. This, too, is demonstrated by the university study: it found that the VÖGELE material feeder constantly guaranteed a homogeneous heat distribution in the freshly laid asphalt pavement. In the N14 project, the asphalt temperature never fell below 120°C immediately after paving, which left a large window of time for final compaction by HAMM rollers.

## Consistently high temperature from the first metre

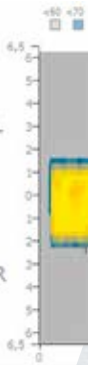
It is a key advantage in the field: the PowerFeeder reaches the high temperatures right at the start of paving – and requires no heating phase. This goes to show that VÖGELE's engineers were perfectly in tune with requirements and developed the PowerFeeder to meet the specific challenges of tough, day-to-day job-site operations.

## Temperature measurement with RoadScan from VÖGELE

A homogeneous paving temperature is the foundation for uniform and even compaction. That is why the scientists from Twente recorded the temperature immediately after paving using two mutually independent measuring systems. One of these was attached directly to the hardtop of the SUPER 1800-2 paver, ensuring simple, convenient and reliable measurement: RoadScan from VÖGELE – an innovation first unveiled at Bauma 2016. A non-contacting temperature-measurement system, RoadScan allows paving teams to keep an eye on the temperature of the mix immediately after paving so that they can find appropriate solutions during the paving process, should the need for intervention arise. The thermoscan images are presented in real time on the colour display of the paver operator's ErgoPlus console. And, on completion of the construction project, contractors also have detailed evidence that the work was carried out within the correct temperature range – thanks to recorded GPS data including precise positioning. »»

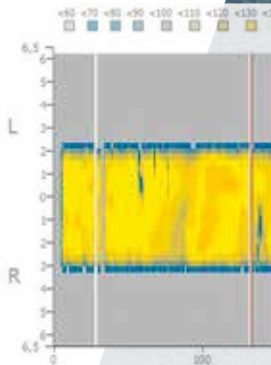
## Paving without a material feeder:

**No continuous paving. On some of the test days, work on the N14 proceeded in the conventional manner. The result: a lot of stoppages in paving caused by the feed lorry – clearly identifiable by vertical blue lines and areas.**

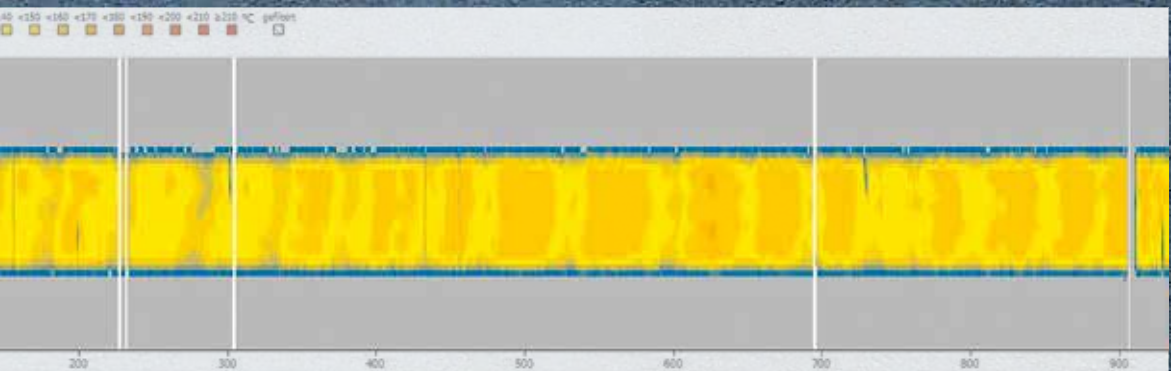
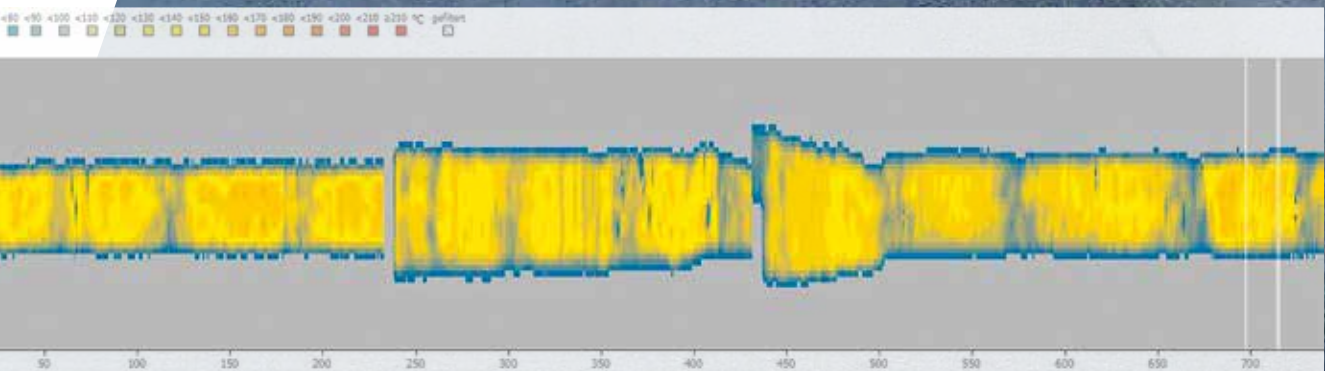


## Paving with a material feeder:

**Continuous paving, uniform temperature distribution. Thanks to its large storage capacity, the VÖGELE MT 3000-2 Offset PowerFeeder can prevent interruptions in paving, ensuring premium pavement quality, as the RoadScan thermoscan of the N14 proves. With the exception of the edges, almost no area is cooler than 120°C.**









# A milestone in pavement quality

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The VÖGELE innovation RoadScan, a non-contacting temperature-measurement system, makes pavement quality verifiable.

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### The highlights of VÖGELE RoadScan

- › Area-wide temperature measurement
- › Real-time display on the paver operator's ErgoPlus 3 console to help the paving team produce a high-quality asphalt pavement
- › Robust hardware without moving parts (e.g. infrared camera instead of a movable pyrometer)
- › Measuring unit easily mounted on the machine (job site)
- › No need to adjust the measuring unit on site (plug & play)
- › Integration in WITOS Paving, the innovative tool for process optimization on asphalt job sites

Making quality measurable is one of the big issues for contractors and clients worldwide. One of the key criteria for the longevity of roads is maintaining a consistent paving temperature. As a result, the significance of area-wide temperature monitoring is currently rising sharply in more and more markets. With RoadScan, VÖGELE's non-contacting temperature-measurement system, the company is on the leading edge of this future trend. The innovation was presented to a multitude of professionals from the industry at Bauma 2016, where it generated tremendous interest.

The VÖGELE innovation RoadScan helps paving teams assess the temperature of the mix immediately after paving so that they can find appropriate solutions, should the need for intervention arise. On completion of the construction project, contractors also have detailed evidence that the work was carried out in the correct temperature range - thanks to recorded GPS data including precise positioning. »»

1.



2.



1.

**Seamless temperature measurement in a range of approx. 2m behind the screed.**

2.

**Fast, simple recording: the RoadScan system's user interface is integrated into the paver operator's ErgoPlus 3 console.**

3.

**Quality management made easy: measurement data can be analysed conveniently in the office - with RoadScan Analysis.**

### **High-precision infrared camera with 100% measurement coverage**

The heart of the RoadScan system is an infrared camera which scans the area of freshly paved asphalt some 2m behind the screed. The high degree of precision is unparalleled: it records grids of 25 x 25cm over a measuring width of 10m. Each of these squares contains up to 16 single measuring points which are then used to calculate a mean value. That allows the system to capture the newly paved surface with no gaps, and so no theoretical or computed values need to be added. The measurable temperature range of RoadScan lies between 0°C and 250°C with a tolerance of  $\pm 2\%$  of the measured value. The purpose of RoadScan's other components is to capture the base temperature before paving (pyrometer), record precise positional data (high-precision GPS receiver) and document the wind strength and direction, ambient temperature, air pressure and humidity (weather station available as an option).



3.



### Integration into ErgoPlus 3

Just as one would expect of VÖGELE equipment, the RoadScan system is intuitive to operate and is easily activated from the paver operator's ErgoPlus 3 console. The paver operator views the temperatures currently being recorded on the colour display, and these are clearly visualized using thermal images and shown in real time. If the temperature is too low, action can be taken immediately and causes of the problem eliminated: either the paving team adjusts the screed and auger settings (in the case of mechanical segregation) or the asphalt mixing plant or lorry logistics company is informed (in the case of thermal segregation). That makes RoadScan an effective instrument for ensuring high pavement quality.

### Encrypted recording of measurement data

RoadScan also saves the measurement data in the paver operator's ErgoPlus 3 console. After paving, this data can be read off via an external data storage device. At the same time, VÖGELE have taken effective measures to protect the data: a specially designed memory stick communicates with a VÖGELE interface on the paver operator's ErgoPlus 3 console, which transfers the data in encrypted form. The data is then analysed in the office using the RoadScan Analysis web application, which presents the data in different types of diagrams and in a map view. ///





A line of HAMM DV+ tandem rollers is shown working on an asphalt runway at Eindhoven Airport. The rollers are green and orange, with white tarps covering their rear sections. They are moving from left to right across the frame. In the background, there are more rollers, construction workers in orange safety gear, and a clear blue sky. The overall scene depicts a large-scale infrastructure project.

# Top level asphalt compaction

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HAMM DV+ tandem rollers with the Easy Drive operating system on board were responsible for compaction in the runway rehabilitation project at Eindhoven Airport, Netherlands. The results were impressively good.


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At Eindhoven Airport, the Dutch construction company BAM Infra bv used 25 HAMM rollers to compact the surface course of the 3km-long and 45m-wide runway. The lion's share of the compaction work was done by 10 state-of-the-art, pivot-steered HAMM tandem rollers of the DV+ series. Thanks to the intelligent compaction technology in the rollers and the use of the HCQ Navigator measuring and documentation system, the 135,000m<sup>2</sup> asphalt surface was compacted extremely homogeneously.

Amsterdam

Netherlands

Eindhoven



**A total of 10 HAMM tandem rollers and 9 VÖGELE pavers, perfectly organized by BAM Infra: one tandem roller was assigned to each paver, while the additional "stand-in roller" took over whenever one of the other rollers travelled to one of the pit-stop stations to fill up with water or fuel.**

### **DV+ tandem rollers: Precise and productive**

With split vibrating roller drums, homogeneous weight distribution and versatile pivot steering, the DV+ series rollers ensure high-quality asphalt compaction.

- › The fully glazed panoramic cabin offers unsurpassed visibility
- › Simple, fast refilling due to a central pressurized process plus the additional possibility of connecting to hydrants and for refilling from above
- › High-precision pivot steering with large turning angles, large track offset and four steering modes
- › Large range of equipment options for all regions and applications
- › Comfortable drive control with the joystick and steering wheel. Pre-selection of the maximum speed and automatic speed ramping for gentle braking and acceleration as standard features.



**Before purchasing new rollers,  
we asked our workforce which  
brand they preferred.  
The answer was unanimous: HAMM.**

**Construction Manager Jeffrey van der Putten,  
BAM Infra bv**

”

The great benefits of HAMM's bauma innovations in everyday job-site operations emerged during rehabilitation of the asphalt surfacing at Eindhoven Airport in June 2016. Maximum quality was required on the 135,000m<sup>2</sup> area, as the 4cm-thick asphalt surface course had to be paved and compacted as homogeneously as possible, without any seams or joints.

#### **10,500t asphalt paved in one pass**

When the surface course had been milled – a task completed in two days by Dutch milling company Freesmij using 5 WIRTGEN large milling machines – the new asphalt surfacing was paved on a Sunday. The day of the week was chosen intentionally, as this was the only possibility of supplying the required 10,500t of asphalt from five mixing plants on the very busy Dutch highways in a single day. A fleet of 130 lorries transported the total of 9 VÖGELE “Dash 3i” generation pavers that laid the 45m-wide asphalt strip “hot to hot” in one pass, working in a V-formation.

#### **DV+ tandem rollers: First choice for high-quality compaction**

BAM Infra exclusively used HAMM rollers for compaction: as many as 10 tandem rollers of the DV+ series (5 x DV+ 70i VO-S and 5 x DV+ 90i VO-S) were on hand for dynamic compaction. All were equipped with the HCQ Navigator, the HAMM measurement and documentation system as well as a temperature sensor. This latest generation of pivot-steered rollers is equipped with the multiple award-winning Easy Drive operating system as a standard feature. The DV+ series also features premium quality in a number of other areas (see information box), for example high-precision steering, even weight distribution, a smartly designed water refilling and sprinkling system as well as excellent visibility. Other advantages include the low emissions achieved with the Hammtronic intelligent machine management system and many other optimization possibilities such as ECO mode and the automatic engine-off function. >>>

**Easy Drive makes it possible: the operator can swivel his seat along with the dashboard. This means that all key controls are always in the same position for the operator.**



### **Easy Drive for intuitive operation**

Easy Drive is the perfect example of the successful advancement of a good solution. Why? Although HAMM have been setting the pace in user friendliness for many decades, developers took another critical look at the operation-related features when designing the latest generation of machines, and incorporated the latest findings. The result is impressive: with the Easy Drive operating concept, even complex functions can be intuitively controlled and the

paver operators can always react quickly and appropriately. This is possible due to the smart switch layout, a good overview on the operator's platform and minimum learning and induction times (see information box).



**With the Easy Drive operating concept, the operator's seat, steering column, dashboard, joystick and the multifunction armrest all form one harmonious unit. Optimally equipped for fatigue-free work.**



### **Easy Drive: The simple and clearly designed operating concept**

- › Clear operating structure
- › Operation of all key functions with the joystick and the multifunction armrest
- › Layout of all controls follows the same principle: the more frequently an element is used, the nearer it is to the joystick
- › Language-neutral operation
- › Clear assignment and clarity due to colour-coding of all controls
- › Ergonomically optimized operator seat, can be turned in either direction and moved laterally as a standard feature



### **One operating concept for all rollers**

There is, however, another, decisive difference to earlier solutions: different roller types previously had different operating concepts. HAMM have put an end to this. Instead, Easy Drive will be installed in future in articulated tandem rollers, pivot-steered tandem rollers and compactors. The same colours are used for the same function groups and there is a common design which is adapted to the specific functions of the various series. The controls for the same

functions are always in the same position on the operator's platform. Consequently, anyone who has ever operated a "HAMM" will be able to work on all other HAMM rollers immediately. This makes switching to a new machine type much easier, supports high-quality results from the outset and ensures that the operator can soon handle the machine with confidence. >>>



**The HAMM rollers with HCQ Navigator can be recognized by the white DGNSS receiver on the roof. The system is extremely flexible, as the panel PC in the cabin and the HCQ satellite receiver can be switched between HAMM rollers and job sites in a few swift moves.**

### **HCQ Navigator optimizes compaction processes**

In their tender, the BAM Infra engineers had to explain to the client which equipment they would employ to achieve a homogeneous and high compaction quality over the entire runway. Construction Manager of BAM Infra, Jeffrey van der Putten, commented: "The HCQ Navigator quickly impressed the client as a quality management system." As the company has been using the system since the beginning of 2016, the BAM Infra team was able to draw on its own experience to show that the HCQ Navigator boosts the compaction quality.

The basic principle is quickly explained: sensors record all main compaction parameters and a GNSS receiver determines the position. The system uses these data to create a graphic image.

Displayed on a panel PC in the cabin, this image provides the operator with live information on which areas have already been sufficiently compacted and where compaction is still required (see information box). If several rollers are linked by wifi, all operators can monitor the compaction progress made by the entire team. This prevents excessive or insufficient compaction, and the surface is compacted very homogeneously. It also saves costs, as many passes can be dispensed with.

### **Debut with five rollers in a wifi network**

For the job in Eindhoven, BAM Infra was the first construction company in the world to use 10 rollers with the HCQ Navigator on board on a single job site. "As professionals, the BAM Infra planners took the safe route and allocated the rollers to two different wifi





### HCQ Navigator: Boosting, measuring and documenting quality

The HCQ Navigator is a satellite-supported measuring and documentation system that is really easy to use. The two main components are:

- › HCQ satellite receiver to determine the exact roller position during the compaction process. The position can be determined with an accuracy of approximately 2.5cm (depending on the signal quality).
- › Panel PC with touch screen on each roller. Serves for operation, display and saving of all measured data.

The main advantages for the compaction process and quality:

- › Area-wide homogeneous compaction
- › Simple verification of area-wide compaction
- › Uncomplicated data back-up and analysis
- › Components can be switched between different machine types



**Various compaction maps can be displayed on the panel PC in the cabin (here: number of passes). Meanwhile, the HCQ Navigator shows a live display of the compaction progress made by the entire team.**

systems. This worked out really well," commented Mark van Haaften, Service Technician at WIRTGEN Nederland. He accompanied the project on the job site and added: "As expected, the system operated perfectly with this set-up."

### Documentation included

Another advantage that not only BAM Infra but also the client appreciates: the HCQ Navigator records all process data. "This recording method is very efficient for us. What's more, we can easily and effectively analyse processes and results if necessary," comments Jeffrey van der Putten, describing this interesting feature of the HCQ Navigator.

### Quality demands met

Inspection of the final compaction quality revealed that BAM Infra fully met the high quality demands. This was all due to the excellent organization, a well-prepared and motivated team at BAM Infra - and intelligent compaction technology from HAMM. ///

# New cone crusher delivers on toughness

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Just a few months after its world premiere at Bauma 2016, the new MOBICONE MCO 11 PRO cone crushing plant from KLEEMANN is proving its prowess in practical operations.

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The plants have a particularly robust design and are configured for heavy-duty use in quarries. In their development, care was taken to ensure they could be used in a wide range of applications. The MCO 11 PRO is currently demonstrating this versatility at four locations across Europe.





**Norway**  
Granite, basalt, gneiss

**Sweden**  
Granite

**Germany**  
Granite

**France**  
Gravel





### When is a cone crusher used?

A cone crusher is used in the second to fourth crushing stages. It operates according to the principle of pressure crushing and is suitable first and foremost for use with moderately hard to hard and abrasive natural stone and in mining applications.

### MCO 11 PRO crushes even the hardest stone

In a granite quarry in Småland, Sweden, the MOBICONE MCO 11 PRO is working together with a MOBICAT MC 120 Z. In the first crushing stage, the jaw crusher breaks the blasted granite of 0-650mm down to a grain size of 0-200mm. The material is delivered directly onto the MCO 11 PRO in order to obtain a finer product with a grain size of 0-90mm. The MCO 11 PRO has a feed capacity of up to 470t/h. Because granite is very abrasive, wear is an issue. To protect the feed hopper even during heavy loading, the plant was equipped with replaceable wear plates in the hopper.

In the next crushing stage, a stationary plant processes the material further to prepare it for asphalt production, for instance. Since the production of the asphalt mixing plant immediately adjacent to the quarry is to be increased, 250,000t of granite are crushed every year for use as an asphalt aggregate alone. Given its high hourly feed capacity and the fact that it can be relocated quickly in step with the progress of mining operations, the MCO 11 PRO is ideally equipped for this purpose.







Sweden  
Granite

# Granite

## Smart additional options for efficient operation

The MCO 11 PRO comes with a raft of practical additional options. The plant in Sweden, for instance, is configured with a smart cold package. The desired start time can be set using a timer, with the system booting up from an external power source at the specified time and heating the diesel engine, the lubricating oil tank and the switch cabinet. That makes sense in the Scandinavian winters especially, as it means the plant is ready to start at the required time without any long waits. Service Technician Robert Johansson of the WIRTGEN GROUP subsidiary in Sweden finds the optional camera system for monitoring the crusher level and feed hopper, with its display screen on the control cabinet, to be very practical. "You can monitor the crusher level from the ground at any time and don't have to climb up onto the plant." What is more, the camera monitoring system can be installed by radio signal in the excavator, so that the operator always has a good view of the plant and can maintain an optimum feed of material to it. >>>



0-90mm  
470t/h



## Perfectly processed gravel for concrete production

The MCO 11 PRO can achieve a remarkable throughput even without a primary crusher, as shown by a gravel application in Alsace. After the gravel is extracted, it is sent to a stationary screening plant for prescreening. The material with a grain size of 11-80mm is subsequently delivered onto the MCO 11 PRO by wheel loader. The cone crusher crushes the gravel to 0-28mm, achieving an average output per hour of 215t. The product is either used in road paving or is processed further. Because most of the material is needed for producing concrete, it is very important to obtain a high-quality, cubic end product. To do so, the MCO 11 PRO crushes the gravel in the next step to a finer grain size of 0-14mm.

## Intuitive control and user-friendly maintenance

The cone crushing plant is controlled by SPECTIVE, the innovative control concept that allows intuitive operation of the plant. For Service Engineer Frédéric Pihet of the WIRTGEN GROUP's French subsidiary, the new control system offers a lot of advantages. "The touch panel gives you a very good overview and the plant functions and components are set out clearly. If a fault occurs, I can see the source of the problem at a glance and can rectify the cause directly." SPECTIVE also enables important information on the operation of the machine to be viewed. Clear symbols make the menu easy to understand. As befits a robust plant, the panel is insensitive to dust and can be operated by finger, pen, tool or work glove.

Maintenance is also user-friendly in practice, because all components requiring maintenance can be accessed easily from the ground or via generously proportioned work platforms. The plant is moved by cable or wireless operation with proportional control, allowing the cone crusher to be driven with precision and relocated easily. The wireless solution offers the advantage that the operator can move freely around the plant, meaning he can always keep an eye on the surroundings.

**Gravel**  
0-28mm  
215t/h







# Granite, basalt, gneiss

**0-32mm  
240t/h**

**Granite**  
**0-56mm  
210t/h**

## Reliable performance in natural stone

An MCO 11 PRO is being used in Germany to process highly abrasive granite. The blasted rock of 0-700mm is first charged to the MC 125 Z mobile jaw crusher. In the second crushing stage, the MCO 11 PRO crushes the rock from 0-200 to 0-56mm. This plant combination turns out 210t/h.

The MCO 11 PRO is also being used in the second crushing stage in Norway. The mix of granite, basalt and gneiss is pre-crushed by a mobile jaw crusher. The 0-150mm material is then fed to the MCO 11 PRO to obtain the final product of 0-32mm. An average output of 240t/h is achieved in the process. ///

# Using cone crushers

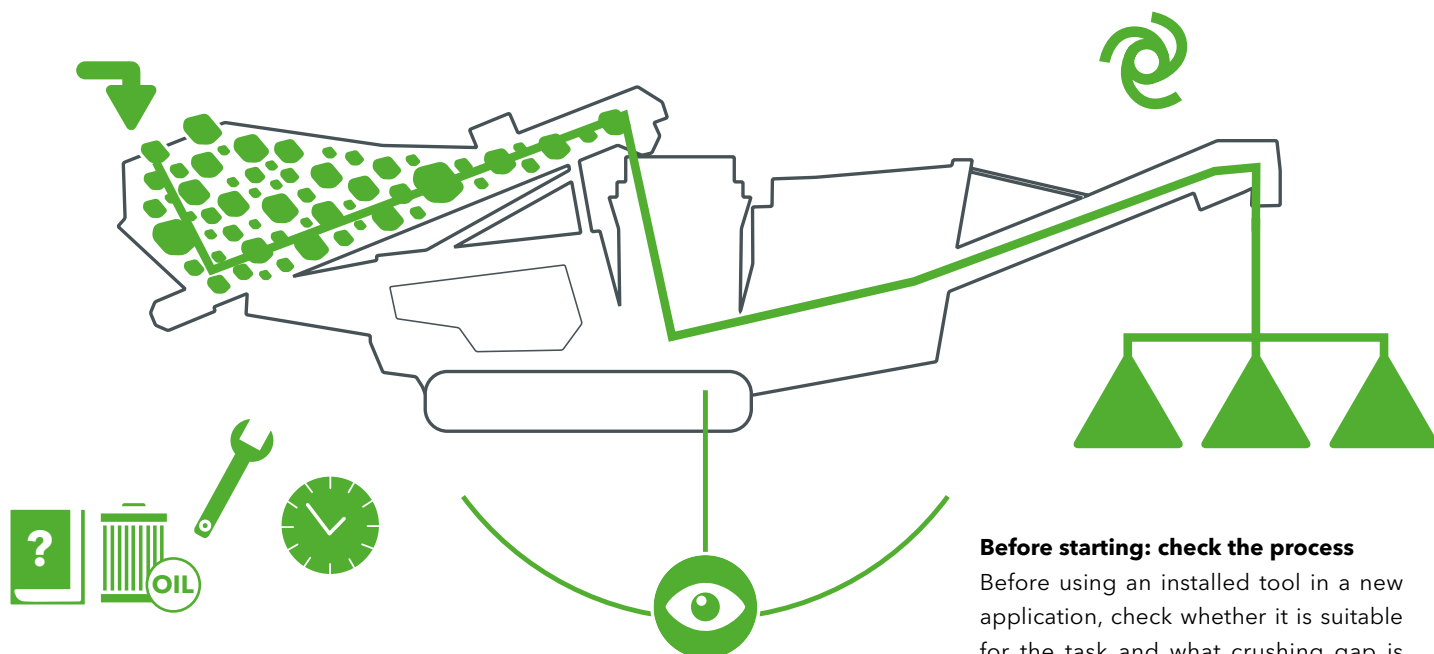
## How users achieve optimum results.

In addition to the right choice of crushing tool, there are a large number of variables that influence the performance of a cone crusher. The following points must be observed if a cone crusher is to be operated efficiently.



### Fill evenly and avoid idling

There should always be a layer of material in the feed hopper, as this helps reduce wear. Avoid overfilling and make sure you fill evenly all round.



### Keep to maintenance and inspection intervals

Regular maintenance and adherence to inspection intervals prevent damage and increase plant availability and hence productivity.

### Monitor processes regularly in operation

Regular monitoring enables operators to identify overloading at an early stage and adjust process parameters accordingly. It is important to avoid overfilling hoppers and return conveyors.

### Before starting: check the process

Before using an installed tool in a new application, check whether it is suitable for the task and what crushing gap is possible. A process simulation can help here.



# efficiently

## **No wet, tacky feed material**

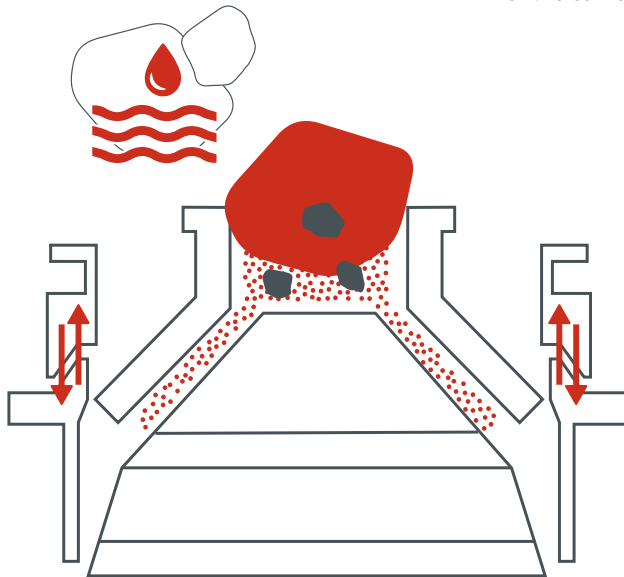
This causes clogging and sticking in the crushing chamber.

**Countermeasures:** Avoid loading with wet and tacky feed material - prescreening may be necessary. Clean a clogged crushing chamber.

## **Make sure the feed size is appropriate**

If the feed size is too large or too small, this will have a negative effect on the process and could damage the cone crusher.

**Countermeasures:** Select a tool appropriate to the feed size or adjust the feed size to the tool. Feed only material of the same kind and avoid gap grading.



## **Adapt the process in the event of overloads**

Overloading of the crusher will be indicated by the crusher suddenly coming to a stop when the overload protection on the drive engine is triggered.

**Countermeasures:** The feed material must be crushed smaller before being fed, or fine material must be screened first. Enlarge the gap if necessary and - if this is not sufficient - increase the speed.



## **Avoid fines**

Tool wear is much greater if fine material is fed than if the feed material undergoes prescreening.

**Countermeasures:** Activate prescreening in the upstream jaw crusher. Alternatively, install a screen machine before the cone crusher in order to separate off fine aggregate.







# Eco-friendly technology is a **top priority**

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BENNINGHOVEN integrate an RPP mixing tower with hot gas generator for RAP material rates of 90 + X% into the existing infrastructure of a 40-year-old asphalt mixing plant.

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When an asphalt mixing plant has been giving faithful service for more than 40 years, you can certainly consider it to have been a successful investment. But if this "antique" of machine technology is broken up into parts and turned into a future-oriented Recycling Priority Plant (RPP) - a plant whose priority is the production of asphalt with an extremely high RAP material rate - the cost-effectiveness reaches a whole new level. And that is precisely what BENNINGHOVEN have recently brought about for their long-standing customer, Johann Joos Tief- und Straßenbauunternehmung GmbH & Co. KG. >>>

**You could say that recycling "runs at full tilt" in RPP plants from BENNINGHOVEN: these mixing towers are configured so that the RAP mix always falls vertically instead of going down a chute, minimizing the sticking of material.**



**The importance of recycled materials is growing apace around the world. Equipped with RPP mixing towers and parallel drums with hot gas generators, our customers are excellently positioned for the future.**

**Ralf Port, Key Account Manager, Sales  
BENNINGHOVEN**

Parallel drum in counterflow with a hot gas generator: the outflow temperature of 160°C corresponds to the further processing temperature. A positive side-effect is the significant energy saving.



### **New BA 4000 RPP mixing tower**

The centrepiece of the new plant at Breisach is a BENNINGHOVEN mixing tower of type BA 4000 with a mixing capacity of 320t/h. A parallel drum in counterflow with a hot gas generator for the gentle, indirect heating of granulated RAP ensures a high level of environmental friendliness and maximum RAP material rates. This unique innovation enables RAP material rates of 90 + X% to be achieved - higher than with any other recycling system on the market. Presented at Bauma 2016 and elsewhere, the innovation takes account of stricter emissions limits, and specifically those set by the new German technical instructions on air quality control (Technische Anleitung zur Reinhaltung der Luft).





### **BENNINGHOVEN parallel drum in counterflow with a hot gas generator**

The unique BENNINGHOVEN innovation takes account of the fact that many markets are looking to achieve an RAP proportion of 90%. The challenge here is to bring the RAP material to the processing temperature of 160°C while keeping emission levels within the normal range and taking care not to burn the bitumen.

To achieve even higher RAP material rates while minimizing the level of emissions, BENNINGHOVEN are going their own way: heating the RAP material in the counterflow, which results in higher material and lower exhaust gas temperatures.

The process is based on the use of a hot gas generator: while with direct firing, the RAP material, with its bitumen content, would "burn", the hot gas generator only heats it indirectly.

### **Added value delivered**

"Just replacing the steel wouldn't get us anywhere – after all, our plant was working perfectly," said Andreas Ruf, Managing Director of Johann Joos Tief- und Straßenbauunternehmung. What he required was tangible added value. And that is what BENNINGHOVEN delivered – and how! The new technology will allow the largest road construction company in the Freiburg area to produce recycled asphalt to practically any formula in the future. In addition to the hot feed system comprising a parallel drum with hot gas generator, BENNINGHOVEN have also retrofitted a cold feed system: a multivariable feed hopper for an RAP material rate of up to 40%. Meanwhile, the cold feed system and other parts of the previous plant were retained.

### **RAP material rates of 90 + X%**

The new BENNINGHOVEN mixing tower of type BA 4000 meets the highest requirements on modern asphalt production. This is attributed in part to an EVO JET 4 combination burner for oil and coal dust delivering 23.7MW, 6-fold screening, a hot bin section with a 170t capacity in seven bins and mixed material storage silos holding 420t. Other new components included a housing, a filler tower and a modern and user-friendly control system – the BENNINGHOVEN BLS 3000 Control System. ///



# "There's simply a demand for this type"

From Bauma 2016 into the field: the new MBRG 2000 granulator from BENNINGHOVEN went straight from the trade fair to its first job sites - in the service of Heitbrink GmbH und Co. KG.

It is becoming ever more important to use resources responsibly. With more roads being rehabilitated than built from scratch, this also applies to the recycling of asphalt. Heitbrink Recycling is a pioneer in the processing of RAP and operates a total of 8 BENNINGHOVEN granulators. The company was also the first to buy the new, improved MBRG 2000 granulator. Thanks to BENNINGHOVEN's innovative parallel drum with hot gas generator, RAP material rates

of more than 90% are now possible. This requires that the milled material or asphalt blocks are granulated as precisely as possible into separate aggregate fractions for each type of layer while minimizing fines. It is little wonder, then, that "there's simply a demand for this type," as Managing Director Martin Heitbrink reports: since its handover after Bauma 2016, the trade fair exhibit has been in uninterrupted service. >>>





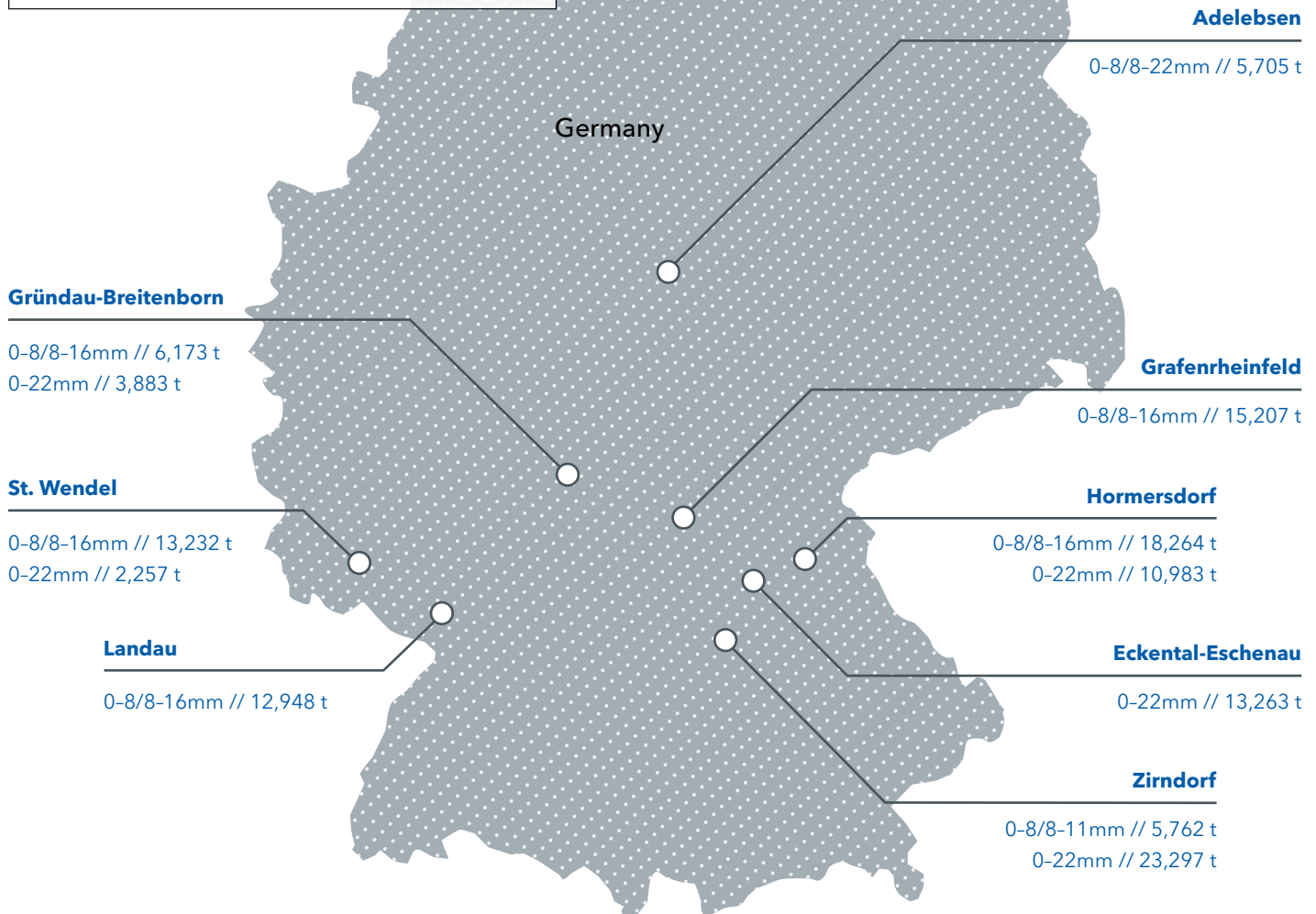
The new BENNINGHOVEN granulator generation:  
the mobile MBRG 2000 granulator (shown here) and the  
stationary SBRG 2000 prepare RAP for reuse.

### Highlights of the BENNINGHOVEN MBRG 2000 Granulator

- › Gentle granulation in defined grain sizes (0-8, 8-16, 16-22mm)
- › Coarse grain structure and low fines content
- › Reduced caking of material in the mixing plant
- › High output of up to 200t/h
- › Low dust and noise generation
- › Integrated self-regulating control system supports one-man operation by the wheeled loader driver
- › Low operating costs and low degree of wear and tear

**The more gently  
the granulate is  
processed, the more  
RAP remains in  
the cycle.**

**Martin Heitbrink, Managing Director  
Heitbrink GmbH und Co. KG**







Heitbrink Recycling is a contractor that operates the MBRG 2000 on behalf of a number of mixing plants.

## 130,000t in six months

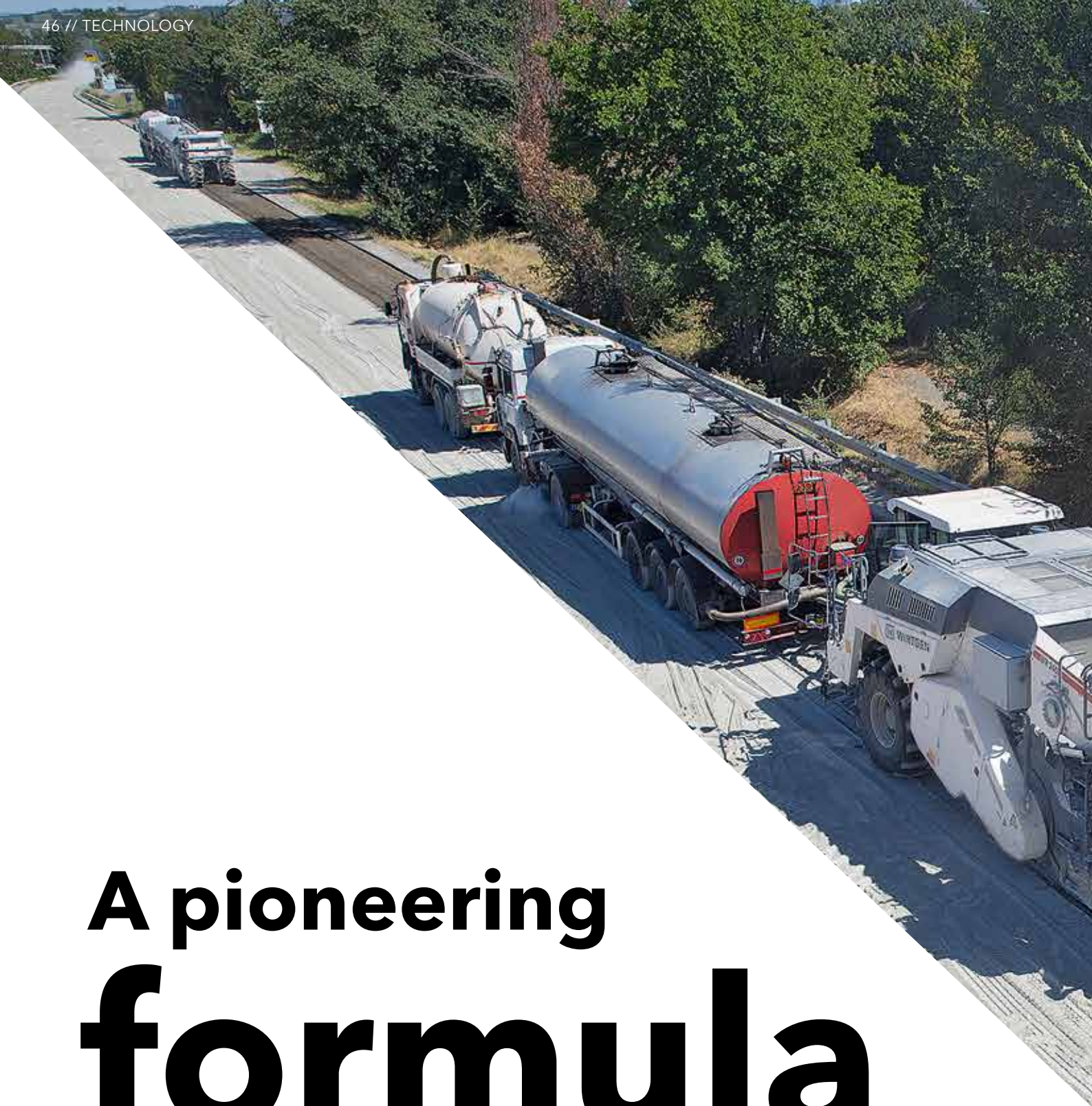
“Even just six or so months down the line, it’s clear that the investment is paying off,” says Martin Heitbrink. His team has already taken the new MBRG 2000 on a tour of Germany: the unit tackled 11 jobs on behalf of eight different mixing plants, granulating 130,000t of RAP. That corresponds to an average output of 135t/h – a compelling figure for the contractor. Martin Heitbrink is suitably enthusiastic: “Our new granulator has been in constant use. The unit has mainly travelled to a number of asphalt mixing plants in Germany, most of them in the southern part of the country.”

## MBRG 2000 granulator impresses customers

„Wherever the granulator appears, it always wins fans,” Heitbrink adds. The effective hourly output and the high RAP material rates speak for themselves. He points out another important benefit of the MBRG 2000: “The more gently the granulate is processed, the more RAP remains in the cycle.” That is one of the great strengths of the new granulator, which has already proven its worth in a very wide range of applications: “Whether it’s tackling blocks removed by excavators or asphalt milled off separately for each type of layer, the MBRG granulates RAP with maximum precision.” ///

## Precise granulation in defined grain sizes

The RAP proportion depends to a large extent on its grading curve, i.e. its constituents in terms of quantity, size and composition. The aim is to bring the grading curve of the granulated RAP as close as possible to the desired grading curve of the end product, finished asphalt. The BENNINGHOVEN granulator is the technology of choice because it generates a very low fines content. Thanks to the integrated 2-deck screen, two grain sizes can be produced – and with a particularly high coarse content (16-22mm).



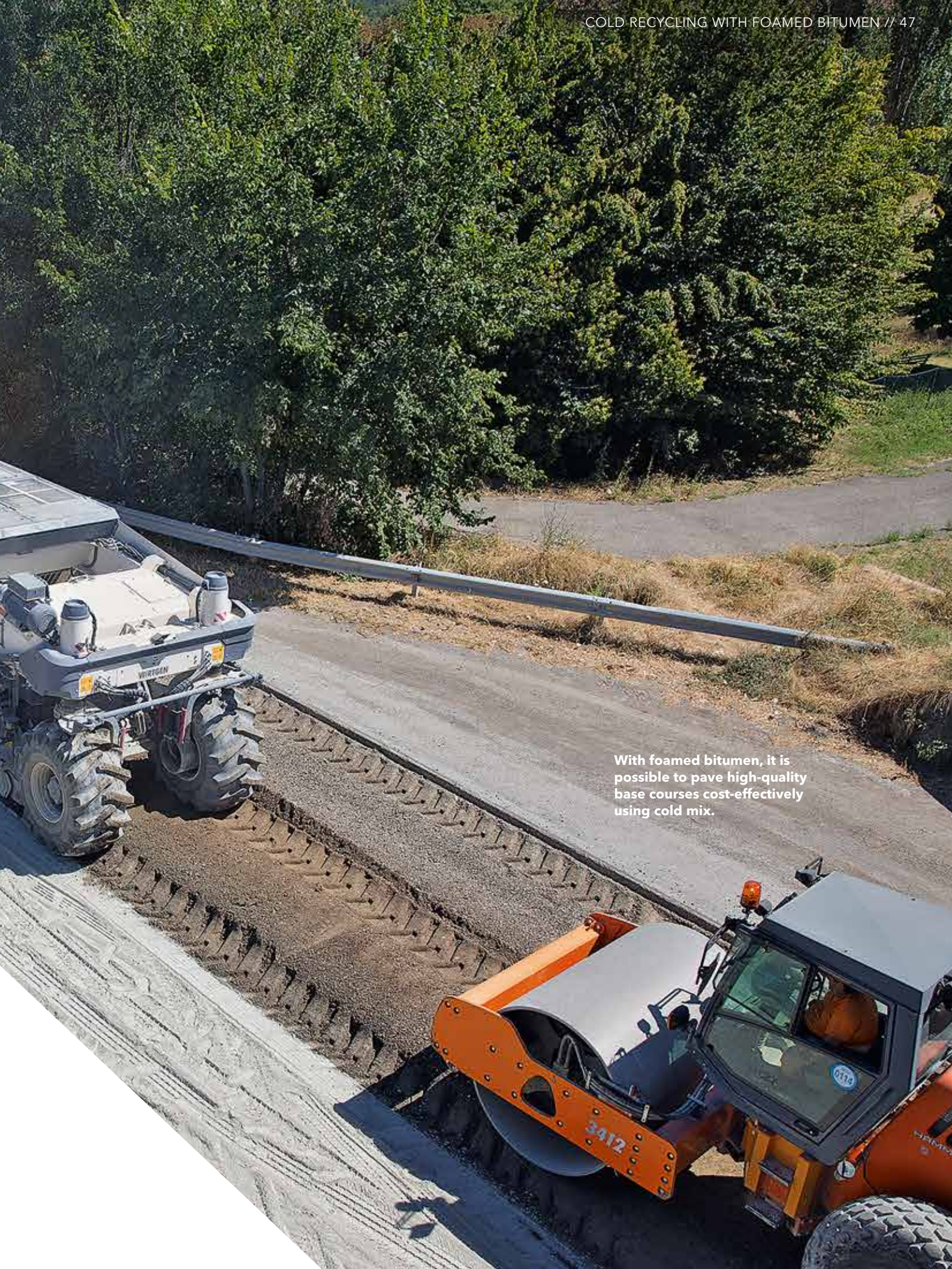
# A pioneering formula

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Cold recycling with foamed bitumen: resource-saving technologies are more in demand than ever before. The WIRTGEN cold recycling process has been proving its credentials for many years - and already meets the demands of tomorrow.

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With foamed bitumen, it is possible to pave high-quality base courses cost-effectively using cold mix.

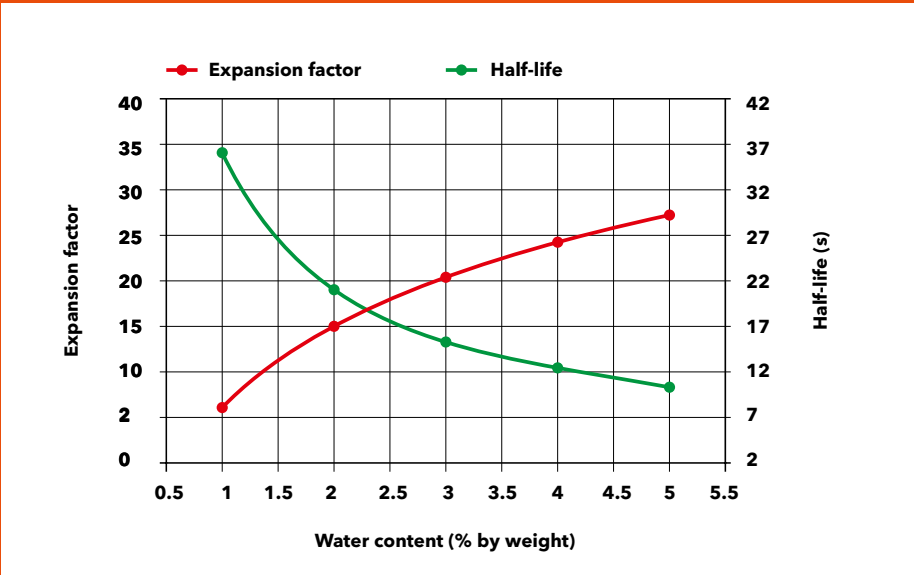




**What is foamed bitumen and how is it made?**

Foamed bitumen is produced by injecting small quantities of water and air into hot bitumen under high pressure. The water evaporates and makes the bitumen foam up rapidly to between 15 and 20 times its original volume. The foam is then injected into a mixer through injection nozzles and optimally mixed into cold and moist construction materials.

The quality of the foamed bitumen is primarily described in terms of the parameters “expansion ratio” and “half-life”. The greater the expansion ratio and half-life, the more easily the foamed bitumen can be processed.



Curves showing half-life and expansion ratio for determining the water content

The foaming process takes place in expansion chambers, where air and water is injected at a pressure of 5 bar into bitumen that has been heated to a temperature of 160 to 180°C.



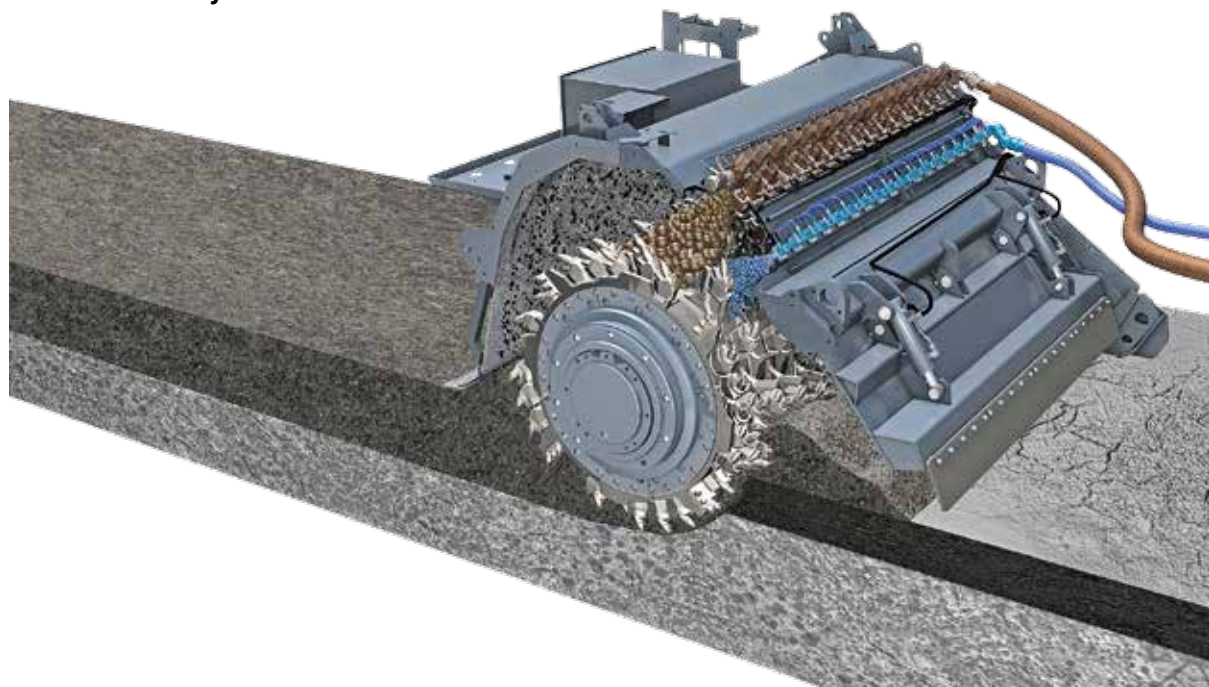


Roads that are subjected to continuous and heavy traffic often show signs of damage that extend down to the roadbase. To eliminate this damage, the entire road needs structural rehabilitation. Full re-use of the milled material as well as its cost-effective treatment make cold recycling with foamed bitumen – a process pioneered and decisively shaped by WIRTGEN over the past 30 years – environmentally friendly and economical.

### **Asphalt road rehabilitation with a moving job site**

Cold recycling with foamed bitumen as a binding agent is a globally established process that is attracting increasing interest from road construction authorities and construction companies for asphalt road rehabilitation. It permits the paving of flexible and durable base layers. As part of the pavement structure, these form the perfect foundation for the final, thinner asphalt surfacing. State-of-the-art technology is used to produce foamed bitumen from normal bitumen which has been heated to approximately 175°C. With the in-situ method, a precisely dosed quantity of binding agent is added to mineral aggregate inside the WIRTGEN 2200 CR or 3800 CR cold recycler or the soil stabilizers of the WR series, using microprocessor-controlled injection systems. The project can hence be carried out as a moving job site. >>>

**Addition of foamed bitumen and water to mineral aggregate by means of separate injection systems.**



## Ancillary cold recycling equipment from WIRTGEN



Both in specialist laboratories for road construction and in research facilities: the WIRTGEN laboratory equipment provides all experts in the field, be they contractors or consultants, with optimum support for cold recycling applications using foamed bitumen.

### New WLW 1 laboratory compactor

WIRTGEN developed the new WLW 1 laboratory compactor for the production of test specimens. Developed especially for cold recycling applications, the compaction process permits the production of large test specimens for carrying out triaxial tests as well as small test specimens for indirect tensile strength testing.

### WLM 30 laboratory-scale mixer

The WLM 30 laboratory-scale mixer defines the best mix composition and reliably produces different mix formulas in a very short time. The WLM 30 holds some 30kg of material, mixer speed and mixing time are variable.

### WLB 10 S laboratory foamed bitumen plant

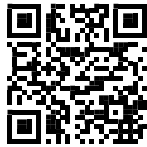
The foamed bitumen quality can be accurately defined in preliminary tests in the WLB 10 S mobile foamed bitumen plant even before construction starts. With its simple operation, parameters such as the water volume, pressure and temperature can be varied.





## Cold recycling on the rise

The cold recycling process has proven its worth around the world. In practical use, there are two different methods: an in-situ approach using wheeled or tracked WIRTGEN cold recyclers, and the in-plant method using the WIRTGEN KMA 200i, a mobile cold recycling mixing plant. The methods allow a large number of materials to be recycled such as milled asphalt, crushed asphalt or new material. The application range for foamed bitumen is varied, and it can also withstand very high traffic loads, as two examples in Brazil and Greece show. >>>



For more information on WIRTGEN cold recycling technology, see: [www.wirtgen.de/cold-recycling](http://www.wirtgen.de/cold-recycling)



The bitumen used for production of foamed bitumen is widely available around the world.



The WLB 10 S laboratory-scale foamed bitumen plant can be used to carry out series of tests to determine the foamed bitumen properties.



A key attribute of the WLM 30 twin-shaft compulsory mixer for batches of approximately 30kg is its high mixing intensity.



Depending on the test procedures, the WLV 1 produces test specimens of various heights. Their quality is then examined with the indirect tensile strength test.



### **Cold recycling with WIRTGEN: Applications expertise included**

To achieve such results, extensive preliminary tests must be conducted on the entire pavement structure, while the mix produced with foamed bitumen must pass a rigorous mix design test. WIRTGEN not only supply the right equipment for the job – customers can also make use of their comprehensive range of advisory services

around the world at any time. For instance, WIRTGEN experts and road construction engineers provide on-site support and advice for customer projects. The WIRTGEN training programme also conveys in-depth applications know-how on the topic of cold recycling.



**Brazil:****Recycled material exceeds expectations**

The Ayrton Senna Highway in Sao Paulo is used by more than 250,000 vehicles every day, 15% of them lorries. During the rehabilitation project in 2011, milled material from the asphalt pavement was recycled with foamed bitumen in a WIRTGEN cold recycling mixing plant and repaved in two layers (20 plus 10cm) by a road paver. Then a 5cm-thick asphalt surfacing was laid.

**Greece:****High load-bearing capacity for more than 10 years**

The cold recycling projects carried out with foamed bitumen back in 2003/2004 on the motorways between Iliki, Korinthos and Athens, Greece, have been demonstrating their strength for more than ten years, withstanding a high traffic volume of 40,000 vehicles per day including a 25% share of heavy vehicles. ///

**Cold recycling: Advantages at a glance**

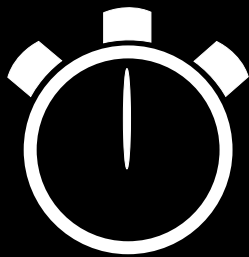
- › Extreme durability of the layers
- › High cost-efficiency
- › Resource conservation by 100% recycling
- › Reduced CO<sub>2</sub> emissions
- › Reduced construction time

# Cost-efficiency – boosted overnight

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Paving porous asphalt in a night-time job,  
WIRTGEN GROUP machines boost the cost-efficiency  
of the construction project.

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1,300m in every work shift: to avoid a complete closure, machines from WIRTGEN and VÖGELE are put to work repairing the heavily used A1 motorway "overnight". Some of the porous asphalt mix was produced by a BENNINGHOVEN BA 3000 asphalt mixing plant.





# 25%

working time saved thanks to machine technology of the WIRTGEN GROUP





● Dortmund

Germany

### Germany // Dortmund

A construction project on a very busy stretch of road places particularly high demands on the reliability of the technology used. On the A1 motorway between the Westhofen interchange and the Dortmund/Unna junction, the repair of the surface course across the entire carriageway was completed not just according to plan, but actually ahead of schedule. Led by general contractor and project coordinator Gehrken Straßen- und Tiefbau GmbH & Co. KG, the construction companies involved needed just 42 instead of the planned 55 night shifts – despite the fact that the surfacing of porous asphalt was paved “hot on hot” on spray seal.

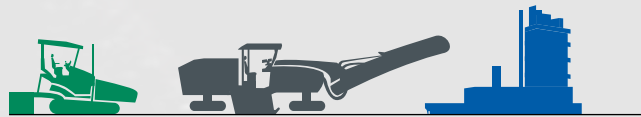
### Innovative technologies prove their reliability

The State Roadworks Office of North Rhine-Westphalia – or Straßen.NRW for short – had already relied on the noise-reducing material a good 15 or so years ago. After all, the A1 runs through the Ruhrgebiet, by far the most densely populated region of Germany. Now, several WIRTGEN GROUP technologies worked together to bring about the successful rehabilitation of the meanwhile badly worn carriageway: WIRTGEN cold milling machines of types W 100 CFi, W 150 CFi and W 210i equipped with fine milling drums, a VÖGELE SUPER 1800-3i SprayJet as a combined spray and conventional paver and a BENNINGHOVEN asphalt mixing plant of type BA 3000. »»

**Fine milling drums from market leader WIRTGEN leave behind a finely structured milled surface that increases the bond between layers.**



Berlin ●



### Job site details

Repair of the A1 motorway between the Westhofen interchange and the Dortmund/Unna junction, Germany

Length of section:	7.2km
Width of section:	2 x 11.25m

### Working parameters

Milling width:	1m, 1.5m and 2m (depending on the milling machine)
Pave width:	6 lanes, each 3.75m wide
Layer thickness	
Binder course:	8cm
Surface course:	4cm

### Material

Binder course:	AC 16 D SMA D 10/40-65 A
Surface course:	PA 8 GW/D 40/100-65 A

### Equipment

- 1 WIRTGEN W 100 CFi cold milling machine
- 1 WIRTGEN W 150 CFi cold milling machine
- 2 WIRTGEN W 210i cold milling machines
- 1 VÖGELE SUPER 1800-3i SprayJet paver
- 1 BENNINGHOVEN BA 3000 asphalt mixing plant



“

**The machines were even more efficient than our calculations had suggested, so after the first few nights, we lengthened the sections and rehabilitated up to 1,300m each night.**

**Dipl.-Ing. Udo Mattigkeit, Project Manager  
Straßen.NRW**

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**On the fast track: WIRTGEN W 210i large milling machine. Thanks to their precise milling processes and Multiplex levelling system, the milling machines ensured superb evenness of the carriageway - creating ideal conditions for paving a thin overlay.**





## Repair alongside flowing motorway traffic

To minimize traffic obstructions during pavement rehabilitation, Straßen.NRW developed an innovative concept: every night, an approx. 700-900m section of one of the 3.75m-wide lanes was rehabilitated when the traffic frequency was at its lowest, in the hours between 8 pm and 5 am. The aim? "If you don't notice during the day that there was a construction site here at night, then we have done our job properly," says Heike Gerlach, Head of Road Construction at the motorway subsidiary of Straßen.NRW in Hamm. For the left-hand and central lanes, this meant blocking the respective section, removing the surface course using the fine milling method, cleaning the milled surface, applying a layer of polymer-modified bitumen and paving the new surface course in one operation – and then adding the road markings.

On the right-hand lane, cold milling machines also removed the binder course. Binder course material was then paved to a thickness of 8cm – and the lane was subsequently opened for temporary use by traffic. In another night shift, the right-hand lane and the hard shoulder were milled to a depth of 4cm and replaced with a new porous asphalt surfacing of the same thickness.

## Fine milling drums lay the foundation for high quality

A perfect bond between layers has a decisive impact on the quality of asphalt roads, and a combination of fine milling and SprayJet technology is the ideal means to achieve this perfection. The contracted milling service provider, GMS Fahrbahnsanierungen GmbH, exclusively relied on WIRTGEN cold milling machines that were configured with fine milling drum units, enabling them to produce a finely structured milling texture. The precise surface accuracy was delivered by the Multiplex levelling system, which is particularly suitable for smoothing irregularities in a lengthwise direction during fine milling jobs. »»



**The high-tech SUPER 1800-3i SprayJet paver belongs to the “Dash 3” generation. In other words, it can be controlled as usual with the paver operator’s ErgoPlus consoles – simply and intuitively.**

**Dietmar Langer, Paver Operator**  
**Gehrken Straßen- und Tiefbau GmbH & Co. KG**

### **VÖGELE SprayJet technology ensures process safety for porous asphalt paving**

A spray paver is essential when paving porous asphalt in particular, because an additional emulsion film has to be laid under the asphalt in order to prevent the ingress of water into the binder course. This film can only achieve its optimum effect if it is undamaged. And this is precisely where the key advantage of the VÖGELE SUPER 1800-3i SprayJet comes in: it applies the bitumen emulsion while simultaneously paving the asphalt. This means that feed lorries never drive over the bitumen film.



**The quality is enhanced by unique technology: the SUPER 1800-3i SprayJet is configured with five spray bars which ensure that the emulsion is applied without a gap even if the pave width varies. The rate of spread can be selected accurately within the range of 0.3 and 1.6kg/m<sup>2</sup>. On the A1, the rate applied was 0.5kg/m<sup>2</sup>.**

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**Paving and spraying in a single pass:  
SUPER 1800-3i SprayJet advances at 7-8m/min**

Immediately after milling, the milled surface was cleaned with a suction sweeper, so that the VÖGELE SUPER 1800-3i SprayJet paver was able to spring into action only a short time later. The combined spray and conventional paver handles spraying jobs (including paving thin overlay on spray seal, "hot on hot") just as easily as conventional paving without pre-spraying. On the A1, the tracked paver spread a layer of polymer-modified bitumen and then paved the fresh porous asphalt on top. Equipped with the very latest in machine technology, the paving team completed the set workload of 5,000m<sup>2</sup> per night shift in just two to three hours. The pave speed achieved was a good 7-8m/min. That left enough time for the surface to cool and the road markings to be applied, which meant that the rehabilitated section could be reopened for the morning rush-hour traffic at 5 am sharp. >>>

**Because the system offers  
6-fold screening, we can  
serve customers flexibly  
with different materials.**

**Michael Scherf, Project Coordinator  
KEMNA BAU Andreae GmbH & Co. KG**



**The housing of the BA 3000 keeps noise and dust emissions to a minimum and prevents heat from being radiated out, optimizing the energy balance of the unit.**







### BA 3000 produces mix for the A1

Some of the porous asphalt mix was supplied by a BENNINGHOVEN asphalt mixing plant. The BA 3000 operated by building contractor KEMNA BAU Andrae GmbH & Co. KG was first set up in Kamen-Heeren in 1999 and has been delivering excellence ever since: "It is extremely reliable," says Industrial Foreman Christoph Schauf in high praise. With a mixing output of up to 400t/h, the BA (which stands for BENNINGHOVEN Anlage, meaning BENNINGHOVEN plant) is the flagship of the BENNINGHOVEN product range. The plant owes its great appeal to its winning combination of the highest quality standards and outstanding maintenance friendliness. High-grade components play a role in this: they can be operated continuously at temperatures in excess of 400°C. In addition, all drives are located on the outside to protect them from heat.

### 3t of mix - every 45 seconds

The BA 3000 of KEMNA BAU Andrae achieves a mixing output of 240t/h with a 3.0t mixer. The highlights include a BENNINGHOVEN burner delivering 19MW of power and 6-fold screening for up to seven different aggregate fractions. With a control system that is both clearly arranged and easy to operate, even more complex mix formulas can be prepared quickly and - once saved - called up again at any time. Incidentally, KEMNA retrofitted a new control system in 2014. They were able to do so because BENNINGHOVEN mixing plants are designed to allow modernization at any time. Industrial Foreman Christoph Schauf says: "Since the retrofit, I have mixing operation even more firmly under control and can adjust and monitor all parameters perfectly." ///

# Steep climb, great feat



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In the Swiss Alps, the VÖGELE SUPER 1803-3i wheeled paver is proving its credentials on extreme slopes.

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### Job site details

Rehabilitation of the combined base and surface course on a steep farm track in Arosa, Switzerland

Length of section:	150m
Descending slope:	11% (approx.)

### Working parameters

Pave width:	3.3m
Pave speed:	2m/min.
Layer thickness:	7cm

### Material

Combined base and surface course:	AC 16 TD LW
Paved material quantity:	100t

### Equipment

VÖGELE SUPER 1803-3i wheeled paver with AB 500 TV  
 Extending Screed  
 HAMM HD 13 VT tandem roller



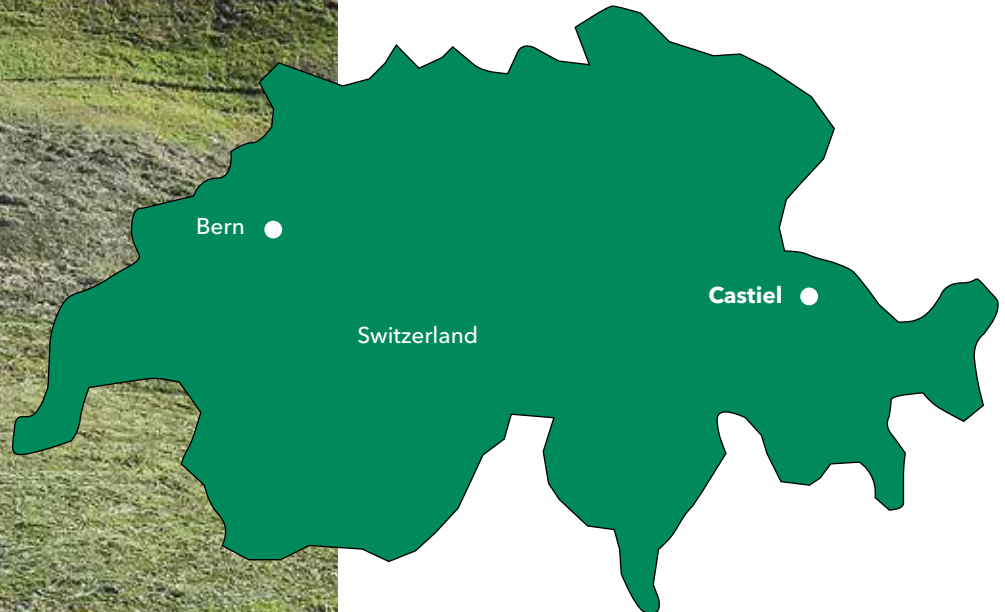
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**Despite the difficult conditions, we managed to complete the paving job in one shift. The SUPER 1803-3i plays an immense part in the cost efficiency of such small construction projects - and it's fun to work with, too!**

**André Deflorin, Construction Manager  
 HWE Bauunternehmung AG**

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# 11%

**Great feat: the robust VÖGELE wheeled paver of the Universal Class with 127kW Cummins diesel engine combines enormous power with high manoeuvrability, mobility and traction.**

## Switzerland // Castiel

On geographically tough terrain such as in the Swiss Alps, asphalt paving is a challenge in itself. Extreme slopes, narrow roads and steep precipices place demands on the paving team and the machine technology alike. In the mountain village of Castiel, located in the Arosa district in the Swiss canton of Graubünden, HEW Bauunternehmung AG opted to use the SUPER 1803-3i

wheeled paver for the rehabilitation of the combined base and surface course on a farm track. Located at an altitude of around 1,200m, the construction project featured an extreme slope of up to 11%. To make matters harder, the farm track was only designed for vehicles up to 18t in weight. This was just the job for the innovative wheeled paver of VÖGELE's "Dash 3" generation. »»

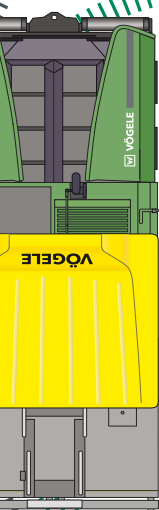


For a video of a comparable project in the town of Chur in Graubünden canton, Switzerland, see:  
[www.voegele.info/chur-en](http://www.voegele.info/chur-en)



For more about how Pivot Steer works, see:

[www.voegele.info/pivotsteer\\_en](http://www.voegele.info/pivotsteer_en)



**3.5m**

**Masters even tight radii:**  
thanks to the Pivot Steer steering brake, the SUPER 1803-3i wheeled paver reduces its outside turning radius to a space-saving 3.5m.

### **SUPER 1803-3i handles one-day construction job efficiently**

In Castiel, the high traction and manoeuvrability of the SUPER 1803-3i were particularly impressive. "That makes working on extreme slopes almost as simple as on flat terrain," said Paver Operator Oliveira Rodrigues Hugo. With its powerful drive and material handling system, it was easy enough for the HEW paving team to complete the construction project in one shift. The short set-up times of the paver also contributed to this.

VÖGELE sensors for grade and slope control, for instance, can be connected according to the plug & play principle: the VÖGELE Niveltronic Plus System for Automated Grade and Slope Control detects the connected sensor automatically. The screed operator then just defines the specified values using the quick set-up function - and the work can begin. When its job is done, the paver also makes a quick exit: the SUPER 1803-3i can travel at up to 20km/h under its own power. ///



**Intuitively designed paver operator's ErgoPlus 3 console:** the SUPER 1803-3i wheeled paver can be controlled easily and precisely using the steering wheel.



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**Thanks to its high traction and manoeuvrability, the SUPER 1803-3i makes paving on extreme slopes almost as easy as on flat terrain.**

**Oliveira Rodrigues Hugo, Paver Operator  
HEW Bauunternehmung AG**

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**Ensuring relaxed compaction: the HAMM HD 13 VT tandem roller with 3-point articulation for high driving comfort.**

#### **Highlights of the SUPER 1803-3i: The powerful wheeled paver**

- › Undercarriage with high tractive power thanks to separate hydraulic drives
- › Optional Pivot Steer steering brake raises the already high manoeuvrability
- › Rapid transport under its own power at up to 20km/h





**Unbridled joy: a mountain pass in the Swiss Alps.**

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