RoadNews for new roads

The WIRTGEN GROUP User Magazine for North America // № 04

WIRTGEN VÖGELE HAMM KLEEMANN

Cold recycling with WIRTGEN wheeled and tracked recyclers:

Full depth, maximum cost-efficiency

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Dear Reader,

The fact that our technologies bring about lasting changes in the way roads are constructed and rehabilitated is just one more testament to their success. We would like to present two of these technologies to you in more detail in this issue of RoadNews: Cold recycling with WIRTGEN's CR and WR series and the paving of ultrathin bonded overlays (UTBOs), as well as conventional asphalt layers with the SUPER 1800-3i SprayJet spray and standard paver from VÖGELE. Both of these examples highlight the innovative power and flexibility of the WIRTGEN GROUP as a whole.

In Seminole County, Florida, for instance, WIRTGEN cold recyclers, VÖGELE pavers and HAMM rollers joined forces. As part of a rehabilitation project, they simultaneously cold recycled and widened a road. The advantages of cold recycling also came to light in another project in Florida – this time in Lakeland. The method saved one-third of the total costs of a project to rehabilitate an area of 120,000 sq. yd.

Many other WIRTGEN GROUP machines and plants make a key contribution to increases in efficiency and quality – for instance HAMM's HCQ Navigator, a system for intelligent compaction control, or an ingenious KLEEMANN machine combination comprising a jaw crusher, cone crusher and screening plants. A job in New York State demonstrated just how simple the HAMM system is to operate. Our customers benefit additionally from such innovations as HAMM's new GRW 280i pneumatic-tire roller and WIRTGEN's large milling machines with micro-milling drums, which restored the race track grip at the Circuit of the Americas in Austin, Texas.

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

Best wishes,

Jim McEvoy
President & CEO
WIRTGEN AMERICA, Inc.

Recycle and widen at the same time

WIRTGEN GROUP machines work together to widen and in-place recycle Florida county road, saving taxpayers time and money.

Florida // Sanford, Seminole County

WIRTGEN, VÖGELE and HAMM machines displayed their synergies in the WIRTGEN GROUP's road technologies sector when they completed a project on a failing rural road in a rapidly growing area of Seminole County, Florida, just north of Orlando. Using the in-place recycling technology and asphalt emulsion-stabilized materials, the trio finished the project swiftly with minimal impact to traffic. Lake Markham Road in Seminole County was recycled using a WIRTGEN 2200 CR cold recycler with a working width of 10.5 ft. which fed in-place-recycled asphalt to a VÖGELE SUPER 2100-3i paver with an AB 600 TV Extending Screed. This was followed by HAMM HD+ 120i VV-HF and GRW 180i rollers. In front of the 2200 CR, a W 1000 cold milling machine was used to excavate a 2-ft. widening cut for the road. »»

Rehabilitation and widening of a county road in Florida: The WIRTGEN GROUP recycling train operated according to the down-cut principle, optimizing the cold recycling process.

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Rehabilitation including widening to 22 ft.

"We're taking a 20-ft. roadway and widening it out to 22 ft. That's why we installed a 10.5-ft. cutter drum instead of the 2200 CR cold recycler's standard 7-ft. 3-in. drum," said Tommy Donald, Regional Manager, Asphalt Paving Systems, Inc.'s Zephyrhills, Florida office. "Earlier, we made the 2-ft. widening cut, boxing it out, and now we are following with our recycling train on the main lanes, recycling 8 in. deep." At the time of the visit, APS was widening and recycling the 10-ft. southbound lane of Lake Markham Road to 12 ft. The VÖGELE SUPER 2100-3i paver used the asphalt emulsion-stabilized recycled asphalt pavement to fill the full 12-ft. width in one pass on the southbound lane. "Because we're dropping the surface an inch and a half, we're able to generate enough recycled material off the main lane to fill in the void where it was widened," Donald said. "The WIRTGEN GROUP equipment gives us the ability to widen and recycle all at the same time."

Addition of cement increases the load-bearing capacity of the recycled layer

The 2200 CR was preceded by a distributor truck placing cement on the disintegrating pavement at 22 lb. per sq. yd. "That's about 2.5% by weight of the existing material," Donald said. "In the 2200 CR, we're running 2.25 gal. per sq. yd. of cationic slow-set (CSS-1h) asphalt emulsion, with about 65% residual asphalt content." Water in the emulsion (35%) serves to hydrate the cement, resulting in a Marshall Stability value of 3500 for the stabilized product. The VÖGELE AB 600 TV Extending Screed with tamper and vibrators was achieving an average of 60 to 65% of the target density for the pavement. After rolling, the pavement was within 96 to 98% of the target density. "The beauty of doing it this way with the in-line, in-place train is that you are boxing out your widening as a 2 ft.-wide, 8 in.-deep trench in front of the train, then filling it right back in with the recycled material," Donald said. "This eliminates the longitudinal cold joint that you get with conventional widenings. It's eliminated, as you have the same type material from shoulder to crown."

Recycling and cold milling in one machine

In addition to recycling with the conventional up-cut method, the 2 WIRTGEN recycler models – the 2200 CR and the larger 3800 CR – can also perform what is known as down-cut milling, a development by WIRTGEN in its drive to optimize the cold recycling process. There – as in the case of Lake Markham Road – the recycled material is rear-loaded directly onto a paver, which immediately paves and precompacts it. Rollers subsequently carry out final compaction. The down-cut process allows the particle size to be precisely controlled during material processing, especially when milling very old and brittle asphalt roads. What's unique to these two models is that both can execute cold milling, as well as in-place recycling, after a simple conversion. This means big savings for the owning contractor and its customer, as the 2200 CR and 3800 CR are actually two machines in one. »»

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The WIRTGEN GROUP equipment gives us the ability to widen and recycle all at the same time.

Bobby Bracey, Project Superintendent, and Tommy Donald, Regional Manager Asphalt Paving Systems, Inc.

Highlights of the VÖGELE AB 600 TV Extending Screed: Virtually unlimited range of applications

- Excellent paving due to optimized geometry of the tamper bar and screed plates
- Convenient hydraulically adjustable end gates, alternatively mechanically adjustable end gates
- Highly efficient screed heating
- Safe and convenient ascent
- Hydraulic crown adjustment
- Ergonomic screed console
- Basic width of 9 ft. 10 in. (3 m)
- Maximum paving width of 31 ft. 2 in. (9.5 m)
- Screed versions TV (equipped with tamper and vibrators), TP1 (equipped with tamper and 1 pressure bar), TP2 (equipped with tamper and 2 pressure bars) and TP2 Plus (equipped with tamper, 2 pressure bars and additional weights)

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VÖGELE pavers, screeds control mixes

APS's Donald said the combination here of high-performance screed and SUPER 2100-3i – and its predecessor, also owned by APS, the SUPER 2100-2i – is essential to the success of the project. "We have an older SUPER 2100-2i with pressure bar/tamper bar screed, and the compaction results we were getting from it in the recycling train were really good," Donald said. "That heavy screed controls this kind of stiff material, especially in heavier lifts. Previously we used a different paver and screed, and the material would push that screed around, controlling the screed so to speak. The VÖGELE AB 600 TV Extending Screed gives us more control over the material." »»

Paving with the AB 600 TV Extending Screed: Equipped with a tamper and vibrators, the VÖGELE extending screed achieves a high degree of precompaction. This key advantage helps to avoid roller errors.


HAMM

Compaction with HAMM tandem and pneumatic-tire rollers

Following the paver, the HAMM HD+ 120i VV-HF tandem roller would provide breakdown compaction in vibratory, then static modes over six cycles. It was followed by the 22-ton GRW 180i pneumatic-tire roller. "It will continuously roll the surface until we achieve our density figure of 96 to 98%," Donald said. "The pavement then will receive 2 in. of hot mix asphalt surface course, placed in two 1-in. lifts by us with the SUPER 2100-3i." ///

Highlights of the HAMM HD+ 120i VV-HF: Articulated tandem roller with two vibratory drums

- 3-point articulation for even weight distribution and excellent directional stability
- Easy Drive operating concept
- HAMMtronic electronic machine management
- Excellent view of machine and job site
- Track offset for comfortable starting and driving away and compacting at curbsides
- Operating weight with cab 28,213 lbs
- Drum width 78 in.
- Emission standard EU Stage IV / EPA Tier 4
- Output of 115 kW (156 HP) at 2300 rpm

Cold recycling with the down-cut process: The milling and mixing rotor of the WIRTGEN CR 2200 cold recycler runs against the direction of travel. With additional support from the VÖGELE paver and HAMM rollers, this ensured high productivity.

Job for the VÖGELE SUPER 1800-3i SprayJet:

Spray paving today,

conventional paving tomorrow

Contractors and government road agencies in North America have been using the VÖGELE SUPER 1800-3i SprayJet paver – and its predecessor, the SUPER 1800 SF – to place ultrathin bonded overlays like NovaChip for years. But increasingly, VÖGELE SprayJet technology is being used to place standard hot mix asphalt overlays as well as ultrathin bonded overlays. The ultrathin bonded overlay is a durable pavement preservation surface treatment generally no more than 3/4-in. deep. Utilizing polymer-modified emulsion from the onboard tank, a computer-controlled spray system built into the SUPER 1800-3i SprayJet places a bond coat, also called a "tack coat", over a width of maximum 19 ft. 8 in.

Experts in sophisticated construction methods, too

On top of this tack coat, the paver immediately places a polymer-modified, open-graded surface mix – fed to it by truck or material transfer vehicle – that cures very rapidly as it's compacted by a roller in mostly static mode. The resulting ultrathin lift optimizes the use of high quality aggregates, while maintaining overhead clearances and curb reveal. And the one-pass construction process moves quickly, allowing efficient construction and return of traffic, while the open-graded mix mitigates tire noise and back spray, thus preventing hydroplaning and improving visibility in wet weather.

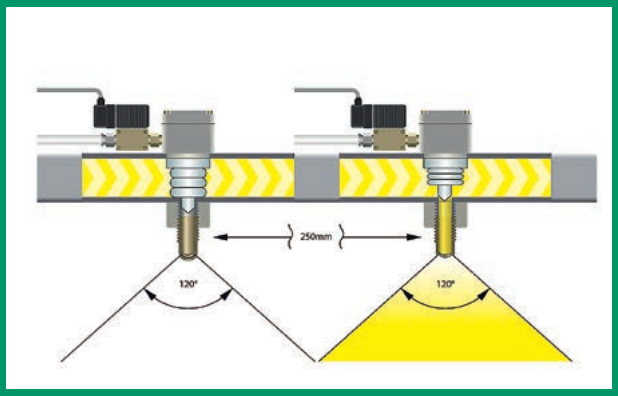
In a classic application for the VÖGELE SUPER 1800-3i SprayJet paver, in heavy traffic on Dallas North Tollway, crews of Austin Bridge & Road used its new SUPER 1800-3i SprayJet paver with an integral tack coat spray system to place a 3/4-in. polymer-modified ultrathin bonded overlay. »»

Thin overlay in Dallas

Such a thin overlay was placed on the Dallas North Tollway in summer 2018. There, Austin Bridge & Road used its new SUPER 1800-3i SprayJet paver to place 50 lane miles of ultrathin bonded overlay nonstop over multiple 48-hour shifts. The spray paver resulted in a fast-moving, clean placement of tack coat and polymer-modified thin overlay. This open-graded mix was placed 3/4-in. deep, utilizing 3/8-in. size aggregate with minimal fines. "Placement of tack coat by the paver results in superior bonding of the overlay to the pavement, with tack coat staying in place and not being tracked off the road," said Mike Kuhn, General Superintendent for Austin Bridge & Road (AB&R). "There's also less end-of-job cleanup work."

Intelligent spray technology

The VÖGELE SUPER 1800-3i SprayJet has five spray bars with a total of 24 high-quality spray nozzles. Spaced 250 mm apart with a 120° spray cone, these ensure the seamless application of emulsion. Depending on the type of emulsion and nozzle size, the rate of spread can be varied between 0.3 and 1.6 kg/m². All the paver operator has to do is set the required quantity before spraying starts. This produces a uniform film of emulsion which covers the entire surface without overlaps. The nozzles of the VÖGELE SUPER 1800-3i SprayJet operate in pulsed mode rather than continuously. This, combined with the low spraying pressure of just 43.5 lbs psi, means that misting is almost completely prevented.



Open-graded ultrathin bonded overlay placed on Dallas North Tollway at speeds of up to 60 ft. per minute and a depth of 3/4 in.

Clean VÖGELE spraying technology protects users and saves on cleanup

Austin Bridge & Road's crews also approve of the new paver. "Our crews like it," Kuhn said. "I asked them, why do you like it? They take their glasses off, look at their uniforms and say, 'No spots'! We no longer have the issue of workers covered with specks of emulsion. It also means that passing automobiles don't get tack coat on them." And that makes a big difference to the operator. "The biggest part for us is how clean it is to operate, compared to other processes," Kuhn said. "The end-of-day cleanup takes 30 minutes thanks to the integrated clean mode, compared to competitive machines where it takes over an hour. There also is no need to use plastic to clean out the spray bar. All of this cuts costs and time for us."

A tight schedule

On the Dallas North Tollway, Austin adhered to a tight schedule in which it started paving on a Friday night and continued for 48 hours straight until Sunday evening. To keep the job moving, it used an auxiliary distributor truck to supplement the onboard emulsion tank on the spray paver. "With the distributor truck hooked up, we were traveling at up to 60 ft. or more per minute," Kuhn said. "When the distributor got low we would top off the onboard emulsion tank and we would slow to 30 ft. per minute to give the truck time to refill and get back. After the refill process, we were able to get back up to 60 ft. per minute." During the ultrathin placement, Austin Bridge & Road worked with lane closures from Friday, 10 p.m. to Monday, 5 a.m. "Generally we try to be completed with the paving by 6 p.m. Sundays to allow time for cleanup and striping," Kuhn said. To keep the work moving day-and-night, all weekend, Austin kept an average of 10 trucks lined up in front of the SUPER 1800-3i SprayJet. "On that job, we had a 45-minute turnaround to refill and return," Kuhn said. "We did 41,000 sq. yd. in nine and a half hours the first night! I remember ten years ago, if you got 30,000 sq. yd., you were celebrating. And now we expect to do that every day with this paver." »»

Working 48 hours nonstop, Austin Bridge & Road crews placed ultrathin bonded overlay under heavy traffic at speeds in excess of 60 ft. per minute.

Beyond ultrathin overlays

As an alternative to spray paving, the VÖGELE SUPER 1800-3i SprayJet also can be easily adapted to conventional hot mix asphalt (HMA) paving following removal of the emulsion spray module. But now state departments of transportation are going beyond ultrathin bonded overlays as they consider the benefits of the placement of HMA mats using the built-in spray system of the spray pavers. “In the three states in which we do business, it’s a requirement for some jobs that a spray paver be used to apply the bond coat emulsion and the mix, whether for an ultrathin bonded overlay, or a conventional Superpave mix,” said Andy Ernst, Vice President for Construction Operations, Pace Construction, St. Louis. “A competitor could not have bid on this portion of the job with only a conventional paver and tack distributor truck, unless he chose to place a chip seal with asphalt overlay, a method we decided not to offer in our bid.” Spray paver-placed conventional overlays are specified at the discretion of the state, according to the job at hand. “I don’t see distributor tack and paving ever going away,” Ernst said. “Instead, spray paving for conventional HMA is just one more tool in the owner’s toolbox – another way to achieve superior pavements. It does a very good job and I see a need for both types of applications.”

Combined paving of a thin overlay and a conventional layer

On U.S. 60 in southwest Missouri, Pace uses its SUPER 1800-3i SprayJet with integral spray system not to place 3/4-in. ultrathin bonded overlay, but a conventional 2-in. Superpave mix. Ernst expects to see more spray paver-applied conventional HMA pavements in the future. "This year we are using this method to place two pavements in Indiana," he said. "They've been doing ultrathin bonded overlays, but this year is the first time they've placed conventional HMA with a spray paver." A tack coat adheres one layer of asphalt to another layer of pavement, whether bituminous or portland cement concrete. Research shows that layers of pavement perform better when thoroughly bonded to each other, just as fragile, thin veneers of wood form a robust sheet of plywood when they are glued to each other. »»

Good reasons for using the SUPER 1800-3i SprayJet paver for conventional paving

The benefits of using a spray paver for conventional HMA placements are many, and they all revolve around the bond coat as applied by the built-in spray systems.

- With the spray paver, the bond coat distributor truck ahead of the paving train is eliminated, reducing congestion in the work zone and providing a safer environment.
- Using a spray paver to place bond coat generally is more thorough than using an independent distributor truck, and the rates of application also are higher.
- With the SprayJet, the warm, fresh emulsion is directly overlaid with asphalt as soon as it has been sprayed. This saves a great deal of time, as there is no longer any need to hold off paving until the emulsion "breaks" (loses its water content, leaving residual asphalt behind).
- When bond coat placement is simultaneous with overlay, there is no way the emulsion can be picked up by haul truck or automobile tires and tracked onto adjacent roadways, curbs, parking lots or retail stores.

Spray paver for HMA

While it typically uses its SUPER 1800-3i SprayJet to place ultrathin bonded overlays, Pace Construction of St. Louis, was using its paver to swiftly place a 2 in.-deep conventional Superpave HMA lift, compacted to 1 3/4 in., on the dual-lane U.S. 60 near Mansfield in southwest Missouri. Two breakdown rollers and a finish roller were being used, with a target density of 94%. For U.S. 60, Missouri, DOT provided an option for standard paving with the spray paver. That's because owning agencies like elimination of the tack coat distributor truck for conventional paving, as is possible when HMA is placed with a spray paver. This option is clean, without haul trucks driving through the emulsion, tracking it all over temporary striping, the pavement and the lift that was placed the day before. Spray paving eliminates all that as the tack coat is placed by the paver immediately ahead of the lift of asphalt.

Perfect results with conventional paving, too

"I've been working with the spray paver all summer, and this is the first full-depth conventional HMA job we've done," said Bob Needels, Project Manager for Pace. "The others have all been 5/8 in. ultrathin bonded overlays. U.S. 60 is the first Superpave I've ever seen it lay, and we're getting really good results out of it. It's a very clean process, with no tracked tack. We're getting a good reaction out of the truck drivers, who don't like tack slung all over their trucks any more than we do on our equipment. Using the SUPER 1800-3i SprayJet benefits everybody." Pace's Needels said it's actually better not having the distributor truck in the paving train at all. "It's safer, because it rules out delivery trucks sliding on the slick tack off into the ditch," he said. "And if a car happens to get into the closed lane, and they slam on their brakes, there is no tack to slide them out of control." »»

With its VÖGELE SUPER 1800-3i SprayJet, Pace would place up to 12,000 t of Superpave mix 2 in. deep on U.S. 60 in southwest Missouri.

This is our third season with this paver. The bottom line is that the emulsion the spray paver puts down creates a very, very strong bond with the Superpave mix. When combined with the 5/8 in.-deep thin overlay with its 3/8-in. durable aggregates, it delivers a very good wearing surface for higher traffic volumes in lieu of a chip seal.

Andy Ernst, Vice President for Construction Operations
Pace Construction

On U.S. 60, Pace's Bob Needels and Andy Ernst

Spray function built-in

One paver manufacturer offers an aftermarket spray system that must be attached to the machine, but this poses significant disadvantages, Ernst said. “The dedicated spray functions of the VÖGELE paver work great for us, because we can get those jobs with spray specs year after year and keep it operational all season,” he said. “That’s why we choose not to make use of the option of removing the SprayJet module for conventional paving.” Pace looked at a competing make of spray paver, and even at the paver for which an aftermarket spray system had been devised, but chose to go with VÖGELE. “That maker was introducing its aftermarket system and considering it was new technology, we just didn’t feel comfortable with that,” Ernst said. “They had a different manufacturer making the spray unit to fit the paver, and with it all being so new, we chose not to go down that road,” Ernst said. “And the only other purchase option was a model which could only be fed by a material transfer vehicle, while the SUPER 1800-3i SprayJet can be serviced directly by trucks if the insert is removed from the hopper,” he added. “That was a feature that was very appealing to us, because we will place the ultrathin bonded overlay in subdivisions without much room for an MTV.”

Movable “wings” with pulsing nozzles on both sides of the SUPER 1800-3i SprayJet paver place tack coat ahead of mix, while emulsion also is distributed from the nozzle array centered beneath the paver.

ErgoPlus 3 control panel for the SprayJet module

When working with spray pavers, a lot more must be taken into account than when simply paving asphalt. After all, spray pavers don't "just" lay asphalt – they also apply the tack coat consisting of bitumen emulsion. Operation of the new VÖGELE spray paver is exceedingly simple so that the operator can concentrate on the essentials – namely the paving and the job site. The SprayJet module is operated entirely via the module's touchscreen and its design, symbols and principle of operation are consistently based on the ErgoPlus 3 operating concept. It is mounted directly on the module, within easy reach of the paver operator, and offers a multitude of convenient automatic functions which cater to practical needs. For the operator, they simplify preparation of the spray module, the spraying process itself and maintenance of the spray module. All the settings required for replenishing, circulating and heating the emulsion can be entered and monitored directly via the touchscreen. ///

The user interface of the SprayJet module's ErgoPlus 3 control panel is based on the ErgoPlus operating concept of the paver operator's console.

An advantage in the field: Spraying and paving technology from a single source

Because spray paving was designed and built into the SUPER 1800-3i SprayJet paver, spray paving jobs are simpler to execute than with aftermarket systems. The system is organically integrated into the paver, rather than bolted on as an afterthought. The SprayJet module is operated entirely via a touchscreen integrated into the spray module, where the entire spraying process can be monitored. The operator can check all settings and values at a glance, such as spray nozzle activity (active/ inactive/ switched off) and spray pressure. Also, on the new SUPER 1800-3i SprayJet, the circuits for spraying and circulating the emulsion – as well as for cleaning the lines – are switched automatically via electronically controlled ball valves, making operation of the individual functions much simpler, and preventing operator errors, such as those associated with manual systems. Work sequences are set automatically in accordance with the function that has been selected and activated. For example, the control unit for the SprayJet module calculates the maximum pave speed as a function of the nozzle size used and the selected rate of spread, and displays this value on the paver operator's ErgoPlus 3 console. This ensures uninterrupted application of the emulsion. The rate of spread can be set and the nozzles calibrated or individually activated and deactivated just as easily on the control panel of the module. In addition, the handy automatic functions "Start of Job" and "End of Job" are activated by the paver operator at the push of a button. This ensures that spraying begins and ends at exactly the desired point over the full paving width.

Quality in every detail:

The HAMM GRW 280i pneumatic-tire roller

Flexible ballasting, convenient operation,
high-quality compaction and much more.

The GRW 280i is available in seven different basic weights ranging between 10 t and 28 t.

New ballasting concept

The many new features of the GRW 280i ensure the quality, safety and flexibility of compaction. The extremely flexible ballasting concept is just one example: prefabricated ballast bodies made from steel, magnetite or concrete can simply be inserted into the ballast chambers between the set of tires. This provides a simple means of adjusting the machine weight. When ballasting, the load is always evenly distributed over both axles – creating the ideal conditions for top-quality compaction.

Operation with Easy Drive

The operating system is also new: the GRW 280i is the first machine in the pneumatic-tire roller segment to be fitted with Easy Drive from HAMM. The prize-winning operating concept with its clearly structured, completely language-neutral design, supports intuitive operation.

Optimum driving characteristics

HAMM has equipped the GRW 280i with a responsive drive control. Preset driving profiles ensure gentle, even breaking and acceleration, effectively avoiding irregularities. The optional anti-slip control is a brand new feature; it delivers optimum traction when working on uneven terrain.

Revised additive sprinkling system

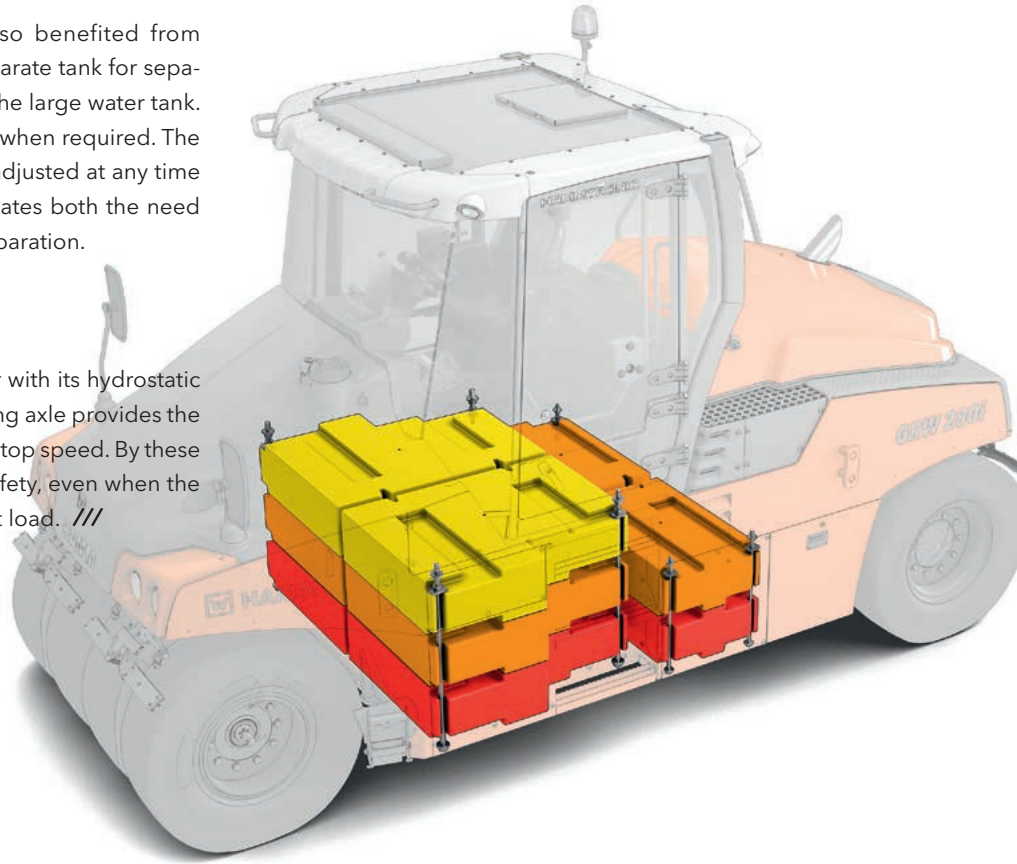
The additive sprinkling system has also benefited from quality-boosting innovations. Now, a separate tank for separating agent can be used in addition to the large water tank. The additive is only automatically mixed when required. The water/additive ratio and dosing can be adjusted at any time from the operator's platform. This eliminates both the need for manual pre-mixing and the risk of separation.

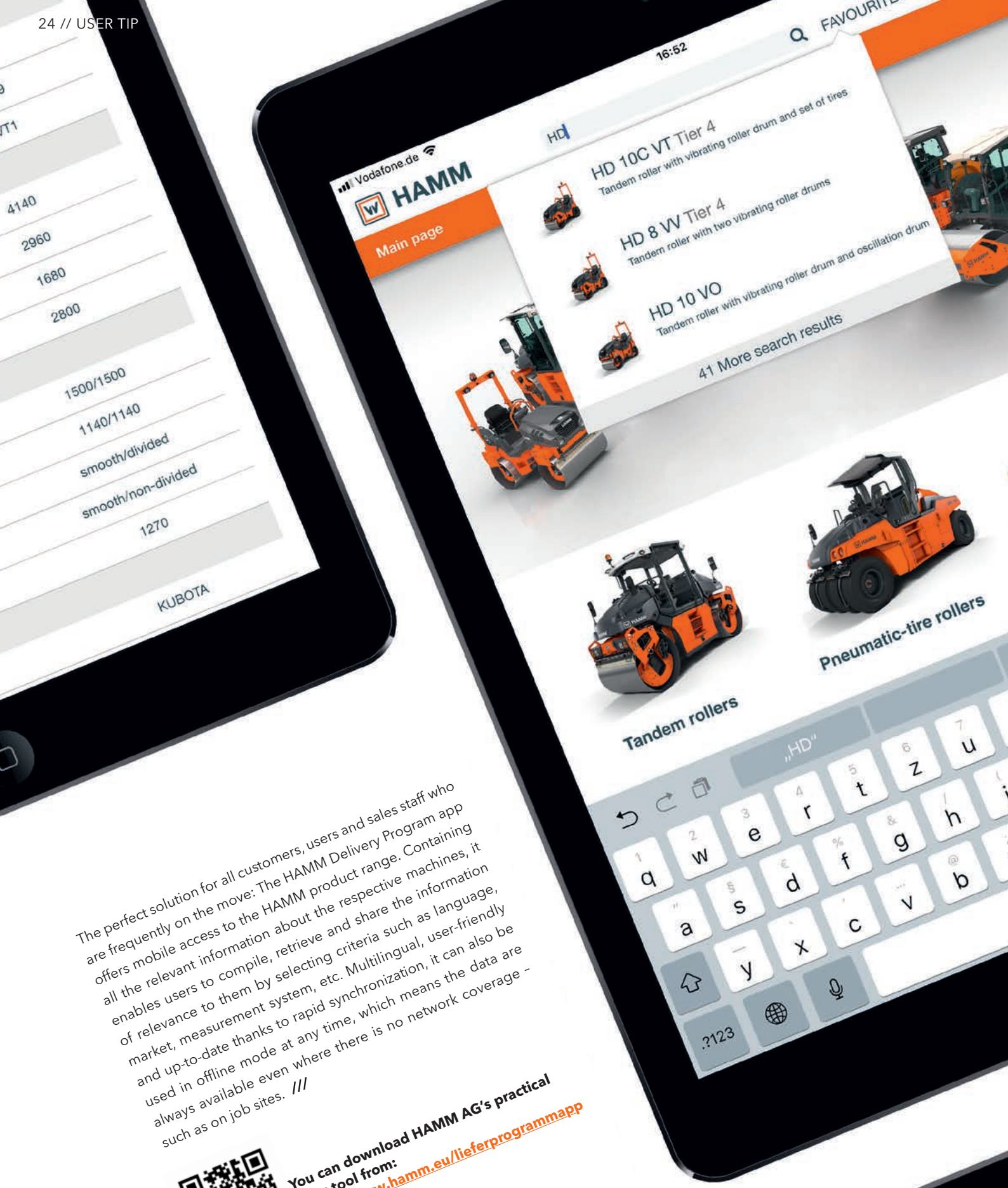
Speedy and safe

And finally, the GRW 280i is a fast mover with its hydrostatic rear-axle drive. A redesigned front steering axle provides the braking power needed to match the high top speed. By these means, HAMM ensures a high level of safety, even when the machine is carrying the maximum ballast load. ///

Highlights of the GRW 280i: A top-class pneumatic-tire roller

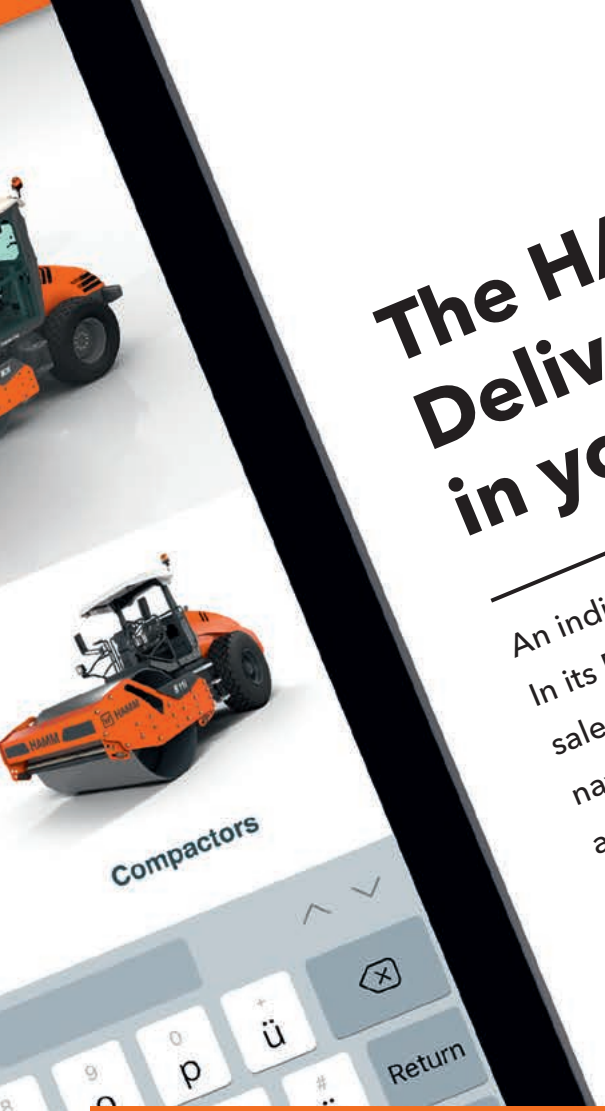
- Excellent visibility thanks to the asymmetrical frame
- Large, comfortable panoramic cabin option or open canopy roll-over protection
- Simple, self-explanatory operation with Easy Drive
- Flexible ballasting from 10–28 t
- Even weight distribution
- Quality thanks to optimized drive control
- Highly flexible water and additive sprinkling system
- Water tank with a large capacity enabling the machine to work for long periods
- Extremely safe thanks to strong brakes





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

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



The HAMM Delivery Program in your pocket

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

The key features at a glance:

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

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

› **My Favorites – Always in view**
Nothing is lost: The individual product data sheets of the machines can be selected using the Favorites function so that they can be accessed at any time via the Favorites button on the main menu bar.

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

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

› **Download now for free**
The HAMM Delivery Program can be obtained free of charge for iOS in the App Store and for Android in the Google Play Store.

Efficient crushing
with the MOBICAT EVO

Compact dimensions and operational flexibility are key attributes of the MOBICAT EVO mobile jaw crushers from KLEEMANN. They boast low diesel consumption combined with high output, meaning they achieve high-level efficiency.

MOBICAT MC 110 Zi EVO

MOBICAT MC 110 Zi EVO – With double-deck prescreen

The MOBICAT MC 110 Zi EVO is equipped with an independent double-deck prescreen – this ensures that fines in the feed material are effectively screened. In this way, the material is also transported effectively into the crusher, ensuring that the crusher is constantly filled and operates very productively while minimizing wear.

Feed capacity:	up to 364 US t/h (330 t/h)
Drive power:	326 hp
Transport weight:	94,350 lbs

The efficient high-performers

The most impressive feature of the MOBICAT EVO mobile jaw crushers are their flexibility. They can be used efficiently in the first crushing stage for both natural stone and recycling applications. With their compact dimensions, they are easy to transport to any job site and, once there, can also be quickly relocated. Thanks to integrated hopper walls and hydraulically folding side discharge conveyors, the plant can be up and running in no time at all. MOBICAT EVO machines are powered by an extremely economical diesel-direct drive that consumes up to 30% less than diesel-hydraulic drive systems. At the same time, they feature an average feed capacity of up to 364 US t/h (330 t/h) (MC 110 Ri and MC 110 Zi EVO) and 243 US t/h (220 t/h) (MC 100 Ri EVO).

MOBICAT MC 100 Ri EVO

MOBICAT MC 110 Ri EVO

Linked operation made easy

All EVO crushing plants can be perfectly interlinked. Linking the MOBICAT MC 110 Zi EVO mobile jaw crusher with the MOBICONE MCO 9i EVO cone crusher results in a highly productive configuration for natural stone processing. The plants are equipped with the Continuous Feed System (CFS), which ensures a constant flow of material through both crushing stages. The interlinked plants communicate with one another, meaning that the upstream crushing plant slows down or accelerates its material transport depending on capacity, so both plants are always fully utilized. »»

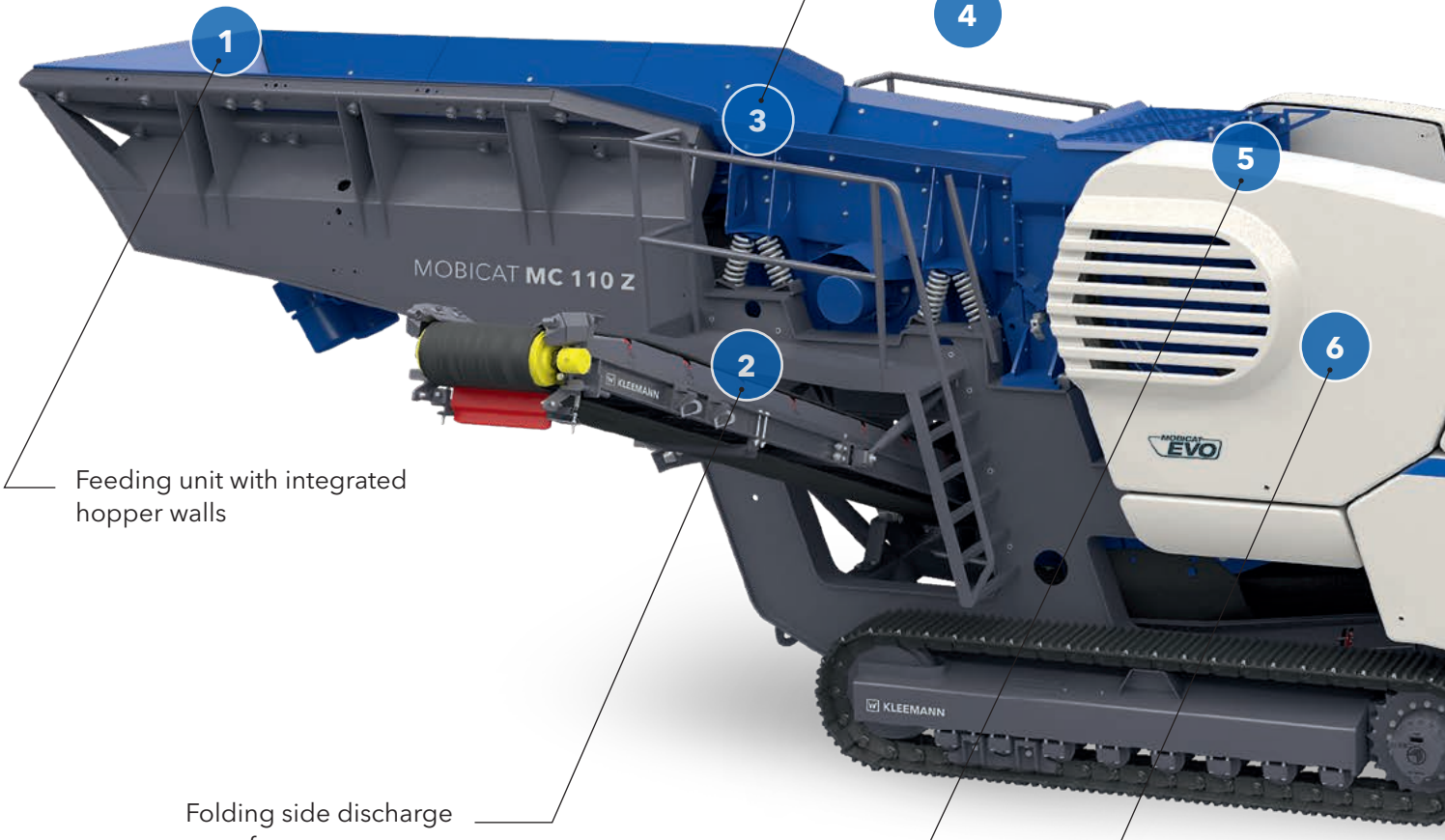
MOBICAT MC 110 Ri EVO – With vibrating feeder

Feed capacity:	up to 364 US t/h (330 t/h)
Drive power:	326 hp
Transport weight:	90,400 lbs

MOBICAT MC 100 Ri EVO – Even more compact, with vibrating feeder

Feed capacity:	up to 243 US t/h (220 t/h)
Drive power:	208 hp
Transport weight:	71,300 lbs

Highlights of the MOBICAT EVO jaw crushing plants



Feeding unit with integrated hopper walls

Effective prescreening by independent double-deck prescreen

CFS ensures a continuous crusher feed

Folding side discharge conveyors for easy transport

New crusher unit with extra-long, articulated crusher jaw

Convenient adjustment of the crushing gap via touch panel

The MOBICAT EVO mobile jaw crusher boasts flexibility, high output and low diesel consumption.

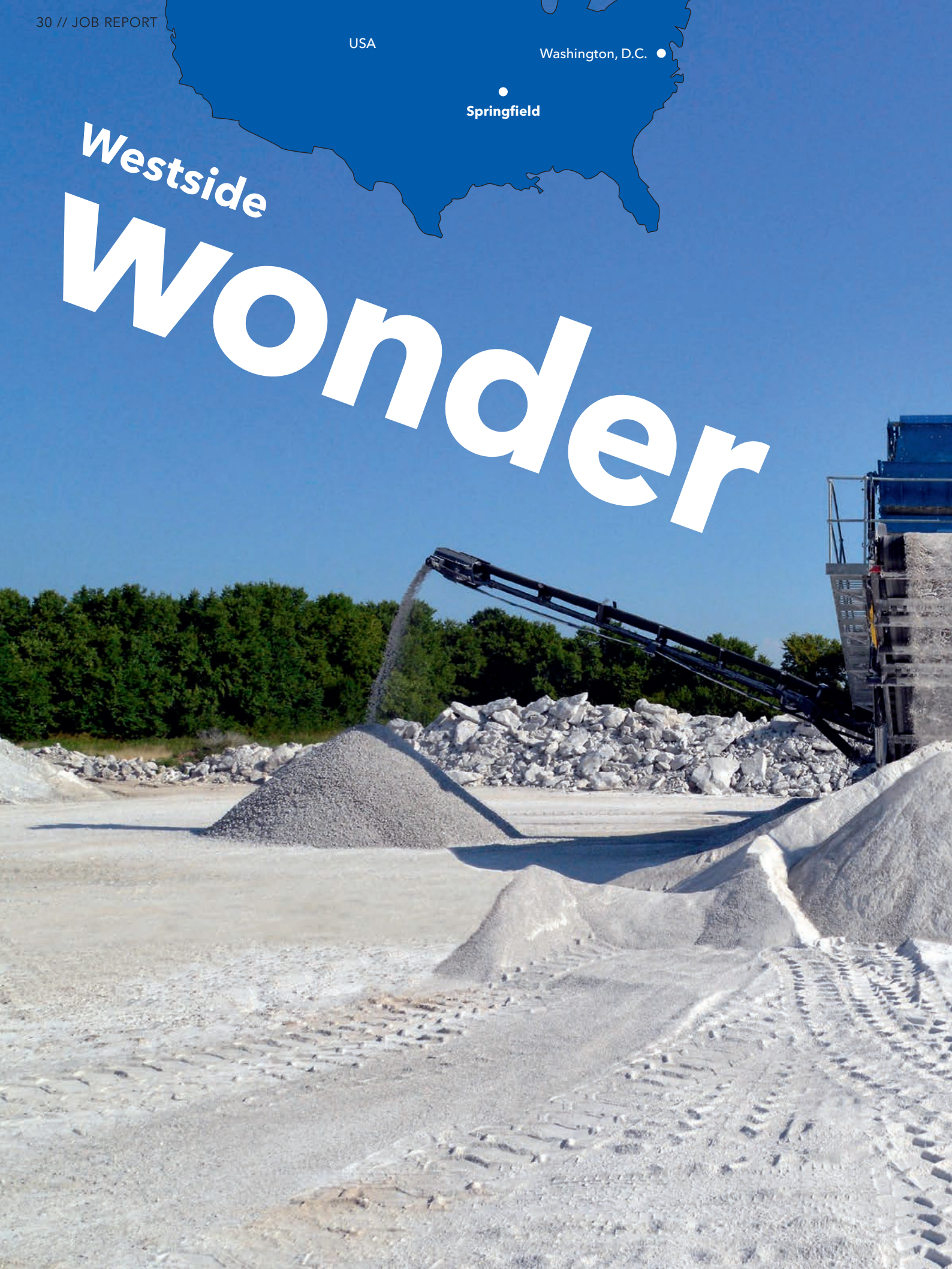
Innovative crusher unblocking system
for extremely short downtimes

Efficient and powerful
diesel-direct drive

MOBICAT EVO

Powerful and durable: Magnet
and crusher discharge conveyor

Simple control with menu-guided
touch panel



Westside Wonder

A new set of crushers and screens from KLEEMANN – including the MC 110 Zi EVO from the MOBICAT jaw crusher series – is contributing to the development of a "greenfield" underground storage facility, while producing multiple aggregate sizes for the construction industry.

600,000

is the quantity of material Westside Stone plans to crush with its KLEEMANN plants

tons

Near Springfield-Branson National Airport, KLEEMANN's robust dust suppression systems keep fugitive dust out of the air, where it might obscure visibility. Both attributes meet U.S. Federal Aviation Administration requirements.

Missouri // Springfield

In southwest Missouri, Westside Stone Company – an Erlen Group Company – is using its new MOBICAT MC 110 Zi EVO jaw crusher, MOBISCREEN MS 15 Z in "scalping" position, MOBICONE MCO 9i EVO secondary crusher, and MOBISCREEN MS 19 D mobile screening plant in final position to process limestone hauled from the Burlington formation below ground. The use of mobile equipment – as opposed to a permanently situated stationary plant – offers important advantages to Westside Stone. Above ground, equipment can be moved at any time as site conditions and stockpiles dictate. And later – as the new underground mine is enlarged – the MOBICAT jaw crusher can be moved underground to facilitate the development of new rooms according to the mine plan. Then, movable stacking conveyors will bring crusher-run stone from the mine to the above-ground screens and secondary crusher, replacing haul trucks.

Investment in KLEEMANN machine sets

"Springfield Underground (another Erlen Group Company) has had an underground limestone mine on the other side of Springfield for 69 years," said Scott Crabtree, General Manager of the new facility. "We've run out of reserves there so we are developing our new location as Westside Stone." As Springfield Underground continues to enlarge that space, some material left behind by mining needed to be crushed. In a far corner of the former mine, illuminated by floodlights and fed with an excavator, a new MOBIREX MR 130 Zi EVO2 impact crusher was paired with a new MOBISCREEN MS 19 D mobile screening plant to process aggregate. This work was being done by a contractor in preparation for additional leasable space. Back at Westside Stone, mining began with initial aggregate processing being carried out by a contractor, until the Westside Stone Company purchased its own KLEEMANN equipment.

600,000 t per year is the goal

Surface mining at Westside Stone began with a box cut, which serves as the mine's portal. The underground tunnels were constructed in 2016. "Our goal is eventually to get to 600,000 t per year," Crabtree said. "We sell primarily to contractors, who use the material for backfill, foundations, and concrete." Products include 1 1/2-in. clean stone, scalped 3/4 x 1-in. base rock, No. 57 concrete stone 3/4 x 3/8 in. in size, and 3/8-in. clean stone. Fines are sold as manufactured sand and aglime. "We have embedded chert we are trying to get rid of, so we crush it at the primary crusher and screen it out at the MS 15 Z before it gets to the cone crusher," Crabtree said. Shot rock below 24 in. in size is fed to the MC 110 Zi EVO primary unit via excavator, and is reduced to a size of under 6 x 2 in. The primary jaw crusher operates at 3.35 in. Closed Side Setting (CSS) Fines drop through its independent prescreen, bypassing the crusher, and re-enter the product flow below the crusher. "This is more efficient as we are not filling up our jaw capacity with fines," Crabtree said. The fines bypass saves wear on the crusher and reduces energy costs as well. »»

Processing primary feed with a MOBISCREEN plant

As the scalping screen, the KLEEMANN MS 15 Z receives the initial feed from the primary jaw crusher and removes the largest sizes from the flow. "There we pull off the base rock under 3/4 in. and fines, and 1 1/2 to 2-in. clean stone," Crabtree said. "Those are both products in which we are trying to reduce the chert content." Chert is common to Missouri's Ozark region and is a fine-grained sedimentary rock composed of microcrystalline silica, the mineral form of silicon dioxide. Chert occurs as oval to irregular nodules in chalk, dolomite and in the case of Westside Stone, limestone. Flint used for arrowheads and tools in ancient times is a form of chert, as it keeps a sharp edge, and common chert is used to surface roadways and driveways. "Usually chert shatters in the shot, or in the jaw crusher, and a lot of it comes out smaller than 2 in. in size once it's been crushed," Crabtree said. "This is scalped off following the primary crusher and we pull a lot of it out, but it also goes into the base rock." Then, the 1 1/2-in. to 6-in. oversize off the top screen of the MS 15 Z is fed to the MOBICONE MCO 9i EVO secondary crusher, which reduces it to a top size of approximately 1 1/4 in. The cone is set to a 30-mm closed side setting. The resulting gradation is fed to the MS 19 D final screen. Its top deck removes any oversize grain over 1 1/4-in. and recirculates it back to the cone crusher. In the meantime, the MS 19 D separates the throughs to sizes of under 1 in. to 3/8 in., under 3/8 in. to 3/16 in., and under 3/16 in. »»

Technical specifications MOBISCREEN MS 15 Z

Feed capacity:	up to approx. 441 US t/h (400 t/h)
Feed size max.:	16 x 16 in.
Screening unit type:	double-deck vibrating screen
Drive concept:	diesel-hydraulic drive
Engine power Tier 4f / Stage IV:	127 hp
Transport weight:	74,900 lbs

Interlinked crushing process delivers high productivity

The MOBICAT MC 110 Zi EVO primary jaw crusher has run as high as 364 t/h, but usually runs at 250 t/h. The MOBICONE secondary crusher is matched to the primary jaw crusher and is choke-fed to provide optimum productivity. That's possible due to Westside Stone's primary jaw crusher being interlinked with the secondary cone crusher via exclusive KLEEMANN technology. The secondary crusher automatically controls the primary crusher; when it needs more stone, it speeds up the primary crusher; when it's receiving too much material, it will slow down the primary crusher. "Interlinking permits hands-free operation," said Nick Ford, District Sales Manager for WIRTGEN America Inc. "You don't have to sit there and think about it, as it balances production on its own. You just keep loading, and let the machines do their jobs. It provides a better-shaped product, with better-formed chips and gradations for cubically shaped concrete. If you don't have a properly choke-fed cone crusher, at a level of 80%, it's going to make a lot of flats or slivers, which are undesirable for concrete," he added. "It amounts to a big benefit for the quarry." Moreover, the KLEEMANN interlink technology does more than other competing systems, Ford said. "The competition may have linking that works only for an emergency stop. They're only e-stop capable. The KLEEMANN system does so much more."

KLEEMANN technology has the best set-up

In outfitting its new greenfield mine, benefits like the automated gap and CSS adjustments led Westside Stone to the KLEEMANN line. "We looked at several manufacturers," said Westside Stone's Scott Crabtree, "but KLEEMANN had the best set-up, with equipment available and competitively priced. And they are loaded with features. "Interlinking is foremost. Being able to link those two crushers together, and have them talk to each other, is a big advantage. Their competitors said the cone crusher would not keep up with the jaw crusher, but that's not the case."

Westside Plant Supervisor Stephen Laughlin and General Manager Scott Crabtree

Interlinking the crushers maximizes the efficiency between them.

Scott Crabtree, General Manager
Westside Stone

Efficient and quiet drive technology

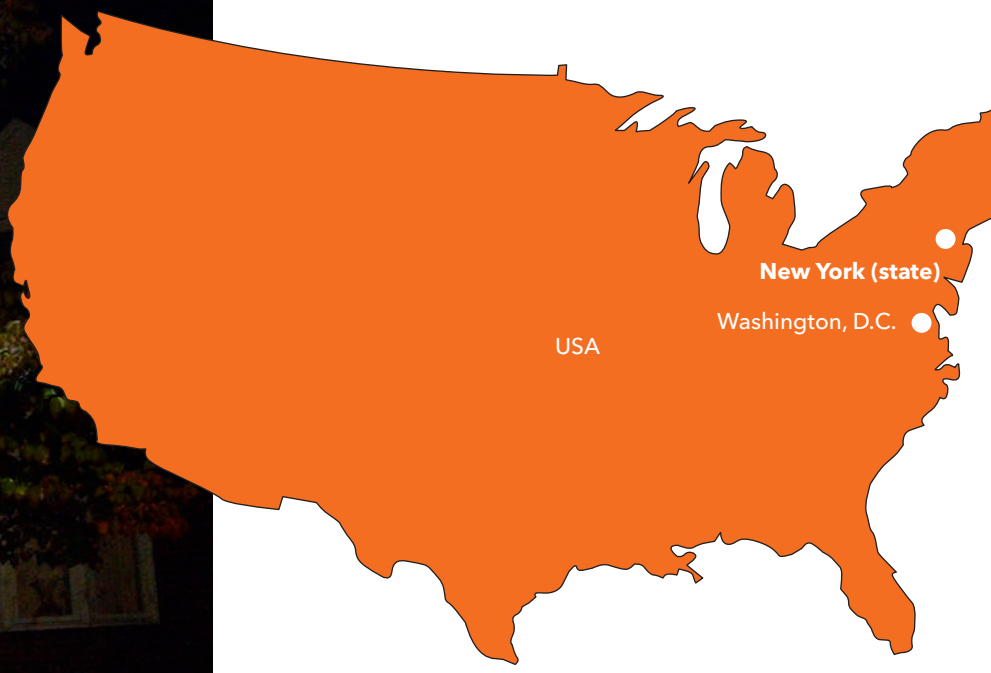
In addition, KLEEMANN's diesel-direct drive design in the EVO machines was a powerful benefit for Westside Stone, with associated fuel savings. It also results in faster start-ups in the winter, when problems can arise with hydraulic fluids. Hydraulic leaks and the associated environmental issues are greatly curtailed. And with fewer hydraulic lines, inspection "under the hood" is less complicated. The KLEEMANN products produce less noise, Ford said, "The engines run at lower rpms, so they are quieter. They are environmentally friendlier, with dust suppression systems that do their jobs." ///

Heavy machine, sensitive measurement technology: HAMM HD+ 140i VV-HF tandem roller with HCQ equipment.

Intelligent compaction control from HAMM:

Just get started

The HCQ Navigator from HAMM is the simple real-time solution for planning, measuring, documenting and analyzing compaction processes. In New York State, the system truly excelled in the field.



New York State // Nassau County and Westchester County

When New York State DOT specifications began requiring intelligent compaction technology (IC) for asphalt paving, a major paving contractor in the Northeast got into it in a big way. Intercounty Paving Associates acquired 8 new HAMM tandem rollers, each outfitted with Hamm Compaction Quality (HCQ) technology, incorporating the HAMM Compaction Meter and HAMM Temperature Meter within the HAMM Navigator system. As the construction season wrapped up in New York State in November, Intercounty was using its new HAMM rollers with HCQ Navigator on State Route 24 (Hempstead Turnpike in Nassau County) in the shadow of Belmont Park race track, and on the Saw Mill River Parkway in Westchester County north of New York City. »»

2,200 tons

of asphalt – the Intercounty paving team removed and repaved this vast quantity every night

The 1,010-HP (753-kW) flagship: A WIRTGEN W 250i large milling machine removed 2 in. of the road pavement.

Rehabilitation with high-level compaction

On Hempstead Turnpike, in a congested urban location in central Long Island, HAMM HCQ Navigator system components were mounted on 2 HD+ 140i VV-HF rollers, and on an HD+ 120i VV-HF tandem roller. A third HD+ 140i VV-HF tandem roller equipped with the HCQ Navigator system was on location as a backup. On the Saw Mill River Parkway project, 2 new 140s and 2 120s were used. On these projects, the 120s are used for main line paving, but also intersections and radii.

Pavement removal with a WIRTGEN W 250i large milling machine

On New York State Route 24, Intercounty spent two weeks repairing the pavement, resetting castings, and replacing deteriorated concrete panels beneath the existing asphalt layers. "Now we are in the mill-and-fill phase, in which each night we mill out a lane and immediately pave behind," said Frank C. Lizza, Jr., General Manager, Intercounty Paving Associates, LLC, Westbury, N.Y. Using 2 new W 250i cold milling machines, Intercounty was milling 2 in., then placing 2 in. of 9.5-mm NMAS PG 64E-22 Superpave mix as a single driving course, all in one night. The mix contained a polymer modifier and asphalt content ranged from 4.5 to 5%. "Our 9.5-mm mix is approximately 60% 1/4-in. material, and 40% stone sand," Lizza said. "Granular material includes 20% reclaimed asphalt pavement (RAP)."

Investment in 8 HAMM rollers with HCQ Navigator

Intercounty dove into intelligent compaction using HAMM HCQ Navigator because IC would be required on future New York State DOT paving projects, and the contractor wanted to have and be familiar with the technology as the Empire State embraces the technology. "This year – for the first time in our operating area – a total of seven projects required use of intelligent roller technology," Lizza said. "We've seen IC systems in recent years, and they were interesting at the time. But up until now they were not required, and we were not voluntarily looking to add costs to our projects. Now state agencies – as part of their quality control – are requiring intelligent compaction, and we acquired 8 HCQ rollers for these seven projects ongoing." »»

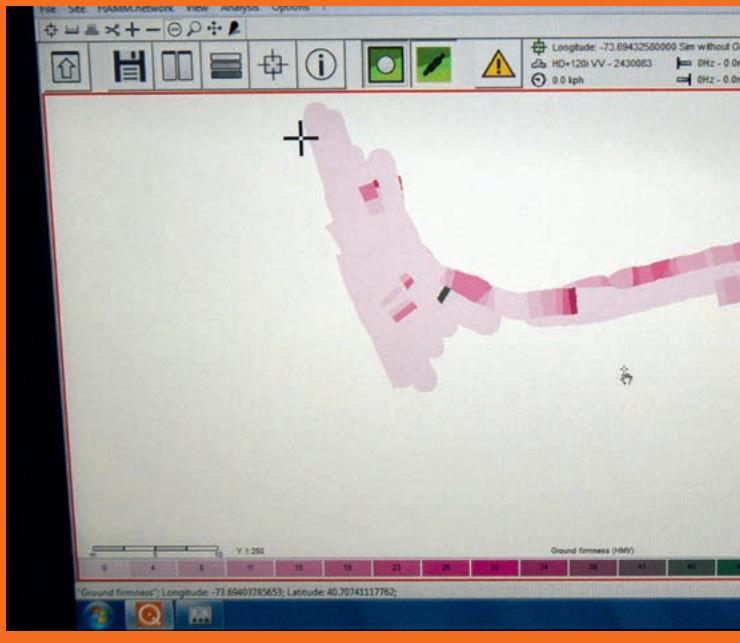
What does intelligent compaction mean?

Intelligent compaction (IC) – as it applies to asphalt and soil compaction – describes compaction of road materials using modern vibratory rollers equipped with an integrated measurement system, an onboard computer reporting system, GPS-based mapping, and optional feedback control, according to Federal Highway Administration consultant The Transtec Group, Austin. IC rollers allow real-time compaction monitoring and timely adjustments to compaction by integrating measurement, documentation and control systems. IC rollers also maintain a continuous record of color-coded plots, allowing the operator to view – in his or her cabin – plots of the precise location of the roller, the number of roller passes, mat temperature, and material stiffness measurements.

> **This year – for the first time in our operating area – a total of seven projects required use of intelligent roller technology.**
>
> **Frank C. Lizza, Jr., General Manager**
> **Intercounty Paving Associates, LLC**

Intelligent compaction control made easy: While the roller operator is compacting the asphalt courses as usual ...

... the current compaction progress is visualized in real time on the panel PC. As a result, the operator can see at a glance when the compaction process has been completed.

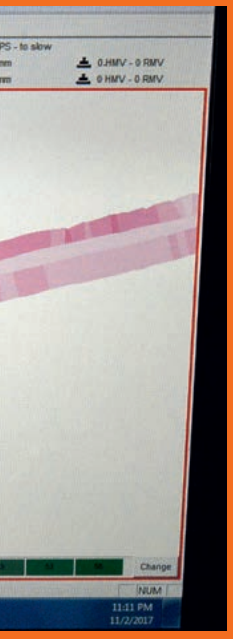


Display of compaction progress on the HCQ Navigator panel PC

"One of the great benefits is the visual display which shows what you've rolled, and how many times you've rolled it," Lizza said. "You also know the temperature of the mat and its stiffness. For night work, it's a dark highway and asphalt is black. Under the circumstances, it can be easy to miss a spot, hit it too many times or not enough. The 'painting' function of the touchscreen – showing you what you've done and identifying areas that need more compaction – brings greater efficiency and speed to what the operators are doing."

Intelligent compaction control and machine technology from a single source

This extraordinary acquisition required special effort to fulfill. "To get the HCQ equipment, the WIRTGEN GROUP in America and our distributor, Edward Ehrbar, Inc., went above and beyond to accommodate us in a rapid manner," Lizza said. "Rather than use aftermarket systems on a different brand of roller, we decided it's better to use one system where the manufacturer is the same as the technology distributor, and it's all made to work together." And that's a competitive advantage for Intercounty Paving. "If IC is the direction the DOT is going, we want to be the ones with the rollers," Lizza said. "We want to be ahead of the curve. These projects have allowed us to begin to absorb the cost of the new specifications and will allow us to have an advantage in the future." ///



HCQ: The intelligent compaction system from HAMM

HCQ is short for Hamm Compaction Quality. HAMM has coined this term to describe a comprehensive range of products for planning, measuring, controlling, documenting and analyzing compaction processes. The entire system has a modular design, and the individual products have been perfectly matched to one another. HCQ products enable construction companies to meet even increased requirements on quality and economic efficiency, their modular design offering maximum flexibility at the same time.

› HCM: HAMM Compaction Meter
The HCM is used to measure and indicate ground stiffness when compacting soils or asphalt pavements.

› HTM: HAMM Temperature Meter
The HTM module is used to measure and indicate the surface temperature of the asphalt pavement to be compacted. It is only used in asphalt compaction.

› HCQ Navigator
The HCQ Navigator is a satellite-based documentation system for the detection and readout of all important compaction parameters and the compaction progress of one or several rollers. It is used in both earthworks and asphalt compaction

Designed primarily for use in highway construction and large-scale commercial applications: With the SUPER 2003-3i, VÖGELE has now developed an entirely new paver specially for the North American market.

VÖGELE +

= Startup success

HAMM

VÖGELE and HAMM equipment is giving a start-up asphalt paving division in upstate New York State the added productivity the contractor needs to make its mark in a crowded field.

Job site details

Rehabilitation of State Route 13 in New York State, south of Ithaca

Length of section:	4.5 mi.
Area of section:	110,000 sq. yd., approx.

Working parameters

Layer thickness	
Binder course:	3/4 in.
Surface course:	1 1/2 in.
Paving width:	up to 19 ft.
Quantity of mix:	
Binder course:	6,000 t
Surface course:	12,000 t
Paving speed:	up to 20 fpm

Material

Binder course:	9.5 mm leveling Superpave base course,
Surface course:	9.5 mm PG 64-22 Superpave surface course

Equipment

VÖGELE SUPER 2003-3i wheeled paver with VR 600 Extending Screed
HAMM HD+ 120i VV tandem roller
HAMM HD+ 120i VO tandem roller

New York State // Ithaca

To jump-start its operations, in 2017 Riccelli-Northern acquired two SUPER 2003-3i 10-foot wheeled pavers with VR 600 rear-mounted Extending Screeds from VÖGELE, 2 HD+ 120i VO tandem rollers from HAMM featuring vibration compaction in one drum, and exclusive HAMM oscillation in the other, and 2 HD+ 120i VV tandem rollers with vibration in each drum. The company also bought an HD 12 VV roller for smaller projects. “We had been in the asphalt manufacturing business for three years, and our owner Rick Riccelli decided to begin laydown operations. So we started at ground zero, jumping right in with 2 pavers and 2 full-blown highway-class paving crews,” said Dale Smith, Vice President Paving Operations, for Riccelli-Northern.

New binder and surface course on 110,000 sq. yd.

Using their new VÖGELE and HAMM products, Riccelli-Northern was paving New York State Route 13 south of Ithaca in the scenic Finger Lakes region. A subcontractor milled the existing five-to-two-lane highway, and Riccelli-Northern followed with two courses. "This project is 4.5 miles long north and south," Smith said. "Approximately 110,000 sq. yd. were milled 2 3/4 in. deep, and we followed with a 3/4-in., 9.5-mm leveling Superpave base course, and 1 1/2-in., 9.5-mm PG 64-22 Superpave surface course." Most of the project was placed 19 ft. wide with one screed extension.

SUPER 2003-3i processed 18,000 t of mix

The tack coat for this job was placed at an application rate determined by the New York State Department of Transportation (NYS DOT), and on a milled surface like State Route 13, the machine runs at between 0.08 and 0.1 gal. per sq. yd. "For this application they dialed it back to 0.06 gal. per sq. yd. from one side to the other," Smith said. "Both the leveling and the surface course will be tacked." Approximately 6,000 tons of leveling course, and at least 12,000 tons of friction course were placed in widths up to 20 ft. by the SUPER 2003-3i paver, depending on roadway width. They were compacted by a HAMM HD+ 120i VV and a HAMM HD+ 120i VO tandem roller. »»

We find wheeled pavers give us more mobility. Unlike on this job, where we will be working 30 days on the same project, with other projects it's not uncommon for us to 'road' the paver as much as 10 miles down to another location. We've driven tracked pavers that distance before, but pneumatic-tired pavers are better for those applications.

Dale Smith,
Vice President Paving Operations
Riccelli-Northern

Highlights of the VÖGELE SUPER 2003-3i wheeled paver

- 10-foot wheeled Highway Class paver with a large range of applications and paving widths up to 25 ft. 6 in. (7.75 m)
- Powerful diesel engine complying with US EPA standard Tier 4f
- Innovative and reliable drive concept for excellent traction behavior
- Superior paving quality due to efficient material management
- ErgoPlus 3 operating system 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

Wheeled pavers work

Both of Riccelli-Northern's new VÖGELE pavers are wheeled, which provides unexcelled mobility, Smith said. The SUPER 2003-3i is designed primarily for use in highway construction and large-scale commercial applications. With a powerful, six-cylinder engine rated at 250 hp (186 kW) and high-output hydraulic drives, it is fully equipped for these jobs. This 10-foot wheeled Highway Class paver has paving widths up to 25 ft. 6 in. (7.75 m). The exclusive, easy-to-use and intuitive ErgoPlus 3 operating system offers functional advantages. »»

WIRTGEN GROUP technology pays off

The advanced technology built into WIRTGEN GROUP products is paying off big-time for Riccelli-Northern as it builds its business. For example, VÖGELE's exclusive Niveltronic Plus System for Grade and Slope Control has proven productive in the field for the contractor. "Niveltronic Plus works fantastically for us," Smith said. "It's a very simple system to use, and is very accurate. A lot of the guys on our paving crews have experience running the newer WIRTGEN milling machines, and because of their similar control patterns, familiarity is high and the VÖGELE system is very easy to use."

Great flexibility meets high precision: VÖGELE VR 600 Extending Screed

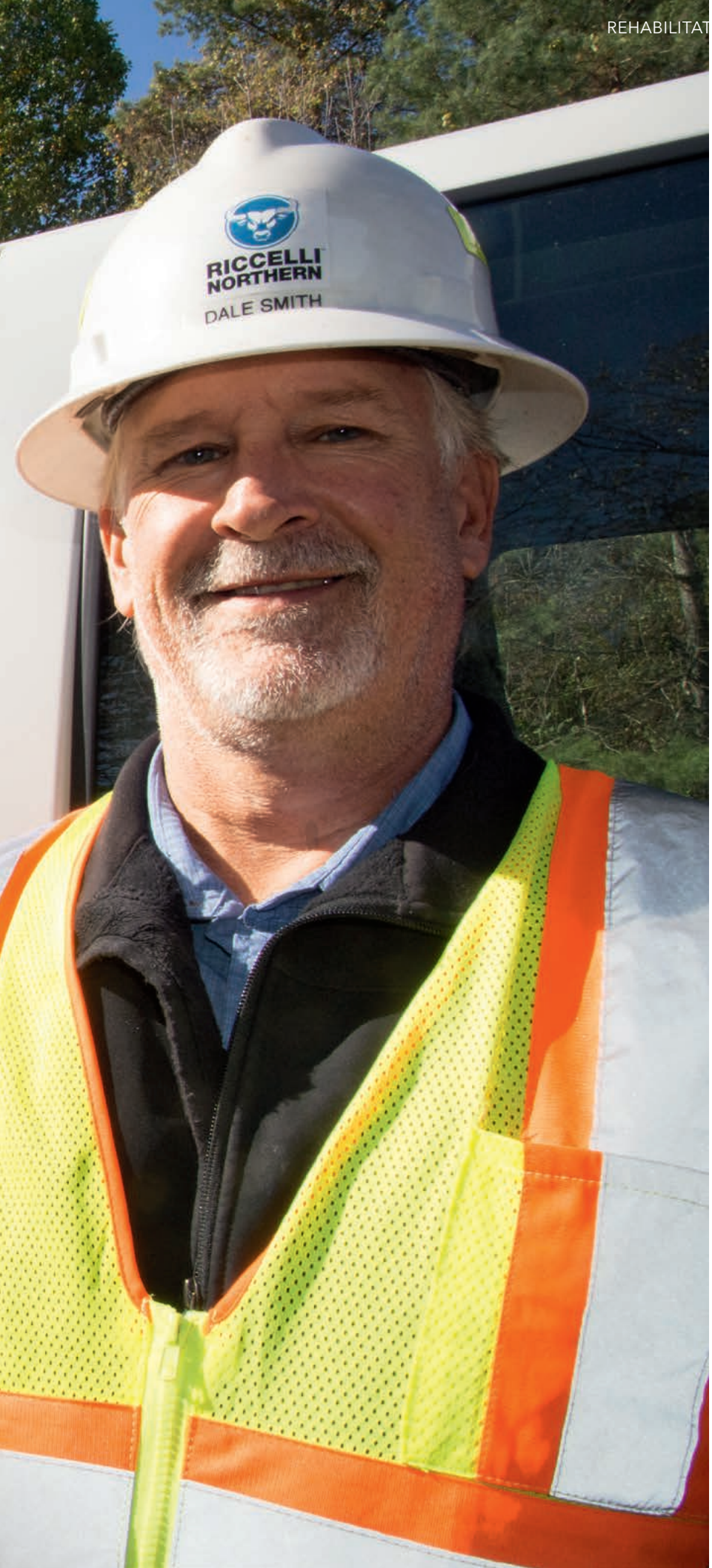
The VÖGELE VR 600 Extending Screed produces high-quality, even road pavement for contractors. The rear-mounted extensions permit paving in widths from 10 ft. to 28 ft. Generously dimensioned, sturdy telescoping tubes featuring high-precision operation provide for excellent stability of the screed, ensuring great paving results. Telescoping tubes are located at high positions, meaning that any contact with the material is avoided. Even with the screed set to its maximum width, the telescoping tubes are extended by no more than half, which ensures zero flexing. Deep screed plate design provides for excellent floatation. Depending on the speed of the paving, compaction at the screed ranges from 30 to 50%. "We run the augers at their lowest setting most of the time," Smith said.

Feet first into the WIRTGEN GROUP

When Riccelli-Northern launched its paving operations, it jumped feet first into WIRTGEN GROUP products, and for some very good reasons. "We did our due diligence, hearing the sales presentations and seeing the machines. When all was said and done, we kept coming back to the VÖGELE product."

Keeping track of efficiency with WITOS FleetView

The same held true with the HAMM rollers. "We had extensive experience with the HAMM and other rollers," he said. "But the critical factor was the WIRTGEN GROUP system WITOS FleetView on our machines, with which we can track everything from the current location to the hours to the speed to the utilization of the equipment. It's integral to all the machines, and it's been a fantastic tool for us in managing our equipment." Also, Riccelli-Northern can monitor the equipment in the home office as well as from a laptop computer in a pickup truck. ///



It was the total package of the machines, the technology, the support, the dealership and our past experience with WIRTGEN GROUP products that made our decision very easy.

Dale Smith,
Vice President Paving Operations
Riccelli-Northern

How can you rehabilitate an 8.5-mile road 33% faster and more cost-effectively than by conventional methods? A total of 3 WIRTGEN cold recyclers delivered a compelling answer to this question in Florida.

Advantage: Full-depth recycling

3 WIRTGEN recyclers breathe new life into damaged road.

Florida // Lakeland, Polk County

In the busy phosphate mining district south of Orlando, a two-lane blacktop road all but destroyed by trucks got a new lease on life – thanks to the biggest full-depth recycling (FDR) and asphalt emulsion stabilization project undertaken by the Florida Department of Transportation (DOT) to date. There, subcontractor Asphalt Paving Systems Inc., used a WIRTGEN 3800 CR working 12 ft., 6 in. wide to pre-pulverize the asphalt pavement at full working depth on Florida State Route 37 to the defined particle size one lane at a time in one pass, followed by two WIRTGEN WR 240i recyclers working in echelon to mix the stabilizing agent. This was followed by compaction with two HAMM rollers, one being a HAMM HD+ 120i VV-HF tandem roller, and the other a HAMM GRW 280i pneumatic-tire roller, in advance of an asphalt overlay provided by the general contractor, Ajax Construction. Best of all – even prior to overlay – reclaimed sections are open to traffic each night, keeping trucks moving and commerce flowing. And because FDR was utilized, the highway was reconstructed at a third of the cost – and in a third of the time – of conventional reconstruction. »»

-33%

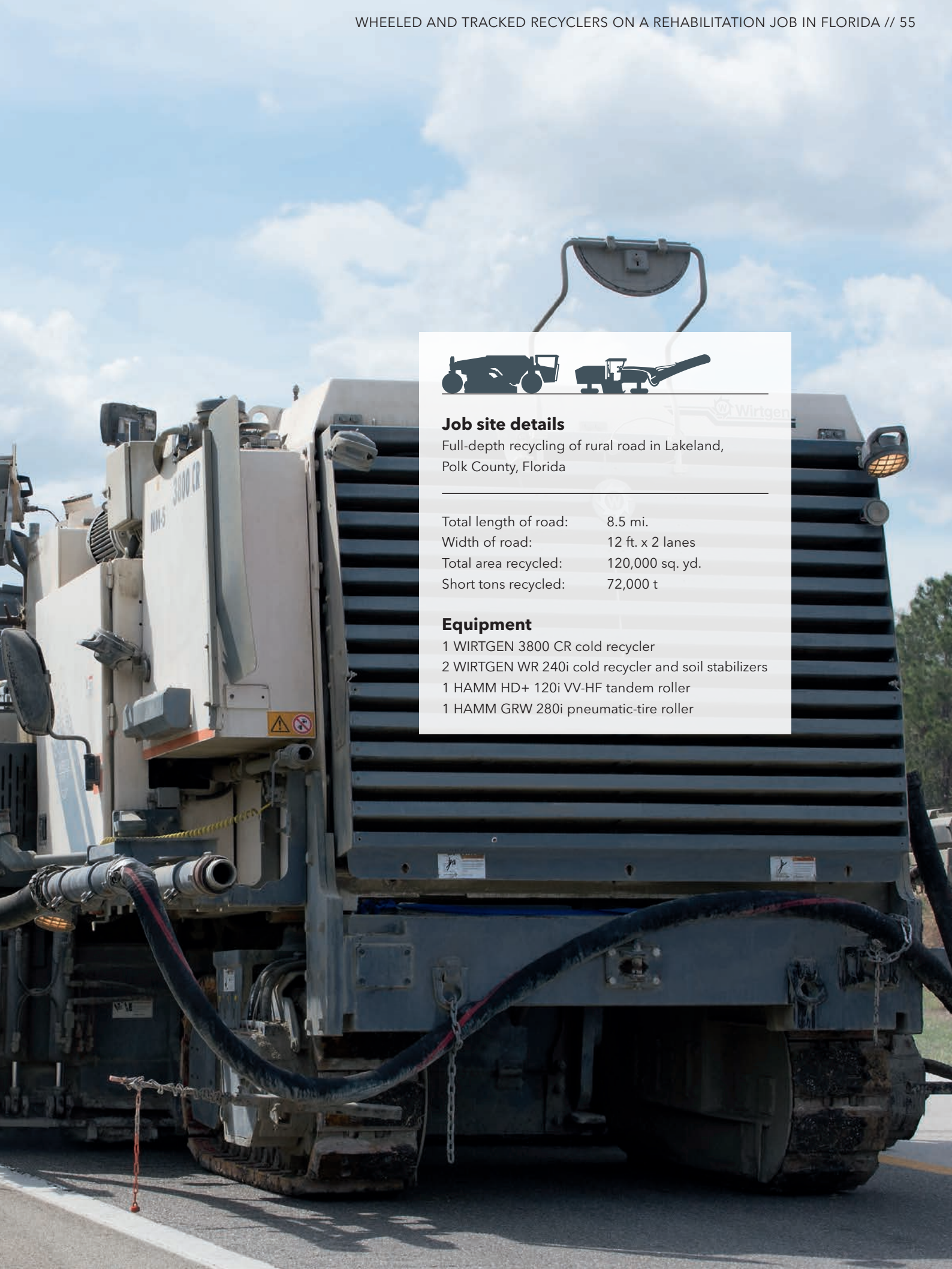
time and costs of full-depth cold recycling

Full-depth recycling (FDR): Cost saving solution

FDR is providing a big advantage to Florida DOT and its taxpaying motorists, providing a new highway at a third of the cost of conventional reconstruction, with a much lower environmental impact. "When you look at the average daily traffic on this road, it's 90% trucks," Donald said. "We are surrounded by phosphate mines, and the wear of the trucks has forced the state to patch the road over and over and over again. To totally reconstruct the road, you'd have to mill out 12 in. of material, discard it, bring in new stone base, build the subgrade back up and put new asphalt layers on it. But we are rebuilding this road, in-place with minimal impact on traffic and the environment."

"This project really is unique. This is the first full-depth recycling project of this size in Florida."

Tommy Donald, Regional Manager
Asphalt Paving Systems, Inc.



Job site details

Full-depth recycling of rural road in Lakeland,
Polk County, Florida

Total length of road:	8.5 mi.
Width of road:	12 ft. x 2 lanes
Total area recycled:	120,000 sq. yd.
Short tons recycled:	72,000 t

Equipment

1 WIRTGEN 3800 CR cold recycler
2 WIRTGEN WR 240i cold recycler and soil stabilizers
1 HAMM HD+ 120i VV-HF tandem roller
1 HAMM GRW 280i pneumatic-tire roller

Milling with the WIRTGEN 3800 CR using the down-cut method

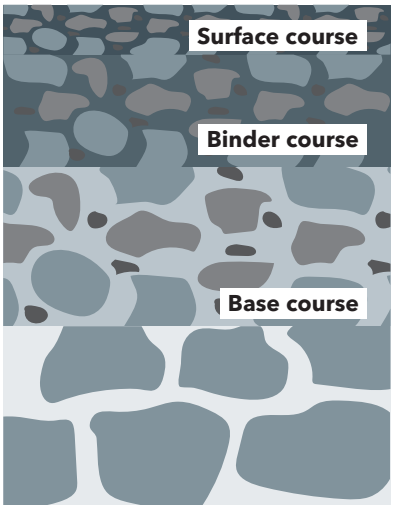
120,000 sq. yd. of recycling – that's 8.5 miles by 24-ft. wide. "The WIRTGEN 3800 CR is working in down-cut mode to break the pavement," said Tommy Donald, Regional Manager, Asphalt Paving Systems' Zephyrhills, Florida office. As a result, particle size can be precisely controlled when processing the material, especially on very brittle, thin, old asphalt roads. "The pavement has 4 to 5 in. of asphalt on this section, and the rest is lime rock base. We're using the 3800 CR with the mold board up and while running the conveyor at the rear to pulverize 8 in. deep, mixing the old asphalt with the lime rock."

2 WIRTGEN WR 240i cold recycling machines working in echelon

Portland cement was spread behind this. Further to the rear, Asphalt Paving Systems was using the 2 WIRTGEN WR 240i cold recycling machines staggered side by side to mix it all together. Their working width is 7 ft. 10 in., so to recycle the full lane they are running in echelon. "This lets us complete a full lane in one pass with no need to back up. That boosts our production by not having to stop and remix another pass. It's one continuous motion."

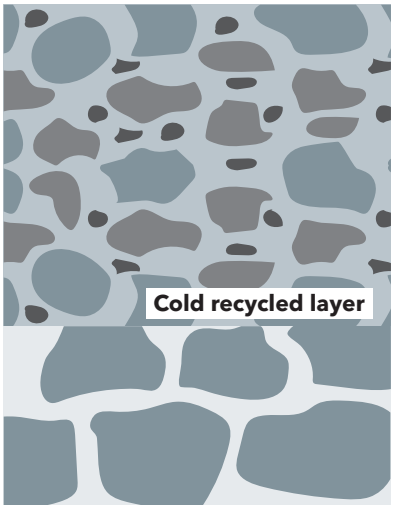
Achieving the required grain size through teamwork

The WIRTGEN 3800 CR was producing a 3-in. minus gradation as it pre-pulverized S.R. 37. Due to the high volume, part of the material was conveyed via the discharge conveyor and pre-profiled by the grader. Afterwards the pre-pulverized material was mixed by the WR 240i with lime rock base at full depth, then leveled by a motor grader in advance of pre-compaction with the HAMM HD+ 120i VV-HF. Then cement was placed by a distributor truck at a rate of 34 lb. per sq. yd., mixed in by the WIRTGEN WR 240i recyclers to a depth of 12 in. The final gradation emerging from the WIRTGEN WR 240i cold recycling machines was exceeding state specifications, with 100% passing the 2-in. sieve, as opposed to the specification of 100% passing the 3-in. sieve, and 95% passing the 2-in. sieve. Each WR 240i was preceded by an emulsion truck, feeding CSS-1h emulsion to the cold recycling machine at a rate of 2.6 gal. per sq. yd. »»



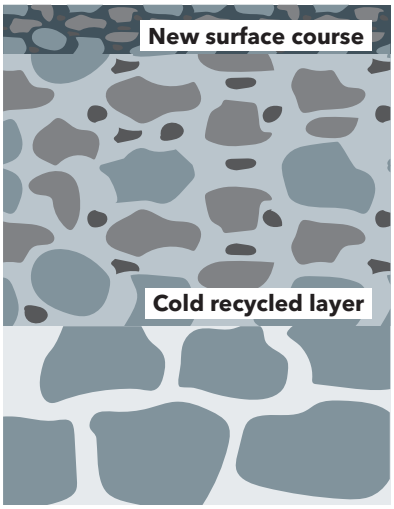
Step 1: Pre-pulverization of the asphalt pavement

Pre-pulverization of the 8-in. asphalt pavement with a 3800 CR cold recycler using the down-cut method



Step 2: Producing the cold recycled layer

Producing the cold recycled layer with 2 wheeled WR 240i recyclers, compaction by HAMM rollers – followed by temporary reopening to traffic



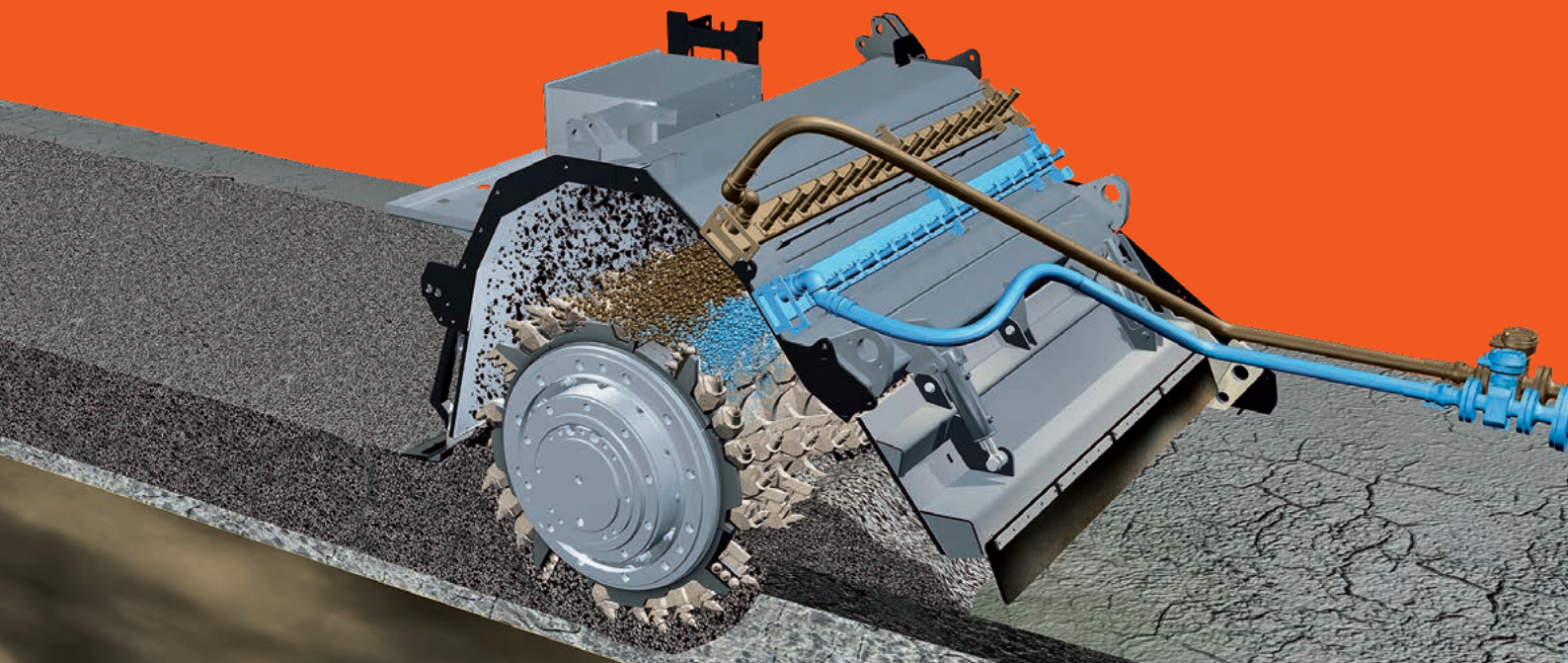
Step 3: Milling of 1.5 in. and paving of surface course

Removal of 1.5 in. of the cold recycled layer with the 3800 CR, followed by conventional paving of the asphalt surfacing

Two injection bars can be operated simultaneously when adding water and bitumen emulsion.

WIRTGEN WR 240i: Injecting water and emulsion

Tanker trucks driving ahead deliver water and bitumen emulsion to the injection bars via feed hoses connected to the recycler. The microprocessor-controlled injection bars for water and bitumen emulsion are of identical design and can be used for both substances to comply with application requirements.



Keeping truck traffic moving

The stabilized material was compacted to 98% density by the tandem rollers, first by a HAMM HD+ 120 VV-HF, and finally by a HAMM GRW 280i as a "traffic" roller, as it is called in Florida. "Florida allows no more than a 2-mile lane closure at a time. So we are recycling a mile per day, two days at a stretch. We prime the lane, seal it, stripe it and open it to traffic every night," Donald said. Surface priming was done using CSS-1h emulsion cut 50:50 with water, and placed as a fog seal, which is defined as a light application of a diluted slow-setting asphalt emulsion.

"It cures immediately and seals our surface in advance of the temporary traffic markings, allowing us to open to traffic in the evening," Donald said. "After two days, we take the WIRTGEN 3800 CR – now in milling mode – back to the beginning of the section and trim 1.5 in. off the top," he added. "This allows us to set grade and cross slope with the WIRTGEN 3800 CR. Paving chases directly behind."

"The beauty of the 3800 CR is that today we can be recycling, and tomorrow turn it around for cold-milling."

Tommy Donald, Regional Manager
Asphalt Paving Systems, Inc.

Cold recycling or milling – The WIRTGEN 3800 CR can do both

The 3800 CR platform is unique because it can be quickly converted from recycle mode to milling mode, so that the machine can be used as a cold milling machine. "It's not at all complicated," Donald said. "Basically, all you do is change out the side gates and shoes on the sides of the milling chamber, and run the machine in the opposite direction. You lift the machine, drop out the side gates and then the shoes, slide in new ones, and go to work." This takes APS about an hour. No truck crane is required. The recycler is versatile in many ways, APS has found. "The beauty of the 3800 CR is that they are bi-directional. Today we can be recycling, and tomorrow turn it around for cold-milling. No muss, no fuss. And this machine has a foamed asphalt spray bar system on it, as well as the emulsion package we are using," Donald said. "You can use it for foam or emulsion, and reclaiming as well as milling." ///

Top surface,

WIRTGEN W 210i micro milling beats diamond grinding for Formula 1 race track in need of retexturing.

215 mph

215 mph is the speed record on the Circuit of the Americas, set in 2017 by motorcyclist Jorge Lorenzo.

top speed

Texas // Austin

A milling drum configuration unique to WIRTGEN enabled micro-milling and enhanced friction on the Formula 1 Circuit of the Americas (COTA) race track south of Austin, Texas. Austin Bridge & Road, Inc. – the contractor which used solely WIRTGEN GROUP equipment such as VÖGELE pavers and HAMM rollers to construct the high-performance track in 2012 – again used specialized WIRTGEN products to refresh the driving surface of a track affected by the expansive clays for which Texas is noted.

Tom Chastain, Milling Application Specialist at WIRTGEN AMERICA, Mike Kuhn, General Superintendent at Austin Bridge & Road, Inc. and Clifford McCarty, District Sales Manager at WIRTGEN AMERICA.

Job site details

Friction texturing and removal of surface undulations in Formula 1 race track in Austin, Texas

Total length of track:	3.4 miles
Width of track:	50 ft.

Working parameters

Total area milled:	45,000 sq. yd.
Short tons milled:	650 t

Equipment

WIRTGEN W 210i cold milling machine, equipped with a 7-fold, 3-in. large milling drum (LA 6 X 2) with FCS Light and W6 cutting tools

More traction required

After six years, with movement from underneath, plus wear and tear from the racing tires, traction became an issue. "The owner wanted to return traction to the track, so they first tried diamond-grinding it, but the racers didn't care for the excessive smoothness. As the owners wanted a different texture on the track, they got us out here with the micro-drum," said Tom Chastain, Milling Application Specialist, WIRTGEN AMERICA.

> **As the owners wanted a different texture on the track, they got us out here with the micro-drum.**
>
> **Tom Chastain, Milling Application Specialist**
> **WIRTGEN AMERICA**

Micro-milling gets raceway back on track

The driving surface was plagued by both undulations (bumps) and a loss of traction. "As time went on, the track settled, so in some spots we had dips and swirls. We're just correcting the surface for the next two races, and then they will resurface the track in late December," said WIRTGEN District Sales Manager Clifford McCarty. "The owner wanted us to restore texture in the surface, and remove 'bumps' as best we can. There were some situations where the bumps were too high compared to the depth of the wearing course. We had to make adjustments so we didn't take too much structure out of it," Mike Kuhn, General Superintendent, Austin Bridge & Road, added.

Drum tailored for micro-milling

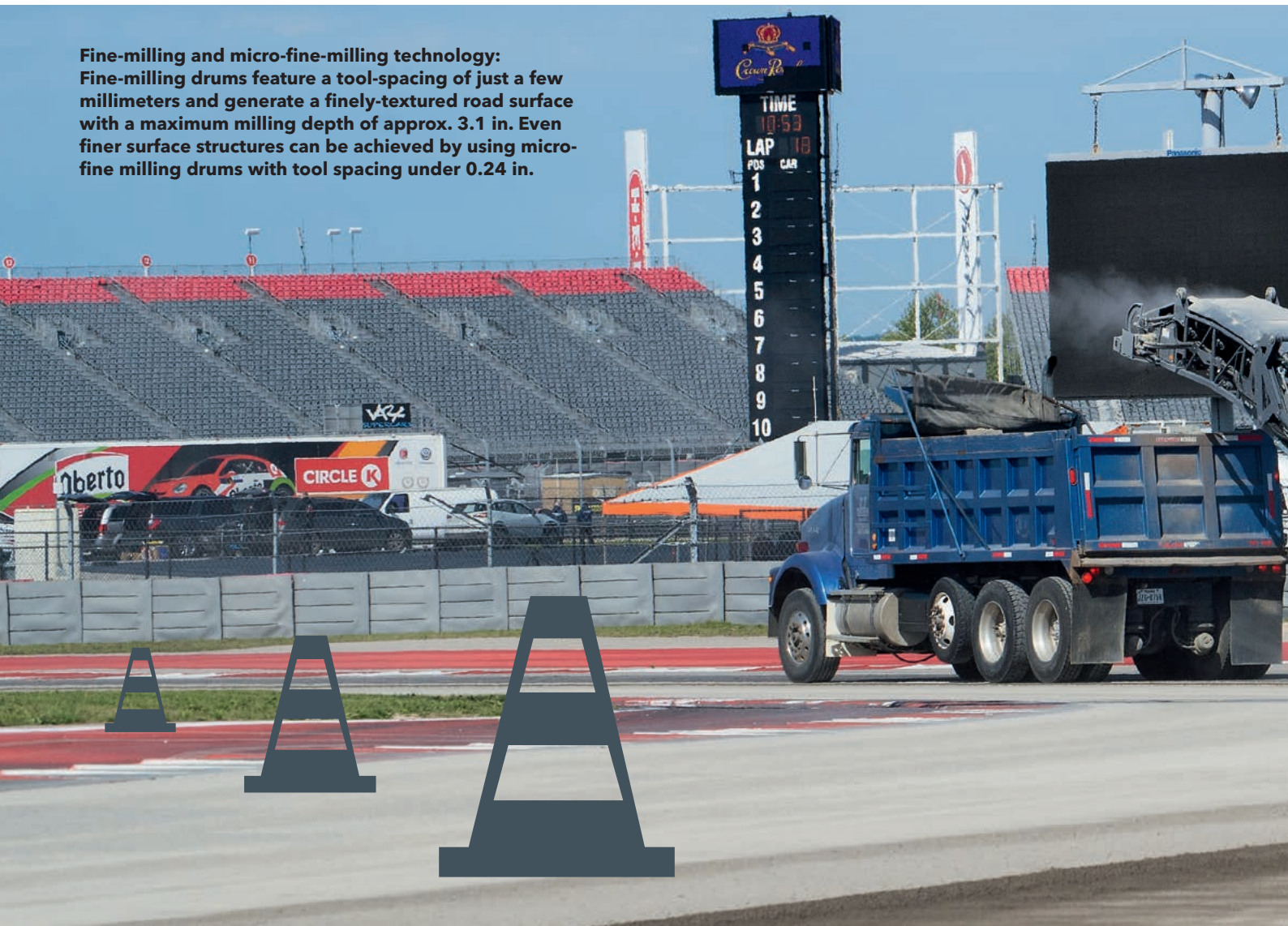
Micro-milling was performed using an LA 6 X 2 drum, that is, 0.24-in. tool spacing with a "double strike" behind. The 7 ft., 3 in.-wide double-strike drum has cutting tools placed 180 degrees apart on each side of the drum. "With a standard drum, you have one impact per revolution of the drum per tool, but on the micro-milling drum we have two tools hitting the same tool spacing 180 degrees apart." Chastain said. Unlike a standard milling drum with 175 cutting tools, it's fitted with 740. The 0.24-in. tool spacing of these super-fine micro-milling drums enables them to produce a very finely textured road surface. »»

Great flexibility thanks to FCS

WIRTGEN'S Flexible Cutter System (FCS) Light allows Austin Bridge & Road's W 210i enormous flexibility and boosts the machine's cost-efficiency, as the micro-milling drum can be swapped out quickly and easily for a conventional drum. The milling drum can be accessed from the side and is simple to remove; it is lowered onto a specialized, wheeled drum skid for easy withdrawal from the drum housing, and the replacement is installed just as easily. With FCS, a drum change takes Austin Bridge & Road no more than two hours, transforming a conventional cold milling machine to a super-fine micro-milling machine, or back again. The FCS greatly increases flexibility, creating a host of new potential uses for the milling machine and boosting the machine's cost-efficiency.

Up to 14,000 sq. yd. per shift

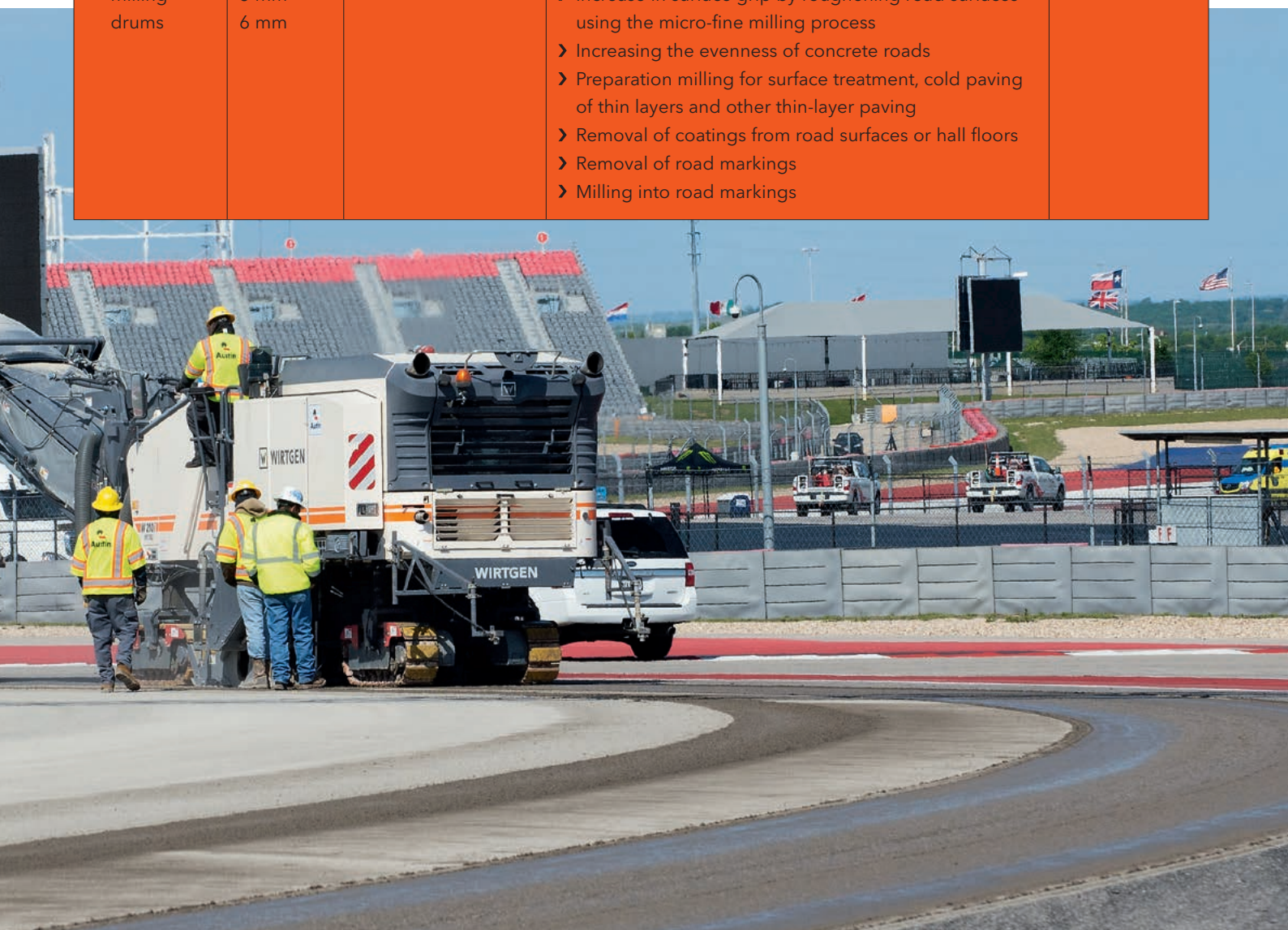
At COTA, cutting depth ranged from 1/8 in. to 1/2 in. "The track has only 1.5 in. of surface course mix on it," Chastain said. "It's a special mix that Formula 1 specified for its friction courses, so we have only an inch and a half to work with, and we are being careful not to get in between those two layers." The power and reliability of the WIRTGEN milling machines was giving the contractor at least three times the performance per day specified in the contract. "On Day 1 we did 14,000 sq. yd.," Chastain said. "The next day we did 12,000 sq. yd. We are well above the anticipated daily output." Standard W6 WIRTGEN cutting tools were used. Several days into the project, the cold milling machine had cut 27,000 sq. yd. but had not yet required any tool changes. The complete area of the project was 45,000 sq. yd., but due to the shallow depth of milling, only an estimated 650 t of material were to be removed. "We're only dumping six to eight loads a day. We're not talking about volume, but precision," Kuhn remarked. »»



Fine-milling and micro-fine-milling technology: Fine-milling drums feature a tool-spacing of just a few millimeters and generate a finely-textured road surface with a maximum milling depth of approx. 3.1 in. Even finer surface structures can be achieved by using micro-fine milling drums with tool spacing under 0.24 in.

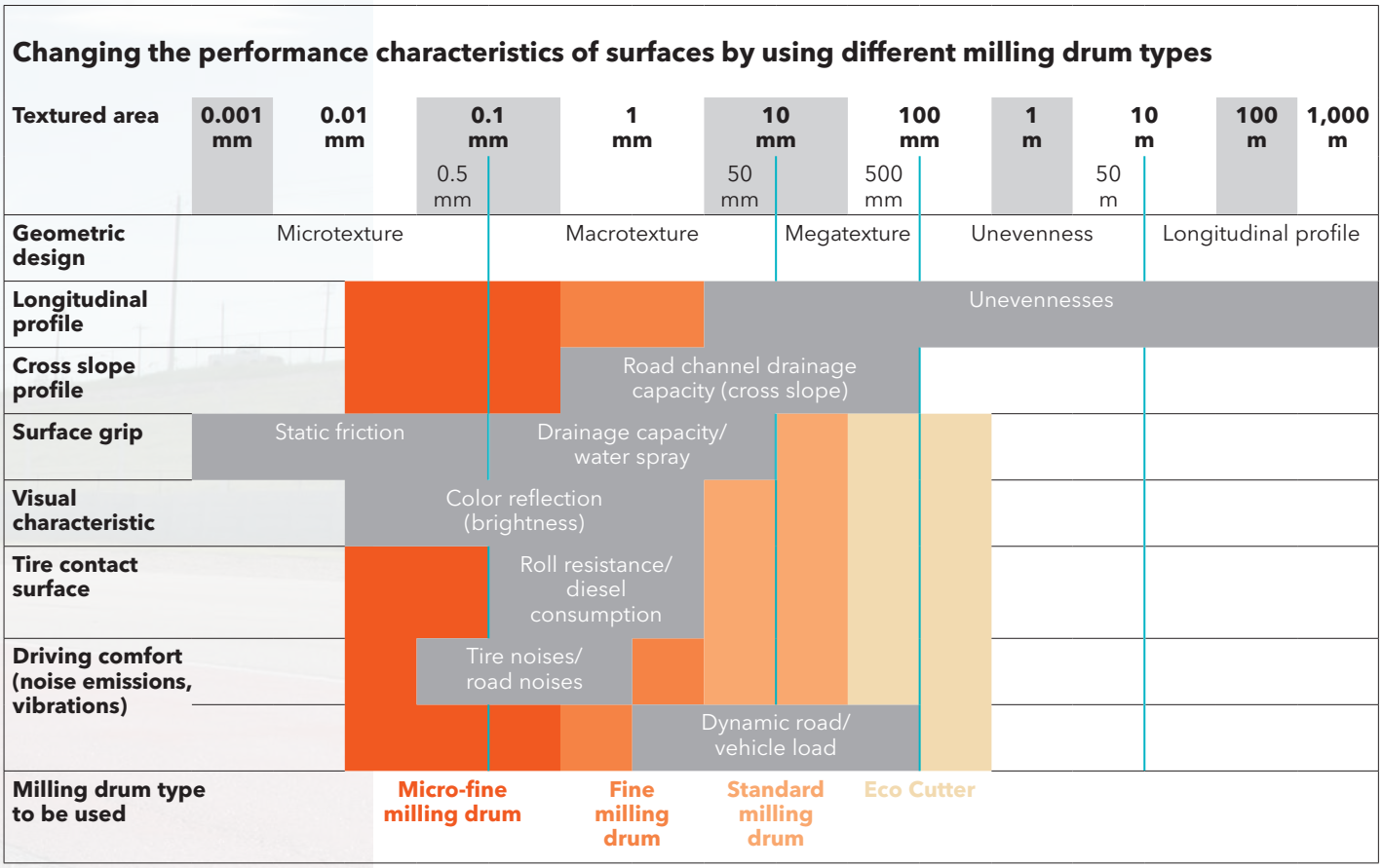
Classification of milling drum types

Milling drum type	Tool spacing	Max. milling depth	Usage options	Texture depth area
Eco Cutter Rough milling drums	20 mm 25 mm	up to 35 cm	**For greater demands on volume performance** › Concrete milling work › Complete road removal	100 to 1,000 mm
Standard milling drums	12 mm 15 mm 18 mm	up to 35 cm	**Universal milling drum for versatile use** › Removal of surface or binder course › Complete road removal › Concrete milling work	25 to 100 mm
Fine milling drums	8 mm 10 mm	up to 8 cm	**For high demands on macro- and microprofile** › Removal of surface courses incl. construction of a more even surface › Corrective milling work on road profiles	1 to 100 mm
Micro-fine milling drums	3 mm 5 mm 6 mm	up to 3 cm	**For the highest demands on macro- and microprofile** › Increase in surface grip by roughening road surfaces using the micro-fine milling process › Increasing the evenness of concrete roads › Preparation milling for surface treatment, cold paving of thin layers and other thin-layer paving › Removal of coatings from road surfaces or hall floors › Removal of road markings › Milling into road markings	0.05 to 1 mm



We're not talking about volume, but precision.

Mike Kuhn, General Superintendent
Austin Bridge & Road, Inc.



Precision is essential

The precision was achieved with the aid of WIRTGEN's LEVEL PRO leveling system. It supplies information on the leveling process and allows the operator to control the milling depth without leaving his platform. Intuitive, ergonomically designed operation with user-friendly graphic displays and function keys are integral to the system. A controller analyses the data from various plug-in sensors, controls the machine's height adjustment and transmits the corresponding data to the control console. One of the decisive factors in milling a surface true to line and level is precision leveling. The purpose of leveling is to regulate the milling depth and slope automatically and as precisely as possible based on a reference line. In the field, it has become standard practice to copy an existing surface by scanning a reference line. But teamed with a wide range of sensors, the WIRTGEN multiplex leveling system can do much more than simple copying. Three sensors on each side of the machine scan the height at wide intervals along the same reference line. The automatic leveling system averages the three measurements to create a perfectly even milled surface, while meeting the target milling depth. This is a highly effective way of leveling out longitudinal undulations. "Additionally, defined surface profiles can be created, such as specified cross slopes or crowns", Chastain said. ///

A symbol of mobility and freedom:
The Golden Gate Bridge in San Francisco.

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