The WIRTGEN GROUP User Magazine | № 08

RoadNews

08

Bauma innovations like the W 210 Fi are getting to work:

Intelligent technology, successful operations

WIRTGEN / VÖGELE / HAMM / KLEEMANN / BENNINGHOVEN

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Editorial

Ideas pay off

At Bauma 2019, we unveiled numerous innovative technologies that make a big promise, namely of being intelligent. The ways in which this improves day-to-day operations were demonstrated impressively by the new generation of W 210 Fi large milling machines from WIRTGEN. On a job in northern Italy, the Mill Assist system provided invaluable support: in just two moves, the milling machine operator was able to set the most efficient balance between milling output and operating costs.

And a host of other innovations have been earning their credentials in the field, too. Take for instance WITOS Paving Plus from VÖGELE, a fully integrated, software-based overall system for process optimization and documentation that already meets the official requirements of the future for digitalization in road construction. HAMM, in a similar move, has enhanced its HCQ Navigator for dynamic compaction control to create the WITOS HCQ telematics solution – likewise taking another step towards the "digital job site".

Meanwhile, the different types of plants from KLEEMANN and BENNINGHOVEN have celebrated successful premieres: a KLEEMANN plant combination became the first equipment ever to deliver white mineral for the construction of 154km of motorway in Vietnam. In Moscow, an asphalt manufacturer has nothing but praise for the excellent handling of its new TBA mixing plant from BENNINGHOVEN.

We hope you enjoy this eighth edition of RoadNews!

Best wishes from

Frank Betzelt
Senior Vice President – Sales, Marketing,
Customer Support WIRTGEN GROUP

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The professional machine with the strongest milling performance demonstrates its full potential on the A31 motorway in northern Italy.

Italy | **Vicenza**

High quality at low cost and a reliable assistant to hand – for milling machine operators, WIRTGEN's new large milling machines are the ultimate in road rehabilitation.

W 210 Fi large milling machine from WIRTGEN:

Master of efficiency


4 cm
surface course
18 cm
asphalt binder course
and asphalt base course

Milling layers separately

A total of three W 210 Fi machines demonstrated the added value of their technological innovations during rehabilitation of the A31 motorway, which connects the A4 Milan-Venice motorway with the Alps. The task on a 1.4km section in the province of Vicenza was to mill the pavement off to a depth of 22cm near the Thiene exit. The lower base course was then stabilized with cement by a WIRTGEN WR 250 recycler and soil stabilizer over an area of roughly 15,000m² and subsequently compacted by HAMM rollers.

VÖGELE pavers then laid the asphalt. To separate the milled material according to the types of mix, the large milling machines first removed the surface course to a depth of 4cm, and then milled the 18cm-thick asphalt binder course and asphalt base course in a second pass. This allowed systematic reintroduction of the separate layers into the material cycle.

Strong performance

The cold milling machines drove in staggered formation to continuously "feed" a rapid succession of 45 dump trucks with milled material.

The new generation of machines impressed even such experienced milling machine operators as Valentino Pivotto, who works for milling service provider Crestani, "And not just because it was the first job following training on the machine."

It was the first time in many years that the operator had driven a WIRTGEN milling machine again. "The leap forward made by the W 210 Fi in terms of control, performance and productivity was therefore enormous. Not to mention the DUAL SHIFT, which makes this machine a real benchmark in its field."

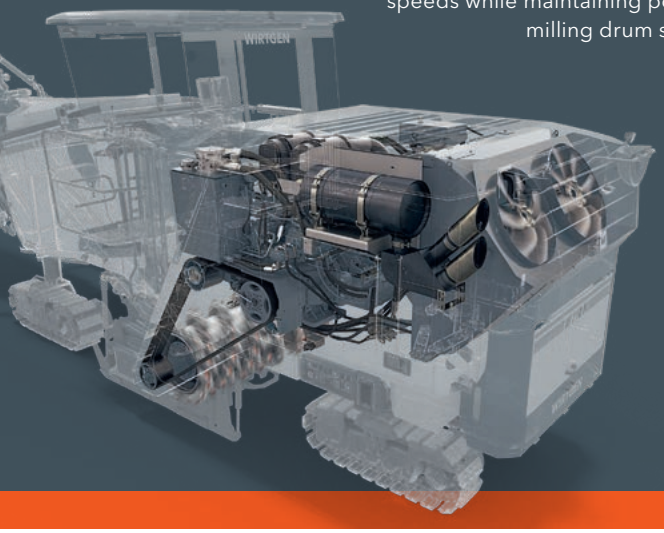
The new LEVEL PRO *ACTIVE* levelling system ensured consistently precise results.

Two-speed DUAL SHIFT powershift transmission for the W 210 Fi professional machine

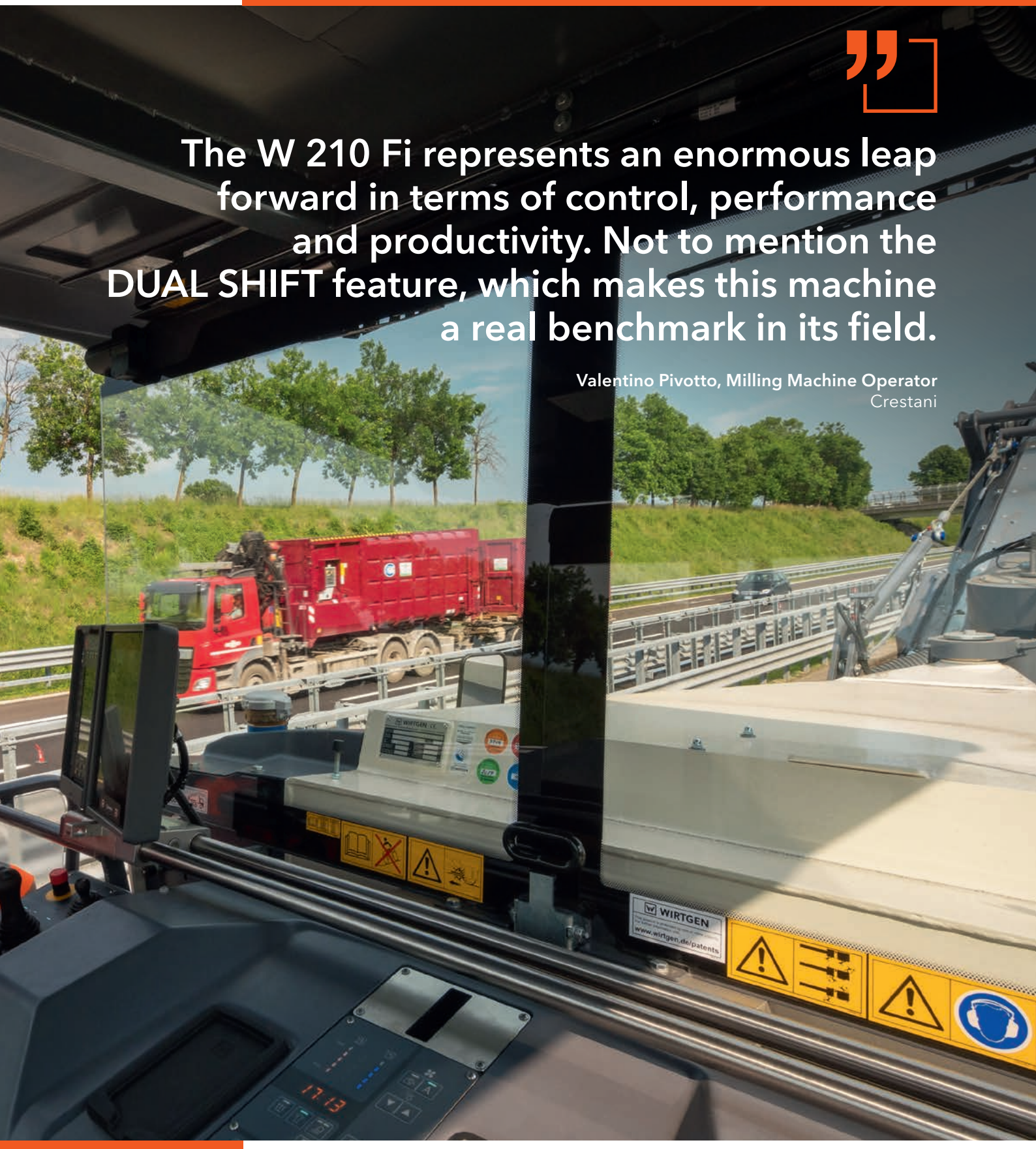
Thanks to the new two-speed powershift transmission, which is automatically controlled by Mill Assist, a much larger range of milling drum speeds is now also available. The diesel engine also features a modern engine rating with a high torque starting at 1,300rpm. This lowers diesel consumption and noise emissions.

The intelligent control of the two-speed powershift transmission combined with the diesel engine extends the range of milling drum speeds, both upwards and downwards. This supports significant reductions in fuel consumption and cutting tool wear in the low milling drum speed range.

A high-quality milling pattern can be achieved in the upper milling drum speed range, even when working with a high area output. This makes the W 210 Fi professional machine ideal for particularly demanding milling jobs.



Automatic fuel-efficient operation: the new two-speed DUAL SHIFT powershift transmission ensures efficient engine speeds while maintaining powerful milling drum speeds.



> The W 210 Fi represents an enormous leap forward in terms of control, performance and productivity. Not to mention the DUAL SHIFT feature, which makes this machine a real benchmark in its field.
>
> **Valentino Pivotto, Milling Machine Operator**
> Crestani

High efficiency

Gabriele Martin, milling machine operator at Ecovie, explains that milling is much more efficient with the professional machine: "It is definitely different from other cold milling machines. Especially when it comes to fuel consumption, which has really been reduced without performance losses. Another interesting feature is the WPT system, which provides a wealth of data". This is true in two respects.

The WIRTGEN Performance Tracker (WPT) now makes it possible for the first time to precisely determine the milling work actually performed and "eliminate all uncertainties about the project parameters".

The machine's performance and consumption data are also extremely valuable to Martin. "I can send all this data directly from the machine, which means we immediately receive a comparison of costs and productivity. This makes job-site cost analysis much easier."

At the same time, efficiency analyses are also a valuable decision-making basis for future orders. The machine operator then knows which milling machine is the most efficient solution for the respective job.

45

dump trucks were "fed" in rapid succession by 5 WIRTGEN large milling machines.

Easy operation

The three milling service providers had opted to primarily use three W 210 Fi machines for the rehabilitation of the A31 motorway. "This machine allows the operator to concentrate more effectively on the work, thanks to the excellent visibility and the new control and data acquisition systems," says Massimo Valerio, pointing out the control panel of the new large milling machines.

Thanks to the newly designed operating concept, the Girardini operator not only has a clear overview of all the most important data on the milling process and the milling machine condition on a central seven-inch control panel; the operating convenience is also enhanced by control panels for levelling or for controlling the discharge conveyor. "At the end of the day, the operator's platform really makes all the difference," says Valerio, who is relieved of many tasks by the new Mill Assist control system.

The WPT system is also an interesting feature. It eliminates all uncertainties about the project parameters.

Gabriele Martin, Milling Machine Operator
Ecovie

Informative WPT –
WIRTGEN Performance Tracker

- Tried-and-tested WITOS FleetView telematics system with optional WPT feature
- Clear documentation of milling performance
- Automatically-generated measurement reports
- Assignment to site by means of satellite map display
- Direct display of actual milling width

WPT

Simply more efficient: even optimization options are communicated to the operators, for example whenever milling in two passes would be more economical than in one.

Mill Assist helps me enormously.

Massimo Valerio, Milling Machine Operator
Girardini

60

signals are continually processed by the new Mill Assist system and converted into a wide variety of settings.

Reliable assistant

To operate the machine at the optimum operating point, he and his colleagues previously had to set a large number of machine parameters, such as the diesel engine and milling drum speed, the milling speed or the quantity of water required to cool the cutting tools, relying only on their intuition and experience. This was a highly challenging task considering the complexity involved.

Varying conditions, such as different degrees of pavement material hardness, also required frequent manual adjustments.

Quality, performance and cost-effectiveness – fully automatically

This is where Mill Assist comes in. It continuously processes more than 60 signals to simulate many different setting variations and combinations in real time using complex algorithms and formulas.

In automatic mode, Mill Assist always strikes the optimum balance between milling performance and operating costs. This not only improves machine performance, but also reduces diesel, water and cutting tool consumption as well as CO_2 emissions.

Massimo Valerio was also immediately struck by the "lower noise emissions and vibrations when milling 10, 15 or even 18cm, as we are doing here" – Milling 4.0 on the A31.

For optimum versatility:
Mill Assist machine control system with three working modes

In addition to automatic operation, the milling machine operator also has the option of selecting one of three work strategies depending on the requirements:

- **"Performance-optimized" working mode:** this is the mode of choice whenever the asphalt layer needs to be removed at high speed due to time pressure.
- **"Cost-optimized" working mode:** on concrete job sites, on the other hand, the hardness of the material is the main challenge. Here the degree of wear must be closely monitored to minimize costs. The "cost-optimized" working strategy would be an option in this case.
- **"Milling pattern quality" working mode:** to produce a particularly fine surface, the operator selects "Milling pattern quality" mode.

Mill Assist

Indonesia | **Yogyakarta International Airport**

The first plane to land at the new Yogyakarta International Airport (YIA) on the Indonesian island of Java was an A320 from Jakarta. Playing a key role in the airport construction: 11 WIRTGEN slipform pavers.

Once the YIA project has been completed, up to 20 million passengers will be able take off and land there each year. With a current terminal area of 130,000m², the new airport is set to replace Adisutjipto Airport, which is struggling with capacity issues.

Construction of Yogyakarta International Airport in Indonesia:

Asia's most efficient ground crew

Airport construction specialists

WIRTGEN is the ideal technology and quality partner for airport construction, whatever the specifications or location involved. A seamless product portfolio, the know-how of experienced applications experts and a reliable service throughout the world are key in this respect.

Boasting a wide variety of applications, slipform pavers can tackle highly diverse requirements on the job site – anywhere in the world. For instance, they can easily produce concrete surfaces with a high degree of precision without using the fixed steel moulds so often employed at airports.

Quality across all series

The tight schedule was a particular challenge of the large-scale project in Yogyakarta. Reliable one-stop solutions were required if the concrete strips were to be completed on time. And this is precisely what the WIRTGEN GROUP sales and service company in Singapore promptly delivered, working in collaboration with the Indonesian WIRTGEN GROUP dealer PT Gaya Makmur Tractors. This solution included the large fleet of machines required, but also technical support and on-site applications advice.

A team of 4 type SP 64, 6 type SP 500 and 1 type SP 84i machines formed the final line-up for the precise and economical paving of the 3,250m-long, 45m-wide runway, its taxiways and the apron.

Paving 50cm thick

The 50cm-thick concrete layer was paved across a width of 2, 5 or 6m, depending on the area involved. During the process, dowels, which were prepositioned on reinforcement cages spaced at transverse intervals of 30cm, and a wire grid were integrated in the concrete as additional reinforcements. "The quality of the concrete surfaces is excellent," says Andek Prabowo, managing director of PT PP Presisi Tbk Group of PT PP (Persero) Tbk. The machines also excelled across the board in terms of their performance.

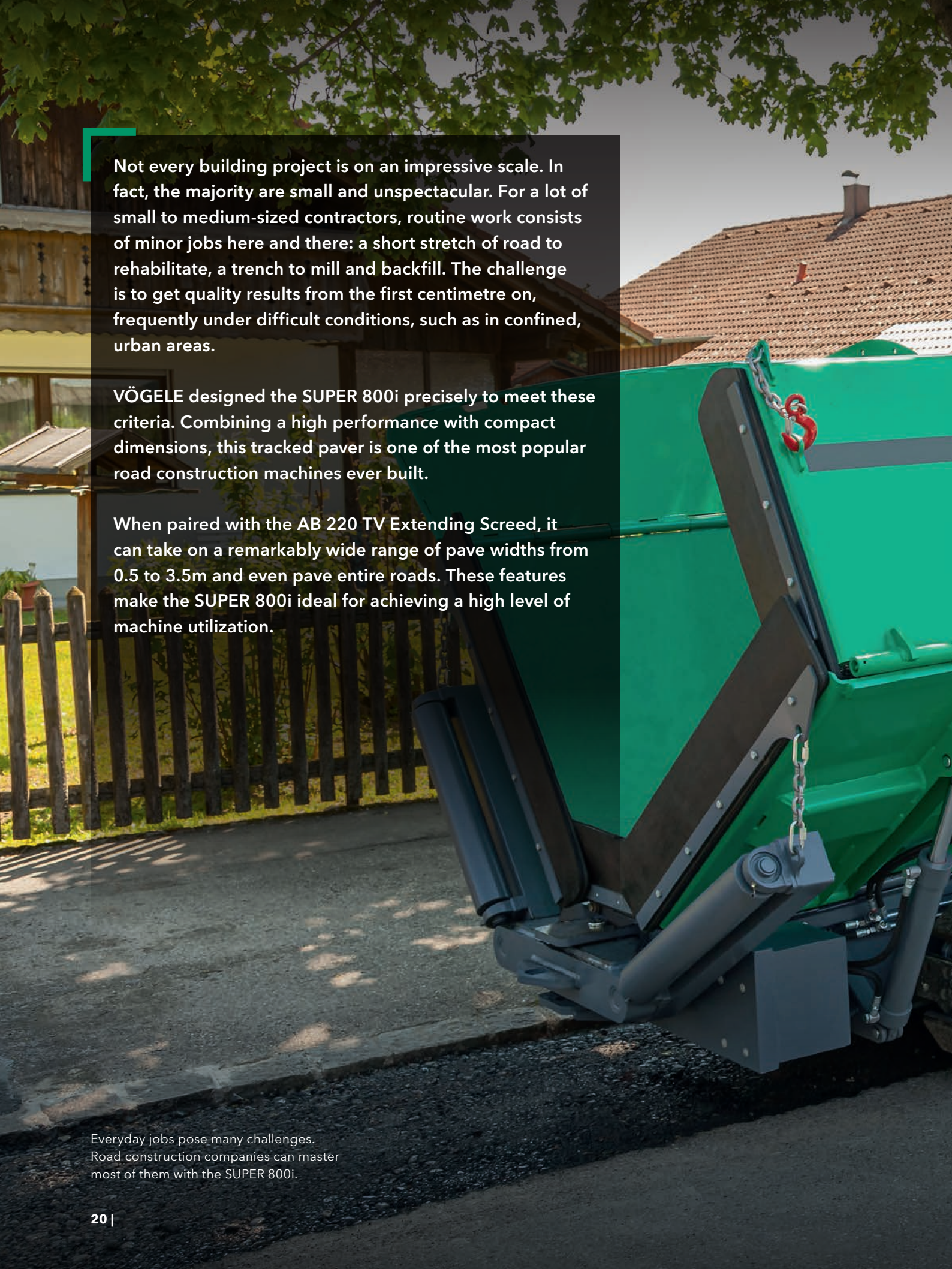
"The airport is set to grow by another 65,000m² in the second construction stage. The landing runway will also be extended by another 350m," Prabowo explains. The WIRTGEN slipform paver fleet is ready for action.

Precise 90° concrete corner: WIRTGEN's high-precision slipform pavers can produce concrete corners with a 90° angle. This quality simplifies the tie-in of adjacent strips, meeting the high standards of the construction inspection authority.

WIRTGEN slipform pavers do a fantastic job – even when working to our tight schedule.

Andek Prabowo, Managing Director
PT PP Presisi Tbk Group of PT PP (Persero) Tbk

Job site details	
Construction of the new Yogyakarta International Airport in Kulon Progo, Yogyakarta Sultanate, Indonesia	
Project dimensions	
Area of airport	645ha
Length of runway	3,250m
Width of runway	45m
Working parameters	
Thickness of concrete layer	50cm
Pave width of runway	5m
Pave width of taxiway and apron	2, 5 and 6m
Equipment	
1 WIRTGEN SP 84i slipform paver	
4 WIRTGEN SP 64 slipform pavers	
6 WIRTGEN SP 500 slipform pavers	



Not every building project is on an impressive scale. In fact, the majority are small and unspectacular. For a lot of small to medium-sized contractors, routine work consists of minor jobs here and there: a short stretch of road to rehabilitate, a trench to mill and backfill. The challenge is to get quality results from the first centimetre on, frequently under difficult conditions, such as in confined, urban areas.

VÖGELE designed the SUPER 800i precisely to meet these criteria. Combining a high performance with compact dimensions, this tracked paver is one of the most popular road construction machines ever built.

When paired with the AB 220 TV Extending Screed, it can take on a remarkably wide range of pave widths from 0.5 to 3.5m and even pave entire roads. These features make the SUPER 800i ideal for achieving a high level of machine utilization.

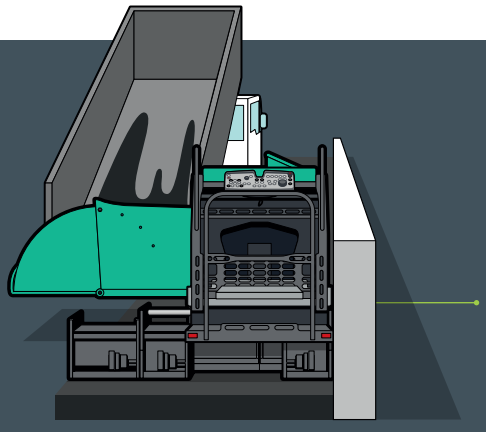
Everyday jobs pose many challenges. Road construction companies can master most of them with the SUPER 800i.

The SUPER 800i demonstrates its many advantages on a variety of job sites:

The everyday hero

The practical advantage for backfilling trenches:
Professional paving and compaction upwards of 50cm

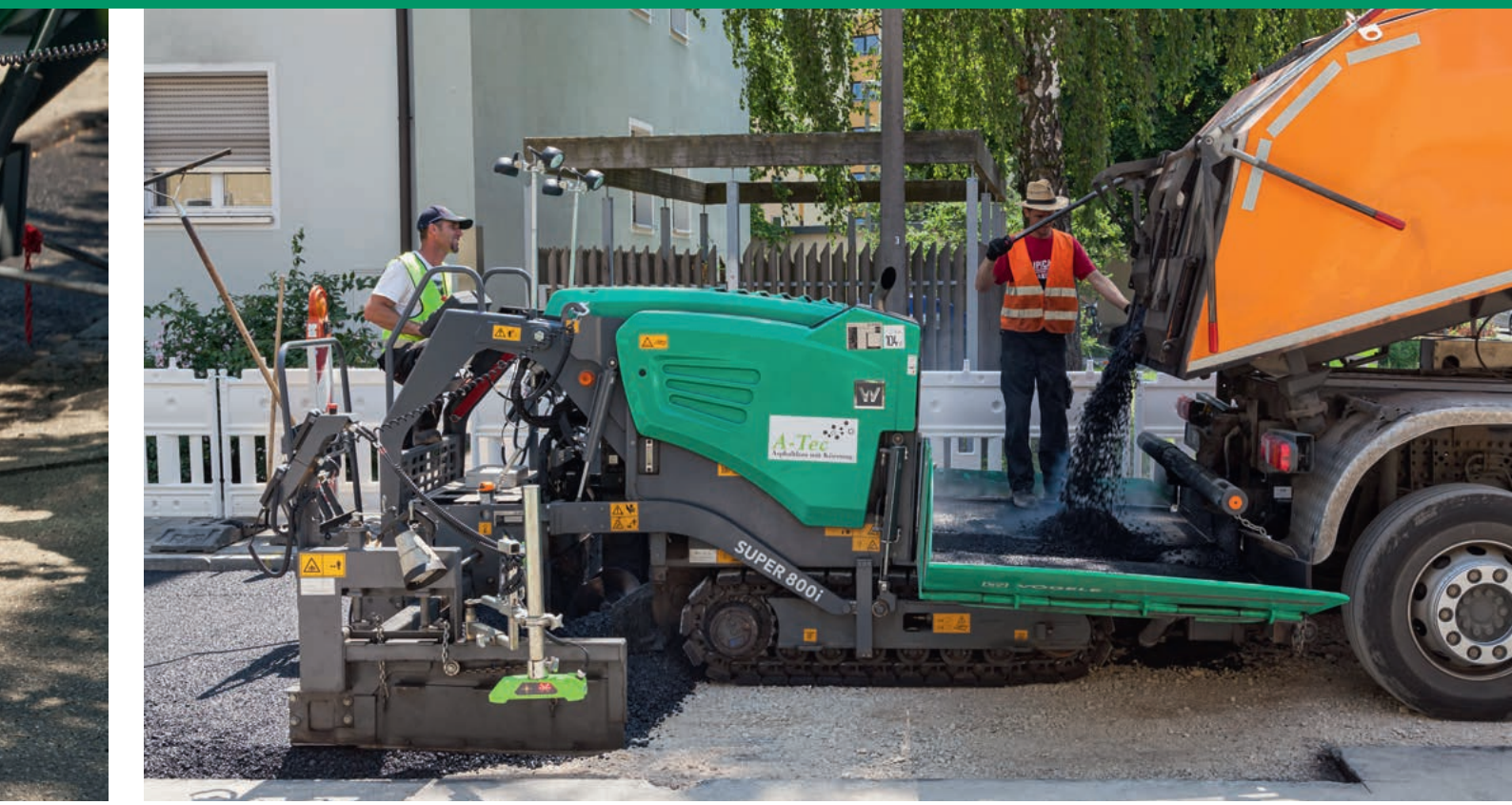
One of the winning features of the SUPER 800i is its ability to pave even the smallest surfaces with the highest quality results and to do it cost-efficiently. The AB 220 TV Extending Screed can handle pave widths starting at just 50cm with the system for pave width reduction. Even trenches narrower than the screed's basic width of 1.2m can be backfilled with outstanding results – like here on a backfilling job in Denklingen, a town 80km southwest of Munich in southern Germany, where the machine worked at a width ranging between 0.8 and 1.2m.



With the optional asymmetrical hopper (left), the paver can be supplied with material by lorry even if the feed vehicle is unable to dock centrally in front of the machine, as is the case when paving along walls or other boundaries.

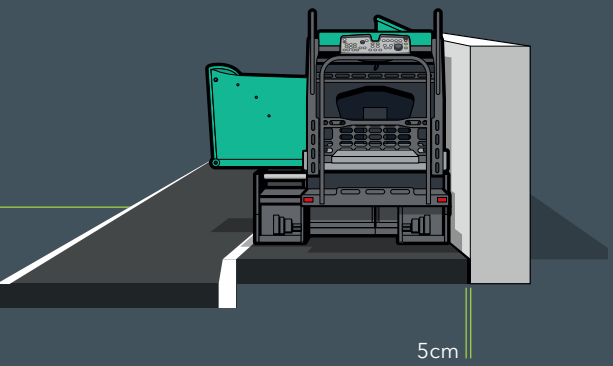
The well-conceived paver design supports machine-based paving to within 5cm of boundaries.

SUPER 800i

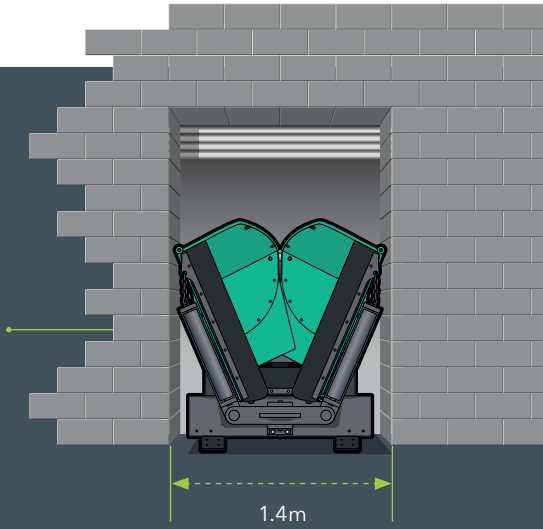


The practical advantage of a rapid material feeding process:
High flexibility in terms of mix supply and paving

In Nuremberg, Germany, a road had to be temporarily resurfaced after some sewer work, prior to an upcoming pavement reconstruction. On the one-day job, the SUPER 800i worked across a width of 3.4m, close to its maximum pave width of 3.5m. A key advantage came into play when feeding the Mini Class paver with mix: VÖGELE designed the 5.8t material hopper with wide sides so that the SUPER 800i can be supplied by conventional mix lorries if space allows.



Outer track gauge: 1.14m,
clearance width: 1.4m,
total height: less than 2m;
with these diminutive dimensions,
the SUPER 800i gets down to business,
effectively driving the shift from
improvised manual work to
professional paving performance.



The practical advantage of user-oriented machine design: Safe and ergonomic operation with ErgoBasic

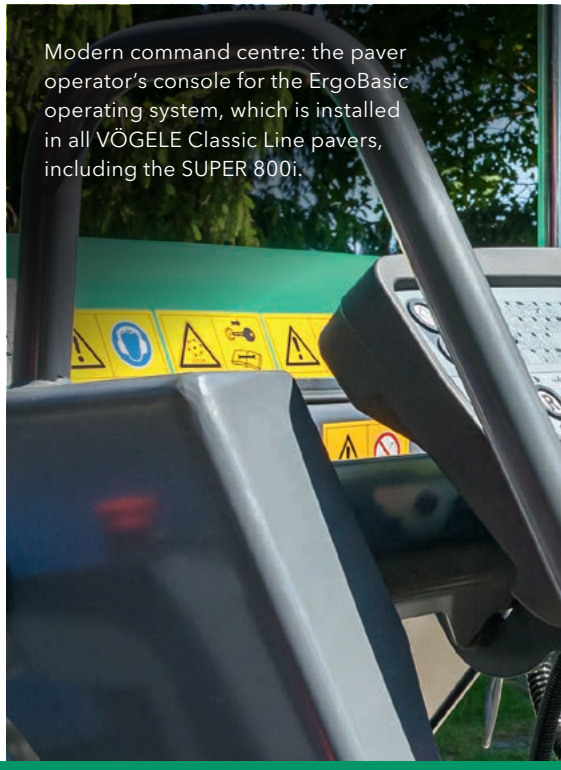
On its very first job, a brand-new SUPER 800i showed how an operating system designed to be intuitive and practical can accelerate construction projects: on the very first day, the paving team widened a road on the B19 motorway in Franconia, Germany – meeting the high quality requirements from the first metre on.

The reason: with the ErgoBasic operating system, the various functions are easy for operators to understand and master, while the control system gives them the reassurance that they have the machine and the screed under control at all times. The machine has a large console for the paver operator as well as remote controls for both screed operators, with which they can also work alongside the paver.

Practical advantage of high precompaction: AB 220 TV Extending Screed for top quality

Milling and backfilling a 160m-long trench in record time: a WIRTGEN W 100i small milling machine, a VÖGELE SUPER 800i and a HAMM HD 10 CompactLine tandem roller breezed through a job in Bobingen, Germany.

Working at a width of 1m, the contractor achieved high quality paving results because the SUPER 800i, combined with an AB 220 TV Extending Screed, can build a perfectly even surface that withstands high traffic loads for a long time. The tamper played a pivotal role here. VÖGELE worked to the same standards it applies to the screeds for its large SUPER pavers when developing and manufacturing this compacting system.



Modern command centre: the paver operator's console for the ErgoBasic operating system, which is installed in all VÖGELE Classic Line pavers, including the SUPER 800i.

Highlights of the SUPER 800i tracked paver:

- Max. laydown rate 300t/h
- Clearance width 1.4m
- The ideal option for highly confined job sites thanks to its compact dimensions
- Wide range of paving applications from 0.5 to 3.5m
- Simple operation with the innovative and easy-to-grasp ErgoBasic operating concept
- Outstanding view of the job site thanks to modern machine design
- High level of precompaction with the AB 220 TV Extending Screed with tamper and vibrators
- Several feed options with the asymmetrical material hopper
- Positive tracking and precise steering due to traction drives in closed loops
- Powerful and cost-efficient thanks to the 55.4kW diesel engine and ECO mode

A variety of jobs, a strong performance: see the SUPER 800i in action in a job site video at www.voegele.info/SUPER800i

Simply practical: in addition to a remote control for the most important paving functions, every screed operator also has a second one available to him for the Niveltronic Basic System for Automated Grade and Slope Control. Both have easy-to-understand symbols and support intuitive operation.

New requirements in road construction: QSBW 4.0

WITOS Paving Plus – Ready for tomorrow today

QSBW 4.0 is the German abbreviation for "Quality in Road Construction in Baden-Württemberg 4.0" and it is ringing in a new digital era in road construction in Germany's southwest. It will be included in public invitations to tender as of 2019, and become standard by 2021.

The state of Baden-Württemberg is playing a trailblazing role with this initiative, pushing road construction into the digital age in a bid to improve the quality of asphalt paving, process safety and cost efficiency.

A VÖGELE road paver with the WITOS Paving Plus process management system and HAMM rollers with the WITOS HCQ module participated in a QSBW 4.0 construction project.

Germany | **Baltmannsweiler**

The road paver sets the pace for every asphalt construction job: the future of road construction is digital. Binding standards for public invitations to tender will have been specified in Germany's southwest by 2021.

Construction project serves as a field trial for WITOS Paving Plus

The contractor, A. Waggershauser Straßenbau GmbH + Co. KG, based in Kirchheim/Teck, won the bid for a job requiring compliance with the QSBW 4.0 standards for the improvement of process quality in road construction. The project involved the rehabilitation of a section of the L1150, a regional road in the municipality of Baltmannsweiler. The 4cm-thick surface course had to be renewed along a 2.1km stretch.

Invitations to tender based on QSBW 4.0 criteria require the inclusion of all the system components associated with a digitally controlled and monitored job site as defined by the QSBW 4.0 initiative. Specifically, these include dynamic logistics and machine control systems, as well as process documentation.

The VÖGELE solution is QSBW 4.0-ready

VÖGELE developed WITOS Paving Plus with just such requirements in mind, and this was the solution that Waggershauser elected to use. It is a fully integrated, software-based overall system for process optimization and documentation, comprising five inter-coordinated modules for the different parties involved in the process – from the asphalt mixing plant and the lorry driver to the construction manager. With WITOS Paving Plus, contractors can already meet virtually all the requirements for road pavers which will generally be specified in future in invitations to tender under QSBW 4.0.

The suffix "4.0" indicates the digital objective of the initiative: "Industry 4.0" is the name of the high-tech strategy aimed at linking industrial production systems with the latest information and communications technology on the basis of intelligent, networked systems.

On the SUPER pavers, WITOS Paving Plus is integrated in the paver operator's ErgoPlus 3 console and can directly access paver data.

Controlling final compaction in real time: HAMM rollers equipped with the WITOS HCQ (HAMM Compaction Quality) module, which can be linked to WITOS Paving Plus, were also in use on the job site.

Systematically improving quality in road construction

QSBW 4.0 provides for implementation of a quality management plan, which defines the parameters a contractor has to monitor independently. These include, for instance, paving temperature and speed, as well as compaction. Logistics aspects also have to be planned, however, including daily laydown rate, supplier plants, mixing output, round-trip times of lorries, number of vehicles and much more. Recording these target data supports a controlling process that is based on real data from the job site.

WITOS Paving Control, one of the five WITOS Paving Plus modules, is available for planning and monitoring. All the required data can be entered here, and it can even be used to select the necessary machines and material quantities, as well as their availability in terms of time. Based on this information, any deviations from the planned workflow can be identified and corrected later on in the construction process.

Ministry of Transport: QSBW 4.0 test was a success

Baden-Württemberg's Ministry of Transport has hailed the rehabilitation of the L1150 in Baltmannsweiler as a successful "milestone in the digitalization of road construction". The process known as "Quality in Road Construction in Baden-Württemberg 4.0" (QSBW 4.0) was developed by the Ministry of Transport of Baden-Württemberg in collaboration with companies in the construction sector and summarized in a manual. The process has been trialled in a competitive environment since 2018.

The objective of QSBW 4.0 is an uninterrupted and digitally controlled construction process designed to ensure excellent paving quality over the entire pavement, increasing the service life of asphalt layers.

> **WITOS Paving Plus means we can rest assured that everything on the job site is right on track.**
>
> **Axel Gairing**
> A. Waggershauser Straßenbau GmbH + Co. KG

RoadScan monitors the temperature, a key quality factor

Temperature measurements are the focus of the quality control measures specified in QSBW 4.0. Because asphalt can only be paved and compacted in specific temperature ranges, the mix temperature must be monitored during loading, transfer to the paver and paving across the entire surface behind the screed.

With WITOS Paving Plus, that is easy to do: the Materials module can record the mix temperature at the time of transfer at the mixing plant. The temperature at the time of transfer to the paver can be measured at the job site. And the temperature data immediately after paving are supplied by the infrared camera which forms part of VÖGELE's RoadScan temperature-measurement system. It precisely scans the entire specified area across a width of 10m.

Because RoadScan, just like WITOS Paving Plus, is integrated in the ErgoPlus 3 paver operating system, the paver operator has access to temperature data right on his console. Construction managers can also check the data online from their offices via the WITOS Paving Control module.

The IT solution that makes everything simpler and more efficient

From planning, recording job site data, and precise document-based accounting to identifying improvement potentials – digital process management makes construction projects transparent. And that is of major importance to clients who want to ensure quality and keep an eye on costs. This is where QSBW 4.0 comes into play. The same applies to WITOS Paving Analysis, the fifth module of the VÖGELE process management solution.

This analysis, statistics and documentation tool monitors the entire process chain. The clearly structured diagrams and charts enable the construction manager or planning engineer to draw important conclusions from a completed construction project, for instance relating to the paving efficiency.

Analysis of the job site in Baltmannsweiler clearly demonstrated the benefits of digital process control. Thanks to perfect cycle calculation and optimization of the paving job, paving efficiency when laying down the surface course totalled 99%.

In short, WITOS Paving Plus helped avoid downtime – also passing its field test with this QSBW 4.0 project.

The VÖGELE system for process optimization and documentation comprises five modules – tailored to the individual parties involved in the process.

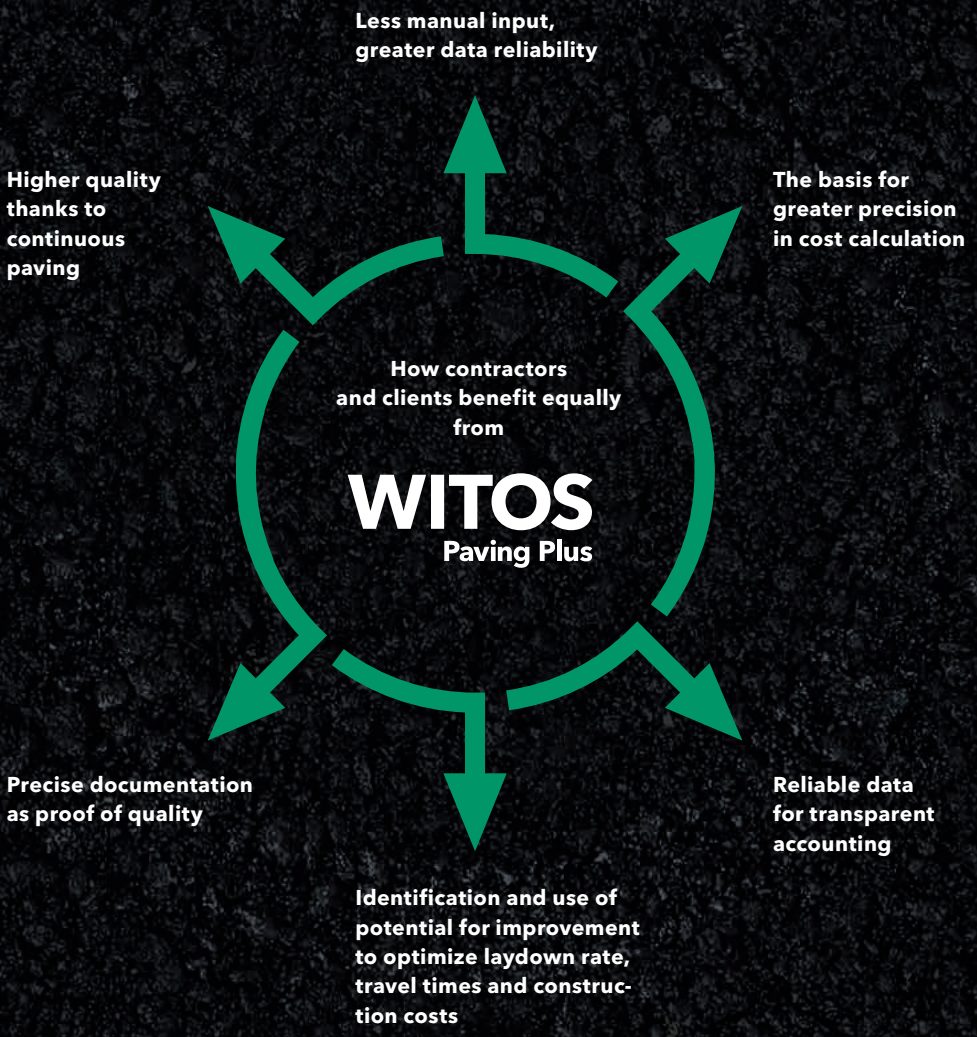
WITOS Paving Control
The planning and control module

WITOS Paving Materials
The mixing plant module

WITOS Paving Transport
The transport module for lorry drivers

WITOS Paving JobSite
The job site module for paving teams

WITOS Paving Analysis
The analysis and documentation module



WITOS Paving Plus –

The VÖGELE solution for road construction 4.0

WITOS HCQ:

Greater transparency, higher quality

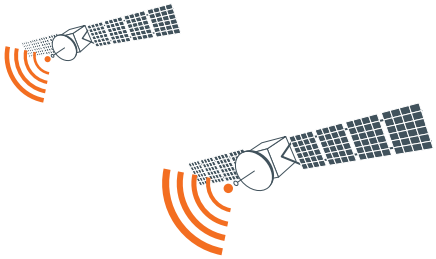
1 | WLAN on the job site
With the HCQ Navigator, data are exchanged between the rollers via WLAN. The rollers are equipped with a GNSS receiver which communicates with satellites to detect their position.

The route of the process data

2 | Communication with the WITOS server
Each roller is equipped with a SIM card and transfers the data to the WITOS server wirelessly.

Random sampling and point measurements in the compaction process will soon be a thing of the past. The HCQ Navigator from HAMM is a highly effective alternative. The intelligent compaction measurement assistance system indicates compaction progress to roller operators, enabling them to produce homogeneously compacted surfaces.
The HCQ Navigator is also an ideal tool for continuous dynamic compaction control. HAMM's WITOS HCQ represents the logical next step towards a digital job site: the module permits live tracking of the compaction process, also remotely.

HAMM
Compaction
Quality

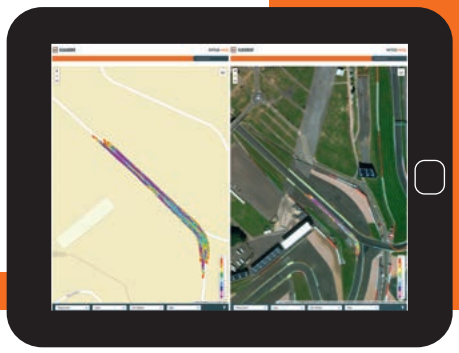


The WIRTGEN GROUP's WITOS portal
Authorized users can monitor the process live and comment on it via the WITOS portal. The data can be exported once the project is complete.

WITOS HCQ: Live view and data analysis

The main functions of WITOS HCQ at a glance:

- Live monitor with a selection of map views and zoom options
- Filter for visualizing the HMV (HAMM Measurement Value) value, temperature window or compaction mode (static, vibration, oscillation, pneumatic tyres)
- VETA export for continuous dynamic compaction control
- Project list with numerous search and management options
- Fast access with view of individual sections



Live mode not only indicates geographical position in various map views, it also displays process data (e.g. number of passes, asphalt temperature, HMV value) for each point, machine and drum individually.

The HCQ Navigator has featured in HAMM's product line-up for some time now. It shows roller operators which points have already been sufficiently compacted and which still require further compaction, displaying the information live on a panel PC in the cabin. This avoids both under-compaction and over-compaction and optimizes the number of passes. What is more, this system enables construction companies to record, analyse and archive all the relevant data on the compaction process.

Live monitoring, worldwide

With WITOS HCQ, it is now also possible to follow the entire compaction process live from any location around the world. Data from the compaction process are transmitted wirelessly to the WIRTGEN GROUP's WITOS portal for this purpose.

They can be called up in real time from here. For instance, regulatory bodies can also access the data, since WITOS HCQ users can issue them with access authorizations for each sub-project.

The advantages: processes can be controlled remotely and decisions made on the basis of salient information. That saves time and money while the prompt response times enhance quality.

Simple data back-up

Data back-up is also incredibly easy with WITOS HCQ: the project data are available on the WITOS portal for subsequent analyses and documentation. HAMM supplies the data for export in the internationally familiar VETA format.

The North Marmara motorway is currently being constructed around Istanbul, Turkey's largest city with a population of 15 million.
Like the city itself, the 120km east-west axis is located on both sides of the Bosporus, partly in Europe and partly in Asia. HAMM rollers showed just what they were capable of when constructing the motorway. They compacted all surfaces quickly and economically in continuous operation, ensuring quality in all construction phases.

Motorway links Europe with Asia

Turkey | **Istanbul**

The project requires the pavers and rollers to work continuously in two- or three-shift operation, even working seven days a week during some phases.

Hakan Necan, Construction Manager
Nalbantoğlu İnşaat ve Tic. Ltd. Şti.

Job site details		
Expansion and new construction work on a 120km-long, 2 x 20m-wide section of Otoyol O-6 (North Marmara motorway) in Istanbul, Turkey		
Layer structure and material		
Layer thickness of crushed-stone base	Overall thickness	40cm
	Layer 1	10cm
	Layers 2 and 3	each 15cm
Layer thickness of asphalt base course	Bitumen-bound base course	13cm
	Asphalt binder courses 1 and 2	each 6cm
	Surface layer	4cm
Equipment		
Earthwork	Fleet of HAMM compactors and pneumatic-tyre rollers	
Asphalt construction	Fleet of Universal and Highway Class VÖGELE pavers	
	Fleet of HAMM tandem rollers and pneumatic-tyre rollers	

Tough challenges call for reliable and powerful machines: the HAMM rollers, with their sophisticated technology, are perfectly equipped to ensure the success of a project.

Construction of the North Marmara motorway in the north-west of Turkey

Large sections of the east-west axis which extends to approximately 120km, including countless approach roads, were completely replanned and rebuilt. On most sections, the motorway will have four lanes in each direction. The stretches that had to be compacted were hence up to 20m wide.

The western section of the route was particularly important, since it links the city, among other places, with Istanbul's new airport and had to be completed before the airport opened. The schedule was correspondingly tight, particularly for the work on this section, so that reliable and powerful construction machines were vital to the success of the project. This was just one of the reasons the road construction companies involved opted to compact the road base as well as the asphalt courses paved on top by means of HAMM rollers.

"We do it the Turkish way"

The North Marmara motorway project was implemented according to the Build-Operate-Transfer (BOT) model. Short construction times and a high pavement quality (see box) were key criteria for the award of the contract. One thing was clear from the start of the work in August 2016: the sections around Istanbul Airport would have to be completed in October 2019, while all the other sections, including approach roads and access and exit ramps, have to be completed by the end of 2020.

When asked how this is to be achieved, Construction Manager Hakan Necan (image on left) from contractor Nalbantoğlu İnşaat, responsible for asphalt construction on the Anatolian section of the route replied: "We do it the Turkish way. That means: we are really very fast. That involves the pavers and rollers working continuously in two or three-shift operation, even working seven days a week during some phases."

Financing based on the BOT model

The Build-Operate-Transfer (BOT) model which is often used in Turkey is a form of private-public partnership. The BOT model was employed for the first time in road construction in Turkey as part of the country's ongoing infrastructure programme. The construction time was one decisive criterion in the award of contract. The shorter the better.

Under the awarded contract, the contractors would be granted the concession to operate the road for a specified period – 12 years in this case.

The state sets the toll while guaranteeing the companies concerned a minimum income. After the end of the contractual term, the road is then transferred to the state.

1 | As many as four compactors of type 3516 combined forces with GRW 280-10 pneumatic-tyre rollers to compact the three-layered unbound crushed-stone base.

2 | The pneumatic-tyre rollers from HAMM, in particular, were greatly in demand due to their compaction performance and the high surface quality they achieve by virtue of their even weight distribution and a tyre overlap of the front and rear wheel pairs.

3 | Reliable endurance runners: six HAMM HD+ 140 VV tandem rollers with double vibration and four GRW 280-10 HAMM pneumatic-tyre rollers compacted the asphalt pavement to a high standard of quality, operating continuously.

HD+ 140 VV

3516

Seven layers paved and compacted

Specifically, seven layers were paved and compacted in each direction to produce the pavement on the two sections approximately 19-20m-wide. In the first step, the 40cm-thick, unbound crushed-stone base was produced. It consisted of one 10cm and two 15cm layers, all with a maximum grain size of 38mm. A whole fleet of 16t HAMM 3516 compactors teamed up with GRW 280-10 pneumatic-tyre rollers to do the job.

The asphalt pavement paved on top of this base comprised a 13cm-thick bitumen-bound base course, two 6cm-thick binder courses and a 4cm-thick surface course. The high-quality compaction work was carried out by six HAMM HD+ 140 VV tandem rollers with vibration and four HAMM GRW 280-10 pneumatic-tyre rollers. "We are compacting the asphalt surface in line with a fixed rolling plan. A pneumatic-tyre roller travels directly behind the pavers when paving the base and binder courses. The HD+ 140 VV tandem rollers with vibration then compact the material in four passes. A pneumatic-tyre roller is then used for final compaction. The process is different for the surface course; in this case, we only work with the tandem rollers and only compact statically," explains Muhammad Özdemir from Kalyon, responsible for asphalt paving on the western section of the project.

Productivity – a key factor for success

The high productivity of the rollers was vital, due to the short project duration. But the HD+ tandem rollers, the GRW 280-10 pneumatic-tyre rollers and the Series 3000 compactors excelled across the board in this respect. For instance, all of the rollers have a large fuel tank. This enables them to operate for long periods without stopping to refuel.

GRW 280-10

Hammtronic also contributes to the high productivity. The machine management system from HAMM optimizes both fuel consumption and the advance and vibratory drives of the rollers. The savings made are particularly evident in the operating costs when compacting large surfaces. This was the case on the motorway job site near Istanbul; the tandem rollers and the pneumatic-tyre rollers used for the project were equipped with Hammtronic.

Quality and efficiency thanks to the smart water sprinkling system

Another key attribute of HD+ tandem rollers is their large water tanks. The water is stored in two large interconnected tanks. This is also a quality factor, since the weight of the HD+ is always equally distributed over both of the drums, regardless of water consumption.

Meanwhile, the high-quality, individually adjustable water sprinkling system ensures top quality. Water is supplied automatically to match the working speed (GRW 280-10) or the different sprinkling levels (HD+ 140 VV).

To ensure maximum availability, particularly for continuous operation, the rollers are equipped with two water pumps and a triple filter system.

Close to our customers:
The WIRTGEN GROUP Smart Service agreement

The Smart Service agreement is an individual agreement between the customer and the subsidiary and can be concluded for machines from all WIRTGEN GROUP brands. The Smart Service enables operators to ensure the constant availability of a perfectly maintained machine fleet – without having to lift a finger. All services including the requisite organization are automatically carried out by the subsidiaries. As a result, no inspections or filter changes are ever missed. What is more, the costs are absolutely clear right from the start. Shown in the photo: Sefa Dermir, one of around 20 service technicians employed at WIRTGEN ANKARA.

Machines from the WIRTGEN GROUP are technically outstanding – and the same goes for the service and parts availability.

Mirac Serdar, Head of Machine Technology
Kalyon İnşaat

Service – a criterion for success

Along with machine technology, a comprehensive, top-quality service is a vital aspect for machine operators. WIRTGEN ANKARA, the WIRTGEN GROUP's sales and service company in Turkey, excels in this respect with its high customer proximity. It is represented at four locations: Ankara, Istanbul, Izmir and Elazig. Over 60 highly dedicated employees support the Turkish construction industry from these bases. This is greatly appreciated by customers such as Hakan Necan, who says: "I enjoy working with HAMM and VÖGELE machines. Because the technology is excellent, because I am very happy with the service and the supply of spare parts – and because we are friends."

Kaylon representatives feel much the same. For them, the supply of parts was a decisive aspect on their large-scale project around Istanbul. Mirac Serdar, head of the Machine Technology department, says: "We know that the HAMM rollers and VÖGELE pavers are technically outstanding. But even the best machines need spare and wearing parts. Their availability is very important to us. This is where we benefit from the synergies of the WIRTGEN GROUP."

An efficient service

Mirac Serdar knows what he is talking about. After all, "around 600 of our vehicles and machines are in action on the European section of the motorway project alone. If these machines are to work reliably in continuous operation, they need excellent care and regular maintenance."

Kalyon has also concluded a Smart Service agreement (see information box on the left page) with WIRTGEN ANKARA. The agreement sets out specific services for a fixed period. "Each customer is given a customized service package, which is, of course, tailored to the machines they operate. The range of possible services comprises maintenance and inspection work performed by our service technicians, but also software updates or spare parts packages," explains Ersan Erceyis, one of the service specialists at WIRTGEN ANKARA. One major advantage for customers is the fact that they have a clear picture of the costs involved right from the start.

Processing of basalt for the expansion of Vietnam's infrastructure:

A1 final products for National Route 1A

Vietnam | **Lang Son**

In the north of Vietnam lie the emerging city of Lang Son, located on the border with China, and National Route 1A, the heavily congested motorway to the capital, Hanoi: a KLEEMANN plant combination was brought in to eliminate this bottleneck.

A total of 5 interlinked plants – 3 crushing and 2 screening plants – processed the basalt, a particularly hard rock, for the surface course, fulfilling high quality requirements.

Masters of the hard rock basalt: KLEEMANN MOBICAT jaw crushers.

> Basalt is a vulcanite – an extremely hard and durable volcanic rock. The density of the hard rock comes to 3t/m³ and is thus higher than that of granite – making it an ideal material for road construction. If we include the sea bed, it is the most commonly occurring rock on the planet.

> The mobile jaw crushing plants in the MOBICAT series are particularly suitable for processing hard rock such as basalt in the first crushing stage, while those in the MOBICONE series are ideal for the second crushing stage.

MOBICAT

In action eliminating a bottleneck

With an immense total length of 2,236km, National Route 1A is particularly heavily trafficked along the section between kilometre 16 (Lang Son) and kilometre 170 (Hanoi). The stretch, which is narrow, steep and winding in some sections, is used by lorries, cars, countless scooters and even pedestrians. It was therefore high time the performance and safety of National Route 1A were improved. Licogi 16 JSC – one of Vietnam's largest construction companies with 20,000 employees and a firm foothold in almost all sectors of the construction industry – won the contract for an approximately 100km section of the 154km-long project.

Vietnam's first interlinked KLEEMANN plant combination

Licogi 16's highly dynamic Civil Engineering division is carrying out a number of road and bridge construction jobs and maintains close business relations with Vitrac, the WIRTGEN GROUP's dealer in Vietnam. Spurred on by their very good experience with the technologies of the other product brands, the company opted for a track-mounted interlinked plant combination from KLEEMANN. The blue crushing and screening plants are thus making their debut in Vietnam, an event which is attracting close attention across the region and beyond. The interlinked plant combination comprises 5 units. Listed in the order of connection, the plants concerned are an MC 110 Z EVO jaw crusher, an MCO 9 EVO cone crusher, an MS 703 EVO screening plant, an MCO 9 S EVO cone crusher and an MS 19 D screening plant.
(Read more about interlinked plants on the pages following the job report.)

First-class final products for National Route 1A: as is usual with KLEEMANN plants, the basalt grain fractions for the surface course have sharp edges and a cubic shape. These properties enable them to interlock excellently in the asphalt course and sail through every quality test.

High-precision crushing of the hard rock basalt

In the quarry 40km south of Lang Son, the Licogi 16 team found itself facing two challenges: firstly, they needed to crush the hard and abrasive basalt and to classify it into clean aggregate fractions. Secondly, they had to fulfil very high quality requirements.

Armed with their new KLEEMANN plant combination, the team from Licogi 16 was able to meet the required criteria with astonishing ease. The team discovered that the crushing and screening plants take care of everything almost completely autonomously, once you know how to coordinate them. The automated Continuous Feed System (CFS) played a key role in making the work easier. The crushing plant in the first crushing stage – in this case, a KLEEMANN MC 110 Z EVO jaw crusher – only draws as much feed material into its crushing chamber as the entire line-coupled plant combination can process. This prevents overloads and, to the greatest possible extent, material blockages, too. After all, the KLEEMANN plants are tough performers.

Thanks to line coupling, the plant combination works hand in hand, just like our team.

Licogi 16 JSC quarry team

Teamwork across continents: the Licogi 16 quarry team commissioned its plant combination in collaboration with KLEEMANN experts from the brand headquarters in Germany. Once the team had been instructed on the operation, the plants delivered an impressive performance right from the word go.

Job site details		
Processing of basalt for the expansion of National Route 1A in a quarry 40km south of Lang Son, Vietnam		
Length of section		154km
Material		
Type of stone		basalt
Use		production of surface course mix
Feed size		0–600mm
Final products		0/5mm, 5/12.5mm, 12.5/19mm and 19/25mm
Working parameters		
Closed side setting (CSS)	1st crushing stage	80mm (MC 110 Z EVO)
	2nd crushing stage	38mm (MCO 9 EVO)
	3rd crushing stage	20mm (MCO 9 S EVO)
Total output of the plant combination		200t/h
Plant		
KLEEMANN MC 110 Z EVO jaw crusher		
KLEEMANN MCO 9 EVO cone crusher		
KLEEMANN MCO 9 S EVO cone crusher		
KLEEMANN MS 703 EVO screening plant		
KLEEMANN MS 19 D screening plant		

Anyone who has witnessed a quarry team putting their KLEEMANN plants into operation at the start of a work shift is above all impressed by their powerful performance: the machines breeze through their formidable task, speedily crushing hefty chunks of rock, which are usually fed by excavator.

Line coupling of crushing and screening plants:

Teamwork delivers productivity

Cable connection and probe make all the difference: line coupling enables the KLEEMANN crushing and screening plants to control their optimum performance automatically and minimize the downtimes associated with material blockages including the manual work involved in removing them.

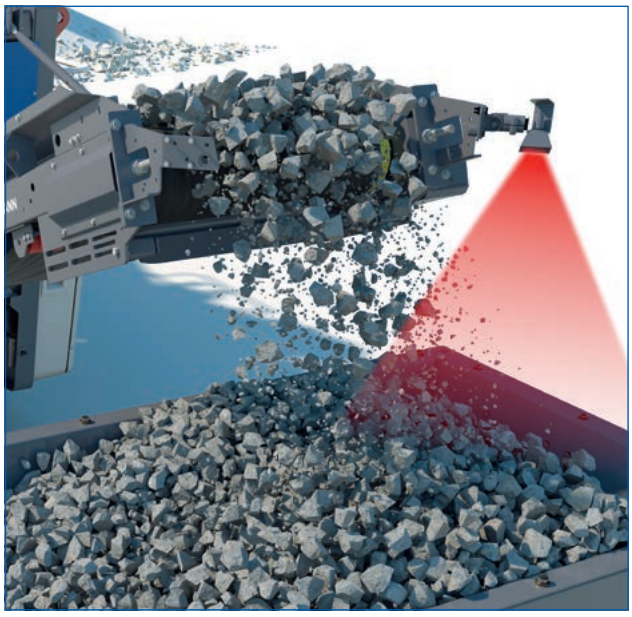
Since most natural stone applications require more than one crushing stage, KLEEMANN plants frequently operate in combination. In the first crushing stage – and when processing hard rock, this usually takes the form of a jaw crusher in the MOBICAT series such as the MC 110 Z EVO – blocks of rock are fed to the plant.

Blocks of hard rock are crushed at a ratio of 3–4:1 and passed to the second crushing plant – which is frequently a cone crusher in the MOBICONE series like the MCO 9 S EVO. Depending on the classified grain sizes required, the next step is then a third crushing stage and/or the screening of the final products – by MOBISCREEN screens such as the MS 703 EVO. KLEEMANN plants can be interconnected by line coupling, enabling the overall crushing process to proceed largely automatically. This enables the plants to communicate with one another – delivering many advantages for users and operators.

Intelligent material flow with line coupling

How line coupling works in KLEEMANN crushing and screening plants

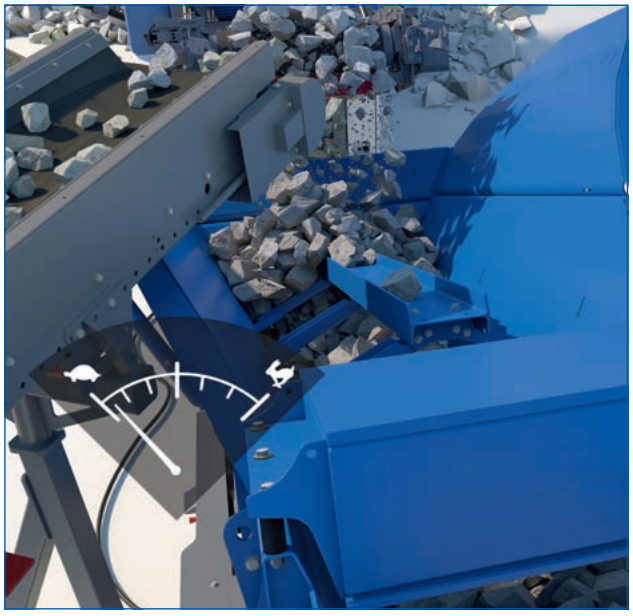
1 The ultrasonic probe of a linked plant detects that the level in the hopper of the downstream machine is too high.



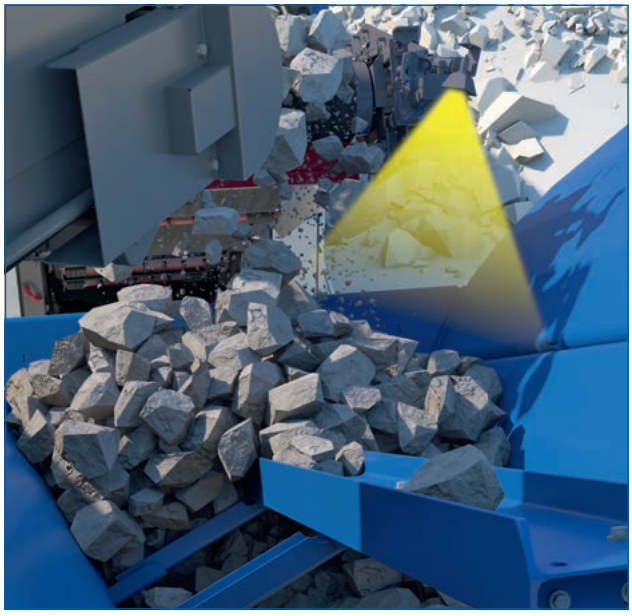
4 The feed speed of this next upstream plant is now also reduced.

5 As soon as levels have dropped in the overfilled plants, the feed speeds are automatically raised again.

2 In response, the Continuous Feed System (CFS) of the upstream plants slows down the feed speed.



3 If the level in the plant that has slowed down also rises, this is detected by another ultrasonic sensor in the next upstream plant.



6 The plants are regulated continually and in several stages, maximizing output.

7 Another advantage of line coupling is the safety aspect: should it become necessary to activate an emergency stop on any of the plants, the conveyor components of all plants are stopped immediately.

Transportable asphalt mixing plant from BENNINGHOVEN in Moscow:

“With the TBA 4000, we’re ready for the future.”

Producing asphalt to a variety of formulas and delivering premium quality products is one thing, but designing asphalt mixing plants with maximum user-friendliness is a real challenge. In the case of BENNINGHOVEN plants, these two challenges are well and truly met, as proven by a new TBA 4000 plant.

Russia | **Moscow**

New TBA 4000 in Moscow: the transportable asphalt mixing plant from BENNINGHOVEN supplies premium asphalt for both road rehabilitation projects on greater Moscow's MKAD Outer Ring Road and for new roads.

Cold, salt and traffic jams: A non-stop stress test for Moscow's roads

Since the Russian Federation was established in 1990, the number of motor vehicles on the roads has been rising steadily. And in the capital city of Moscow, this increase has led to daily holdups. The response in the 1990s was to build more and wider urban motorways, but now the amount of available land has been all but exhausted, and the city has turned to investing in expanding its public transportation system, dismantling traffic lights and improving transport connections.

The construction of new roads is still on the agenda, especially for relieving the situation on the 109km-long MKAD Outer Ring Road. A budget of RUB 4.4 trillion (EUR 91.15 billion) is available for expanding the road-way infrastructure up to 2020. The following facts and figures illustrate how crucial these investments are for the economy and the public sector: apart from heavy traffic volumes, wet, cold winters and road salt have such a devastating effect on the asphalt pavement that the 4-5cm-thick surface courses have to be renewed every two to three years – or even every year on roads frequented by tourists. On account of the heavy traffic, only individual sections of road are usually resurfaced and the work is done at night.

New TBA 4000 puts up-and-coming construction company ahead of the game

Encouraged by this promising market situation, Moscow-based contractor Zentrodostroy decided to invest in a transportable asphalt mixing plant from BENNINGHOVEN. "With the TBA 4000, we are looking to arm ourselves to meet current challenges and prepare for the future at the same time," explains Nikolai Konstantinovich, mixing plant director at Zentrodostroy. "We have long-term plans for our

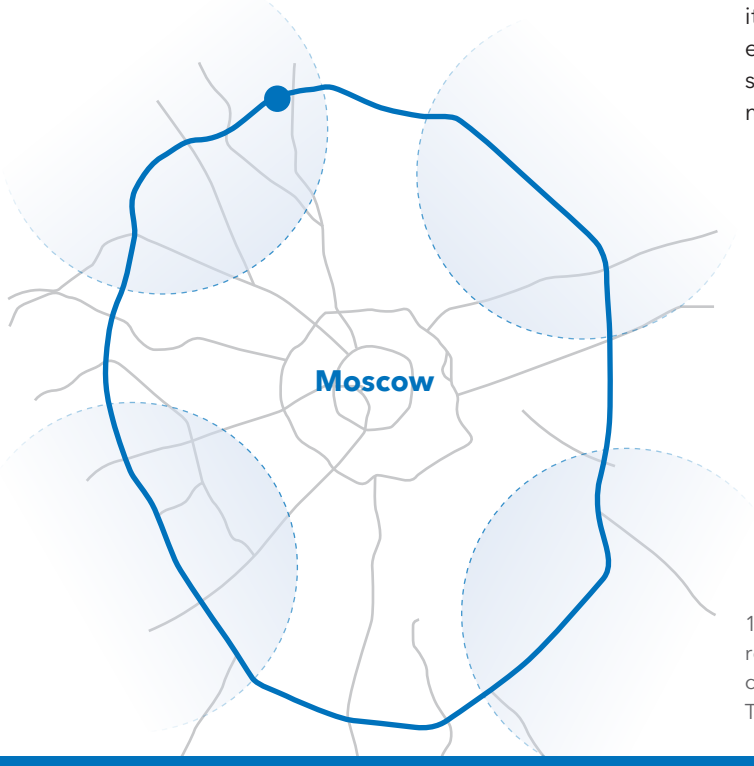
320 **nominal mixing output of the TBA 4000 t/h**

TBA 4000

BENNINGHOVEN plant. One important argument in favour of the investment was the option of retrofitting modules at any time to keep pace with the state of the art," says Konstantinovich, describing the advantages of the TBA line's modular design.

Specifically, Zentrodostroy already has its eye on BENNINGHOVEN's multivariable feed technology. The RAP cold feed system achieves RAP material rates of up to 40%, making asphalt production more cost-efficient and sustainable. "In Russia, there has been a strong focus on white mineral in the past, but attitudes in the industry are changing," says Konstantinovich.

The reasons are obvious: instead of disposing of old asphalt, the BENNINGHOVEN RAP feed system turns it into a valuable raw material: first, the milled material entirely eliminates the cost of new white mineral, and second, less bitumen is required to process it into new mix in the TBA 4000.



109km around Moscow: the MKAD Outer Ring Road is to be relieved of heavy traffic through the construction of additional city motorways (dashed lines). The location of the new TBA 4000 (blue dot) was chosen strategically.

WIRTGEN INTERNATIONAL:
The WIRTGEN GROUP's team in Russia

The WIRTGEN GROUP subsidiary – Moscow-based WIRTGEN International Service and its team – can attend to the needs of customers and users all over Russia, thanks to its many service technicians stationed at various decentralized locations to ensure rapid response times.

WIRTGEN INTERNATIONAL SERVICE sells products from all five WIRTGEN GROUP brands – WIRTGEN, VÖGELE, HAMM, KLEEMANN and BENNINGHOVEN – and operates a large spare parts store that is open 24/7.

BENNINGHOVEN plants are just very reliable. They run non-stop – no failure, no downtime.

How does it feel working with a BENNINGHOVEN asphalt mixing plant for the first time? RoadNews asked Viktor Muratov, mixing plant supervisor at Zentrodostroy.

Mr Muratov, you've had time now to familiarize yourself with your new TBA 4000. What's your impression?

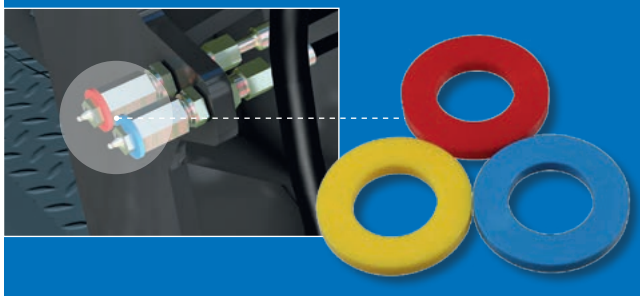
I like my new workplace very much! Because it's so advanced, I feel safe and my superior is very happy with the asphalt formulas I've been mixing. We can also use the plant to produce special mixes, such as Superpave, which is in very high demand here. The best aspect is the fact that even special products like Superpave are simple to mix with the BENNINGHOVEN control system. And the visual overviews play a key role, giving you the sense of reassurance that comes with always having everything under control.

Before getting to work, asphalt mixing plants have to be assembled. How were those few days for you, before the plant went into operation?

The team from WIRTGEN INTERNATIONAL did a great job and we were surprised at how well we were able to help them with the assembly. The plug & work principle makes handling so easy; it all went very fast. You basically plug it in and you're all set. It was impressive to see how such huge components can simply be plugged together. Now we won't have to worry at all if we ever need to relocate the plant.

User advantage: Lubrication made easy

The system behind the colour-coded lubrication points greatly simplifies maintenance. The plant operator knows right away when scheduled lubrication is required just by looking at the respective components. This simple and intuitive system effectively ensures that operators adhere to all lubrication schedules.



Consistent colour-coding, identical on all plant components: red stands for daily, yellow for weekly and blue for monthly.

User advantage: Added safety

BENNINGHOVEN asphalt mixing plants feature a uniform safety system for service and maintenance situations: the intelligent and exclusively mechanical key transfer system.

When servicing is required, the operator can use a key to either release an element in the control cabinet of a plant component, or a guard locking device on one of the maintenance doors – but never both at the same time. Users can hence feel safe in the knowledge that only they can put a component they are currently working on back into operation.

How do you rate the importance of the plant's modular design?

It's a very important aspect. If requirements change, we can adapt our TBA 4000 to meet them at any time. Be it recycling, mixed material storage silos or feeding additives, there's an interface for each additional technical component. And one thing is for sure: recycling is becoming a major topic in Moscow, which is why we're already planning to upgrade to a multivariable feed system.

Then all you would have to do is check in with your WIRTGEN GROUP contact in Moscow and you would be able to cold feed up to 40% RAP with this recycling technology.

Exactly. It works perfectly. We have a reliable partner in the WIRTGEN GROUP. They do their utmost to help us out. And that goes for the servicing, too. Although the BENNINGHOVEN lubrication schedule plays a role here, too, helping me keep track of all maintenance requirements.

You mean the intuitive lubrication schedule, which breaks maintenance down into intervals with its three colour codes. Is maintenance work also easy to perform now?

It used to be such a nightmare, but not any more! There are large service panels that are wonderfully accessible, and everything inside is perfectly illuminated by modern lighting equipment. The preinstalled electrical and compressed air connections for our tools are also very practical, because now we don't have to run up any cords or cables. And anywhere I have to go on the plant, it's safe. That shows that the team from BENNINGHOVEN knows how we work out there. Our managing director can also rest assured that the plant is being well-maintained. That's important to all of us because we want to use our TBA 4000 for a long time to come, and make sure it keeps pace with the state-of-the-art at all times.

User advantage: Exemplary accessibility

Very good accessibility to all areas thanks to large walkways and work platforms as well as generously dimensioned service openings – over a metre high and half a metre wide – which guarantee ergonomic access to all relevant plant components.

As a result, any servicing or maintenance work that needs to be done on the plant is as ergonomic as possible. What's more, service and assembly aids, such as defined attachment points for electrical and compressed air tools, facilitate the work.

> There are large service panels that are wonderfully accessible, and everything inside is perfectly illuminated by modern lighting equipment. That shows that the team from BENNINGHOVEN knows how we work out there.

Bird's-eye view of modern infrastructure:

Motorway intersection in Dubai,
United Arab Emirates

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