

# RoadNews

for new roads

The WIRTGEN GROUP User Magazine // № 05

 WIRTGEN

 VÖGELE

 HAMM

 KLEEMANN

 BENNINGHOVEN

WIRTGEN GROUP solutions  
for automation and process optimization:

## On the leading edge





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# Editorial



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Dear Reader,

How would it be if VÖGELE asphalt pavers were able to “remember” dozens of settings just at the push of a button? Or if WIRTGEN concrete pavers operated fully automatically with AutoPilot? Solutions like these are already reality – thanks to the high level of development and applications expertise we deliver as the technology leader.

Amid all these advancements, however, people still take centre stage in everything we do. KLEEMANN’s SPECTIVE system, the intuitive interface between users and the automated crushing process, is a prime example. And what better reason could there be to devote this edition’s Top Feature to such pivotal topics for the future as automation and process optimization in road construction and processing technology?

HAMM are currently celebrating a very special anniversary: 35 years of oscillation. This technology compacts surfaces particularly gently and efficiently, producing top quality results. Rapidly increasing the degree of density, it ensures an optimized process with fewer passes – just one of many reasons it continues to occupy the cutting edge. BENNINGHOVEN, meanwhile, have just handed over a brand new innovation: a hot gas generator with a counterflow parallel drum system. This recycling technology forms part of an advanced 40m-high BA RPP 4000 asphalt mixing plant, which drew many a glance back at the bauma trade fair.

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

Best wishes,



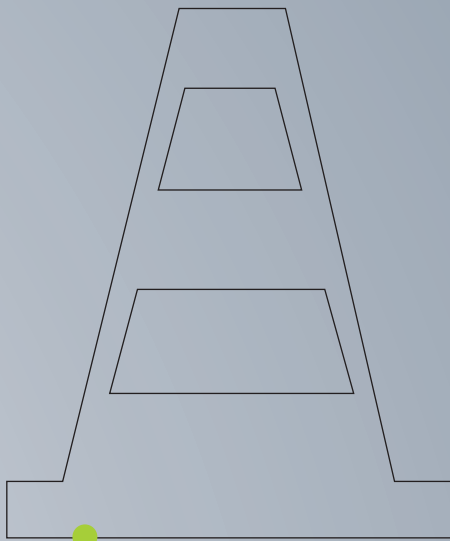
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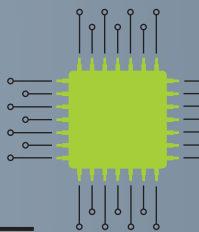
# Automating processes, improving future prospects







Automation and process optimization in road construction and material processing: how solutions from the technology leader, the WIRTGEN GROUP, help customers and users get ahead.



Winning tenders, executing construction projects profitably, prevailing against tough competition: anyone wishing to boost productivity and improve their prospects in road construction or material processing cannot afford to overlook the topics of automation and process optimization. In the WIRTGEN GROUP, contractors and users have a partner that can already offer a wide range of innovative efficiency-boosting solutions - and who is already looking to the future. It is not without reason that the WIRTGEN GROUP are the technology leader.

In a diverse array of fields, each of our product brands is busy researching, developing and testing technologies that make all the difference. Many of them have had a major impact on the way that roads are built and rehabilitated today. On the following Top Feature pages, three examples from WIRTGEN, VÖGELE and KLEEMANN will spotlight current innovations that are making a mark in the sector and that spell success for our customers.







# Stringline-free in Mobile

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Producing kerbs as if by magic: in Mobile Bay on the Gulf of Mexico in the US state of Alabama, a WIRTGEN slipform paver SP 15i operated fully automatically.

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For maximum flexibility: the WIRTGEN SP 15i supports tight radii from 0.5m.



## USA // Mobile Bay

When a new residential area is developed, the individual contract work sections are often very detailed. Roads and paths have to be paved and access roads to the individual plots constructed. The various traffic areas are often separated by concrete structures such as kerbs. These can be either precast parts or monolithic profiles produced right on the job site by WIRTGEN inset/offset slipform pavers. The construction company Ammons & Blackmon Construction LLC decided to take the second option. The company's SP 15i has produced hundreds of running metres of kerbs in a newly-developed residential area in Mobile, located in Mobile Bay on the Gulf of Mexico – working in both tight and wide radii as well as different heights and widths. Cost-effective as this method is, one time-critical and quality-sensitive issue usually remains to be dealt with – tensioning stringlines. The new-build project in Alabama shows that this job can also be dispensed with, since in this case, an SP 15i produced all kerbs fully automatically.

### SP 15i is compatible with common 3D control systems

As is often the norm in many new-build projects, a 3D digital terrain model was available at the Mobile job site. The great advantage of the SP 15i: thanks to its certified standard interface, the concrete paver can also be equipped with 3D systems of other leading suppliers alongside AutoPilot, WIRTGEN's 3D control system. The data are transmitted to the machine via a 3D interface, and various systems such as the RTK GNSS receiver or automatic total stations are employed during paving. The sensors mounted on the machine permit precise measurement while the machine is in operation. These systems constantly check that the specified and actual values of the paving parameters correspond. If no 3D digital terrain model is available for a project, users can also enlist the aid of WIRTGEN's AutoPilot Field Rover and create a new digital data model directly on the job site. >>>





## Dispensing with stringlines also simplifies material supply

When working in the small town of Mobile, the paving team of Ammons & Blackmon Construction LLC had to switch between different work sections several times in every work shift. It was therefore obvious that dispensing with time-consuming surveying, tensioning and checking of stringlines would greatly increase the profitability of the project. The supply of material is a much simpler affair, too, as lorries can quickly reach the SP 15i and drivers do not have to be on the lookout for tensioned stringlines. An additional feature of the slipform paver itself also supported particularly speedy progress – the trimmer. This unit levels the base to ensure optimum paving. The trimmer drum design is based on WIRTGEN milling technology, one of the company's core competencies. The telescoping trimmer with its helically positioned point-attack cutting tools guarantees uniform profile paving – in a single pass.

## Inset/offset slipform paver demonstrates its extreme versatility

The project in Alabama also testified to the wide range of monolithic profiles that the SP 15i can produce with its many standard and special profiles for offset paving. In Mobile, alongside the conventional kerbs, the to-do list included a number of contract work sections that are typical for the United States – including kerbs with integrated gutters, flat gutters between private driveways and public roads that can be driven over as well as complete footpaths. The slipform paver placed the concrete with a width of 0.3-1.8m and a height of 15-30cm. ///



**WIRTGEN technologies enabled us to produce the concrete profiles even more quickly and precisely.**

Chad Ammons, Project Manager  
Ammons & Blackmon Construction LLC



# Further development: The WIRTGEN AutoPilot 2.0



The 3D control system comprises a computer integrated into the paver and a tablet attached to the Field Rover survey pole. Two GPS receivers mounted on the machine communicate with a GPS reference station at the job site.

Greater paving precision at lower costs: now further advanced by WIRTGEN, AutoPilot 2.0 can be used with the SP 15i and SP 25i models to create all manner of offset and inset profiles with even greater efficiency and precision. To this purpose, the 3D system either uses a previously created data model or a new digital data model is produced on the job site – a simple task with the Field Rover survey pole. The AutoPilot 2.0 software automatically checks the imported or newly-created data for any kinks affecting the steering and grade control. The user can correct unwanted kinks in the model data directly on the tablet with the aid of graphic editors.



Comprehensive checks are run when importing external data models to ensure that the best possible paving quality is achieved.



Each object can be directly controlled with the Field Rover. Water inlets, hydrants etc. can then be examined to ensure that they are correct.



Errors can be corrected immediately by rounding the kinks using graphic editors.





Wide range of functions, divided into five practical modules: WITOS Paving is the solution from world market leader VÖGELE for optimizing processes in road construction.



# Optimizing processes, enhancing efficiency

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WITOS Paving is the innovative VÖGELE solution for optimizing processes in road construction. The system already has a proven track record in practical applications. Now VÖGELE are further enhancing the system's practical performance with additional functions.



# WITOS Paving



**WITOS Paving Control**  
The planning and control module



**WITOS Paving Analysis**  
The analysis and documentation module

## Process optimization made easy

Amid growing cost pressures, demands for better pavement quality and a longer road service life, it is becoming increasingly important to exploit untapped potential in the paving process. WITOS Paving from VÖGELE is a solution that brings the different players together – from the construction manager through the asphalt mixing plant and the lorry driver to the paving team. The system covers the planning and control of asphalt job sites, ensuring greater transparency across the entire paving process. The fact that the data are available in real time enables users to respond more rapidly and effectively to deviations from plans and to

disruptions. That's confirmed by one of the customers, the managing director of Franz Schelle GmbH & Co. KG, Franz Schelle: "WITOS Paving has made the paving process a whole lot smoother. The paving team, for instance, always knows how many lorries are approaching the job site and can react accordingly, by requesting more lorries, for example. That means the pave speed of our SUPER pavers always remains constant – which in turn improves the paving quality enormously." >>>





#### **Module 1: WITOS Paving Control**

WITOS Paving Control, for instance, supports simple project planning by means of an assistant that guides the construction manager through the planning process, step by step, calculating the quantity of mix required, for instance.

#### **Module 2: WITOS Paving Materials**

The number of lorries required to supply the mix to the paver is sent to the "Materials" module. The system suggests a variable working cycle to the supervisor in the asphalt mixing plant, and this cycle is continually adjusted. In many cases,

that also allows the number of lorries required to be reduced.

#### **Module 3: WITOS Paving Transport**

The "Transport" module keeps the construction manager, paving foreman and mixing plant supervisor informed in real time of where the individual lorries are located at that particular moment and when exactly they will reach the job site or mixing plant, enabling paving or asphalt production to be controlled perfectly.

#### **Module 4: WITOS Paving JobSite**

All information on the job site is compiled in real time in the WITOS Paving JobSite module, enabling the paving foreman to compare his planned workflow with the reality on the job site

and respond to any deviations. Lorry deliveries are also recorded here, either by manual input or simply by scanning a QR code on the delivery note from the mixing plant.

#### **Module 5: WITOS Paving Analysis**

The construction project is subsequently analysed using the "Analysis" module with the aim of making the process even more efficient in the future.



## One-stop software and machine solution: The only paver-integrated system

In the VÖGELE solution, the software and the machine technology come from a single source – and the benefits of this are compelling. For instance, this means that no interfaces are required. “WITOS Paving is the only system that offers direct access to the most important machine data,” explains Dr Stephan Weller, Head of Software Products at VÖGELE. Contractor and WITOS Paving

customer Franz Schelle also recognizes the practical advantages: “WITOS Paving combines parameters from planning with such paver data as layer thickness and pave speed. This is one benefit that third-party suppliers of process optimization software are unable to match.”





## High functional security thanks to values obtained in the field

Being a fully integrated system solution, WITOS Paving offers a high degree of functional security in operation. The fact that all job data, such as pave width and pave speed, are recorded in real time is just one contributing factor. This means that paving teams are always working with data that have been obtained in the field rather than calculated virtually. With no need to enter figures manually, the process is also more convenient for users. In addition, the exact operating status of the paver (paving, relocation on the job site, transport and neutral) is detected automatically.

## Field experience demonstrates that WITOS Paving is easy to learn and boosts efficiency

"Planning has become much simpler since WITOS Paving was introduced," reports Franz Schelle, Managing Director of Franz Schelle GmbH & Co. KG. "There's no need to enter figures in calculation programs. WITOS Paving thinks and calculates for itself. That saves a huge amount of time." Even training the team in the use of WITOS Paving had been surprisingly easy: "It took only two or three jobs for us to master the system completely - and that applies to everyone involved in the process." This thought is echoed by Construction Manager Roman Schruff: "Overall it makes planning, paving and analysis significantly easier, because the system includes and records the relevant data - from the mixing plant and the lorry travel times to the paving temperature. I am highly satisfied with WITOS Paving." >>>



**WITOS Paving is integrated into the ErgoPlus 3 operating concept: paver operators receive a constant flow of information on their console display about incoming mix lorries and the current progress of construction - all without a separate display. All the requisite information is hence displayed directly in the paver operator's field of vision. Ergonomically integrated - as you would expect from VÖGELE.**



## The right hardware for each participant

The strategic importance of process optimization, efficiency and standardization is well known. WITOS Paving makes it easier to get started. That's because the technology is intuitive. It is used on a variety of terminal devices – with each participant using the one that best suits them. Before the construction work begins, for instance, the construction manager prepares the project on the PC in his office using the WITOS Paving “Control” module. The mixing plant supervisor also uses a PC to run the “Materials” module. The lorries report their precise position to the system via an app on the driver's smartphone (“Transport” module). The information includes the expected arrival time at the job site or the mixing plant – and this is all done automatically. The paving foreman uses the “JobSite” module on a tablet or outdoor PC on site, and/or the paver operator runs it via his ErgoPlus 3 console. After completion, the project is analysed back in the construction manager's office.

## VÖGELE integrate new benefits and improvements

It is not only the construction companies that use WITOS Paving who are constantly learning and optimizing their processes – VÖGELE, too, are continually improving the system. “The feedback from customers is invaluable for us and has already led to new tools,” reports Dr Stephan Weller, Head of Software Products at VÖGELE. WITOS Paving records incoming and queuing mix lorries automatically by geo-fencing, for instance, while the delivery notes are registered by means of QR code and scanner. Once the drivers set off on their return journey, the asphalt mixing plant is informed of their expected time of arrival. Travel times are calculated solely on the basis of professional lorry navigation systems. What is more, WITOS Paving can now be used even without the involvement of the mixing plant. Also new are the possibilities of planning crowns via the system and optimizing the ongoing paving process from the office, while the smart “outstanding quantity calculator” – also available on the job site – is particularly helpful.

## Valuable findings for future construction projects

What exactly is the point of analysing job sites? “WITOS Paving gives us a huge pool of data. That enables us to look at a large number of aspects – so that if the mix runs out, for instance, we can see exactly where the problem was,” says Franz Schelle, Managing Director of Schelle. He confirms that the system delivers important findings on the paver's operating efficiency: “We can now recognize whether the work added value or whether it only incurred costs.” But WITOS Paving also indicates the reasons: “Was it the volume of traffic? Was there a bottleneck at the mixing plant? Was something about the planning not quite right? Or about the procedures on the job site? Everything is documented – and this provides a veritable treasure trove of data that can be used to improve efficiency on the next job site. And the one after that. And so on, into the future.” The HCQ (HAMM Compaction Quality) data from HAMM rollers, and hence also the compaction process, are now also documented, and these can be additionally analysed and optimized by means of the “Analysis” module. Details like these are precisely what make WITOS Paving such a worthwhile acquisition for contractors. This thought is echoed by Franz Schelle: “It is already evident that we are continually learning more and improving.” And if any questions arise, users can rely on support from VÖGELE – from a central contact – today and in the future, too. For as part of the WIRTGEN GROUP, VÖGELE – and hence also WITOS Paving – stand for a high level of security for the future. >>>





**WITOS Paving  
is a very simple system,  
and our staff get along very  
well with it. After the first few  
construction projects, using  
it was a no-brainer.**

**Franz Schelle, Managing Director  
of WITOS Paving customer  
Franz Schelle GmbH & Co. KG**



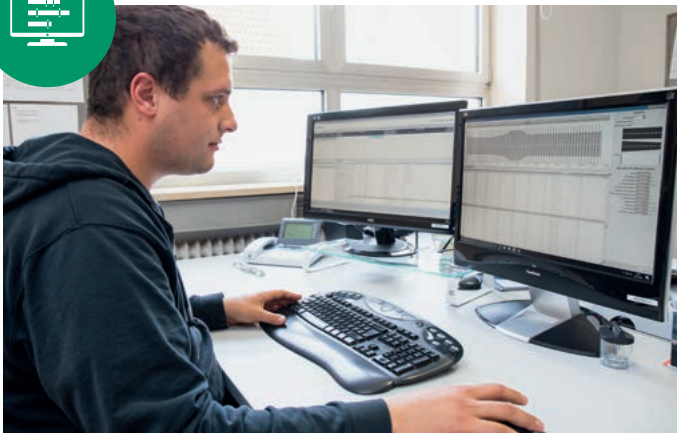
**Thanks to JobSite Client: WITOS Paving can  
be used without a mobile phone network**

The JobSite Client is a new feature of WITOS Paving which will be of great relevance in practical applications. This offline solution guarantees the continued updating of data on the job site, even if mobile phone coverage is patchy. As a result, VÖGELE's process management solution can also be used offline.



# All about WITOS Paving from VÖGELE

## Overview of the five modules of WITOS Paving



### 1. WITOS Paving Control

Planning and control module with assistant function for convenient planning and monitoring of the current construction project



### 2. WITOS Paving Materials

Mixing plant module for supplying the job site with material just in time, on the basis of dynamically cycled delivery



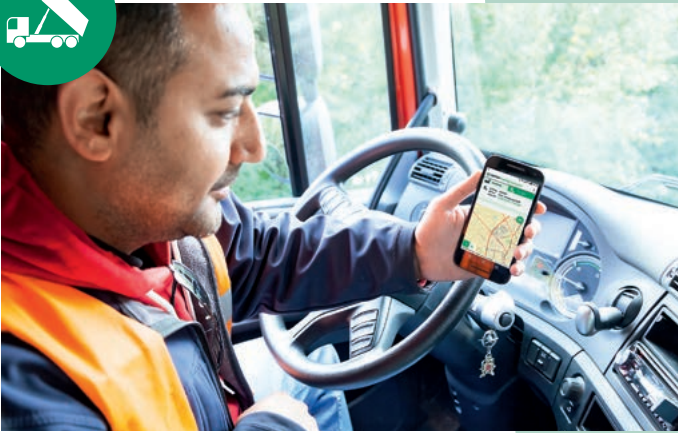
### 4. WITOS Paving JobSite

Job site module for efficient process management throughout the construction period





WITOS Paving is the innovative, IT-based process management solution for enhancing quality and efficiency in road construction. The system from VÖGELE, the global Number 1 for road pavers, is fully integrated into the machine technology, offering customers and users unique benefits. ///



### 3. WITOS Paving Transport

Transport module updating the mix lorries' estimated arrival times on the basis of the current lorry positions



### 5. WITOS Paving Analysis

Analysis module for documentation and analysis of the construction job

### The new functions of WITOS Paving

- › Variable job-site geometries taken into account in the planning to ensure even more precise determination of quantities
- › Lorry cycles adapted to the job-site geometries
- › Geo-fencing around the paver automatically detects incoming and queuing mix lorries
- › Estimated time of arrival of the lorries now also available for the mixing plant
- › Delivery notes registered via QR code for fast, easy acceptance on the job site by scanner
- › HCQ compaction data (recorded by HAMM rollers) integrated into the system
- › The JobSite Client, an offline solution that allows data to be recorded even in areas with no mobile phone coverage
- › WITOS Paving can be operated without the participation of the mixing plant and lorry





# AutoSet


and the paver thinks for itself



Widening of a trans-European motorway: AutoSet Plus, the automatic functions of the SUPER pavers, made it a lot easier for the paving team to move between the many small job-site sections.



# Plus –



**Deployment on the Berlin ring road: on the motorway job site at Potsdam, the AutoSet Plus Paving Programs function helped the paving team to ensure they were always working with the correct machine settings.**





## Berlin // Germany

A construction project with many small, scattered sections: for the paving team from contractor Johann Bunte Bauunternehmung GmbH & Co. KG, the widening of the A10 motorway around Berlin was fraught with challenges. After all, if the work cannot be done all in one go, important machine settings have to be constantly re-entered. That takes time, and is also a potential source of errors. And this is why the motorway job site impressively highlighted the benefits of the AutoSet Plus paving programs: the automatic functions for SUPER pavers ensure paving quality at the press of a button. >>>







### **This is AutoSet Plus**

The innovation for the SUPER pavers of the “Dash 3” generation allows procedures to be automated and make the paving process more efficient – and all at the press of a button on the paver operator’s ErgoPlus 3 console. It is important to distinguish between two basic functions:

#### **1. The Repositioning function**

Automatic repositioning accelerates the resumption of work after the paver has been moved on the job site or when there is a change of work shifts, for instance. Paving-related paver settings are stored for later retrieval.

#### **2. The paving programs**

When paving programs are created, all the settings and paving parameters of relevance for a particular job site are saved. This ensures that the data will be available for comparable projects in the future and can be called up at the press of a button.

**This article explores these AutoSet Plus paving programs.**



## › The construction project: Widening of the main traffic artery towards eastern Europe

At 196km, the A10 motorway – known as the Berlin ring road – is the longest motorway orbiting a European metropolis. A large proportion of the heavy goods and passenger traffic to and from Poland and other eastern European countries uses it to bypass Berlin, and it is additionally used by many commuters. One of the most heavily used sections lies between the Potsdam and Nuthetal junctions southwest of the German capital. It is predicted that the volume of traffic on this 9km stretch will rise from 90,000 to 126,000 vehicles a day by 2025, around a quarter of them lorries, which is why the A10 is being widened to eight lanes over this stretch. Until the project is completed in 2020, traffic around the job site will continue to run on six lanes. The work will proceed as follows: the first phase of the process is the complete removal of the three existing westbound lanes. Next, four new lanes will be built from scratch. The same procedure will then be applied for the eastbound carriageway. The width of the carriageway will increase to 18.5m in each direction.

Strip 1:  
SUPER 2100-3i with Navitronic Plus

Strip 3:  
SUPER 1900-3i scanning on both sides  
with multi-cell sonic sensors ("hot to hot")

### Paving scheme for maximum precision

Many small sections, one identical paving scheme: work began with the paving of one strip, with the other two strips then being laid by two pavers in parallel. The details of the procedure are as follows:

Strip 1: the first strip of the base courses was laid by the SUPER 2100-3i – true to line and level thanks to Navitronic Plus from VÖGELE.

Strips 2 and 3: after repositioning, the SUPER 2100-3i also laid the outer strip with Navitronic Plus, working in a team with the SUPER 1900-3i – in a "hot to hot" process.



## › The challenge: Frequent changes between short sections

The main challenge in the project was that, to ensure adherence to the schedule, the carriageways had to be widened with interruptions, because the bridges and underpasses had to be widened or likewise built from scratch simultaneously with the construction of the road. That meant that the paving team of the contractor Johann Bunte Bauunternehmung GmbH & Co. KG frequently had to move from one strip to the next or between the sections while also paving a variety of mixes – sometimes within the same work shift.

## › The solution: AutoSet Plus paving programs

AutoSet Plus is tailor-made for such jobs. On the job site before the gates of Berlin it not only took a great deal of strain off the Bunte workers, but also played a key role in ensuring quality. AutoSet Plus is easily and intuitively operated from the paver operator's ErgoPlus 3 console. The Paving Programs function enables AutoSet Plus to automate the work processes – not only saving time, but also improving the paving quality. The function was used on the Berlin ring road because it allows all settings and paving parameters to be saved and then retrieved as required. This made the processes on the job site, with its numerous separate sections, significantly more efficient and convenient. »»



Strip 2:  
SUPER 2100-3i with Navitronic Plus  
("hot to hot")

The SUPER 1900-3i used multi-cell sonic sensors from VÖGELE for grade and slope control, as the precisely paved strips on the right and left of this paver could be used as a reference.





**Fully focussed on the paving work: Navitronic Plus, VÖGELE's 3D machine control system, takes care of the steering, while controlling the grade and slope as well as the screed's position.**





**We've delivered  
first-class work on the A10.  
We were greatly helped  
not only by AutoSet Plus,  
but also other cutting-edge  
technology from VÖGELE –  
especially RoadScan and  
Navitronic Plus.**

**Jürgen Schimang, Asphalt Coordinator  
Johann Bunte Bauunternehmung GmbH & Co. KG**

### **3D control with Navitronic Plus, temperature control with RoadScan**

The use of AutoSet Plus was not the only innovative aspect of the paving work, though: to ensure the pavement was true to line and level exactly as specified in the planning data, the SUPER 2100-3i was equipped with Navitronic Plus from VÖGELE. The 3D control system takes over the grade and slope control – automatic control of the grade and crossfall – while also controlling the screed's position. But that's not all: Navitronic Plus handles the steering of VÖGELE tracked pavers as well – a benefit that only VÖGELE offer their customers. To provide a virtual reference, an mmGPS system from TopCon (3D zone laser and GPS) was used on the Berlin ring road. This ensured maximum precision in truth to line and level – likewise automatically. The documentation of the paving results, too, was cutting edge – both SUPER pavers were equipped with the VÖGELE temperature-measurement system, RoadScan. >>>





## Project broken up by construction of new bridges

The construction project was also a typical job for AutoSet Plus: the motorway section is being widened to 18.5m in each direction, but the existing bridges are not configured for this width and likewise have to be replaced and widened. As a result, the job site is split into many different sections of relatively short length over which the entire asphalt package has to be laid. The asphalt package consists of a mortar base on which the asphalt layers comprising base, binder and surface course are placed. For noise abatement purposes, this has to be largely porous asphalt.

## AutoSet Plus eliminates manual input of paving parameters

"Normally we have to set all the paving parameters again every time we reposition the paver," explains Henry Moser, Paving Foreman at Johann Bunte Bauunternehmung GmbH & Co. KG. "The same applies for every new layer if a different mix is to be paved with a different thickness and paving speed." In a construction project such as the widening of the A10, the settings for the 2 VÖGELE SUPER 1900-3i and SUPER 2100-3i pavers would have to be re-entered again and again. "And when there's time pressure as well, it goes without saying that mistakes can arise," Moser adds. "That's why we were glad of the assistance AutoSet Plus provided on the job site."

## Error-free work at just the press of a button

The critical factor on the motorway job site was that each mix for the various asphalt layers had to be paved with identical parameters. To achieve this, both paver operators saved the settings after each layer as a paving program whenever this layer was laid for the first time. This was quick and easy to do, because most of the settings can be taken over automatically by AutoSet Plus.

After laying the asphalt pavement on one of the sections, Bunte transported the 2 VÖGELE Highway Class pavers to the next one – and the operators were able to continue working with identical settings at the press of a button. "That enables us to ensure that every asphalt layer is laid and precompacted in the same way on each section," adds Jürgen Schimang, Asphalt Coordinator at Bunte. "So AutoSet Plus gives a high degree of security: to the paving team, because there is one less potential cause of errors; to us, because we have more process reliability; and to the client, because they can be sure that every metre of every layer is paved identically." >>>





Combination of pavement construction and rehabilitation: VÖGELE pavers are widening the A10 motorway before the gates of Berlin.

### The Berlin ring road (A10) in figures:

- › Complete orbital bypass around Berlin
- › At 196km, the longest motorway ring road in Europe
- › Projected traffic: increase from today's 90,000 to 126,000 vehicles/day by 2025
- › Proportion of heavy goods traffic: 25%
- › The only motorway that already had six-lane sections back when it was part of East Germany
- › Huge importance for national and international traffic to and from Berlin, for commuters from the region and for trans-European heavy goods traffic





Settings entered manually

Mix type:  
asphaltic concrete AC 22

Pave width:  
6m

Type of layer:  
base course

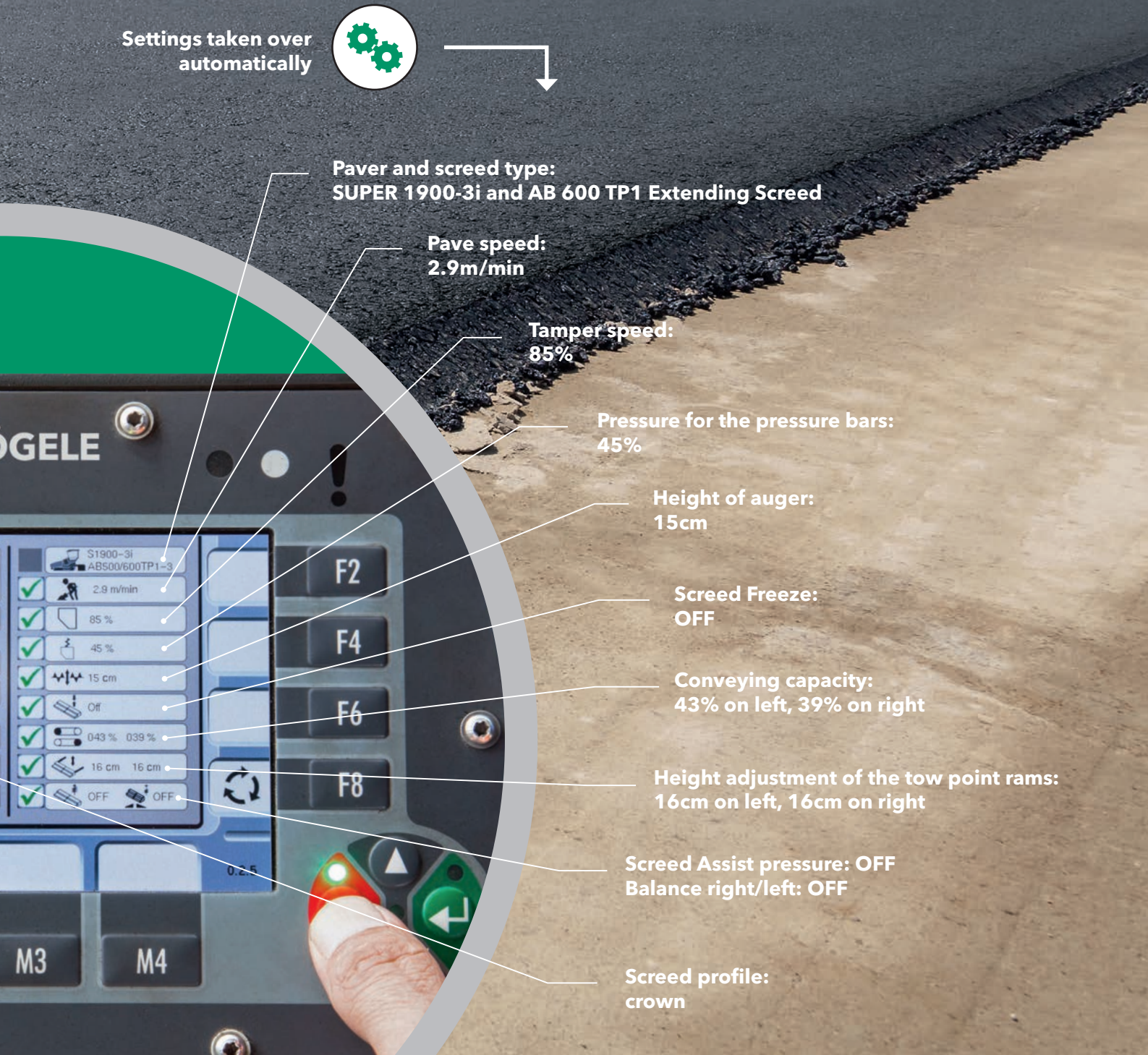
Layer thickness:  
10cm

Tamper stroke:  
4mm



**The actual AutoSet Plus paving programs for the Berlin motorway job site, taking the base course as an example**





Thinking for itself at the press of a button: when the first base course strip had been laid, the Bunte workers saved all the machine settings using AutoSet Plus. To do that, the paving team saved just six parameters manually in the "AC22T-10cm-06m" paving program, because AutoSet Plus automatically took over all the rest of the data from the machine settings. The name of the paving program is generally composed of the parameters entered: in this case "AC" for the type of mix (Asphaltic Concrete), "22" for the maximum grain size in millimetres and "T" for base course (which is *Tragschicht* in German). The "10cm" addition denotes the layer thickness and "6m" the pave width. The large number of parameters stored indicates just how much time can be saved using the AutoSet Plus paving programs: at the start of a work shift or another construction project, the paver operator or paving foreman can select the program from the memory and activate it by pressing a button. The Bunte paving team has also created paving programs for the binder and surface courses - allowing them to increase its productivity further.



## A real bonus on many jobs: The AutoSet Plus paving programs

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### Use:

The AutoSet Plus Paving Programs function allows operators to save detailed paving parameters and retrieve them in the future at the press of a button – either on the same job site or on a different one with comparable paving conditions.

### Saving a paving program:

The user presses the M2 key to go to the AutoSet Plus paving programs menu and the F6 key to go to the menu for saving a new paving program.

All of the relevant parameters from a paving program can be collated and saved. A distinction must be made between six settings that always have to be entered manually, and many others that can be taken over automatically from the machine settings currently selected.

### Settings to be entered manually:

- › Type of layer
- › Type of mix
- › Grain size
- › Pave width
- › Layer thickness
- › Tamper stroke

### Settings taken over automatically:

- › Crown profile
- › Pave speed
- › Tamper speed
- › Pressure for the pressure bars
- › Height adjustment of the auger
- › Screed Freeze or Screed Assist
- › Max. speed of the two conveyors
- › Height adjustment of the tow point rams

Once a name has been entered for the paving program, the user can save the program by pressing the F8 key.

### Retrieving a paving program:

The saved program can be retrieved from the AutoSet Plus program memory and activated at any time.





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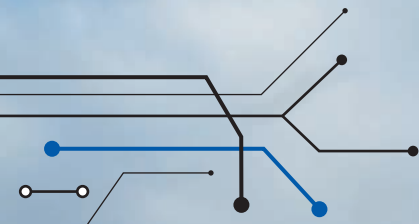
**With  
AutoSet Plus  
the paving  
quality achieved  
on one job can be  
reproduced time  
and again. That's  
because the paver  
and screed settings  
can be saved as a  
paving program.  
Quality assurance  
couldn't get  
any easier.**

**André Felchner,  
Head of Applications Technology  
VÖGELE**

”







The latest generation of KLEEMANN plants incorporate a whole series of innovations. The SPECTIVE control system - a convenient interface to the machine technology - is used to ensure that they remain easy for users to control and meet high requirements in every situation.



Denmark

Copenhagen

Fjenneslev



# Always one step ahead

Machine sets from KLEEMANN are boosting productivity in recycling jobs in Denmark – thanks to automated functions and innovative technologies such as SPECTIVE, the intuitive control system.



## Denmark // Fjenneslev

The Danish recycling market has been experiencing a real boom over recent years. With the services they offer, MIS Recycling A/S are reaping the benefits of this trend: the company has already been actively involved in the processing of residual construction materials for the last 20 years. To meet the huge demand, MIS now operate 10 impact crushing plants from KLEEMANN's advanced MOBIREX series that achieve a high level of productivity. »»



”

**KLEEMANN plants are very flexible and easy to transport, so they can be up and running quickly on frequently changing operation sites.**

”

**Martin Henriksen, Director  
MIS Recycling A/S**



### **Continuous crusher loading thanks to CFS**

The continuous feed system (CFS) makes an essential contribution to the high performance of KLEEMANN plants:

1. Sensors measure the load of the toggle and the rotor.
2. Depending on the load status of the crusher, the conveying frequencies of the vibrating feeder and the prescreen can be regulated independently of one another.
3. Once the crushing chamber is free again following an overload, material transport is resumed without delay.
4. As a result, the plants can quickly resume operation at full output, wear of the components is reduced and the overgrain percentage is minimized.



## Processing 3 million tonnes of residual construction materials a year

In Denmark, MIS are playing a pioneering role with their services. Their business activities include both recycling projects and natural stone processing throughout the country. Each year, the recycling company processes approx. 3 million tonnes of residual construction materials. It is not always worthwhile for smaller recycling service providers to acquire their own crushing plant. This is where MIS comes into play, because the contractor can deploy its machine pool to fit demand. The crushing and screening plants are transported straight to the desired location, remaining on site for one to two weeks, depending on the size of the project. It is important that the machines deployed have a long service life and high capacity, which is why MIS have been relying on KLEEMANN for their screening and crushing plants for many years.

## Investment in cutting-edge MOBIEX EVO2 impact crushing plants

"The high quality and robustness of the plants impressed us as soon as we started using our first MOBIEX 130 mobile crushing plant in 2002," says Martin Henriksen, Director of MIS Recycling A/S. "Since KLEEMANN didn't have a subsidiary in Denmark at that time, however, customer support was not available." When KLEEMANN were integrated into the WIRTGEN GROUP, Denmark finally gained a dedicated customer service and contacts for the mobile crushing and screening plants. When Finn Nielsen, a sales representative of the WIRTGEN GROUP in Denmark, went to MIS in 2009, the two business partners therefore decided to buy the latest MR EVO models. MIS now have 10 MOBIEX MR EVO2 plants and 3 MOBISCREEN screening plants of types MS 12 Z, MS 15 Z and MS 16 D. "The KLEEMANN plants just last longer, are more powerful and deliver a higher quality than other crushing plants we worked with," says Henrik Hvid, Production Manager at MIS. "Service for the plants is also important for us. We can always rely on the team from the WIRTGEN GROUP in Denmark." >>>







**A partnership that pays off: Martin Henriksen, Director of MIS Recycling A/S, Finn Nielsen, Sales Representative of the WIRTGEN GROUP in Denmark and Henrik Hvid, Production Manager at MIS.**

## Easy to handle - Swiftly up and running

The continuous use of the MOBIREX EVO2 impact crushing plants creates synergies: since the MIS operating personnel are very familiar with the plants, they do not need to adjust to different technology from one project to the next. It also simplifies the storage of spare parts. What is more, the two latest MR 130 Zi EVO2 plants are equipped with the new SPECTIVE control system, which is particularly intuitive to use and even automates some machine functions. "It's much easier to use the plants and no explanations are required," says Martin Henriksen. "Our operators can control all machine functions and components very simply from the ground using the touch panel." That makes their day-to-day work not only significantly easier, but also safer and more productive. The operator is also aided by error messages and user help. The flexibility of the plants is crucial for the contractor business. The MOBIREX EVO2 plants with their hydraulically folding hopper walls and side discharge conveyors are ready for operation in just 30 minutes.

## Partnership on an equal footing

One of the most frequent applications is the processing of asphalt. The impact crushing plants crush RAP into grain sizes of 0-6mm and 0-20mm. The final product is returned to the asphalt production cycle. The MOBIREX impact crushers can also be used in the processing of bricks or concrete if required. These materials are frequently reused in roadbase construction. Track ballast and occasionally natural stone are also processed. Amounting to some 100,000t a year, however, natural stone processing accounts for a smaller share. MIS not only work with the latest technology, but also set great store by efficient processes. That is why the company has, for instance, developed its own app to facilitate the recording of operations on job sites throughout the country. "It's important for us always to stay one step ahead - whether in terms of the crushing plants or our project management," says Henrik Hvid. "The benefit of our many years of cooperation with KLEEMANN is that we can propose ideas for options that could make our work even more efficient."





### Latest engine technology ensures security for the future

The next few years are expected to see stricter regulations on the use of screening and crushing plants being implemented in the city centres of Copenhagen, Aarhus and Odense. As it geared up for this development, it was important to MIS that the two new MR 130 Zi EVO2 plants met the exhaust emissions standard Tier 4 final. The Scania engine of the plant is fitted with a diesel particulate filter and a carbamide tank in order to reduce emissions of nitrogen oxides, carbon monoxides and fine dust. The company is thus well equipped to meet the future requirements of the Danish recycling market. >>>

**Important contribution to high capacity utilization: fully automatic crushing gap adjustment**

To adapt crushing plants for a different material or different final grain size, the crushing gap must be changed. In the MOBIREX EVO2 plants, adjustment of the crushing gap is fully hydraulic and can be carried out from ground level via the touch panel – even while the rotor is running. A real bonus for efficiency and productivity.





## Easy control with SPECTIVE

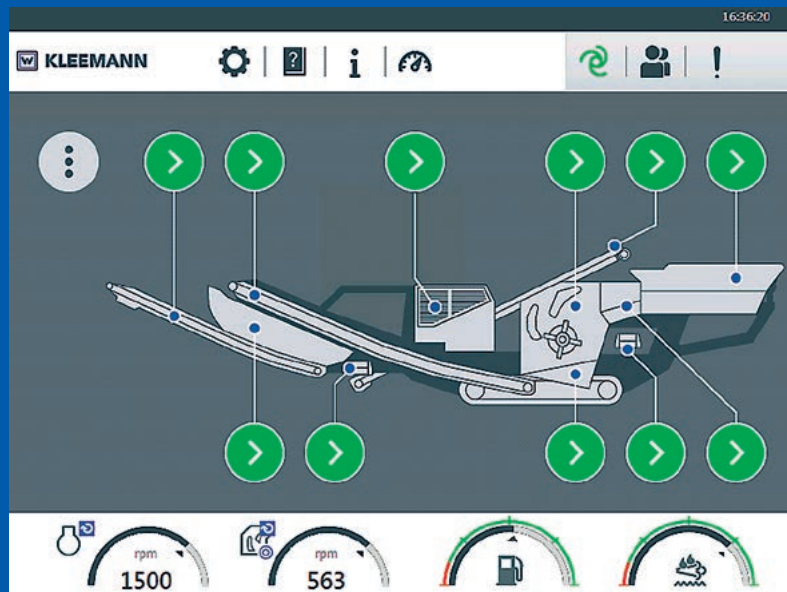
### Step by step to automatic mode

SPECTIVE is the interface between the user and the programmable logic controller (PLC). Starting the plant is particularly easy for the operator, because SPECTIVE takes him step by step through the start process on the 12-inch touch panel. The PLC then initiates the automatic mode. Optimization of the machine utilization is also automated in the plants of the EVO and PRO series. The Continuous Feed System (CFS) enables the crusher feed, the speed of the crusher drive and the stockpile probe to be monitored by the control in order to achieve the best possible plant utilization. The CFS is also capable of learning, enabling it to optimize utilization even more.

KLEEMANN presents a new, intuitive control system for the crushing plants of the PRO and EVO2 series.

The operation of crushing plants is becoming more and more complex due to the increasing requirements placed on modern crushing plants. At the same time, the technology must be reliable and as simple as possible to operate – and without lengthy instruction and familiarization periods. The answer? SPECTIVE. With its new control system, KLEEMANN have taken intuitive operation to a new level.

SPECTIVE provides help even in manual mode. If, for instance, the feeding conveyor of the MCO 11 PRO is still in the transport position and the operator wants to start production, the control reports an error. The operator brings the conveyor into the operating position, so that the plant can start. This troubleshooting aid makes operation easier and prevents operating errors.



**1. The SPECTIVE philosophy: the more comprehensible the structure of a control concept, the more effectively operators are supported in their work.**



**2. Clear symbols indicate at a glance which machine functions can be operated.**

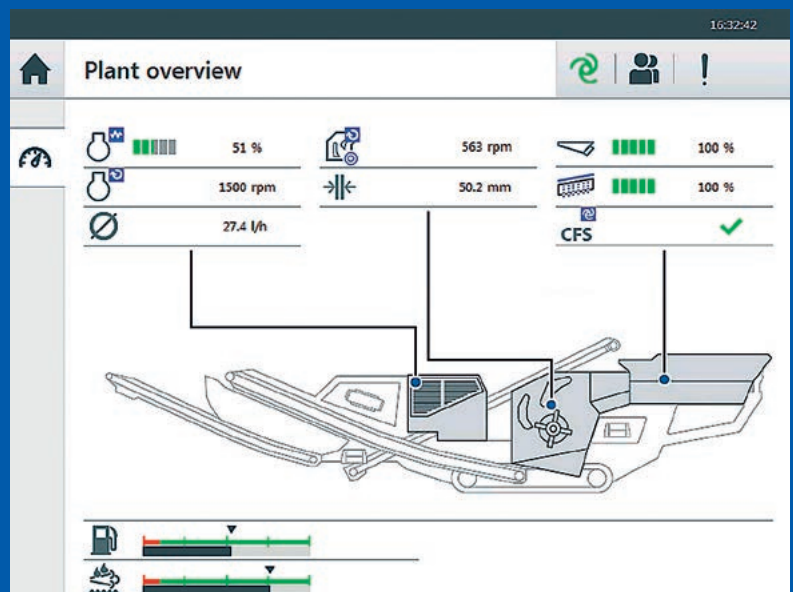


## Clarity accelerates operation

With SPECTIVE, only those functions which are actually required are displayed – a key attribute of the system. With clear symbols all plant functions are recognizable at a glance and can be set and adjusted in a few steps. The operator is guided intuitively through the control system, like on a smartphone. In addition, machine operation data can be retrieved via the touch panel and the diesel and lube oil fill levels, for example, can be viewed in the plant cockpit. This ultimately allows the crushing plant to be operated particularly efficiently. SPECTIVE is available in 28 languages and features as standard on plants of the PRO line as well as the latest impact crushing plants of the MOBIREX EVO2 series. ///

## Here's how easy SPECTIVE is to use:

- › Users are given help in using the touch panel right from the start and guided step by step through the start process.
- › On the start screen, the operator sees the entire plant with the functions that can be set. The operator selects the desired function and is then guided through all steps with clear instructions.
- › In the event of a fault, the display offers an error diagnosis with localization and tips for a solution – minimizing downtimes.
- › The robust 12-inch touch panel can also be used while wearing work gloves and is easy to read even in direct sunlight.



**3. The current production data can be viewed on the information screen at any time.**



# HAMM Oscillation:

**Successful in asphalt  
construction and earthworks  
for the last 35 years**

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Over 35 years ago, HAMM were the first roller manufacturer to introduce a drum with oscillation technology. Today this technology is an integral part of the HAMM product portfolio: one in four new HAMM tandem rollers is equipped with an oscillation drum. One reason behind HAMM's success is their broad range of products, including oscillation rollers in all weight classes and for all markets. The other reasons: with oscillation rollers from HAMM, you can complete high-quality compaction jobs quickly and cost-efficiently, and the range of applications is enormous. >>>





# Oscillation from HAMM – The Video

Watch it now at

[www.hamm.eu/  
oscillation](http://www.hamm.eu/oscillation)





## Oscillation from HAMM

Did you know that...

...HAMM is the pioneer of oscillation?

...HAMM has manufactured over  
7,000 rollers with oscillation?

...today one in four HAMM rollers  
is ordered with oscillation?



Find out more about HAMM oscillation  
in the video – at

**[www.hamm.eu/oszillation](http://www.hamm.eu/oszillation)**





**Product portfolio with over 35 oscillation rollers:**  
apart from tandem rollers from 7-14t, HAMM is the  
only supplier worldwide to also manufacture oscillation  
rollers in the compact class (2.5-4.5t) and soil  
compactors with VIO drum that additionally support  
oscillation compaction.



### **Fast, cost-efficient, high-quality**

Tandem rollers from HAMM with one oscillation and one vibrating roller drum achieve at least the same degree of density as a double vibrating drum roller, but with fewer passes. At the same time, they emit significantly lower levels of vibration to the surrounding area. Another plus: oscillation rollers can begin dynamic compaction right behind the paver. What is more, they can handle the main compaction work. Even when asphalt temperatures are low at the end of the process, oscillation makes it possible to increase the degree of compaction without grain destruction. Overall, the time available for compaction is considerably longer with oscillation than with vibratory rollers.

### **Use in earthworks and asphalt construction**

Oscillation rollers can be used for all layers encountered in earthworks and road construction. In earthworks applications, they are in demand wherever the upper layers need to be reliably prevented from re-loosening, for instance on landscaping jobs. Another important application is compacting surfaces in vibration-sensitive areas, such as above pipelines or in the vicinity of railway tracks. In asphalt construction, oscillation rollers reliably compact all base, binder and surface courses. They are particularly effective in compacting generally hard-to-compact asphalts, such as SMA or polymer-modified material mixes. This is because, in contrast to vibration compaction, the effective direction of the vibrations during oscillation promotes the desired redistribution of long-chain binding agents.

### **Demanding job sites**

Other applications include work on thin layers (surface courses, thin overlay) in vibration-sensitive areas (bridges, confined urban spaces, buildings or parking decks) and anywhere where mix cools quickly (thin overlay, windy or cold environments). The compaction of joints is another important application: here, oscillation rollers compact hot asphalt without damaging the adjacent cold asphalt. >>>

# 35

YEARS





### **HAMM - A pioneer of oscillation**

- › HAMM were the first to introduce oscillation rollers to the market and have since continuously advanced the technology.
- › Today, HAMM have over 30 models equipped with oscillation technology in their range.
- › HAMM are the only manufacturer worldwide to engineer rollers in the compact class and soil compactors with oscillation technology.
- › HAMM offer oscillation rollers that meet different exhaust emissions standards (Tier 3 and Tier 4).

**Rollers with an oscillation and vibrating roller drum compact faster and achieve higher degrees of density than double vibrating drum rollers.**





## Advantages of oscillation

Oscillation has a positive impact on the efficiency and quality of compaction



### Advantage 1: High compaction performance - High efficiency

Oscillation rollers compact very rapidly. Put another way: their compaction performance is extremely high, thanks to the combination of dynamic shear forces and continuous static load resulting from the net weight of the machine. Significantly fewer passes are required as a result, particularly when compacting large surface areas. Therefore, using oscillation is very cost-efficient on many major projects, because thanks to the rapid increase in the degree of density, fewer rollers are required for an optimized process.



### Advantage 2: Easy operation

To generate vibration, HAMM harness the laws of physics in such a way that oscillation rollers are extremely easy to operate. Just switch on the machine and it automatically sets the right amplitude based on the rigidity of the material to be compacted. And it adjusts so quickly that compaction is at the optimal setting at all times, even when the type of ground varies. This way, HAMM also prevent operating errors caused by choosing the wrong settings.



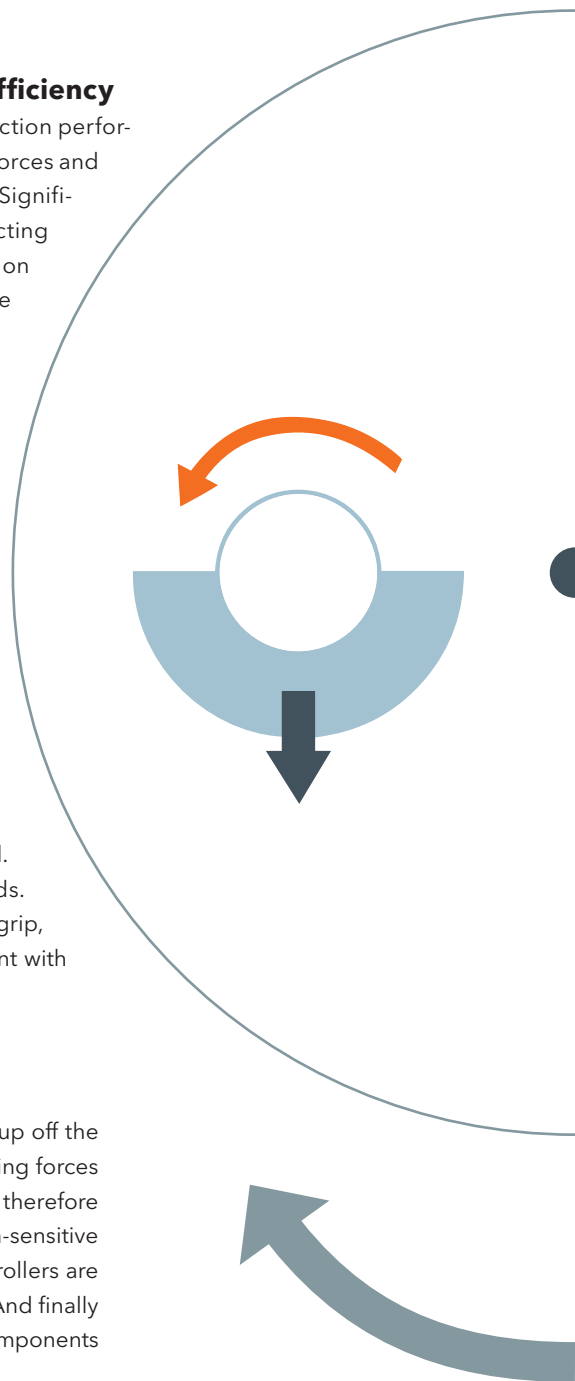
### Advantage 3: Level, non-skid surfaces

Oscillation rollers produce surfaces with outstanding longitudinal evenness, because the drum is in continuous contact with the ground. What is more, no undulations result, even at high operating speeds. Asphalt compaction with oscillation also produces an excellent initial grip, because the drum abrades the bitumen on the surface of the pavement with its oscillating motion.



### Advantage 4: Low vibration load

In comparison with vibration technology, oscillation drums do not rise up off the ground during compaction and therefore only about 15% of the vibrating forces are conducted into the ground around the roller. Oscillation rollers can therefore easily be used for dynamic compaction in the direct vicinity of vibration-sensitive buildings or systems. Because they generate less vibration, oscillation rollers are also considerably quieter and contribute to environmental protection. And finally but importantly, low-vibration compaction is easier on all the machine components and relieves some of the stress on the roller operator.



### The principle of oscillation

With vibration technology, a single eccentric shaft is responsible for the up and down motion of the drum. It hits the ground at high frequency. In contrast, two eccentric shafts rotate synchronously in the oscillation rollers, driven by a toothed belt. The eccentric shafts are mounted at an offset of 180°, which causes the drum to execute a rapidly alternating forward-backward rotation.

This motion conducts the compaction power, in the form of tangential shear forces into the ground towards the front and back. Unlike with vibrating roller drums, the compaction power acts continuously on the ground, because the drum is in continuous contact with it. Oscillation rollers thus compact dynamically but also statically at all times on account of their machine weight.



#### ➡ Advantage 5: Compaction does not damage the paving material

In vibration compaction, above a certain rigidity level, you risk destroying the material structure or destroying the grain. This is not the case with oscillation, which ensures non-destructive redistribution of the grain. In other words, oscillation avoids grain destruction or over-compaction. What is more, oscillation compaction produces dense, durable joints without damaging the cold asphalt.

#### ➡ Advantage 6: Wider temperature window

With oscillation, you widen the temperature window in which compaction is possible, because non-destructive compaction is possible for oscillation rollers even at relatively low temperatures. Oscillation is therefore particularly suitable for compacting thin overlay or on rapidly cooling surfaces, like bridge decks. Furthermore, this characteristic enhances the flexibility of the construction process. >>>



## Clients worldwide are choosing oscillation

Building authorities and private clients know that dynamic compaction with oscillation improves quality in road construction. Not least because oscillation has proven its worth on major construction jobs. The rapid increase in the degree of density optimizes the process and fewer passes are required. It's no wonder then that using rollers with oscillation technology for compaction is an increasingly common requirement when rapid completion, quality and durability are of the essence. ///



**Road construction site in Ithaca, New York:** oscillation is as much in demand in the USA as it is in Europe and Asia.



**Earthworks between railway tracks and historic buildings in Oberwesel, Germany:** just one oscillation roller could deliver the required compaction here without damaging the half-timbered houses or the sensitive railway tracks.



**Constructing the Formula 1 track in Baku, Azerbaijan:** when building this city circuit, a premium-quality asphalt surface had to be produced despite confined conditions as well as underground parking decks and pipelines. Oscillation rollers were therefore mandatory on this job.



**Construction of motorway section on the A61, Germany: oscillation rollers from HAMM achieved a high compacting performance and premium quality results.**



**Construction of the Hong Kong-Zhuhai-Macao bridge in southern China: oscillation rollers dynamically compacted the thin asphalt overlay on the 35km-long bridge. The resultant surface was of outstanding quality, thanks to HAMM technology.**

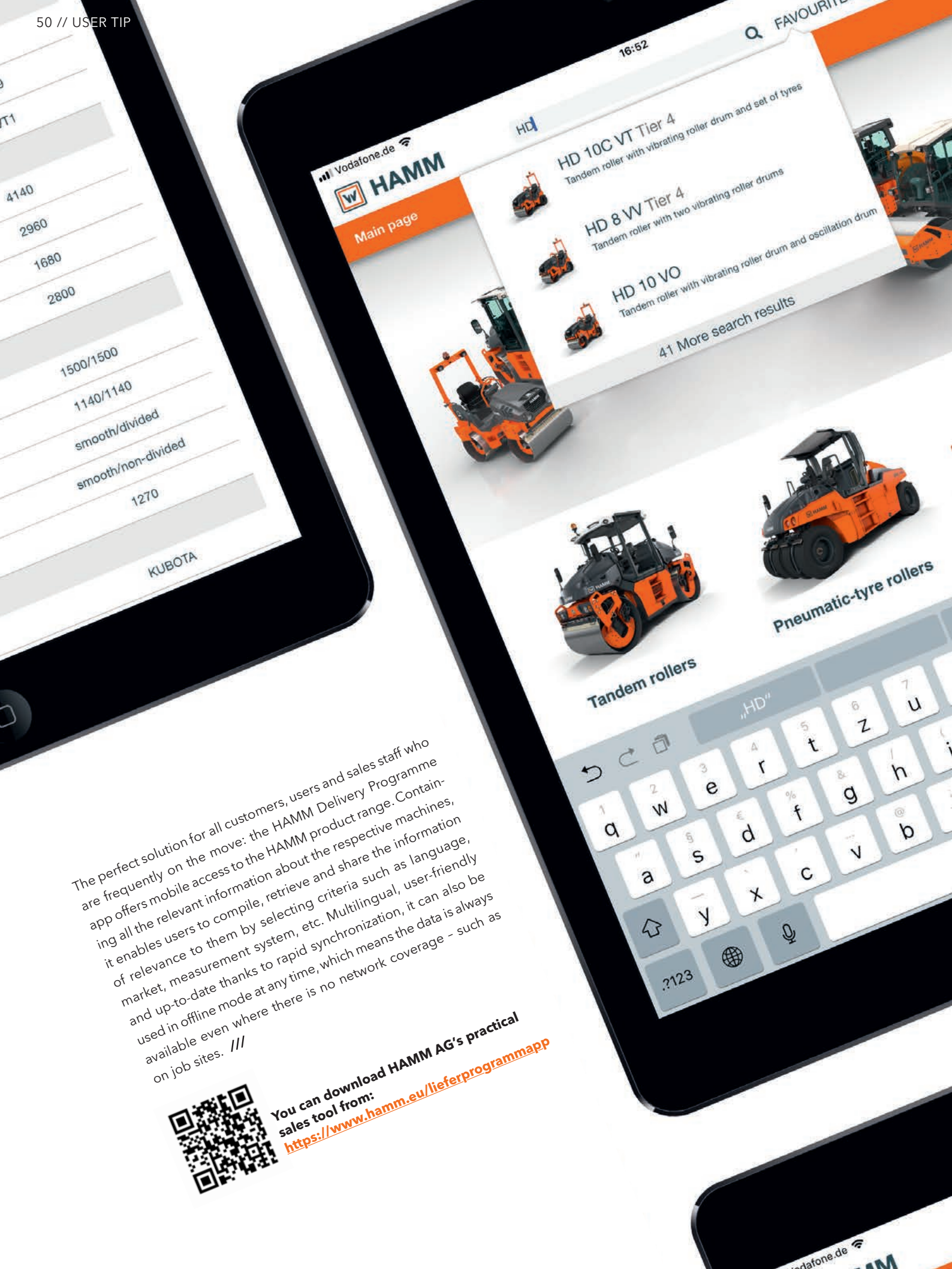


**Compacting the roadbase around existing installations (manhole covers etc.) in a new housing development in Münchberg, Germany: the compact HAMM H 7i VIO compactor is in its element on jobs like this. Thanks to the VIO drum, this compactor can operate with either oscillation or vibration.**



**Rehabilitation work along a railway line in Vienna, Austria: while replacing supply lines, the pavement of a main roadway had to be broken up, fresh asphalt was paved and compacted. Compact oscillation rollers from HAMM were used for this job.**





The perfect solution for all customers, users and sales staff who are frequently on the move: the HAMM Delivery Programme app offers mobile access to the HAMM product range. Containing all the relevant information about the respective machines, it enables users to compile, retrieve and share the information of relevance to them by selecting criteria such as language, market, measurement system, etc. Multilingual, user-friendly and up-to-date thanks to rapid synchronization, it can also be used in offline mode at any time, which means the data is always available even where there is no network coverage – such as on job sites. ///



You can download HAMM AG's practical sales tool from:  
<https://www.hamm.eu/lieferprogrammapp>

# The HAMM Delivery Programme in your pocket

An indispensable tool for compaction professionals: in its Delivery Programme app, HAMM AG offer a practical sales tool that delivers a winning combination of intuitive navigation, faster access and updated data. The mobile application hits the mark with many practical features, is available in commercial app stores (iOS/Android) and has been optimized for both tablets and smartphones.

## The key features at a glance:

### › Open for all languages and markets

The app is available in 31 languages and tailored to the product range of about 200 countries. The language and country are selected via the main menu. Selecting the country simultaneously defines the market, so users are only shown those machines that are actually available in their market.

### › The HAMM product world in quick and easy grasp

Tandem roller, pneumatic-tyre roller or compactor? Starting from the clearly laid out home page, the user navigates successively from the relevant roller type through the series selection to the specific product data sheet for the machine of his choice. All the information is well structured and always presented in a consistent format. The high-quality illustration of the machine is followed by a brief overview of the highlights. This is in turn followed by the configuration options, with a further distinction being made between standard and special equipment. Finally, the technical data such as the weight, dimensions and engine power of the machine are presented. Practical icons help with orientation, and the option to switch the unit of measurement from metric to imperial or vice versa is a handy feature for the Anglo-American user.

### › My Favourites - Always in view

Nothing is lost: the individual product data sheets of the machines can be selected using the Favourites function so that they can be accessed at any time via the Favourites button on the main menu bar.

### › Rapid sharing

The "Share" function allows the selected product data sheets to be shared easily with business partners or colleagues.

### › New data available?

In online mode, the latest data can be accessed at any time. If the app is launched in offline mode, the most recently updated data record is always available.

### › Download now for free

The HAMM Delivery Programme can be obtained free of charge for iOS in the App Store and for Android in the Google Play Store.





## Soil stabilization has the

Soil stabilization is proving to be the optimum solution whenever the properties of soil have to be altered to make it suitable for further roadworks. That was the case in Bloomington/Indiana, USA, for instance, where a WIRTGEN WR 250 soil stabilizer laid a load-bearing base for the construction of a new approach road to Interstate 69.



**High load-bearing capacity  
for the approach road  
to Interstate 69: the WIRTGEN  
WR 250 delivered a top  
performance stabilizing soil  
in Indiana.**



A large, white and grey Wirtgen WR 250 soil stabilizer is shown in operation on a construction site. The machine is equipped with large, heavy-duty tires and a complex mechanical system for mixing and spreading stabilizing agents into the soil. The background shows a clear sky and a distant horizon.

## edge over soil exchange

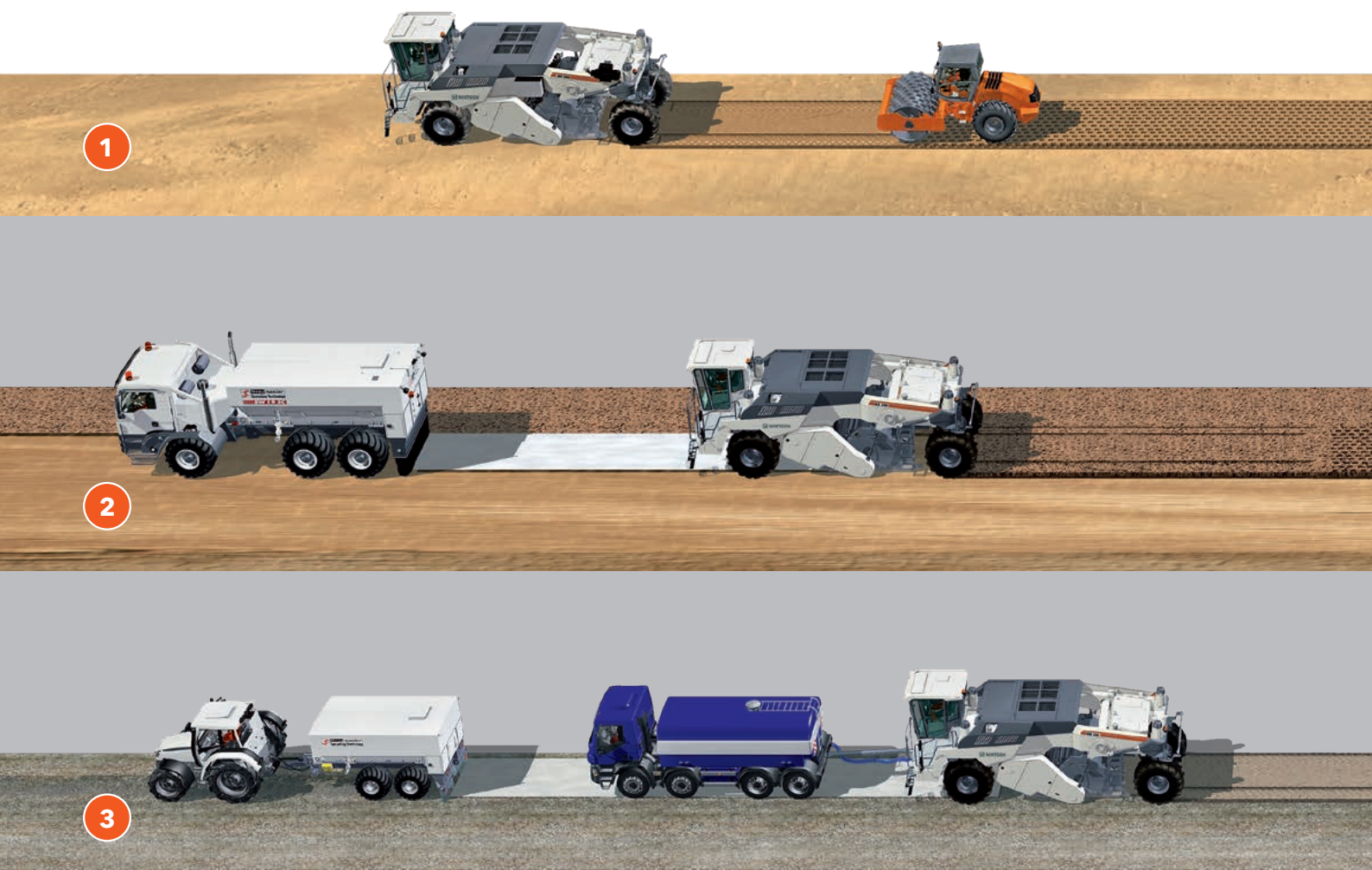


Two interlocking gears, one larger than the other, are positioned in the upper right corner of the page. They are dark grey and have a metallic, industrial appearance.

Soil stabilization is the method of choice when it comes to ensuring the load-bearing capacity and quality of soil in preparation for road construction projects. The targeted addition of stabilizing agents can, for instance, help to reduce the moisture content of soil, which is vital for further roadworks. Compared to the process of exchanging the entire soil, soil stabilization is an economical and resource-saving method. Cost savings result from the simpler job-site logistics, for instance, with fewer lorry trips and shorter construction periods. Resources are also conserved, because all of the existing soil is used in the stabilization process with only stabilizing agents such as lime or cement being added – or a combination of both in the form of a mixed stabilizing agent. >>>



# WIRTGEN technology for soil stabilization: Versatility is key



## 1 Homogenization

In the homogenization process, the powerful milling and mixing rotor of the WIRTGEN soil stabilizer granulates the native soil without the addition of stabilizing agents and loosens it. While a grader profiles the homogeneous soil prepared this way, rollers for soil compaction take care of the compaction process.

## 2 Soil improvement with lime

A machine train is generally required if the properties of the soil are to be lastingly improved. This begins with a binding agent spreader that deposits the stabilizing agent evenly, followed by a WIRTGEN soil stabilizer. The WR 250 uses its milling and mixing rotor to mix the soil homogeneously with the pre-spread lime. A pressurized scraper on the rear milling drum flap ensures that the treated material is smoothed evenly. While a grader profiles the soil mixture, rollers for soil compaction ensure optimum compaction.

Many invitations to tender continue to specify that the soil is to be exchanged – but this is no longer a state-of-the-art method. The WIRTGEN soil stabilizer uses its powerful milling and mixing rotor to mix pre-spread stabilizing agents such as lime or cement into existing soil with insufficient bearing capacity, transforming it into a high-grade building material right on the spot.

The homogeneous mixture of soil and stabilizing agent that is produced offers a high load-bearing capacity as well as lasting resistance to water and frost, and volume stability. Typical applications include the construction of paths, roads, motorways, routes, parks and sports grounds, industrial estates, industrial plants, airfields, dams, back-filling and landfills.



### Different applications: Improving soil, stabilizing soil

In soil stabilization, a distinction is made between improving the soil and stabilizing it. Lime improves the paving properties and compactability of wet, cohesive soil. This is known as soil improvement. If the aim is to stabilize the soil, cement is used because it lastingly enhances the load-bearing capacity, volume stability and resistance to water and frost. Soil can be stabilized or homogenized even without the use of stabilizing agents.

### 3 Soil stabilization with cement

Stabilization with cement creates water-bound base courses. The binding agent is laid by a towed spreader, which is followed by a water tanker. Behind it, the milling and mixing rotor of the WIRTGEN soil stabilizer mixes the soil with the pre-spread cement to form a homogeneous mass. At the same time, water is sprayed into the mixing chamber by means of an injection bar. Here, too, graders profile the treated material and rollers complete the job by ensuring optimum compaction. >>>



**Perfect stabilization: the powerful milling and mixing rotor of the WR 250 blends the pre-spread binder into a homogenous soil and stabilizing agent mix.**



## Case example: Soil stabilization in Bloomington/Indiana, USA

In the soil stabilization project on Interstate 69 south of Indianapolis, the newly embanked earth first had to be stabilized in order to create the necessary load-bearing capacity for the asphalt pavement of the new approach road. The contractor, Specialties Company, LLC, used lime as a stabilizing agent and took advantage of WIRTGEN's applications expertise. Lime immediately reduces the water content in the soil and binder mix. This ultimately improves compactability and increases the load-bearing capacity of the treated soil. "To achieve the optimum outcome, we always liaise closely with the applications professionals from WIRTGEN. They are always on hand to offer their consulting expertise," explains Jamie Cardiff, Equipment Manager at Specialties Company.

### WIRTGEN WR 250 soil stabilizer required

When it came to choosing the machine, too, the Specialties Company's team put their trust in the innovative technologies from WIRTGEN, opting for the WR 250 wheeled soil stabilizer. The 571kW powerhouse also used, among other applications, in cold recycling for granulating asphalt, is the most powerful machine in the WR generation and specially designed for the stabilization of heavy and boggy terrain. With this machine, daily performances of up to 15,000m<sup>2</sup> are far from uncommon in soil stabilization applications. After the lime had been pre-spread, the high engine power and optimum traction of the WR 250 enabled it to effortlessly work



through the heavy and sometimes deep soil. The WR mixed the soil and binding agent homogeneously across the entire working width of 2.4m to a depth of exactly 30cm.

### **Strong performance, easy operation**

"Operating the machine is child's play. The multifunctional joystick on the right armrest, for instance, gives me easy control of all the main basic functions," says Richard Clark, describing the high operating comfort. One of the challenges was the uneven condition of the earth, which varied from very firm to loose. "The milling speeds can be controlled from the operator's cabin, so our machine

operators were able to respond directly to the frequent changes in soil conditions. This ensured a high mixing quality at all times," Cardiff adds. It took just five days to complete the stabilization work and lay the load-bearing base for the new approach road to Interstate 69. Lorries carrying material for paving the asphalt layers began to roll onto the job site only a short while later. ///

**“The WR 250 is a real power pack and works extremely efficiently.”**

Jamie Cardiff, Equipment Manager  
Specialties Company, LLC





Precision right down the line:  
WIRTGEN cold milling machines  
not only create an even base  
for new asphalt pavements that  
is true to cross-section line and  
level. They also contribute to  
the highly economical recycling  
of milled material in asphalt  
mixing plants.



# Milling layers separately, recycling economically

During rehabilitation work near Tokyo, a W 210 large milling machine removed the surface and binder courses on the Jōban Expressway in individual layers. This makes it easier to separate the milled material according to type of mix and reuse it more purposefully. WIRTGEN milling technology makes the entire operation particularly economical.



## Job site details

Rehabilitation of the surface and binder courses of a section of the Jōban Expressway between Mito and Tokyo, Japan

|                    |                              |
|--------------------|------------------------------|
| Area of section:   | 800m <sup>2</sup> (approx. ) |
| Length of section: | 250m (approx. )              |
| Width of section:  | 3.425m                       |

## Working parameters

|  |                   |
|--|-------------------|
| Milling depth – surface course/step 1: | 10cm              |
| Milling depth – binder course/step 2:  | 15cm              |
| Milling speed:                         | 7m/min (approx. ) |

## Equipment

WIRTGEN W 210 cold milling machine





## Japan // Tokyo

The city of Mito is located around 140km north-east of Tokyo and is home to Kairaku-en, a shining example of a perfect landscape garden and one of the most famous of its kind in Japan. Professional maintenance of the garden is essential – and this is also true of roads, which need to be rehabilitated from time to time. For the selective removal of the pavement on the Jōban Expressway, the contractor Unite Co., Ltd. elected to use the latest milling technology from WIRTGEN. In action: the powerful 2-metre front loading W 210 cold milling machine.

## WIRTGEN VCS is an official tender criterion

While traffic continued to flow on one lane, the powerful 500kW large milling machine set to work removing the damaged sections. “Our machine is equipped with the Vacuum Cutting System (VCS),” explains Site Manager Mr Koji Yamada. Five years ago, the VCS vacuum cutting system developed by WIRTGEN was included in the New Technology Information System (NETIS) of the Japanese Ministry of Land, Infrastructure, Traffic and Tourism. Following this move, many tenders for road construction projects have specified that contractors must offer cold milling machines equipped with WIRTGEN VCS technology if their bid is to be successful. »»

### The WIRTGEN Vacuum Cutting System – An overview

During the milling process, fine material particles and water vapour are produced in the milling drum aggregate. The Vacuum Cutting System applies negative pressure to suck the particles and water vapour into the milling machine's short conveyor channel directly at the milling unit, which is additionally sealed. A suction hood located above the conveyor channel draws the particles into two hoses that lead directly to the long conveyor of the loading system.

#### 1. Extraction in the milling drum housing:

**The VCS creates a negative pressure in the milling drum assembly that draws off the mixture of material particles and water vapour/air. The material travels through the hose system and is transported directly onto the loading conveyor.**

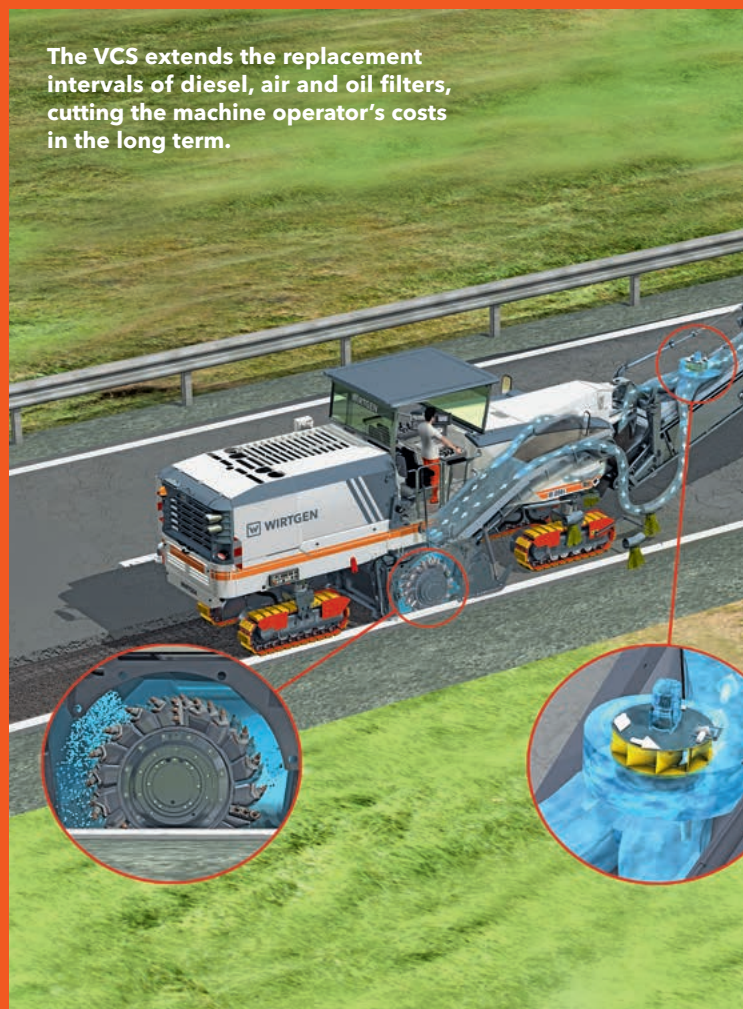
#### 2. Further transport to the discharge conveyor:

**The hydraulically driven centrifugal fan ensures that the material is fed into the long conveyor channel.**

#### 3. Transport onto the lorry:

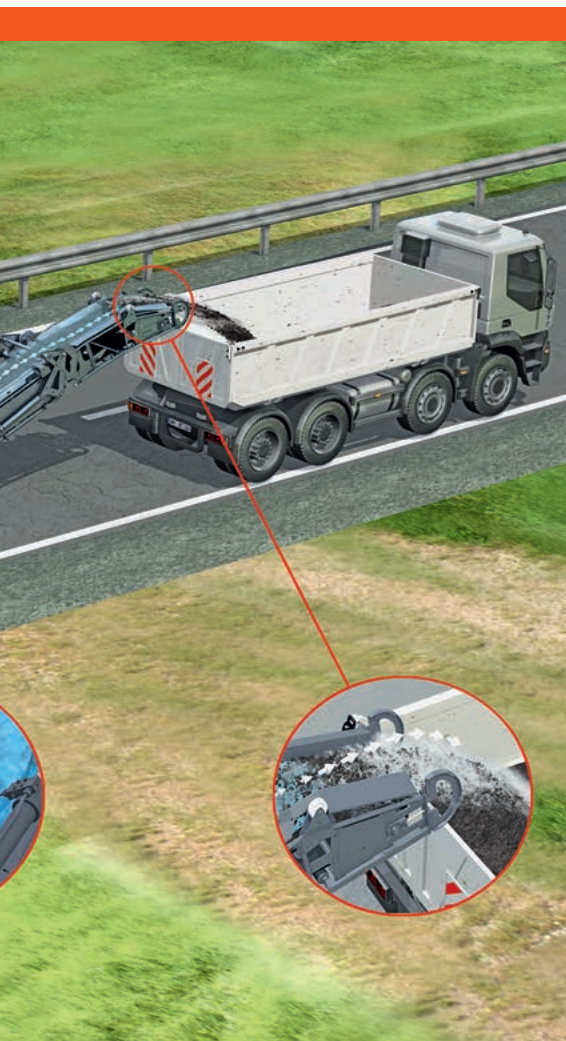
**Together with the milled asphalt, the material is loaded from the long conveyor onto the lorry.**

**The VCS extends the replacement intervals of diesel, air and oil filters, cutting the machine operator's costs in the long term.**



# The WIRTGEN Vacuum Cutting System is a clean solution and ensures the best visibility conditions.

Kazunari Watanabe, Milling Machine Operator  
Unite Co., Ltd.



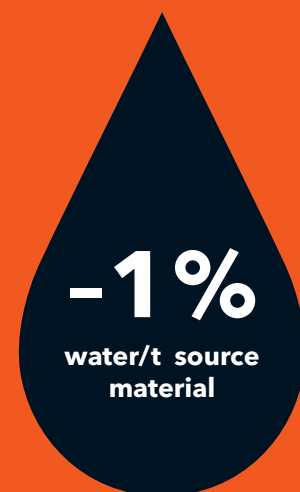


### Intelligent milling: Economically and ecologically worthwhile

To repair cracks in the road pavement, the large milling machine in Mito was equipped with a standard milling drum. After removal of the 10cm-thick surface course, the W 210 cold milling machine milled the binder course to a depth of 15cm in a second pass. Because the different types of mix were separated, it was possible to return both layers to the material cycle for reuse in line with their technical suitability and qualitative characteristics. The selective reclaiming of the material alone delivers clear ecological and economic benefits. When intelligent milling technology is factored in, WIRTGEN cold milling machines not only optimize the overall rehabilitation process, but also the cost-effective reuse of the RAP in the asphalt mixing plant. Load-dependent water sprinkling plays a key role here. The water required for cooling the cutting tools is regulated in accordance with the engine load and milling speed. As the water system is automatically switched on when the milling drum is lowered into working position and automatically switched off when the milling work is stopped, water consumption can be cut considerably. Specifically, up to 20% of the water can be saved. As a result, the service life of the cutting tools is extended, the cold milling machine requires less frequent refills and the downtimes are shorter. In addition - and this is decisive for materials processing - the residual moisture of the milled material is only 3-4% per tonne. If WIRTGEN milling technology is not employed, the residual moisture is generally 5%.

### Less water = Less heating oil

When producing new asphalt, a simple equation applies to the drying process in the asphalt mixing plant: 1% drier source material saves 1 litre of heating oil in the production of 1t of asphalt. On top of this comes a reduction in CO<sub>2</sub> emissions due to the lower energy requirements. When processing the milled material on the Jōban Expressway, a total of some 400 litres of heating oil were saved - and in just two hours, as this was how fast Unite Co., Ltd. selectively and precisely removed the surface and binder courses with the powerful W 210. Site Manager Mr Koji Yamada says: "The quality of the milled surface is flawless thanks to the Level Pro levelling system - it's the perfect base for paving and compacting the new asphalt." ///







### Precise milling boosts cost-efficiency of recycling

The up to 20% lower water consumption with WIRTGEN milling machines increases energy efficiency, as the following applies: –1% water in the source material = –1 litre heating oil per tonne of asphalt during further processing into recycled mix, e.g. in BENNINGHOVEN asphalt mixing plants (see page 64).

For the Jöban Expressway site, this means:

800m<sup>2</sup> area  
x 0.25m milling depth

200m<sup>3</sup> volume of RAP  
x 2.47t/m<sup>3</sup> density by volume of  
granulated RAP

**= 200m<sup>3</sup> reclaimed asphalt**

**= ~500 litres heating oil**



**Result:** The potential quantity of heating oil that can be saved in the mixing plant as a result of using the WIRTGEN cold milling machine is around 500 litres.



# Sustainability

Investment in cutting-edge technology from BENNINGHOVEN: the new BA RPP 4000 asphalt mixing plant operated by the Max Bögl Group at its Sengenthal site is the backbone for many road construction sites in the Nuremberg region. The most important innovation is a hot gas generator with a counterflow parallel drum system that supports RAP material rates of 90 + X% - with minimal emissions. The plant had already met with an enthusiastic response from professionals of the industry at bauma 2016.

**The BA RPP 4000 meets all requirements for operating with maximum sustainability.**





in a whole  
new dimension

### Germany // Sengenthal (Bavaria)

Ready for the asphalt production of the future: the new BA RPP 4000 operated by the Max Bögl Group is something special. Located in Sengenthal, the plant supplies some 2,000t of hot mix to job sites across the region every single day. Depending on the formula, about 1,800t of the mixes can consist of RAP. That is because the recycling innovation from BENNINGHOVEN, the counterflow parallel drum system with hot gas generator, can work with RAP material rates of 90 + X %. The unique technology also delivers a massive reduction in emissions, making investment in this green and efficient technology particularly sustainable and forward-looking. After all, in industrialized nations such as Germany it has long been the case that far more miles of road are rehabilitated than built from new – which also means that millions of tonnes of asphalt are removed. This task is largely handled by cold milling machines, which at their peak can load up to 3,000t of milled material onto lorries in a single shift. The residual waste from such operations has long posed a challenge for road construction contractors. »»





## Reclaimed asphalt pavement - A valuable resource

The recycling technologies of BENNINGHOVEN transform RAP - in the form of aggregate in a variety of grain sizes and the binder bitumen - into "black gold". In many countries, almost every lorry delivering material to a job site carries a proportion of recycled asphalt. This is evident from the fact that out of a total of 40 million t each year, 12 million t of recycled asphalt are now being laid by road pavers - and that's just in Germany. Across the world, too, RAP is increasingly being discovered as a resource. In response to this trend, BENNINGHOVEN have developed the counterflow

parallel drum system with hot gas generator to market-maturity. "The main advantage of the technology is that it combines sustainability and efficiency to profitable effect," says Markus Bühl, Consulting and Sales, of the WIRTGEN GROUP sales and service company in Augsburg. This was one of the clinchers for Max Bögl, prompting the company to invest in a completely new plant rather than modernize the existing one.





**Impressive dimensions: the mixed material storage silo has a capacity of 418t in six compartments and offers additional direct loading with 18t.**



### Plant details

Commissioning of a new BENNINGHOVEN BA RPP 4000 asphalt mixing plant in Sengenthal, Germany

### Working parameters

|                                 |  |
|---------------------------------|--|
| Mixer capacity:                 | 4t   |
| Number of feed hoppers:         | 8-fold cold feed system, 12m³ each and 2 RAP cold feed hoppers, 15m³ each        |
| Rotary dryer burner:            | EVO JET 4-3 FU K-Öl "Z" combination burner for coal dust and oil delivering 19MW |
| Parallel recycling drum burner: | EVO JET 3 FU K-Öl "Z" combination burner for coal dust and oil delivering 16.6MW |
| Capacity:                       |  |
| Hot bin section:                | 7 bins with a total capacity of approx. 285t                                     |
| Bitumen supply:                 | 5 tanks, 80m³ each   |
| Mixed material storage silo:    | 418t in 6 compartments + 18t direct loading                                      |

### Technologies

Hot feed system: counterflow parallel drum system with hot gas generator for RAP material rates of 90 + X%

Cold feed system: multivariable feed hopper for RAP material rates of 40%

### Second recycling technology creates flexibility

The BA RPP 4000 comes with a second recycling technology as well - the multivariable cold feed system, which allows up to 40% RAP to be fed cold into the production process. This means that even small mix quantities from 2t can be produced, giving mixing plant supervisors great flexibility. Thanks to the high-performance plant, Max Bögl will immediately be able to supply a wide range of different road construction sites in the Nuremberg area with mix from Sengenthal - using its own fleet of temperature-controlled lorries. ///

### BENNINGHOVEN counterflow parallel drum system with hot gas generator

The cutting-edge technology stands for the highest rate of RAP in asphalt recycling worldwide. The recycling material is heated to the optimum asphalt processing temperature of 160°C in a parallel drum - in counterflow, as with aggregate obtained from quarries. Unlike in conventional asphalt production, the burner heats the RAP indirectly, i.e. with hot gases, to ensure that the bitumen contained in the asphalt does not burn while keeping emission levels within the normal range.



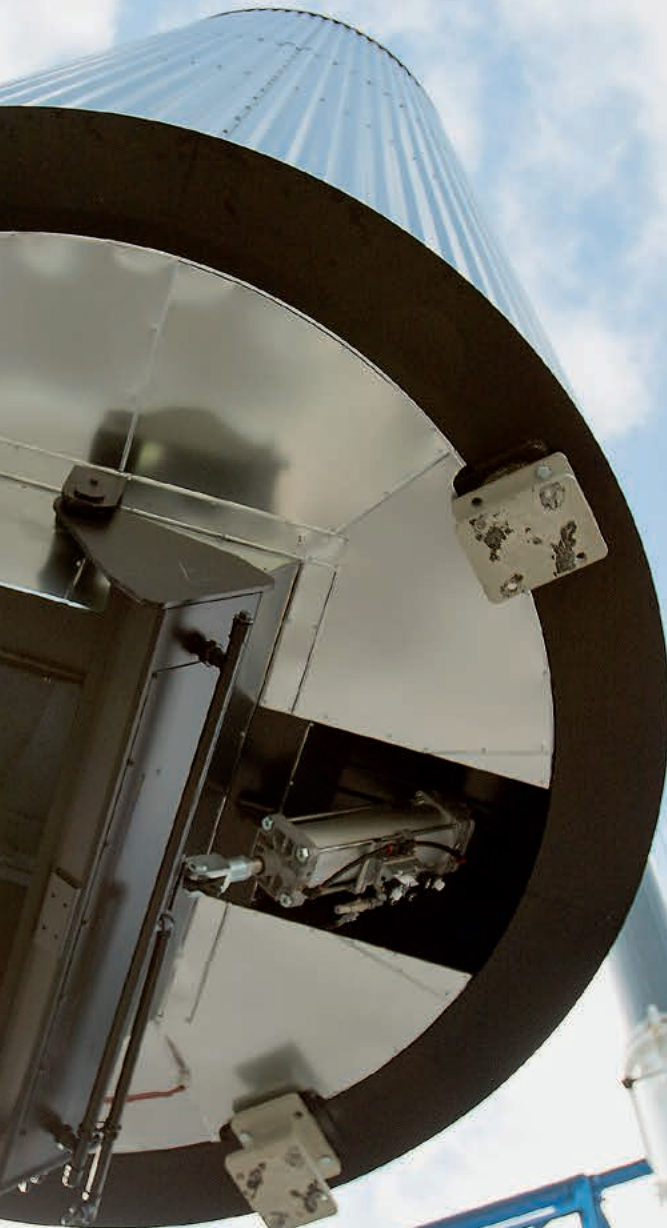
# The 800t buffer

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A retrofit solution delivers maximum flexibility:  
in Luxembourg, contractor Cajot are investing in the  
biggest mixed material storage silo BENNINGHOVEN  
have ever built.

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### **Luxembourg // Leudelange**

In 2017, Luxembourg-based contractor Julien Cajot S.e.c.s. invested a huge sum in the expansion of their BENNINGHOVEN mixing plant in Leudelange, close to the capital. One of the key elements of the project was the construction of a large long-term storage silo with a capacity of 800t of mix that can hold up to eight different types of asphalt. It was complemented by an entirely new cold feed system comprising 12 covered hoppers, each holding around 5,000t of aggregate and an underfloor extractor that transfers the material to the mixing plant. For both projects, Cajot relied on the know-how and support of BENNINGHOVEN. »»



**Innovation underground: Marco Claus, Managing Director of Cajot, and Achim Keller, Sales Manager of the WIRTGEN GROUP, on a tour of the 200m-long subterranean conveyor system.**



### **BA 3000 delivers 400t/h with its huge silo**

Cajot have been operating a BENNINGHOVEN mixing plant of type BA 3000 with a mixing capacity of up to 240t/h in Leudelange since 2005. At this location, the company produces asphalt for roads of all categories, car parks, industrial estates, private premises and airports. The plant previously had one silo with a storage capacity of 300t of mix. That was no longer sufficient for Cajot, because "it's not uncommon for us to get orders for volumes of 3,000-4,000t a day. The new silo now gives us a larger buffer for delivering 400t per hour all day long," explains Managing Director Marco Claus. To ensure that its 15-strong team could produce and supply the various mixes economically, Cajot had the mixed material storage silo designed and built by BENNINGHOVEN. Although no reference

project had ever been implemented on this scale, that did not faze either Cajot or BENNINGHOVEN. Cajot can now produce mix in advance and store it in eight 100t bins from which four lorries can be loaded simultaneously. "That gives us greater latitude in planning and ensures greater process reliability in large construction projects," says Sales Manager Achim Keller from the sales and service company of the WIRTGEN GROUP in Windhagen, Germany, pinpointing two key benefits.

### **Project completed by the desired date**

Despite its unprecedented scale, the project was executed at an impressive speed: BENNINGHOVEN were delivering the first components to Leudelange just six months after signing the contract. The deadline more or less emerged on its own,



since Luxembourg has construction holidays: four weeks in the summer when nothing is built anywhere in the country, and no asphalt is produced either. "Everyone had this period and hence the completion date in mind at all times," explains Marco Claus, adding: "Our team, just like the people at BENNINGHOVEN, played their part in achieving the installation and commissioning on schedule. It meant the plant was ready to start on time. And not only that: the professional work put in by BENNINGHOVEN ensured that no real problems arose during the planning, construction and assembly either." He is also delighted that "everyone involved pulled together. That was essential, because a project of this magnitude can only be successful if people cooperate and everyone shows a little bit of flexibility." ///

“

**Thanks to  
the perfect  
insulation  
of the silos,  
Cajot can  
produce  
the material  
up to  
48 hours in  
advance.**

**Achim Keller, Sales Manager  
at the sales and service company  
WIRTGEN Windhagen**

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An aerial photograph looking down the Avenue de la Grande-Armée in Paris. The wide, multi-lane road is flanked by dense rows of mature green trees. Numerous cars and a few buses are visible traveling along the road. On either side of the trees are multi-story buildings with classic Parisian architecture, including mansard roofs and ornate facades. In the far distance, the modern glass skyscrapers of the La Défense business district are visible against a clear sky. The Arc de Triomphe is partially visible at the very top of the frame, from which this view is taken.

**View from the Arc de Triomphe towards the Grande Arche:  
the magnificent Avenue de la Grande-Armée in Paris.**