

RoadNews_{for new roads}

The WIRTGEN GROUP User Magazine for North America // № 02

 WIRTGEN

 VÖGELE

 HAMM

 KLEEMANN

WIRTGEN GROUP technologies prove themselves in the field:

Ready for action



Contents



Editorial

// Top Feature

04 

Rehabilitation of a state route in Illinois by WIRTGEN GROUP machines: Paving across a width of 25.6 ft.

// Technology

16 

WIRTGEN PCD cutter: Cutting technology with diamond tips increases the resistance of point-attack cutting tools

38 

Making quality measurable: RoadScan, the temperature-measurement system from VÖGELE

50 

Product campaign by KLEEMANN: 4 new classifying screens in the MOBISCREEN EVO series

60 

MOBIREX impact crushing plants from KLEEMANN: Tips on prescreening

// Job Reports

18 

WIRTGEN 4200 SM surface miner in an opencast coal mine: The hardest worker in Texas

24 

Combined inset and offset application in Kentucky: Concrete paving with 2 WIRTGEN slipform pavers – an SP 15i and an SP 25i

30 

Complete pavement removal with machines from WIRTGEN, VÖGELE and HAMM: RoadScan delivers proof of excellent paving quality in North Carolina

42 

Optimized asphalt compaction: HAMM DV+ rollers with HCQ Navigator at Eindhoven Airport, the Netherlands

54 

New efficiency with old material: KLEEMANN MOBIREX crushing plant takes the recycling process to the next level

Dear Reader,

When investing in new technology, the added value is frequently a key aspect. With their wide array of impressive products, our WIRTGEN, VÖGELE, HAMM and KLEEMANN brands have a great deal to offer in this respect. One such product is presented in the Top Feature of this issue of RoadNews. A VÖGELE road paver worked across a width of 25.6 ft. on a job site in North Carolina – rehabilitating two lanes at once. VÖGELE's screed expertise made this possible.

Meanwhile, KLEEMANN has helped a customer in New Jersey to make a quantum leap: In just two days, an MR 100 Zi EVO2 breezes through the work that the previous plant could only do in five. The impact crushing plant increases the quality of the final product.

A job site in Europe demonstrates the practical benefit of our digital technologies: Here, intelligent compaction technology from HAMM and the measuring and documentation system HCQ Navigator joined forces to ensure exceptionally homogeneous and efficient compaction.

When it comes to added values, WIRTGEN surface miners deserve special mention. The machines operate in open-cast mines – mining coal in Texas, for instance – where they deliver an incredible performance, operating 24/7.

We hope you enjoy reading this second issue of the WIRTGEN GROUP RoadNews North America!

Best wishes,



Jim McEvoy
President & CEO
WIRTGEN AMERICA, Inc.

PUBLISHING DETAILS

RoadNews for new roads – The WIRTGEN GROUP User Magazine for North America | Publisher: WIRTGEN GROUP Holding GmbH, Reinhard-Wirtgen-Strasse 2, 53578 Windhagen, Germany, www.wirtgen-group.com | Editorial office: Roland Schug (editor-in-chief), Anja Sehr | Foreign languages management: Sylvia Naumann, Christine Gabelmann | In cooperation with: bilekjaeger Werbeagentur, komplus Projektgemeinschaft für Kommunikation und Gestaltung GmbH | Reprints and reproduction of articles and photos are subject to prior consent of the WIRTGEN GROUP.

Unless specified otherwise, all brands mentioned in the magazine of WIRTGEN GROUP Holding GmbH are registered trademarks. WIRTGEN GROUP Holding GmbH protects its intellectual property, including patents, trademarks and copyright.

25.6 feet,

Paving over large widths:
A SUPER 2000-3i demonstrated its
outstanding performance on
State Route 50 in Illinois. The VÖGELE
paver with a VF 600 Extending Screed
produced seamless quality over a
25.6-ft. width. WIRTGEN W 220 and
W 210i milling machines had already
laid the basis for paving, and
HAMM vibratory rollers took care
of compaction.



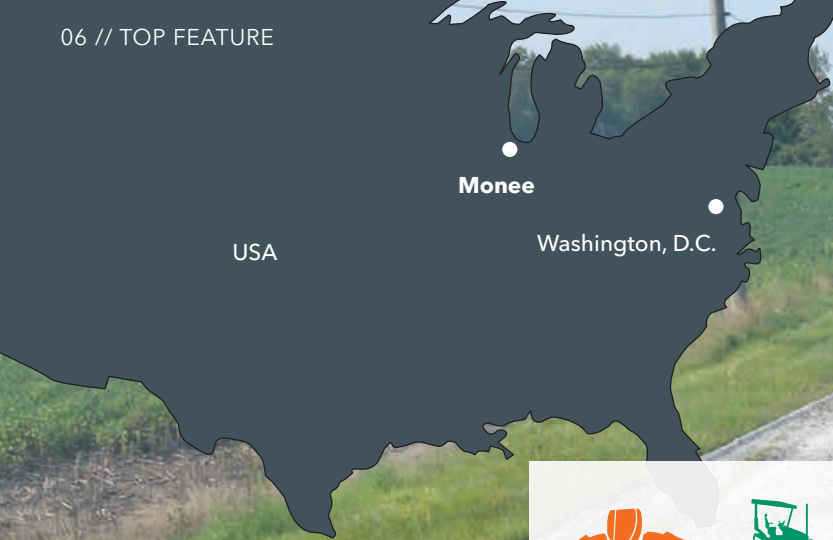
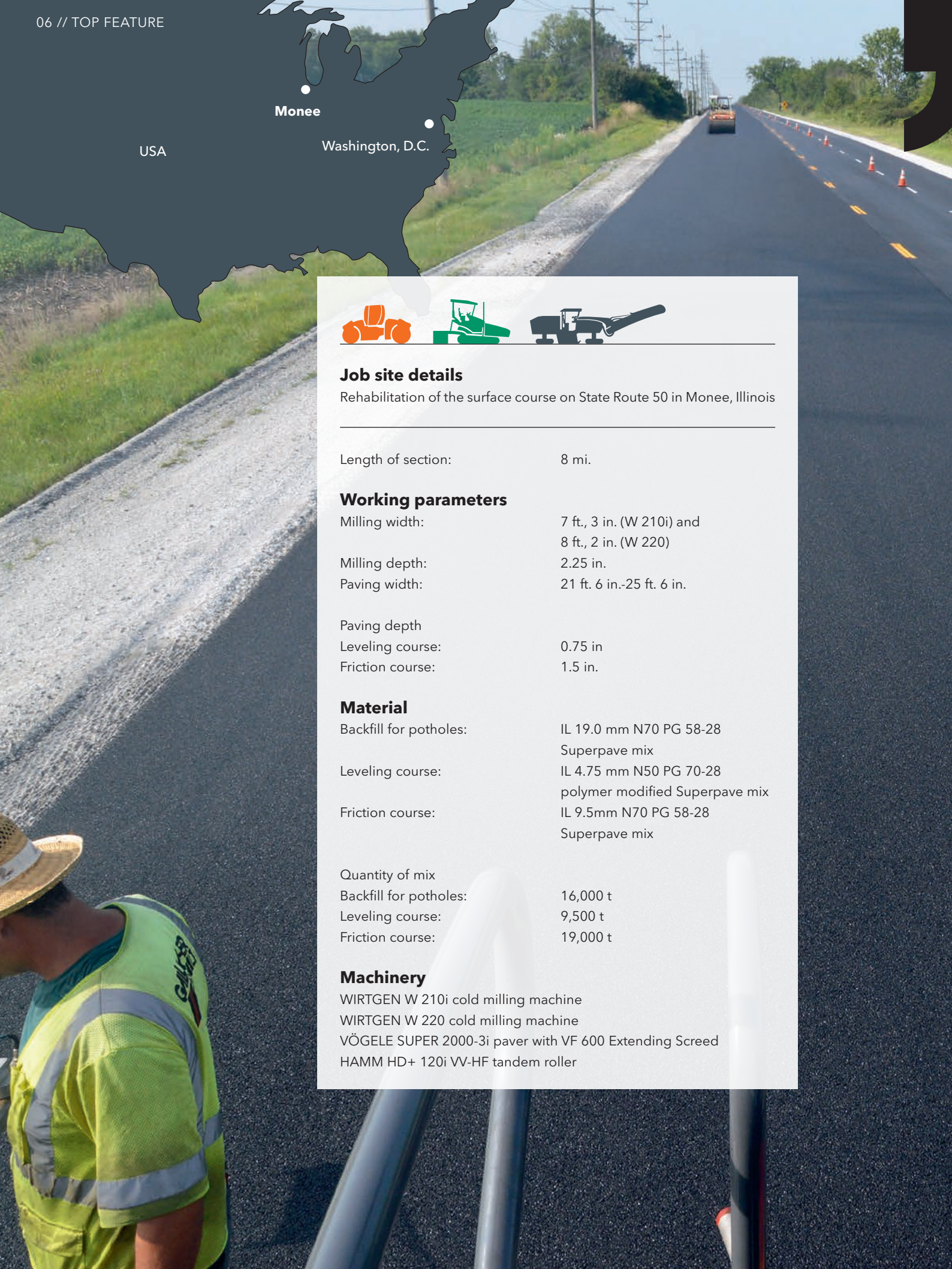
Quality campaign in Illinois: South of Chicago, the paving team of Gallagher Asphalt Corp. delivered excellent results - supported by the leading technologies of the WIRTGEN GROUP.

O seams

Monee (Will County) // Illinois

The problem of deteriorating longitudinal “cold” joints between parallel one-lane lifts of asphalt has long perplexed pavement owners. These joints between paved lanes quickly degrade and permit water to enter the pavement, leading to debonding, delamination, long joint patches, and potholes. Many fixes have been offered, including wedge joint designs and paver-mounted devices that are supposed to knit the edges of the lifts together. Paving in echelon using two pavers close together – placing lifts of hot mix asphalt next to each other so they are thermally bonded – is one solution. But the best solution is no longitudinal joint at all, as demonstrated in August 2017 on Illinois State Route 50 near Monee, just south of the Chicago metro area. >>>





Job site details

Rehabilitation of the surface course on State Route 50 in Monee, Illinois

Length of section: 8 mi.

Working parameters

Milling width: 7 ft., 3 in. (W 210i) and
8 ft., 2 in. (W 220)

Milling depth: 2.25 in.

Paving width: 21 ft. 6 in.-25 ft. 6 in.

Paving depth

Leveling course: 0.75 in

Friction course: 1.5 in.

Material

Backfill for potholes: IL 19.0 mm N70 PG 58-28
Superpave mix

Leveling course: IL 4.75 mm N50 PG 70-28
polymer modified Superpave mix

Friction course: IL 9.5mm N70 PG 58-28
Superpave mix

Quantity of mix

Backfill for potholes: 16,000 t

Leveling course: 9,500 t

Friction course: 19,000 t

Machinery

WIRTGEN W 210i cold milling machine

WIRTGEN W 220 cold milling machine

VÖGELE SUPER 2000-3i paver with VF 600 Extending Screed

HAMM HD+ 120i VV-HF tandem roller

Wide paving is something out of the ordinary, that takes us to the next level.

Terry Sullivan, Project Superintendent
Gallagher Asphalt Corp.

Paving over large widths boosts economic efficiency

In Monee, Gallagher Asphalt Corp. placed a Superpave HMA friction course two lanes wide using a new VÖGELE SUPER 2000-3i and a VF 600 Extending Screed with 25.6-ft. kit. The result is an attractive mat that will resist moisture infiltration and deterioration for years to come. Placing two lanes with one paver at the same time also is more productive for a contractor. "Paving wide eliminates the lane joint and provides a smoother ride," said Don Gallagher, Operations Engineer, Gallagher Asphalt Corp., Thornton, Illinois. "It also allows us to complete the job faster as we make one pass instead of two."

Win-win-win situation

"To both the contractor and government agency, wide paving enhances pavement durability by eliminating the longitudinal joint," said Laikram "Nars" Narsingh, Manager, Commercial Support and Development for VÖGELE. "That joint usually is the first place to fail in a pavement. Every time you can eliminate a joint, you eliminate the first point of failure." In addition to providing a more durable pavement, wide paving makes a job site safer.

Wide paving is the kind of thing our company always is looking to do, and that is something out of the ordinary, that takes us to the next level," said Terry Sullivan, Gallagher Project Superintendent. "We are putting down the best quality product we can, both in terms of material and laydown. Wide paving is important for longevity, and rideability as well." >>>



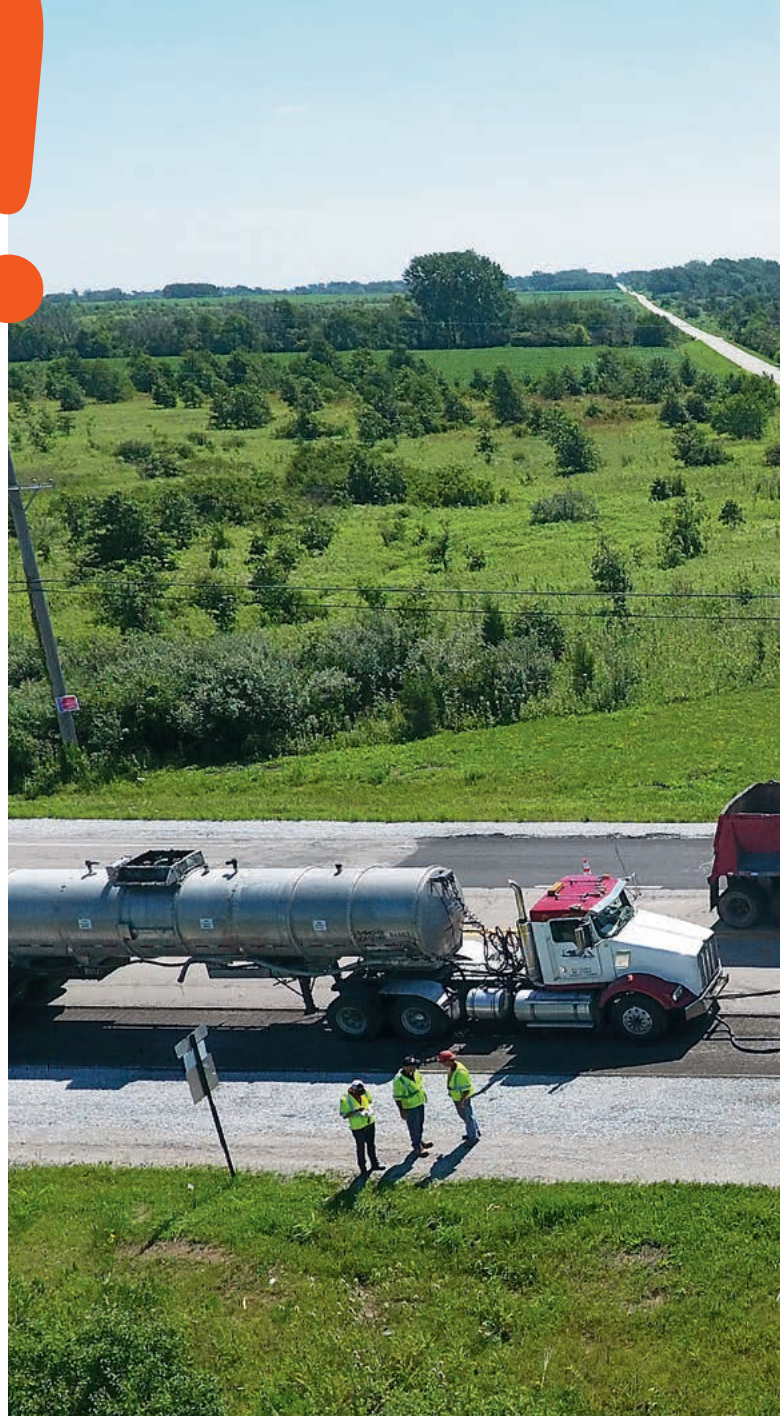
Patching, then milling

The entire project was eight miles long by four lanes and began with extensive patching of the pavement, much of it full-depth into a crumbling underlying concrete pavement which was reflecting through the asphalt overlays. "We had a significant amount of patching that needed to be done," said Jim Trost, Vice President of Operations, Gallagher Asphalt. "There was concrete under some sections, asphalt under others. We had to go down full-depth to repair the sections, and patched them with an IL 19.0 mm N70 (70 gyration) Superpave mix." These included extensive failed concrete expansion joints which had to be cut with saws. Because of the substantial amount of patching required – at 15 in. deep – approximately 16,000 t of IL 9.5 mm N70 PG 58-28 Superpave mix was required.

Powerful performance by 2 WIRTGEN large milling machines

Echelon milling followed the patching work, in which Gallagher's W 210i and new W 220 removed 2.25 in. on average from the pavement. The W 220 was purchased with a 7 ft., 3 in. drum, but because it incorporated WIRTGEN's Flexible Cutter System, Gallagher used a 8 ft., 2 in. drum for this project. The W 210i also was not equipped with its standard 6 ft., 7 in. drum but with a 7 ft., 3 in. drum which is available for this machine optionally as well as the 4 ft., 11 in. drum.

"Both machines working in echelon took out a full lane and a half with each pass," Trost said. "We ran our LEVEL PRO systems on both machines to ensure consistency and as smooth a pavement as possible to form a base for the new pavement layers. We used a sonic ski sensor for the LEVEL PRO system on the milling machines, and later, Big-MultiPlex-Skis for the Niveltronic Plus System for Automated Grade and Slope Control for our SUPER 2000-3i paver. We utilized a material transfer vehicle, and even paved long days to eliminate the number of transverse joints in the pavement. We did all this to deliver a top quality finished product that would be as smooth as possible." >>>



FCS Light: Maximum range of applications

Cutting technology is a core competence of WIRTGEN. With the Flexible Cutter System Light, or FCS Light for short, WIRTGEN offers the optimum solution for high capacity utilization of the machine: Milling drums with different tool spacings can be exchanged in a short amount of time. That makes it possible to perform a range of milling operations with one and the same machine. As a result, the WIRTGEN



ECO Cutter

Milling width: 2,000 mm
Milling depth: 0-330 mm
Tool spacing: 25 mm



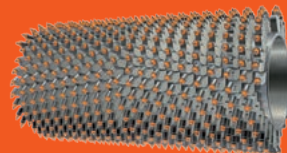
cold milling machines are extremely versatile to use, covering everything from standard applications through fine milling for the creation of new, level road surfaces to the use of what are known as ECO cutters for a particularly high area performance. This increases the capacity utilization of the large milling machine, boosting its economic efficiency in the process.

All milling drums are equipped with the HT22 quick-change toolholder system for point-attack cutting tools whose robust upper part can be quickly and easily replaced directly on the job site. The system minimizes downtimes and increases the service life of the milling drum. The HT22 combines maximum milling output with efficient operating costs.



Standard milling drum

Milling width: 2,000 mm
Milling depth: 0-330 mm
Tool spacing: 18 mm



Micro-fine milling drum

Milling width: 2,000 mm
Milling depth: 0-330 mm
Tool spacing: 6 x 2 mm



Paving two-lanes wide offers exceptional pavement durability and smoothness.

Paving a 0.75 in.-thick leveling course

After milling, because the drop-off between lanes was too high for drivers to negotiate safely, Gallagher followed with the paver placing the required IL 4.75 mm N50 (50 gyrations) PG 70-28 polymer-modified leveling course. "Illinois allows no more than 1.5 in. of drop-off in the pavement to ensure motorist safety," Trost said. "Because we cut 2.25 in. of pavement, we chose to pave the 0.75-in. leveling course right behind the milling operation." About 9,500 t of leveling course was placed on the project.

Paving the surface course over a width of 21 ft. 6 in.

Following patching and laydown of the leveling course, Gallagher set up its SUPER 2000-3i to pave a 21 ft. 6 in.-wide surface with a 1.5-in. compacted lift thickness, placing two lanes of surface course with each pass of the paving operation. Initial set-up advice and support for wide paving was provided by VÖGELE's Regional Product Support Manager James Boucher and Narsingh. "VÖGELE provided technical personnel to get us set up," said Tim Murphy, Director of Construction for Gallagher. "We selected a day before the test strip was to be paved and they helped our mechanics put on the auger and screed extensions, get everything configured and checked out, and get the long skis set up. Our people were really happy with how smoothly things went with the wide paving."

Highlights of the VÖGELE SUPER 2000-3i

- › 10-foot tracked Highway Class paver with a large range of applications and paving widths up to 28 ft. 3 in.
- › Powerful Cummins engine complying with US EPA standard Tier 4f
- › Advanced design for precise material handling
- › Innovative and reliable drive concept for accurate tracking
- › ErgoPlus 3 with a number of additional ergonomic and functional advantages
- › Daily maintenance-free paver with auto-lubrication and more
- › The right screed for every application: The paver can be combined with the VF 600, VR 600 or AB 600 Extending Screeds



Quality impresses the Illinois Department of Transportation

While not unknown in North America, paving two or more lanes wide is not common here. One reason is the reluctance of government agencies to try new processes, and with good reason: They are stewards of the public's resources, and if a new process is tried and fails, the money is wasted. It makes sense to stick with the tried-and-true basics. Therefore, much depended on the success of placement of the test strip. "The test strip was exciting," Don Gallagher said. "We had a lot of executives who came out, and everybody was impressed by the job and the quality of the test strip. I believe IDOT was very happy with the test strip and because of that they allowed us to continue with wide paving for the entire project." The surface material was another Superpave mix, an IL 9.5 mm N70 (70 gyrations) PG 58-28 formula. Approximately 19,000 t of surface mix was placed, manufactured by Gallagher's own plant.

First-class performance pays off

The project fell under Illinois DOT's Pay for Performance (PFP) quality management program (QMP), in which bonuses or penalties are imposed according to two plant mix qualities which are based on the air voids in the HMA mixture and on voids in the mineral aggregate (VMA) in the paved mix. "We are getting paid based on test results from the mix, and each of these properties accounts for 30% of the overall pay factor," Trost said. "In-place density is the final pay factor and accounts for 40% of our overall pay factor. It's important to us to have good control over the mix, and making it in our own plant helps us achieve this." Ride quality is evaluated outside the PFP program. >>>



Paving team processes more than 4,000 t mix per day

"On the first day of wide paving, using a material transfer vehicle, Gallagher Asphalt was able to place some 4,400 t of HMA, placing another 4,800 t on the second day," Don Gallagher said. "We paved the four-lane S.R. 50 highway two lanes at a time," Trost said. "Our schedule was to get all the paving done in four days, so after test strip approval, we did four miles a day for two days southbound," says Trost. "Then, the following week we turned around and did four miles a day for two days northbound." "Density target for the wide lift was 93%, but Gallagher was routinely hitting 94%," Sullivan said. "The VF 600 Extending Screed was providing initial compaction." >>>



Highlights of the VF 600 Extending Screed

- › Maximum paving width 25 ft. 6 in.
- › Basic paving range 10 ft. to 19 ft. 6 in.
- › Compacting system V (vibration)
- › Smooth, robust telescoping system for precise operation at all widths
- › Capable of many screed profiles with crown and sloping extensions
- › Berm is available as an option
- › Sloping extension up to 10%
- › Innovative electric screed heating
- › Easy-to-use ErgoPlus operating system
- › Compact design allows for great visibility to all areas
- › Ideal tool for multivariable width applications and mainline paving




The VF 600 Extending Screed with 25.6-ft. kit was configured easily in the field.



Highlights of the HAMM HD+ 120i VV-HF tandem roller

- › Simple, intuitive and language-neutral operation
- › Excellent view of the machine and the job site
- › Seat-operating unit can be moved and rotated
- › Track offset for comfortable starting, pulling off and compaction at curb edges
- › 3-point articulation for even weight distribution and excellent straight travel





HAMM HD+ 120i VV-HF:
one of four breakdown rollers
following the paver in echelon.



Final compaction in 7 passes

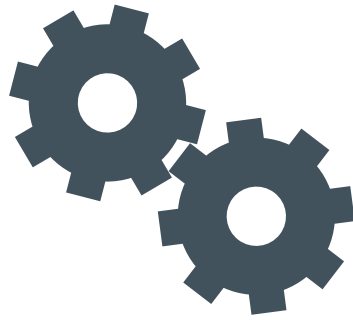
Breakdown rolling for the wide paving was done by four tandem rollers, operating side-by-side behind the paver in seven-pass echelon. Included was a HAMM HD+ 120i VV-HF. "We have four vibratory rollers upfront, running side-by-side, each making about seven passes," Gallagher said. "They're followed by two finishing rollers to get out lines in the pavement. Final smoothness is the result of consistent material supply, the paver with wide screed moving at a consistent paving speed, the MTV eliminating mix segregation, truck bumping and stops in paving, and careful and consistent compaction."

Intelligent technology documents compaction

Having that many breakdown rollers is important because the Superpave wide lift must be compacted before it loses heat. Temperatures of mix coming out of screed varied from 290 to 310 °F. On this job, a thermal sensor system that sits on the paver and measures the temperature of the mat as it emerges from under the screed. "I think it's very important going forward to know you are consistently laying down a nice temperature mat that will roll nicely, as temperature plays a big role in how well the pavement will be compacted," Gallagher said. "We also were running intelligent compaction on the rollers, logging temperature, roller speed and pass counts," he added. "Being able to pull the reports and see that we are consistently rolling the same number of passes lets us monitor the compaction process and diagnose problems if something comes up. This can show our consistency in compaction, which will point to something else having gone wrong if there is an issue." Because Gallagher was using a variety of roller makes, they were using a third-party IC system on the breakdown rollers.

Leading technology and outstanding service make the difference

"WIRTGEN is a reliable brand we've stuck with," he added. "They're responsive and good to work with. And if we need anything, WIRTGEN and our distributor Roland Machinery are fantastic to work with. If we ever have any issues, they jump on them right away." Gallagher also has a variety of HAMM rollers ranging from 48 in. to 66 in.-wide drums, as well as a fleet of HAMM HD CompactLine rollers. And it uses HAMM HD+ 110i VT and HD+ 70i VT combination smooth drum/pneumatic-tire rollers in their hot in-place recycling operations as well as conventional HMA paving. ///



Diamond bite

WIRTGEN is the market leader in cutting technology, offering customers a wide range of high-quality, cost-efficient solutions for all kinds of asphalt and concrete milling applications.



Thanks to cutting technology, one of WIRTGEN's core competences, and premium machines, WIRTGEN offers perfectly matched milling solutions.

WIRTGEN is continuously improving the components that form part of its cutting technology to maximize the performance of every cold milling machine. Field experience and customer feedback are important factors feeding directly into the development process.

Cutting solutions for every application

WIRTGEN offers not only the complete range of point-attack cutting tools, but also the PCD milling tools. PCD stands for polycrystalline diamond – a highly sophisticated, synthetically manufactured, strong mixture of carbon and carbide. A PCD tip consists of different layers: concentrated diamond particles in the upper layer, the interlayers and a tungsten carbide substrate. Depending on the application, PCD tools are a useful addition to the existing cutting-tool range with conventional carbide tips. A PCD milling tool must achieve at least 50 times the service life of a regular carbide milling tool (depending on the milled material) to obtain a cost benefit per volume unit, when comparing acquisition costs. Reductions in fuel consumption and labor times, achieved with reduced machine downtimes for milling tool changes, boost the cost benefit of the PCD. Thanks to their advanced tool geometry and material, PCD milling tools are particularly suitable for surface layer rehabilitation. The tools offer an exceptionally long service life due to the highly wear-resistant tool tip made of polycrystalline diamond. Optimum evenness over the milled surface and a consistently high machine feed are ensured by the very minor lengthwise wear.

Increased flexibility with FCS Light

The WIRTGEN Flexible Cutter System – or FCS Light for short – is a key factor for the economic operation of large milling machines. FCS Light allows for the rapid, easy exchange of same-width milling drums in less than two hours typically. The system allows one machine to be used for a broad range of applications with minimal downtime when exchanging drums. Offering maximum flexibility, WIRTGEN FCS Light is the ideal complement to PCD tool technology, since conventional carbide tools may be more economical for some applications while PCD tools may be more economical for others. WIRTGEN FCS Light provides opportunities for contractors to combine the best of both worlds in one machine.

Perfect combination: HT22 and PCD

The time spent on toolholder maintenance is a crucial factor in any application. Combining the HT22 toolholder with PCD milling tools delivers an advantage over all other available toolholder systems by reducing this maintenance time. The maintenance requirements of the HT22 (e.g. tightening of bolts) is in line with the lifetime of the PCD tool upper section (carbide/PCD combination). ///

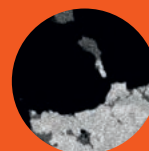
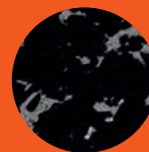
Schematic diagram of a WD2-15B/HT22 PCD tip

- 1 > PCD tip
- 2 > Carbide bolster
- 3 > Steel body



Polycrystalline diamond

Tungsten carbide substrate
(base of the PCD tip)



Precisely engineered
polycrystalline diamond
composite material ("interlayer")

**The WIRTGEN 4200 SM cuts lignite
12 in. deep. It also pre-crushes the
coal prior to loading.**



Titans in Texas

Two type 4200 SM WIRTGEN surface miners are bringing light to South Texas and Northern Mexico.





Eagle Pass // Texas

A WIRTGEN 4200 SM is extracting sub-bituminous coal at an open-cast mine owned by the North American Coal Corp. in Eagle Pass, Texas, USA - right on the border with Piedras Negras, Coahuila, Mexico. The extracted coal is then transported over the border by train to a multi-unit power plant in Coahuila. Meanwhile, at another open-cast mine in Texas, another 4200 SM is extracting lignite, just as economically. The two surface miners - the largest models in WIRTGEN's product range - went into operation in the last two years and are extracting coal with a low sulphur content, operating 24/7. The 4200 SM is 21 ft. 5 in. high and has an operating weight of 450,397 lbs. It is powered by a highly efficient diesel engine with 1,500 hp. When cutting soft material such as coal, limestone or gypsum, the 4200 SM cuts down to a depth of 32 in. using a 13 ft. 9 in. wide milling drum and operating in an up-cut direction. >>>

**Sub-bituminous coal in Eagle Pass:
New mine, new extraction method**

Eagle Pass Mine is located in an area which has been worked for coal since as early as the late 19th century. Piedras Negras, the name of the town on the other side of the border, translates as “black stones”, a reference to the coal deposits located there.

“Every ton we extract goes to a coal-fired power plant in Mexico,” says John C. Duffey, P.E., Chief Engineer of Camino Real Fuels. A subsidiary of the North American Coal Corp., this company operates the mine for the owner, Dos Republicas Coal Partnership (DRCP). Eagle Pass has replaced the depleted open-cast mine Siglo XXI (21st century) in Mexico, on the other side of the Rio Grande – or Rio Bravo, as it is known in Mexico.

Achieving a high exploitation of deposits

At the mine, a 6,300-acre area is available for coal extraction, offering sufficient deposits for 8 years of mining work. The total quantity of deposits is much larger, however. One special feature of this location is the fact that the seams are very thin, some of them only 6 in. thick. “And this is precisely where the WIRTGEN surface miner proves invaluable. We use it to selectively extract coal from the rock. This enables us to achieve a high material quality,” explains Duffey.

The four seams lie beneath a 60-ft. layer of top soil and overburden, in a series of layers around 20 ft. thick. “Barely 5.5 to 6.5 ft. of this is coal,” says Duffey. “We conduct preliminary examinations in an attempt to find out exactly how much coal there is under the surface, but we are often surprised.”



Job site details

2 WIRTGEN 4200 SM machines mining coal in Texas

Working parameters

- Cutting depth: 0-2 ft. 9 in. (soft rock)
- Cutting width: 13 ft. 9 in.
- Cutting performance: up to 3,000 t/h

Extracted material

- Sub-bituminous coal
- Lignite

Machines in operation

2 WIRTGEN 4200 SM



The loading conveyor of the 4200 SM can be slewed 90° to either side.

The 4200 SM transfers a 250-t payload onto dumpers. They transport the coal to a transshipment center equipped with five grizzlies and conveyors. Each grizzly supplies one loading conveyor which transports the coal to the train-loading station.

Maximizing coal recovery by minimizing fines

"The thin seams can be mined precisely with the WIRTGEN 4200 SM, which also saves us a great deal of money for processing," says Duffey. "We don't need a primary crusher at the transshipment center anymore, because the 4200 SM crushes the coal directly during loading." The surface miner crushes the coal to a maximum size of 4 in. while minimizing fines. As coal fines tend to block the loading conveyors at the transfer points when there is a high moisture content, a low proportion of fines is a great advantage.

"Blasting, excavating and loosening – the 4200 SM does away with all this," explains Duffey. "We don't have a permit for blasting and we don't blast coal or surrounding rock. Almost 95% of our coal is crushed and loaded by the 4200 SM. The remaining 5% – for instance, material located in inaccessible corners or right at the end of a drift – is broken up by bulldozers and loaded by front loaders." >>>



≤ 95%

of the existing coal is being mined by the 4200 SM – that makes the giant particularly efficient.

Lignite in South Texas: Fast loading

At the other open-cast mine in Texas, the lignite used to be extracted by two smaller, older surface miners. The WIRTGEN 4200 SM was bought in 2014, when these two miners were approaching the end of their service lives. The 4200 SM is technologically superior in terms of its hydraulics and control system. What is more, it loads dumpers 30 to 40% faster than the older models, the drivers laud the WIRTGEN model. "I love this machine," says the thrilled driver of the 4200 SM, as he stands beside his equipment. "The 4200 SM runs much more quietly than our previous surface miner.

The cabin is very comfortable and the machine is so easy to operate. The video cameras also show me the area directly behind the cutting drum unit, ensuring that I don't penetrate too deep into the interburden." Compared with the mining methods used in the past, the 4200 SM produces fewer fines and more material in the target grain size. The selective mining method extracts material with a high degree of purity, reducing coal washing costs at the processing plant. This also enhances the quality of the end product, enabling the coal to be sold at a more profitable price.



Surface Miner = Mining made easy!



WIRTGEN surface mining - a single operation instead of four. The mining material is cut, crushed and, if required, loaded straight into trucks or dumpers in a single operation, thus dispensing with conventional primary crushing in an additional work step. The surface mining process is much more economical than standard drilling and blasting methods with subsequent material loading.

The 4200 SM from WIRTGEN crushes the lignite to a maximum grain size of 4 in. during the mining process.





Lignite loading: The driver loads a tandem coal train within minutes in the mine in South Texas; this then drives some 16 miles to unload the material at the power plant.



WIRTGEN surface miners: Economical and safe

In many cases, the use of surface miners offers a more economical, eco-friendlier and safer alternative to conventional mining which can require drilling and blasting. The surface miner can cut, crush and load the material in a single pass. Dispensing with drilling and blasting, the application causes no destructive vibrations, making this process a great deal safer. Dust and noise pollution is also much lower. As a result, material can be extracted in areas directly adjacent to residential areas and industrial estates. Apart from reducing machinery and personnel costs, the process also saves time over conventional methods. Furthermore, surface miners produce level, stable surfaces – a great advantage for mine logistics as it means that ordinary trucks can travel over the routed access roads. Not only can they transport the material faster, they are also more cost-effective to acquire and maintain than dumpers.

Efficient material extraction

Surface miners operate in a similar way to road milling machines working on asphalt or concrete. A special cutting drum cuts and crushes the material. Robust loading conveyor systems then load the material onto trucks or dumpers or deposit it in windrows behind the machine. Alternatively, the material can also be sidecast. A high-precision, automated leveling system ensures a constant cutting depth. This extremely precise method supports selective mining of a wide range of materials – for instance, coal, limestone, gypsum, salt, bauxite, iron ore, etc. The mechanically driven cutting drum, on which the cutting tools are arranged in a helical pattern, work against the direction of travel, cutting the material and crushing it. Ejectors on the milling drum help to transfer the material to the loading conveyor system. The main loading conveyor takes the material from the drum housing and transports it to the rear of the machine, where it is then transferred to the slewing, height-adjustable discharge conveyor. The discharge conveyor loads the material onto trucks or dumpers or sidecasts it alongside the machine. The height of the discharge conveyor can be adapted flexibly to the height of any transport truck. ///



The Inset paving on KY 80
using a WIRTGEN SP 25i
required an uphill climb.



Leveraging technology



A Kentucky concrete slipforming contractor has moved in a big way into curb, gutter and parapet construction by utilizing the advanced technology available to them.

Kentucky // USA

Fox Enterprises now constructs offset curb, gutter and parking lot "island" placements using an on-site guidance system. The system permits automated placement of those items, including tight radii. Its fleet recently expanded to include a larger slipform paver that can do offset curb-and-gutter paving, but also inset pavement slab paving. "We want to be the best there is, and for that we need to buy the best technology available," said Ed Chenault, President, Fox Enterprises, Richmond, Kentucky. "Automated control of the paver is the future. My daughter some day will take over the reins of the company, and I want to have the next generation of paving technology available to the next generation of management. I didn't buy the new slipform pavers for a five-year plan, I bought them for the long haul, the future of the company." To this end

Fox bought two WIRTGEN SP 15i slipform pavers with exclusive AutoPilot control technology in 2012 and 2014, and followed up with the next-sized model, the SP 25i in late 2016. »»



Job site details

Concrete paving projects in Kentucky in different applications - inset and offset

Applications

- Offset: curb, gutter and parking lot “island” placements using AutoPilot
- Inset: tracks and roads up to 12 ft. wide

Machines in operations

- WIRTGEN SP 15i (offset)
- WIRTGEN SP 25i (inset and offset)

Fox President Ed Chenault and Vice President Samantha Chenault; the company is buying advanced technology as it plans for future generation ownership.





Cost-efficient WIRTGEN technology

"The bottom line is that with this technology, on many projects we can install curb at a lower cost than before," Chenault said. "We've overcome the challenges that you get with any kind of new technology. Now that we know the machines' capabilities, we are getting more efficient in their use. We're developing more and more opportunities to put them to work, and are pursuing other contractors that are using similar technologies, because they understand the advantage of competitive pricing with higher technology."

Top precision thanks to AutoPilot

"The WIRTGEN AutoPilot technology is really cool, and I use GPS daily," said Samantha Chenault, Vice President, Fox Enterprises. "If we can advance the technology with the kind of work that we are doing and keep up with the times, this is the best way to do it." Quite often Fox will serve as a subcontractor, which was the case when it was placing curbs, gutters and islands in a reconstructed parking lot for a major manufacturer outside Lexington, Kentucky. Chenault was working on a stormwater improvement and parking lot expansion there. "Using AutoPilot, we installed a large number of trench drains, and were placing curb and gutter to tie into the trench drains," he said. "We have more success with the tight radius for curbs using AutoPilot than we do with stringline." To use AutoPilot, Fox has to select the right project and mate the AutoPilot to the project, Chenault said. "It depends on the general contractor we are following," he continued. "The general has to buy in to the utilization of the technology. We have found that most of our contractors and customers welcome this technology with open arms, because they understand the need for better technology." >>>

The bottom line is that with this technology, on many projects we can install curb at a lower cost than before.

**Ed Chenault, President
Fox Enterprises, Richmond, Kentucky**

”

Work more effectively

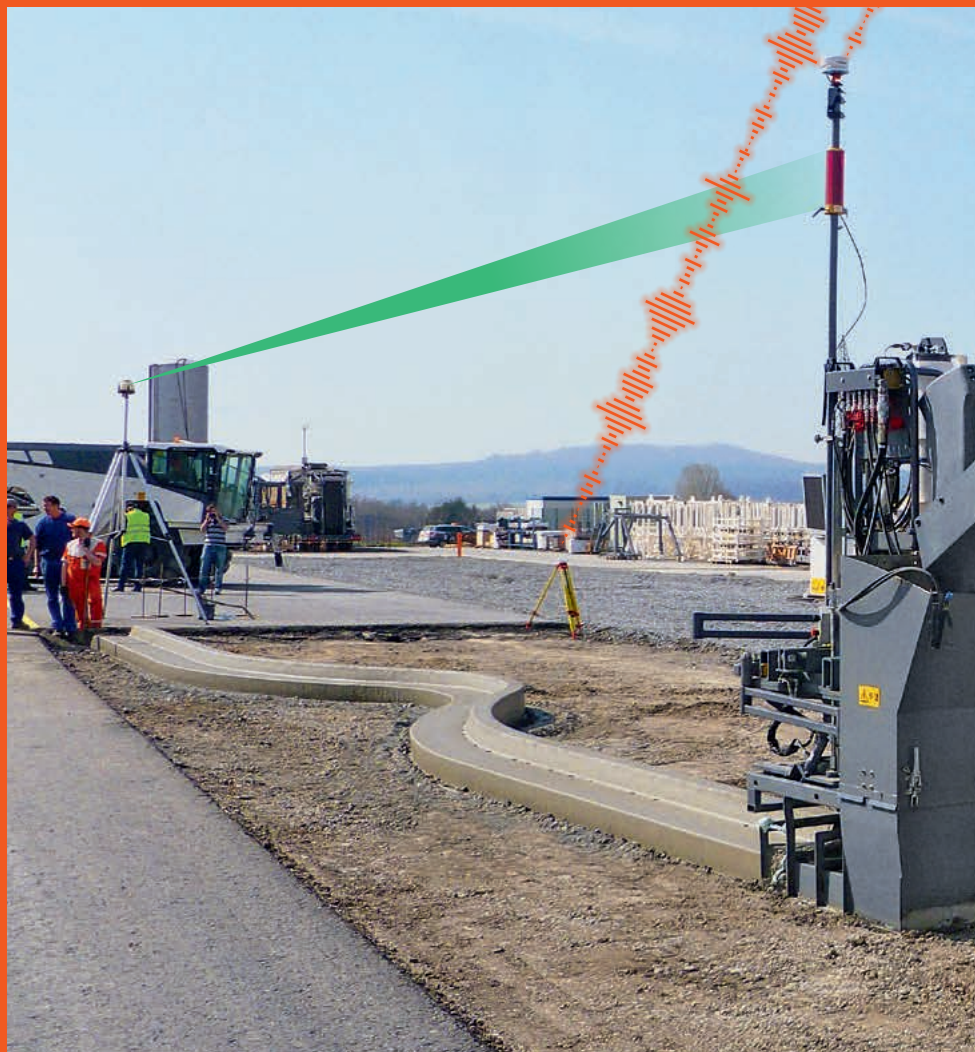
The WIRTGEN AutoPilot is a pioneering 3D control system for use with the WIRTGEN SP 15i and SP 25i slipform pavers. It is a user-friendly, cost-effective system for the construction of poured-in-place concrete profiles, such as curbs or safety barriers, in offset application. The GPS based system guarantees high precision and maximum efficiency, regardless of whether straight profiles, highly complex curved profile paths, or even closed profile configurations need to be paved. The AutoPilot enables fully automatic, high-quality paving at extremely small radii of merely 2 ft. with great ease and without the use of stringlines. This entirely dispenses not only with the time-consuming work of surveying but also with the installation and removal of stringlines. The WIRTGEN AutoPilot also automatically negotiates any obstacles on the job site, such as manhole covers. The proprietary WIRTGEN 3D control system gives construction companies a distinct competitive edge, for it pays off

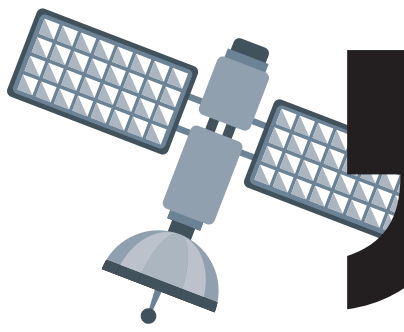
quickly and opens up new fields of application. Establishing a digital terrain model is not required as programming of the profile path or profile configuration is completed on site. The system comprises a computer integrated in the machine as well as a control panel. Two GPS receivers, mounted on masts on the machine, communicate with an additional GPS reference station positioned on site. The machine control software is a proprietary WIRTGEN development. The system is handled skillfully even by inexperienced personnel after only a short period of time. After positioning the total station and laser on the job site, the slipform paver is taken to the specified starting position and heading. Parameters are directly entered into the system via the rotary push-button and function keys at the clearly structured control screen. Menu navigation is self-explanatory, and graphics visualize the various profiles and profile configurations. ///

Automatic paving in six steps

Programming the WIRTGEN AutoPilot is a matter of mere minutes. In a first step, the machine operator selects a profile configuration at the control panel. Next he enters length, width and radius of the configuration to establish the steering path of the slipform paver. The starting point is determined in a third step, followed by machine level and elevation profile. In a final step, the machine operator determines the cross slope. A laser sensor or sonic sensor mounted on the slipform paver scans the ground surface to ensure precise level control. The fully automatic paving operation commences.

Previously programmed profile configurations can be saved and retrieved as required. The operator is in full control during the entire process. He can intervene in the automatic paving operation at any time if necessary, for example, to modify the machine's level and angle of incline.





“

**The WIRTGEN
AutoPilot convinced me
one hundred percent.**

**Samantha Chenault, Vice President
Fox Enterprises**

”



**Fox is able to utilize existing mold inventory,
mating them to the WIRTGEN SP 15i.**





The Innovation

RoadScan, the temperature-measurement system by VÖGELE, proves its credentials during roadworks on Route 220 in Greensboro, North Carolina - teamed up with an MT 3000-2i Offset PowerFeeder and a SUPER 2100-3i paver.





**that makes quality
measurable**



Job site details

Complete removal and reconstruction of several sections on Route 220 near Greensboro, North Carolina

Working parameters

Paving width: 12 ft.
Paving thickness: 4 in.
Paving speed: 30-100 fpm

Equipment

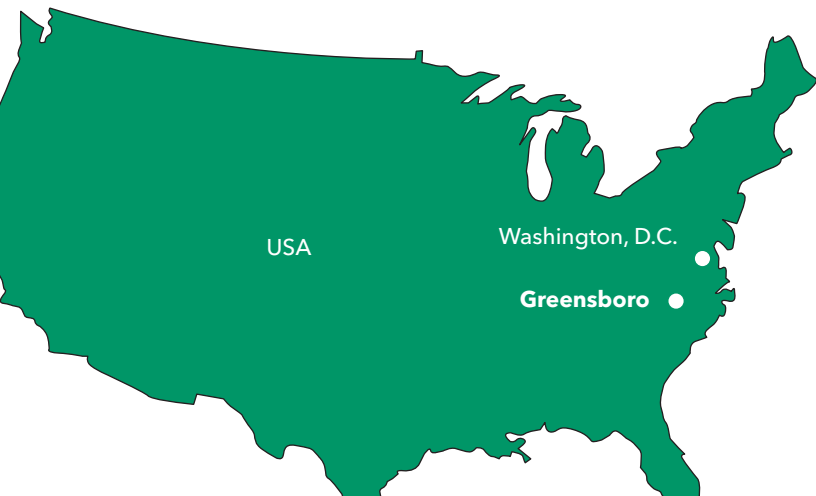
VÖGELE MT 3000-2i Offset PowerFeeder
VÖGELE SUPER 2000-3i paver
with VF 600 Extending Screed and
RoadScan temperature-measurement system



”

**It was astonishing
how smoothly
RoadScan worked
from the very beginning.**

**Richard Rizzo, Paving Superintendent
Thompson-Arthur**





Greensboro // North Carolina

Proving the high quality of asphalt paving is a key concern in the road construction industry around the world, and most particularly in the USA. Maintaining a consistently high material temperature immediately after paving has a crucial impact on quality. Indeed, this is the only way to ensure that an adequate timeframe is available for final compaction by rollers. Proof of the paving temperature is being increasingly requested, specifically in several US states. This is good reason for Thompson-Arthur to take the lead in this development. The construction company from Greensboro, North Carolina, invested in RoadScan, the temperature-measurement system from VÖGELE. This innovation was used for the first time during the complete removal of several sections of Route 220 in the metropolitan area of Greensboro, practically on the company's own doorstep.



The VÖGELE RoadScan system measures the temperature in real time

VÖGELE's new RoadScan technology not only delivers proof of quality for clients and contractors once the construction work has been completed, it assists users during the construction process itself. If, for example, feed trucks arriving at the job site deliver a mix load that has already cooled down too much, the paving team can react immediately and actively influence the quality parameters specified. This is made possible by real-time thermoscan photos shown on the color display of the SUPER paver operator's ErgoPlus 3 console. The paver at the Greensboro job site was a SUPER 2000-3i. From now on, whenever Thompson-Arthur completes a project, it will have a detailed report proving that the work was performed within the correct temperature window - thanks to the GPS reports, including precise geodata. This data can be easily read out via a special USB flash drive, and analyzed on a PC using the WITOS Paving Analysis software. You can read more about RoadScan technology on Page 38 ff. »»

MT 3000-2i PowerFeeder ensures non-stop paving processes

Of course, there is a lot more to high quality paving than just measuring, monitoring and recording the correct asphalt temperature. Above all else, the conditions required to maintain the correct temperature first need to be created – along the entire width and length of the job site. Material feeders are effective instruments in this context, laying the basis for continuous paving processes. Decoupling the transfer of material from the feed truck to the paver ideally allows paving to be carried out without interruption. It eliminates a possible source of paving errors by preventing paver standstill, which can lead to the mix cooling down in front of the screed. Another key advantage is that the jolts generated by the feed trucks docking onto the material feeders are not transmitted to the pavers, and are therefore also not passed on to the screed. This means that the freshly paved

surface bears no signs of these impacts. Thompson-Arthur consequently opted for another VÖGELE innovation on Route 220: the cutting-edge MT 3000-2i Offset PowerFeeder. The VÖGELE PowerFeeder contributes not only to productivity and quality but also to occupational safety. “Working with this material feeder is so much more relaxed and it provides a much better overview. The driver’s seats offer greater stability and provide operators with an unobstructed view of their entire surroundings,” says a delighted Richard Rizzo, Paving Superintendent at Thompson-Arthur.

Superb paving conditions for the SUPER 2000-3i

The conditions for high-quality asphalt paving results were ensured with the help of the VÖGELE PowerFeeder and the RoadScan temperature-measurement system. The paving itself was a job for Thompson-Arthur’s SUPER 2000-3i machine. “The paving job



The VÖGELE MT 3000-2i Offset PowerFeeder also ensured that the paving team was able to work without interruption on the Greensboro job site – an essential factor for top paving quality.



was all in a day's work for our SUPER 2000-3i. Our relatively new VÖGELE paver has already paid off in hundreds of operating hours, and excels in terms of its technical advancement," explains Rizzo. "All the members of our paving team have become real fans of this technology, and could operate the machine in their sleep. You can see this in the results."

ErgoPlus 3 by VÖGELE: Intuitive operation of paver and material feeder

When it came to operating VÖGELE's new PowerFeeder, however, the paving team was not so well versed. "But the ErgoPlus operating system made it easy for us to learn the ropes. As a paver operator, I'm already familiar with the operating consoles on the SUPER pavers, so I had a perfect command of the machine from the word go. In addition to the operating console, the MT 3000-2i Offset PowerFeeder also has a joystick for controlling the pivoting

conveyor. Operation is unbelievably simple and the joystick is highly responsive. The possibility of pivoting the conveyor is a huge asset, too. Other material feeders cannot do this. I can imagine us working on job sites in the future where this technology will give us a previously unthinkable degree of flexibility – for example, because the paver can also be fed from the side," explains Undra Robinson, Paver and Material Feeder Operator at Thompson-Arthur. The challenges of the complete pavement removal and reconstruction job on Route 220 did not end with the asphalt paving. "For me, it was exciting to see how practical RoadScan is in real-life application," adds Rizzo. >>>

Highlights VÖGELE MT 3000-2i Offset PowerFeeder

- › Continuous paving with a total storage capacity (material feeder and paver) of 39 t and a conveying capacity of 1,320 t/h
- › Non-contacting material transfer ensures maximum paving quality
- › Homogenized material in the receiving hopper of the material feeder from conical augers
- › Wide range of applications thanks to the pivoting and inclining conveyor
- › Ease of operation based on automatic distance control and anti-collision protection
- › Excellent visibility from the convenient and practical ErgoPlus operating system
- › Perfect balance of power and fuel economy from the powerful Deutz diesel engine delivering 215 hp (160 kW) at 2,000 rpm
- › The undercarriage with its rubber tracks and high precision drive components provides excellent maneuverability, flotation and traction while enabling paving speeds of up to 250 fpm



Thanks to RoadScan, the paving team has everything under control

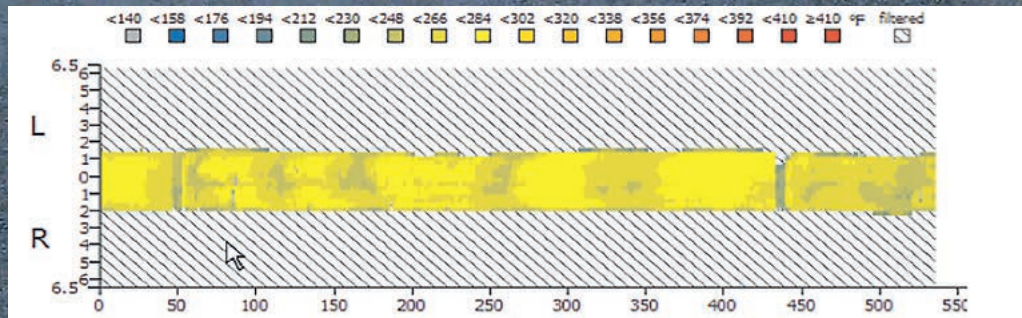
ErgoPlus 3 is also the key word when it comes to monitoring the paving temperature in real time. The current paving temperature is displayed continuously on the color display of the paver operator's ErgoPlus 3 console, provided the requisite menu has been activated. "At the touch of a button, I can see on the thermoscans exactly how high the temperature behind the screed is. All that's needed is a brief glance, thanks to the perfect contrast and clear colors; VÖGELE has done a really good job in this respect. There's no need for a second monitor in an improvised holder on the paver operator's platform," reports Hector Altamirano, a Thompson-Arthur paver operator, happily. "For me, it's super to be able to monitor the temperature myself. Without a real-time display, the system would only be of use when paving is finished, but this way, it supports us during the paving process itself. It really is a great help in delivering quality. Whenever I'm asked if everything's alright, my answer is 'Of course!' and not 'I think so'. This gives me a great deal of security in what I'm doing – and quite simply, a good feeling."

Consistently high quality at all paving speeds

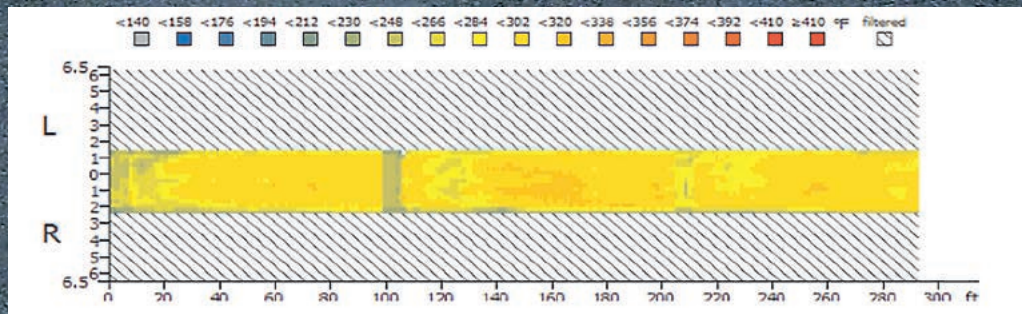
However, the sixty-four million dollar question is: How well did the high-tech equipment perform on the job? "It was astonishing how smoothly everything went. We had defined several sections on which we wanted to work at different speeds. We found that both the paving team and the technology took a fast paving speed in their stride," comments Richard Rizzo. Reconstruction of Route 220 started on a 550 ft-long section, on which the SUPER 2000-3i and the MT 3000-2i Offset worked at 30 fpm. Further sections followed at a faster pace. Beginning at 40 fpm, the paving speed was first raised to 80 fpm and then to 100 fpm – a pace that was sustained on all further sections of the Greensboro project. The specified minimum surface temperature of 250 °F behind the paver was reliably maintained on all sections, even at high paving speeds, as the RoadScan thermoscans impressively prove. As a result, Thompson-Arthur complied with the criteria specified by the Minnesota Department of Transportation (MN DOT), just as intended. ///

Whenever I'm asked if everything's alright while I'm paving, I say, 'Of course!' – thanks to RoadScan. A good feeling.

**Hector Altamirano, Paver Operator
Thompson-Arthur**



Paving at a relatively low speed of 30 fpm: The thermoscan of the RoadScan system provides proof of continuous paving and a uniform temperature distribution ($> 250^{\circ}\text{F}$).



Paving at a relatively high speed of 100 fpm: The high quality of both the RoadScan thermoscan and the resultant pavement ($> 250^{\circ}\text{F}$) remains unchanged.



A milestone in pavement quality

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





Highlights of VÖGELE RoadScan

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

Making quality measurable is one of the big issues for contractors and clients worldwide. One of the key criteria for the longevity of roads is maintaining a consistent paving temperature. As a result, the importance of area-wide temperature monitoring is rising sharply. With RoadScan, VÖGELE's non-contacting temperature-measurement system, the WIRTGEN GROUP is on the leading edge of this future trend. The innovation was presented to a multitude of professionals from the industry at Conexpo 2017, where it generated tremendous interest.

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



1. Seamless temperature measurement in a range of approx. 6 ft. 7 in. behind the screed.

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

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

High-precision infrared camera with 100% measurement coverage

The heart of the RoadScan system is an infrared camera which scans the area of freshly paved asphalt 6 ft. 7 in. behind the screed. The high degree of precision is unparalleled, it records grids of 10 x 10 in. over a measuring width of 32 ft. 10 in. Each of these squares contains up to 16 single measuring points which are then used to calculate a mean value. That allows the system to capture the newly paved surface with no gaps, and so no theoretical or computed values need to be added. The measurable temperature range of RoadScan lies between 32 °F and 482 °F with a tolerance of $\pm 2\%$ of the measured value. The purpose of RoadScan's other components is to capture the base temperature before paving (pyrometer), record precise positional data (high-precision GPS receiver) and document the wind strength and direction, ambient temperature, air pressure and humidity (weather station available as an option).



Integration into ErgoPlus 3

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

Encrypted recording of measurement data

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







Top level asphalt compaction

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

At Eindhoven Airport, the Dutch construction company BAM Infra bv used 25 HAMM rollers to compact the surface course of the 1.9 mi.-long and 148 ft.-wide runway. The lion's share of the compaction work was done by 10 state-of-the-art, pivot-steered HAMM tandem rollers of the DV+ series. Thanks to the intelligent compaction technology in the rollers and the use of the HCQ Navigator measuring and documentation system, the 161,460-square yard asphalt surface was compacted extremely homogeneously. »»



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



Job site details

Surface course rehabilitation of the runway at Eindhoven Airport

Working parameters

Paved area:	161,460 yd²
Width of runway:	148 ft.
Layer thickness:	1.6 in.
Quantity of mix:	11,575 t

Equipment

- 5 WIRTGEN W 210i cold milling machines
- 4 VÖGELE SUPER 1800-3i pavers
- 4 VÖGELE SUPER 1900-3i pavers
- 1 VÖGELE SUPER 2100-2 paver
- 5 HAMM DV+ 70i VO-S tandem rollers with HCQ Navigator
- 5 HAMM DV+ 90i VO-S tandem rollers with HCQ Navigator
- 15 HAMM HW 90B static rollers

The great benefits of HAMM's bauma innovations in everyday job-site operations emerged during rehabilitation of the asphalt surfacing at Eindhoven Airport in June 2016. Maximum quality was required on the 161,460-square yard area, as the 1.6 in.-thick asphalt surface course had to be paved and compacted uniformly, without any seams or joints.

11,575 t asphalt paved in one pass

When the surface course had been milled – a task completed in two days by Dutch milling company Freesmij using 5 WIRTGEN large milling machines – the new asphalt surfacing was paved on a Sunday. The day of the week was chosen intentionally, as this was the only possibility of supplying the required 11,575 t of asphalt from five mixing plants on the very busy Dutch highways in a single day. A fleet of 130 trucks supplied the total of 9 VÖGELE pavers that laid the 148 ft.-wide asphalt strip "hot to hot" in one pass, working in a V-formation.

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

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

DV+ tandem rollers: Precise and productive

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

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

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



Easy Drive for intuitive operation

Easy Drive is a perfect example of how a great solution can be advanced successfully. HAMM has been setting the pace in user friendliness for many decades. This time around, developers took another critical look and came up with the Easy Drive concept. The result is impressive: With the Easy Drive operating concept, even complex functions can be intuitively controlled and the operators can always react quickly and appropriately. This is possible due to

the intuitive layout, a good overview of the operator's platform and minimum learning time (see information box).

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



Easy Drive: The simple and clearly designed operating concept

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



One operating concept for all rollers

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

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



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

HCQ Navigator optimizes compaction processes

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

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

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

Debut with five rollers in a wifi network

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



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

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

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

Documentation included

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

Quality demands met

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



The EVOLution continues

KLEEMANN product campaign for the new MOBISCREEN EVO screening plants





MOBISCREEN EVO for flexible applications

KLEEMANN is extending the EVO range by a total of 4 classifying screens; the double-deck screening plants MS 702i EVO (with a screen surface of 7 m² on the upper deck - this corresponds to 5 ft. 1 in. x 14 ft. 9 in.) and MS 952i EVO (9.5 m² - this corresponds to 5 ft. 1 in. x 20 ft.) as well as the triple-deck screening plants MS 703i EVO and MS 953i EVO. All four are equipped with crawler tracks. As with the crushing plants of the EVO range, the classifiers with their compact transport dimensions and short setup times meet the demands of contractors.

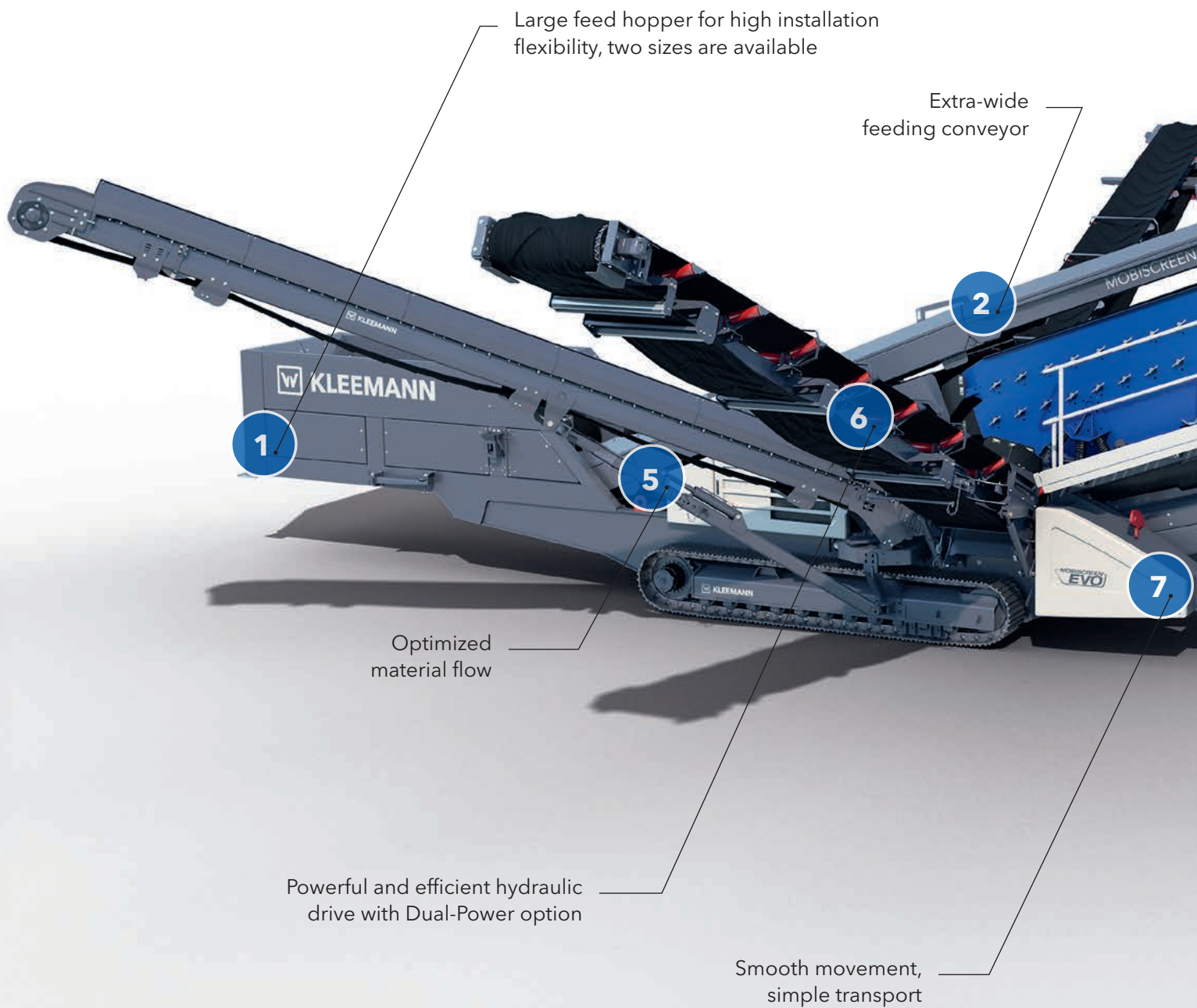
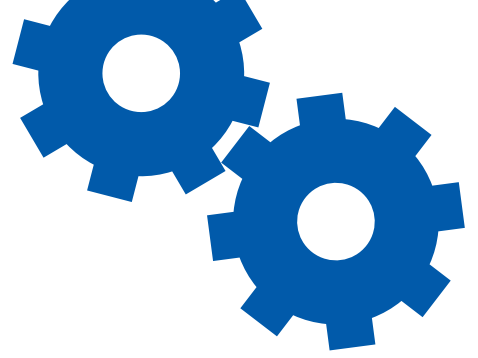
Well-configured material flow for high outputs

The MS 702i EVO and MS 703i EVO plants achieve a maximum output of 386 t/h, while MS 952i EVO and MS 953i EVO plants have an hourly output of up to 551 t/h. The main factor contributing to this high output is the well organized material flow through the plant. This starts with the material feed. With the generously dimensioned feed hopper, the MS EVO screening plants can be supplied with material by a wheel loader or an upstream crushing plant. The material is transported on the extra-wide 4-ft. feeding conveyor to the screen box. The screen angle can be adjusted as required, supporting flexible adaptation of the screening plant to suit different applications. This guarantees a high quality and performance. An impact plate at the discharge point of the feeding conveyor distributes the material evenly on the screen media. The result - low wear and a high throughput.

Excellent safety standards and high operating comfort

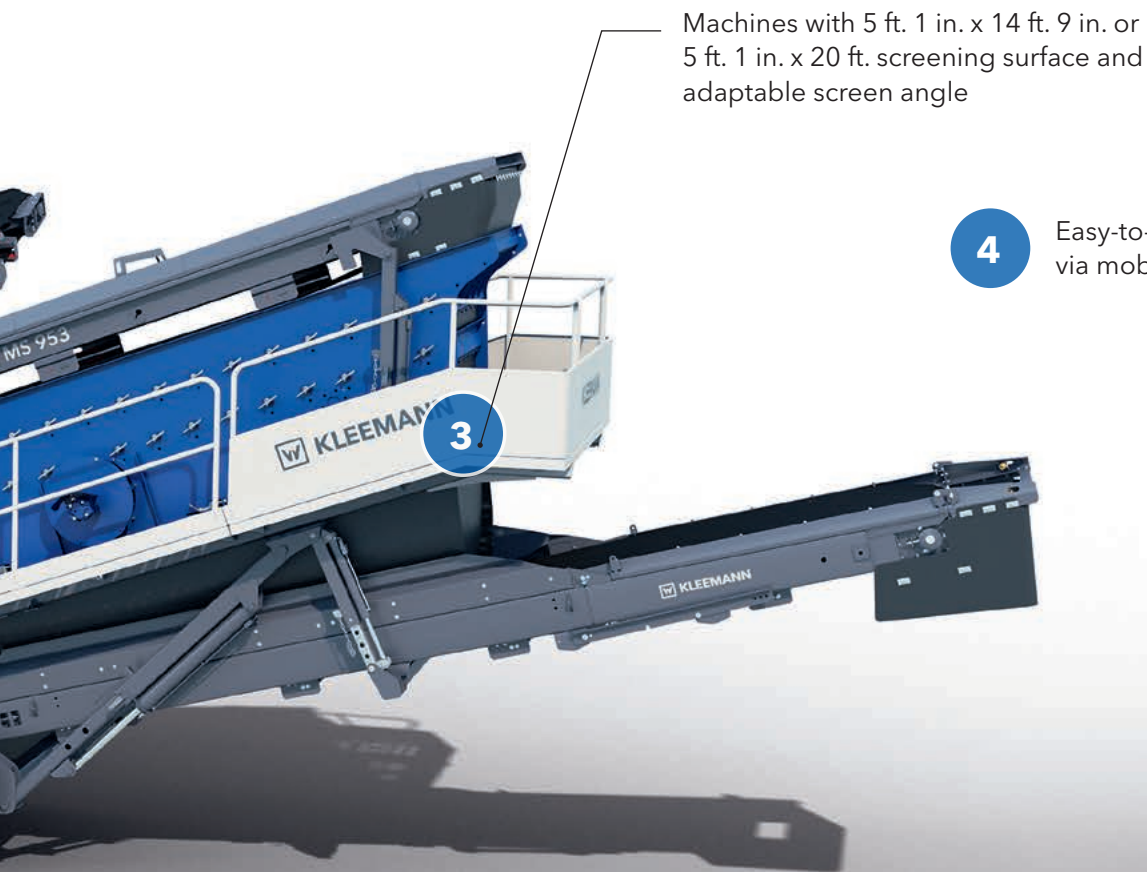
KLEEMANN has established very high safety standards for the MOBISCREEN EVO screening plants. The screening plant is operated from a mobile control panel that can be attached at three different points on the plant. This ensures that the best position can be selected for viewing the executed plant functions. In addition, the data on machine operation can be read off at the control panel. If the MS EVO screening plants are interlinked with other EVO crushing plants, all systems can be shut down in a hazardous situation by means of the emergency-off function. The lowering brake stop valves on all discharge conveyors further increase safety. They keep the conveyors in position if the hydraulic system of the plant should fail. >>>

Highlights MOBISCREEN EVO classifying screening plant



Service and maintenance - Easy screen media changes

Maintenance is an important topic in plants that often process thousands of tons of rock in each shift. On the MOBISCREEN EVO screening plants, the generously dimensioned engine compartment simplifies inspection work. Additional service elements are easily and quickly accessible from the all-round work platform with railings. Easily accessible screen decks make it easier for users to change the screen media. For example, the fine grain conveyor can be lowered to enable access to the lower screen deck. KLEEMANN also supplies a wide range of screen media, offering the right option for every application.



Machines with 5 ft. 1 in. x 14 ft. 9 in. or 5 ft. 1 in. x 20 ft. screening surface and adaptable screen angle

4

Easy-to-operate control system via mobile control panel

Technical data for KLEEMANN MOBISCREEN EVO plants

Machine overview:	MS 702i EVO	MS 703i EVO	MS 952i EVO	MS 953i EVO
Type:	vibrating screen	vibrating screen	vibrating screen	vibrating screen
Screen decks:	2	3	2	3
Screening surface:	5 ft. 1 in. x 14 ft. 9 in.	5 ft. 1 in. x 14 ft. 9 in.	5 ft. 1 in. x 20 ft.	5 ft. 1 in. x 20 ft.
Feed capacity up to approx:	386 t/h	386 t/h	551 t/h	551 t/h

“This plant is a real productivity booster.”

Taking efficiency and quality to the next level with state-of-the-art technology: The new KLEEMANN MOBIREX MR 110 Zi EVO2 impact crusher in service for GreenRock Recycling breezes through one week's worth of work in just one to two days.



Job site details

Recycling of residual construction materials and milled asphalt to produce Recycled Concrete Aggregate (RCA) and Reclaimed Asphalt Pavement (RAP) in Clinton, New Jersey

Material

Feed material:
brick, construction materials, concrete, asphalt

Main final products:
RCA: 1.5 in.
RAP: 1.5 in. and 1.25 in.

Equipment

1 MOBIREX MR 110 Zi EVO2



Clinton // New Jersey

New crusher, higher productivity: GreenRock Recycling boosts the crushing performance and quality with a KLEEMANN MOBIREX MR 110 Zi EVO2 impact crusher. Based in Clinton, New Jersey, the company recycles a wide range of materials. Bricks, construction materials and concrete are turned into high-quality Recycled Concrete Aggregate (RCA), and the milled asphalt is turned into Reclaimed Asphalt Pavement (RAP). In addition, GreenRock Recycling extracts shale, which is used as a filler, from their own quarry. The company was not able to reach its business targets

With the MOBIREX MR 110 Zi EVO2, GreenRock Recycling succeeded in expanding their business with recycled asphalt in a very short time - and also in tapping a new line of business with DOT-certified concrete.



with its previous jaw crusher, as the crushing output was only 1,000 t per day and the crushing plant was not equipped with an integrated screening unit. As a result, the final granulations were not classified and did not comply with grain shape specifications. It was therefore impossible to satisfy the standards of the Department of Transportation (DOT) and acquire DOT certification for defined grain sizes such as 1.5 in. - a must for medium and large-scale jobs. >>>



Business targets achieved with KLEEMANN impact crusher

Investment in a KLEEMANN MOBIREX MR 110 Zi EVO2 has paid off for GreenRock Recycling. With the track-mounted impact crusher, the company also tapped into another line of business – DOT-certified concrete. In addition, business with recycled asphalt has been expanded. Meanwhile, operating costs are falling, as the diesel-direct drive of the MOBIREX MR 110 Zi EVO2 consumes considerably less fuel. The crusher is driven directly by the diesel

engine via a fluid coupling, while the conveyors and other components are driven by electric motors. Its efficient power transmission makes it the crusher with the lowest consumption based on one ton of final product. “Our old crusher guzzled 11 gallons of fuel per hour, and the KLEEMANN with its 500-hp engine consumes just 6.5 gallons per hour,” enthuses Mike Plushanski, General Manager of GreenRock Recycling. »»

Highlights of the KLEEMANN MOBIREX MR 110 Zi EVO2 impact crusher

- › Expanding system widths for optimized material flow
- › Feeding unit with hydraulic hopper folding and locking system
- › Effective prescreening with independent double-deck prescreen
- › Continuous crusher utilization due to Continuous Feed System (CFS)
- › Crusher unit with innovative C-shaped rotor ledges for superb product quality
- › Lock & Turn safety system for safe rotor ledge replacement
- › Efficient and powerful diesel-direct drive
- › Simple control with menu-based touch panel
- › High-performance final screening unit with extra-large screen surface
- › Simple loading due to greater ground clearance

”

**Our new KLEEMANN
crusher consumes
4.5 gallons less fuel
per hour.**

**Mike Plushanski, General Manager
GreenRock Recycling**

”

KLEEMANN



**More high-quality final product is
produced in a much shorter time
with the MOBIREX MR 110 Zi EVO2:
The crushing capacity is 240 t/h for
concrete and 205 t/h for asphalt.**

With the **MOBIREX MR 110 Zi EVO2**, GreenRock Recycling produces the exact grain shape and size that is required for DOT-certified concrete.



MOBIREX from KLEEMANN: The powerful impact crusher

The track-mounted impact crushers of the MOBIREX series are used for soft to medium-hard natural stone and for recycling residual construction materials. Their main advantages alongside the quality of the final product are the high operational availability, a wide range of applications and the environmental and cost benefits. In comparison to competitor products, the crushers consume the least amount of fuel per ton of final product. The MOBIREX plants guarantee a final product that meets the stringent specifications of the concrete and asphalt granulation standards with regard to grain shape, grain size distribution and cleanliness.

Prescreening for a high-quality final product

The impact crushers are equipped with a prescreening system. This lowers the wear on the crushing plant and increases the throughput as well as the quality of the final product. Material prescreening is particularly efficient with the independently vibrating double-deck prescreen of the MOBIREX impact crusher: Fines and material that already have the required final grain size are routed past the crusher via a bypass. As a result, only material that still requires processing is fed to the crusher. This also significantly lowers wear.



Main components can be controlled from the excavator

The MOBIREX MR 110 Zi EVO2 demonstrates very effectively just how simply even complex crusher plants can be operated. The main components can be conveniently and remotely controlled by the excavator operator. Start-up and basic configuration are controlled from a panel in the easily accessible control cabinet. The touch panel is hallmarked by its well-structured menu navigation, intuitive symbols and clear operating instructions. This enables the operator to start the plant in a few steps and view the statuses of all components such as the speed or temperature. Even the size of the crushing gap (CSS) can be set fully hydraulically in this way and during active operation. The operating system of the MOBIREX MR 110 Zi EVO2 therefore reduces downtimes considerably - boosting the plant's operational availability and productivity at the same time. "With the MOBIREX, I can simply make any necessary adjustments on the touch panel, for example when changing the material. This saves time and is more convenient. I used to have to clamber around on the plant with a wrench in my hand for half an hour, now I only need 30 seconds to make the adjustments," explains Mike Plushanski, General Manager of GreenRock Recycling. ///

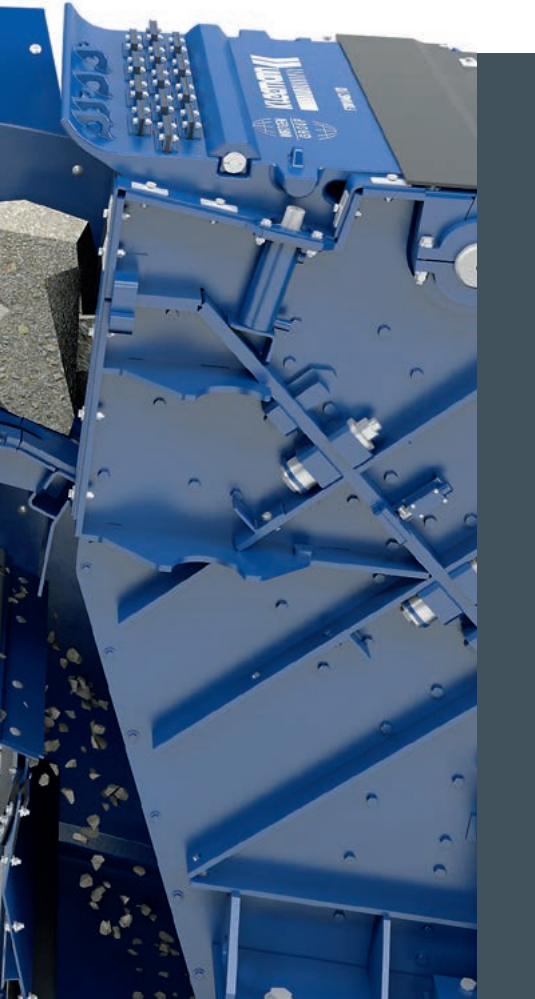




High output and product quality thanks to prescreening

How users can boost the capacity and product quality of their crushing plants.





How can I achieve high screen efficiency?

MOBILEX impact crushing plants control the layer of material and can be coordinated to ensure an optimum material layer thickness during transport to the crusher. This makes screening even more efficient and lowers wear in the crusher. Selecting the right screen media is key for efficient prescreening. The following options are available for the double-deck vibrating screen:

Upper deck with punched plate

- › Most frequent application: Recycling
- › Variable tensioning possible
- › Good separation

Lower deck with screen media

- › Different tensioning sizes possible – depending on requirements
- › Purifies the final product, for example unwanted fractions can be screened out.
- › If the feed material does not contain any unwanted fractions, a salable product can also be discharged via the side discharge conveyor.

Upper deck with grating

- › Most frequent application: natural stone
- › Larger open screen surface
- › Efficient screening of fines
- › Effective in preventing caking

Lower deck with dummy cover

- › If the feed material is free from unwanted or even hazardous fractions, the fines can be added to the final product via the bypass.

Why use a prescreen?

To ensure efficient processing, excessively fine material should not pass through the entire crushing process. The impact crushers of the MOBILEX range are aided in this respect by a double-deck prescreen. It prescreens the feed material so effectively that fines and also material with the specified final grain size are routed past the crushing chamber. This lowers wear on the plant and achieves a high throughput. Prescreening also removes impurities such as clay from the product. As the fines content is precisely controlled, operators achieve a higher-quality final product.

How does prescreening work and which types are there?

The material is fed onto the feeding unit of the MOBILEX. It is then conveyed from the vibrating feeder to the independently vibrating double-deck prescreen. Material that is larger than the openings on the upper deck passes to the crusher. Material that is small but still larger than the openings in the lower deck is routed to the final product via the bypass. Material that is smaller than the openings on the lower deck is fed to the side discharge conveyor. The material discharged from the side discharge conveyor can be further processed directly, depending on the quality. The medium grain that passes into the final product via the bypass also lowers strain on the crusher. ///

**An exciting drive through spectacular scenery:
Artist's Drive in the Death Valley National Park.**

