The WIRTGEN GROUP User Magazine for China | № 06

RoadNews

06

Dam compacted by HAMM 322 compactor

Even extreme inclines mastered

WIRTGEN / VÖGELE / HAMM / KLEEMANN / BENNINGHOVEN

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Publishing Details | RoadNews – The WIRTGEN GROUP User Magazine for China | Publisher: WIRTGEN GROUP, Branch of John Deere GmbH & Co. KG, Reinhard-Wirtgen-Strasse 2, D-53578 Windhagen, www.wirtgen-group.com | Mannheim Local Court HRA 704371, VAT ID No.: DE 283 504 884 | Personally liable partner: John Deere GmbH, limited liability company, Domicile Luxembourg, Commercial Register No. R.C.S. Luxembourg B 161281 | Managing Directors: Dennis Docherty, Rainer Otto, Markwart von Pentz, Dr Thomas Peuntner, Domenic G. Ruccolo | Editors: Roland Schug (editor-in-chief), Simone Ellner, Tim Xie |

Editorial

Machines of steel, intelligent technology.

In China, it's the start of the Year of the Rat. This zodiac animal symbolizes intelligence and this year, is linked to the heavenly stem metal. Here at the WIRTGEN GROUP, we can do a lot with both these things: our customers and users in China and beyond appreciate our machines of steel for their ruggedness, whilst our engineers in Langfang and in Germany are collaborating to make our technology ever more intelligent.

The wide variety of features in this issue shows where this has already led. AutoPilot 2.0, for example, enables the WIRTGEN SP 15 Offset Slipform Paver to make concrete profiles without a guide wire and, as a result, quickly and easily. The cold recycling paving method which WIRTGEN has been developing and optimizing for years also makes a huge contribution to economical operation, delivering a saving of up to 90 % of resources.

You can also discover the stand-out features of a new VÖGELE paver – the SUPER 3000-3i. The flagship effortlessly masters pave widths of over 16 m which we demonstrate in a specific project. Or how HAMM compactors manage to compact a dam economically and safely despite its extreme incline – or in conjunction with VÖGELE pavers, create a CTB layer 50 cm thick. And how efficiently KLEEMANN PRO line crushing plants work together when linked.

We hope you enjoy this sixth edition of RoadNews!

Best wishes,

Ulrich Reichert
CEO and Managing Director
WIRTGEN (CHINA) Machinery Co., Ltd.

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W 380 CR

Effective in the long term

Roads require structural rehabilitation to ensure that the road infrastructure remains functional over the long term. WIRTGEN developed the high-performance W 380 CR cold recycler to meet this requirement.

Recycling with integrated rear loading

When recycling with integrated rear loading, cement is first pre-spread where specified. The milling and mixing rotor of the WIRTGEN recycler granulates the asphalt layers. At the same time, the cement is mixed in as injection bars inject water and bitumen emulsion or foamed bitumen into the mixing chamber from the connected water and emulsion/bitumen tank trucks. VÖGELE pavers lay down the new homogeneous construction material and precompact it. HAMM rollers then carry out final compaction.

90%

reduction in use of resources

50%

reduction in quantity of binding agent

Time is of the essence

Road rehabilitation projects have to meet the same requirements all over the world: they must be cost-effective, eco-friendly, and above all, finished quickly. After all, the global road network is showing visible signs of ageing. Patchwork repairs are neither sustainable nor do they address the root cause. The cold recycling process is already popular today, and demand for this solution is set to grow in the future. Recycling of the surface and base course material is a prerequisite for this method. In the in-place cold recycling process, for example, the asphalt surface is processed on site, either in full or in layers, depending on the level of damage, and the material is then repaved immediately. This task is performed in a single pass by a recycling train operating across the entire width of the pavement. The pace-setters at the heart of this recycling train are tracked recyclers like the new W 380 CR. It uses the down-cut process when recycling. This process, in which the milling and mixing rotor rotates in sync, was developed years ago by cold recycling pioneer WIRTGEN. This method has become an essential part of day-to-day recycling operations, as it makes it possible to vary particle size selectively when processing the material – especially in the case of old asphalt roads which are fragile and thin.

The values provided are to be understood as maximum possible values. Whether or not they can be achieved in actual day-to-day operations depends on the specific parameters encountered on site.

W 380 CR

DURABLE

Roads rehabilitated by means of cold recycling have to meet the same durability requirements as roads designed and built using conventional methods. With the development of its own laboratory equipment, WIRTGEN has created solutions to guarantee that rehabilitation measures will be cost-effective and sustainable even before they are carried out. As a result, it is not only possible to define the ideal composition of the RAP, but also to analyse its quality and properties. The quality of the foamed bitumen can also be precisely defined in the materials laboratory before starting the rehabilitation project.

Mix stabilized with foamed bitumen creates the ideal basis

Cold recycling, particularly with foamed bitumen, is becoming increasingly popular with road-building authorities and contractors. This method processes the foamed bitumen with the existing construction material in-place. The newly produced bituminous mix is known as BSM (bitumen-stabilized material). After final compaction, it exhibits a durable and extremely high load-bearing capacity. Viewed from a long-term perspective, BSM has another advantage: the foamed bitumen which is mixed in leads to selective adhesion within the cold recycling layer and thus prevents cracking. As part of the pavement structure, the permanent layers prepared in this way form the perfect foundation for the final, much thinner asphalt surfacing.

Rapid construction with low life cycle costs

Immediate reuse of the removed material and the streamlined logistics which result in in-place cold recycling make construction times much shorter than those of conventional rehabilitation methods. The complete recycling train can be accommodated in the width of one lane. On two-lane roads, recycling is performed on one lane whilst the traffic can be routed past the job site on one lane on the other side. Outside working hours, the full road width is usually available, as even the freshly recycled carriageway can be used on a temporary basis as soon as compaction is complete.

A big benefit of the WIRTGEN cold recycler is its ease of operation.

Recycling with integrated screed

The WIRTGEN W 240 CR cold recycler can also be equipped with a VÖGELE AB 375 T Extending Screed. When recycling with an integrated screed, cement is pre-spread by a binding agent spreader where specified, followed by a water and a binding agent tank truck. The milling and mixing rotor of the W 240 CR granulates the asphalt layers. At the same time, cement is mixed in as injection bars inject water and bitumen emulsion or foamed bitumen into the mixing chamber. The recycled construction material is transported to the rear of the machine via the primary conveyor. It is then paved true to cross-section, line and level by the VÖGELE screed with auger. HAMM rollers then carry out final compaction.

The most advanced and highest-performing cold recycler in the world

Easy operating concept

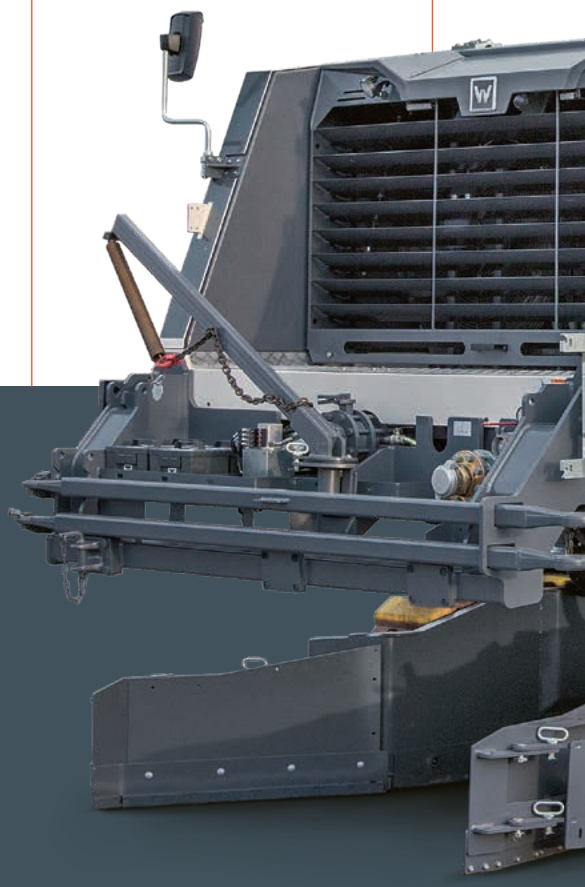
- Flexible positioning of the main control panels in both directions of operation
- Four large, clear control panels for the ground crew; on-board diagnosis system for simple, rapid maintenance assistance
- New automated features enhance ease of operation
- High-precision LEVEL PRO levelling system with various types of sensors

Optimum visibility, convenience and ergonomic design

- New machine geometry ensures perfect visibility
- High-quality camera system with up to seven cameras
- Easy start-up and quick modification of the machine to suit the specific application

Tremendous power

- High-powered, high-torque diesel engine
- Minimized engine noise emissions allow round-the-clock operation in urban environments
- Optimum traction delivered by all-track drive (ASC) and the four-fold full-floating lifting column feature



Model	W 380 CR	W 240 CR
Engine power	708 kW/963 hp	
Working widths	3,200 mm, 3,500 mm, 3,800 mm	2,350 mm
Working depth	0–300 mm (cold recycling application) 0–350 mm (milling application)	
Exhaust emissions category	EU not regulated/US Tier 2	

Precise and reliable injection systems

- Machine-integrated injection systems for water, bitumen emulsion and foamed bitumen
- Metering panel with screen for reliable operation and easy monitoring of binding agent metering
- Innovative process water monitoring for the production of foamed bitumen
- Automatic self-cleaning and flushing feature for high functional reliability of the injection nozzles

Effective cutting and mixing technology

- Milling and mixing unit designed for both recycling and front-loading operations (milling)
- Multiple Cutting System (MCS) for three working widths: 3.2 m, 3.5 m and 3.8 m

Paving concrete without a tensioned wire using AutoPilot 2.0

Digital technology speeds up concrete paving

SP 15 paves a New Jersey profile

A large number of standard or special profiles enable offset pavers like the SP 15 to produce a huge variety of monolithic profiles economically. On the 8 km Beizhen-Matai section, the concrete paver had to pave a New Jersey profile 1.1 m deep around the pre-assembled reinforcement. The base thickness of 56.6 cm narrows to 20 cm towards the top. The concrete safety wall was paved conventionally using a tensioned wire – WIRTGEN AutoPilot 2.0 demonstrates that it is possible to do so without.

The Chinese authorities are specifying the most stringent safety standards during the upgrade of the G 230 national road in Jinzhou. WIRTGEN's SP 15 slipform paver is paving a stable concrete safety wall to segregate the carriageways with two lanes running in each direction.

AutoPilot 2.0

Saving costs, increasing safety

WIRTGEN developed AutoPilot 2.0 to enable the offset and the inset profiles to be produced even more economically and accurately. In conjunction with the SP 15 and SP 25 offset concrete pavers, the 3D control system enables concrete safety walls, kerbs, traffic islands or road surfaces up to 3.5 m wide to be paved without a tensioned wire.

This process requires AutoPilot 2.0 either to use an existing data model or to create a new digital data model immediately on the job site. The advantage of this is that there is no need to measure, tension and remove tensioned wires and tensioned wires no longer get in the way of the team around the paver.

The mobile mixers get more space for manœuvring, simplifying transport of material to the slipform paver. This makes the operational process as a whole shorter, safer and more economical. Clay Armstrong from Talley & Armstrong, Inc. has been using new AutoPilot 2.0 for some time and is really keen on it: "When we worked without a tensioned wire for the first time, we saved costs at once."

AutoPilot 2.0 consists of a computer integrated in the paver and a tablet attached to the Field Rover survey pole. Two GPS receivers mounted on the machine communicate with a GPS reference station on the job site.

If external data models are imported, an extensive examination is performed to guarantee the best possible paving quality.

Two variants: how it works

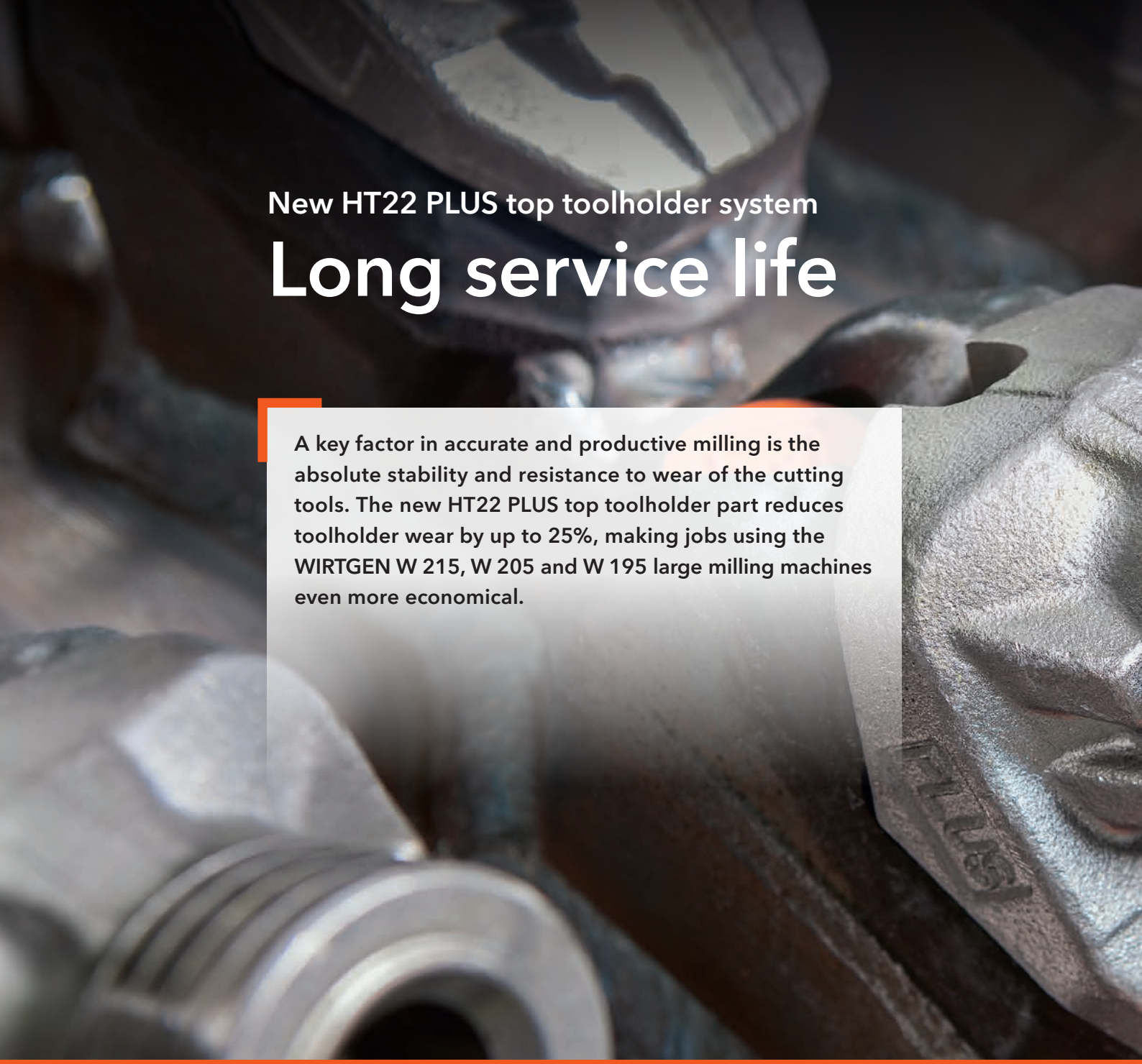
The user can create a virtual tensioned wire in situ himself using the intuitive software on the rugged tablet – in one of two ways.

1 | The user imports the data from an existing 3D model to the tablet.

2 | The user walks the WIRTGEN Field Rover survey pole along the section to be paved, defining individual measuring points as he goes. The key is that the software then calculates the ideal line – the virtual tensioned wire – from the points measured. Existing objects such as water inlets, hydrants or light masts can be taken into account during the process and the virtual tensioned wire adapted if required.

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

Errors can be corrected immediately using graphic editors to smooth out kinks.



New HT22 PLUS top toolholder system

Long service life

A key factor in accurate and productive milling is the absolute stability and resistance to wear of the cutting tools. The new HT22 PLUS top toolholder part reduces toolholder wear by up to 25%, making jobs using the WIRTGEN W 215, W 205 and W 195 large milling machines even more economical.

Changing in good time reduces operating costs

Damaged or worn picks and pick holders should be changed to minimize operating costs. With WIRTGEN toolholder systems, picks and pick holders can be changed quickly and simply directly on the job site. Toolholder systems consist essentially of two parts, a holding part (bottom part of pick holder), welded to the milling drum tube, and a pick holder (top part), connected to the holding part by a quick-release screw connection.

HT22 PLUS: longer service life, less down time

The new HT22 PLUS top toolholder part features an innovative centring stamp in the pick contact surface. In combination with the new A² generation of picks, pick holder wear is reduced by up to 25% and pick rotation is optimized as a result. Key benefits of the new top part include higher milling surface quality and extended change intervals.

HT22 PLUS

VÖGELE Compact Class paver rehabilitating 210 villages

Cramped conditions, yet professional paving

Jiangsu | **Jiangning**

Rehabilitation of a local road: VÖGELE Compact Class machines are totally in their element when conditions are cramped, but convincing results still need to be achieved.

Not every road has several lanes, covers large distances and is used by thousands of vehicles a day. Lots of roads simply link up small villages and snake through them. To rehabilitate local roads like these, compact and manœuvrable road pavers are required to deliver a high-quality result, especially under cramped conditions. Compact Class road pavers from VÖGELE meet these requirements. This was demonstrated in Jiangning district in Jiangsu province, where a SUPER 1100-3 did great work – literally in record time.

Two days per village:
SUPER 1100-3 rehabilitates 210 roads

A SUPER 1100-3 demonstrated its capabilities in Jiangsu province. Here the Compact Class paver completed a demanding job: rehabilitating local roads in 210 villages in Jiangning district. On the one hand, this entailed working at an extremely variable width, whilst on the other, the aim was to maintain a tight schedule, because work in each of the villages had to be completed within two days.

In one of these villages, Banshan, a concrete road needed rehabilitating. The local government decided to have an asphalt surface course 6 cm thick paved over the top of it. For this job, the SUPER 1100-3 worked at a width between 2.9 m and 4.2 m, paving a total surface area of 3,600 m^2 with asphalt. The high pave speed of up to 4.5 m/min made an important contribution to maintaining the schedule. On the SUPER 1100-3, this is facilitated by a powerful 74.4 kW diesel engine.

Like on the large pavers:
a uniform operating concept

Where simple, safe operation is involved, users need to make no compromises at all, even with the VÖGELE Compact Class. This is because VÖGELE machines are operated in an identical manner across all series. The Premium Line pavers, of which the SUPER 1100-3 is one, integrate the ErgoPlus 3 operating concept. The Classic Line machines rely on ErgoBasic, but both systems are similar in structure, satisfy stringent ergonomic requirements and allow asphalt job sites to be managed reliably at all times.

The paver operator from the contractor, Nanjing Western Road & Bridge Group Co., Ltd., agrees: "You can find your way around VÖGELE machines very quickly. And if, like us, you use pavers of several different types, you don't need to get used to it first." In addition to the SUPER 1100-3, his company also uses different SUPER 1900-3 L pavers of the Highway Class.

The uniform and simple operating system means you can find your way around VÖGELE machines very quickly.

Paver Operator
Nanjing Western Road & Bridge Group Co., Ltd.

Mastering the whole job site reliably: made possible by ErgoPlus 3, the ergonomic and intuitive operating concept from VÖGELE.

Paving in cramped conditions: the SUPER 1100-3 paves close to restrictions in every situation and reduces manual labour to a minimum.

The SmartWheel really is a brilliant idea from VÖGELE. It makes adjusting width simple and accurate.

Screed operator
Nanjing Western Road & Bridge Group Co., Ltd.

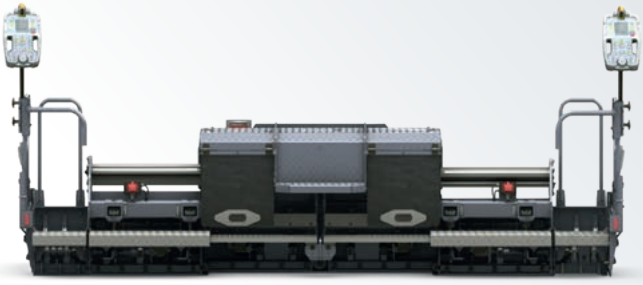
Varying pave width, consistently high-quality results

The screed is especially important when pave widths change frequently. It is only possible to work under such conditions at high speed and to a high quality standard if the screed can be adjusted as smoothly and rapidly as possible. This makes the SmartWheel on the screed operator's console a very important feature indeed. It enables users to adjust width reliably and above all accurately without having to take their eye off the outer paving edge. "It's a really brilliant idea from VÖGELE. It makes our work with the screed easier. The SmartWheel makes it child's play to pave right up to obstacles such as house walls with ease. And with extreme accuracy, too."

High performance, straightforward handling: the VÖGELE AB 340 V Extending Screed

The AB 340 V Extending Screed is ideally suited to the spheres of application of VÖGELE Compact Class machines. It can be infinitely extended in a range from 1.8 m to 3.4 m and with bolt-on extensions, achieves its maximum pave width of 4.2 m. Cut-off shoes permit a minimum width of just 0.75 m, allowing even trenches, for example, to be filled economically and professionally.

The AB 340 V with its powerful electric heating system is also typical of VÖGELE extending screeds. The modern heating system quickly and uniformly heats the screed up to operating temperature, ensuring a smooth paving result. To make sure this too is even, VÖGELE relies on a highly stable single-tube telescoping system which allows width to be adjusted accurate to the millimetre. This telescoping system is furthermore arranged at a high enough level to prevent contact with paving material.



AB340V

Screed operator's console with SmartWheel: straightforward screed adjustment makes operators' work easier.

Paving a width of 16 m with the new SUPER 3000-3i flagship

Leading-edge technology from VÖGELE – convincing across the board

Precisely-allocated power combined with intelligent technology: the SUPER 3000-3i is much more than just powerful. VÖGELE developed a great many innovations for its flagship paver.

Germany | **Munich**

Paving across a large working width is a challenge in itself. If the job also calls for a high-quality asphalt pavement to withstand a long-term heavy traffic load of some 78,300 vehicles per day, then leading technology is key. As early as one of its first jobs – rehabilitating a section of the A96 motorway near Munich – the SUPER 3000-3i from VÖGELE hinted at the feats of which it was capable. The flagship paver from VÖGELE teamed up with the SB 350 Fixed-Width Screed, paving across widths varying between 14 and 16 m, still some way below its potential maximum.

Complete removal of the pavement on the A96: on the motorway near Munich, the SUPER 3000-3i processed 2,500 t asphalt per shift, using a VÖGELE material feeder for an uninterrupted supply of mix.

SUPER 3000-3i

Paving without joints delivers quality benefits

The job specifically involved extending the road from two to three lanes. In its invitation to tender, the Southern Bavarian Motorway Authority specified for the asphalt work that both lanes had to be paved without joints over a length of 8.9 km. As a result, this was the perfect job for the new SUPER 3000-3i from VÖGELE in the fleet of Richard Schulz Tiefbau GmbH & Co. KG. Based in Neuburg, Bavaria, this construction company has a great deal of expertise in paving across large widths. At Richard Schulz, they are convinced that this method offers clear quality benefits over paving several strips "hot to hot".

Flexible paving across widths of up to 16 m with the SB 350 Fixed-Width Screed

Initially, the SUPER 3000-3i and the SB 350 Fixed-Width Screed were new to the paving team, though the team does have experience working with a SUPER 2500, a predecessor by two generations of this new VÖGELE flagship. The newly-developed extra-wide hydraulic bolt-on extensions, which boosted productivity, were the most notable of all the innovations. Using the SmartWheel, pave width can be adjusted by up to 1.25 m on each side of the screed, allowing total pave width to be varied hydraulically by up to 2.5 m.

On the A96 job site, however, the screed and paver still had substantial power reserves: the base course was paved in two 11 cm-thick layers, followed by an 8.5 cm-thick binder course.

Of course, the project on the A96 job site was very impressive, even though the SB 350 was not working to its full potential. This fixed-width screed can also pave anti-freeze layers up to 50 cm thick.

Smooth job site logistics from the outset

On large projects, logistics are more important than ever. On the A96, the plan involved the teams paving 2,500 t asphalt per shift while minimizing traffic disruption. Richard Schulz therefore used a VÖGELE MT 3000-2i Offset PowerFeeder as specified and performed the paving work in the evening and at night: the material feeder ensured that the mix was unloaded rapidly, whilst starting the shift late in the day at 4 pm helped reduce the time required for trucks to travel between the mixing plant and the job site from about 70 to 40 minutes. The Schulz team performed the paving work itself at a speed of around 2-3 m/min. VÖGELE technologies – the SUPER 3000 and the SB 350 – can easily surpass even this figure: maximum pave speed is a substantial 24 m/min.

Unbelievable that such a gigantic machine can work with such precision.

Eyup Kandemir, Senior Site Manager
Richard Schulz Tiefbau GmbH & Co. KG

SUPER 3000-3i

Mr Kandemir, you are the senior site manager for a medium-sized construction company which frequently undertakes projects involving a large pave width. What are the advantages of the method?

It is clear to us that this method contributes to pavement quality. We believe paving without joints has the edge over paving several strips "hot to hot". That's why we always pave a single strip wherever possible, even if we have to work at large widths. Pave widths of 10 m and above are routine for me and my paving team!

What are the key criteria when paving a large pave width?

It starts with preparing the job site, which is very important. How many mixing plants and how many trucks will it take to ensure smooth job site logistics? You have to make sure things go right at this planning stage. On the A96, we decided to work from evening to early morning. That way, we reduced the total round-trip time of the trucks by 30 minutes. On the job site itself, the most important thing is to ensure surface accuracy across the entire roadway. The screed needs to be very stable, right to the very edges of course; the new SB 350 Fixed-Width Screed meets these criteria perfectly.

We found the hydraulic bolt-on extensions especially flexible, allowing pave width to be adjusted by a total of 2.5 m. This was an enormous help to us on this project. Pave width varied frequently between 14 and 16 m within one part-section of the road, but with the new screed, we were able to pave continuously without any conversion work. That wouldn't have worked with our existing equipment. As a result, we saved a lot of time and of course, non-stop paving enhances the evenness of the paved surface, which is outstanding in this case.

So the demands on machine technology are very high. Were you impressed by the new SUPER 3000-3i paver as well as by the new SB 350 Fixed-Width Screed?

I most certainly was, and so was my team. We were thrilled with its powerful performance, and by that I don't just mean the engine output. The SUPER 3000-3i is totally precise when it comes to material flow, too; it always doses the mix perfectly. The new material transport system, which allows you to adjust the height of the entire chassis, ensures a perfect head of mix in front of the screed, regardless of layer thickness. Compared to the largest paver in our fleet – a SUPER 2500, which is a predecessor by two generations – the SUPER 3000-3i is a beacon of progress. Our paver and screed operators were delighted with their "new workplaces" and above all with the intuitive ErgoPlus 3 operating concept with its easy-to-use consoles. Thanks to them, we had the paver under control right from the start.

And that is undoubtedly a key point: when employees change, it is important that operators are able to familiarize themselves with the machine quickly and concentrate on essentials, in other words, on paving. Particularly when you're paving across such large widths, minor operating errors can have a major impact on the schedule. My team and I were absolutely thrilled with the new SUPER 3000-3i. We think this machine is the absolute best!

There's more to come on the new SUPER 3000-3i!

We will be introducing the machine concept and the technologies of the new VÖGELE flagship paver in one of the next issues of RoadNews.

Compaction of a sophisticated dam construction:

HAMM 322 – the climbing specialist

The outstanding features of the HAMM 322 compactor include plenty of power, a climbing ability in excess of 50% and quality compaction, all of which were needed in Ningxia province. The Xixia reservoir dam being built there has a minimum slope of 35%; this was easily mastered by the HAMM 322 compactor, which delivered high-quality compaction with economy.

Yinchuan | **Xixia**

UP TO

50%

The hydraulic drive of the HAMM 322 soil compactor allows it to compact easily – even on dams with a slope of over 35%.

HAMM 322

Water for Yinchuan

In 2019, a huge water reservoir, the Xixia reservoir, was built in Yinchuan, capital of Ningxia province in the north of China. It is located in the first flood discharge area of Huangyangtan Farm, Ningxia and is part of the water system supplying the Yinchuan metropolitan area. The reservoir is surrounded by three dikes, has a maximum capacity of 18.2 million cubic metres and a water area of approx. 2 square kilometres.

The water in the reservoir will supply the newly-built southern Yinchuan Waterworks and the Helanshan Waterworks. Once completed, it will be used for desilting sediments and regulating water storage for residents in three districts and two counties of Yinchuan City. After completion of the whole project in 2020, over 2.6 million people in urban and rural environments will benefit from it.

Enormous dimensions: once the reservoir is full of water, the compacted dam will have to withstand its pressure, so powerful compaction of the dam was critical.

Slope, safety and time were major challenges

On a dam project, thorough compaction of the mineral aggregates is a prerequisite for withstanding the pressure of the water behind it. Any problem with the quality of the dam body may cause a leak, threatening the lives and property of the surrounding residents.

In the Yinchuan project, it was quite a task to compact the dam, which consists of a mix of clay, rock and sand from local sources: it is 18 m high, with an incline of at least 35%, so the resulting inside surface of the dam is 54 m long. Given the 5.6 km circumference of the reservoir, a total area of some 302,400 square metres required compaction.

Besides compaction quality, the other factor with an impact on occupational safety is the incline of at least 35%. Using construction machinery to work on a slope like this inevitably entails potential safety risks such as rollover or slipping which may harm machine operators and other job site staff.

After investigating the performance of different types of soil compactors, the project manager selected Ningxia Zhongyuantong Construction Machinery Rental Co., Ltd., a rental and construction company which has several HAMM 322 high-performance compactors in its machine fleet. In addition to performance, the HAMM 322 also provides a high level of safety because it is a fully hydraulically-driven compactor: it can completely self-lock by braking, eliminating the phenomenon of slipping on the slope and thus avoiding potential safety hazards.

Mike Yu (Sales Director Road Technology WIRTGEN CHINA), Jens Ruprecht (Application Engineer HAMM), Ma Zhongyong, General Manager of Ningxia Zhongyuantong Construction Machinery Rental Co., Ltd. and Dong Yuan (Sales Manager WIRTGEN CHINA).

Powerful drive system

On this project, semi-hydraulic compactors were not considered a qualifying machine option, as their climbing capacity is limited to a 30% incline – and that's before compaction has even been mentioned. The HAMM 322, meanwhile is fully hydraulically driven and its powerful drive system features an original Rexroth hydraulics system with hydraulic flow divider – a special feature for the Chinese market. Self-locking differential guarantees excellent climbing ability, allowing HAMM compactors to impress with their gradeability of up to 50% on soft soil. In fact, the high performance of the HAMM 322 compactor working on the slope totally convinced both the contractors and the project managers.

Scaling incline and compacting effortlessly

The contractor was highly satisfied with the compaction efficiency of the HAMM 322, as well as with its climbing ability. One reason for its efficiency is its engine, with a rated output of 164 kW which delivers plenty of power to ensure a sustainable and stable amplitude output when compacting along such steep slopes. Its static linear load of 62.4 kg/cm is every bit as impressive as its centrifugal force of 331 kN.

This power feature leads to a high compaction performance. While compacting the final layer on the slope, for example, the HAMM 322 worked 6 hours a day at a compaction speed of 3 km/h. Compacting the dam with two passes in low amplitude mode, it completed

Compacting the dam: a job for roller drivers with no fear of heights.

9,000 m² per day. The contractor used two HAMM 322 units for this project and this compaction performance made it possible to complete final compaction in the short time frame available at the end of the project without compromising on quality.

Highly cost efficient

If we take a closer look at operating costs, the contractor is also satisfied with the HAMM 322 in this regard. Ma Zhongyong, General Manager of Ningxia Zhongyuantong Construction Machinery Rental Co., Ltd., mentioned on the job site that: "In terms of operational efficiency, one HAMM 322 can completely replace two semi-hydraulic single-drum rollers. This reduces labour costs (operator wages), fuel consumption and machine depreciation to 50%, as only half the number of machines is needed. The total cost saving is obvious and improves our return. What is more, WIRTGEN CHINA and its local dealer provide reliable customer support which gives us the confidence to handle the project."

HAMM's series 300 comes with outstanding features

Compared with other models in the same class, HAMM 18–25 t compactors have many advantages. The series is composed of the five models 320, 320 P, 322, 322 P and 325. All of them are produced in WIRTGEN CHINA's Langfang factory and are tailored exclusively for Chinese customers by an engineering team from Germany and China. They combine numerous powerful features typical of HAMM – such as compact design, unique visibility, first-class handling and compaction performance – with features essential for the Chinese market – like the exhaust gas directives or the choice of wear parts available in China.

Series 300

HAMM 300 series soil compactors are all equipped with a 2,220 mm-wide drum. They comply with emission standard MEP III and come with many special options tailored for the Chinese market. The 320 is shown on the left of the image and the 322 P on the right.

322 compacts steep and deep

The HAMM 322 soil compactor comes with a clearly designed operating platform and protective roof. It can be equipped with a cabin, including air conditioning. The user-friendly operating panel features a modern design of information display and intuitive operation with international symbols. Displays for engine rpm and drive speed are standard equipment. A compaction meter can optionally be added.

For high compaction performance, the 322 model has an efficient Dongfeng Cummins engine type QSB 6.7 C220 (164 kW) on board. Its fuel consumption is low as this is a latest-generation engine.

An innovative cooling system – the cooling air is fed in from the rear part of the engine hood – provides an optimized air supply, an increased power pack lifespan and a reduction in noise emissions compared to earlier solutions.

The drive system comes with an original Rexroth hydraulics system and a hydraulic flow divider as standard equipment.

HAMM 300 compactors: types and weights

Type	Type of drum	Weight in kg
320	Smooth drum	20,045
320 P	Padfoot drum	20,565

Type	Type of drum	Weight in kg
322	Smooth drum	21,740
322 P	Padfoot drum	22,260
325	Smooth drum	24,730

The 9.5 m-wide CTB course was compacted by three HAMM rollers. All were made in the Langfang factory in China.

Henan | **Puyang**

Easy paving and compaction of 50-cm CTB layer

HAMM 322 and VÖGELE SUPER 1880 L showed their muscles

In Henan province, close to the Yellow River, two HAMM 322 compactors proved their outstanding performance by successfully building a cement treated base course (CTB) up to 50 cm thick. This type of compactor is manufactured in the WIRTGEN GROUP's China-based factory in Langfang and has been tailored to meet the needs of Chinese customers.

Paving a 36 cm-thick CTB in one pass

The S101 Mazhuangqiao section, located in Qingfeng county in the Puyang municipality of Henan province, was severely damaged by heavy traffic. This resulted in bumps, ruts, cracks etc. having a negative impact on driving comfort and safety. The local government decided to upgrade a part of this provincial road to the G342 national road. The total length of the section in question is 2.5 km. Eventually, it will be a road with four lanes in both directions.

For the rehabilitation process, the damaged top layer and the 36 cm-thick CTB layer were milled off first. The next step was to pave a new CTB course which was 50 cm thick before compaction and 36 cm thick afterwards. It was subsequently covered with a new wearing course.

CTB courses with a total final thickness of 36 cm are usually built in two layers, each 15-20 cm thick. The main reason for this procedure is the ease with which compaction quality can be controlled. But there was an additional challenge on this project: time. The time frame was limited, so the contractor decided to pave the 50 cm-thick CTB course in one pass, taking advantage of higher working efficiency and lower costs.

High performance for efficiency and quality

Compared to the traditional paving method, the construction of such a thick layer has several advantages: the integrity of the pavement is improved, the pavement construction process is simplified and

Impressive layer thickness of 50 cm: The VÖGELE SUPER 1880 L.

construction time is saved. Whilst the procedure of paving such a thick CTB is simple, its quality control becomes a challenge. Other factors affecting quality, such as the evenness of the ground, aggregate grading and water content, the performance of the pavers and compaction performance become key factors when completing such a project.

The contractor, Henan Guangda Road & Bridge Engineering Co., decided to use a WIRTGEN GROUP fleet composed of two VÖGELE SUPER 1880 L multi-functional pavers equipped with an SB 300 HDT screed specially designed for paving cold materials in thick layers. A HAMM HD 138 tandem roller and two HAMM 322 soil compactors were used for compaction. The two SUPER 1880 L pavers paved the CTB course side by side with a total paving width of 9.5 m and a paving thickness of 50 cm. After the HAMM rollers had completed their work, the CTB course was successfully compacted to a thickness of 36 cm.

Compaction speed of 3 km/h at high amplitude

In Puyang, a high compaction efficiency was essential, which was why the contractor defined a specific roller plan to achieve the ideal compaction degree. The first machine – the HAMM HD 138 tandem roller – was responsible for preliminary compaction. The roller applied static pressure in the forward direction, and compacted in vibration mode at high amplitude during reverse travel, only once back and forth. Then two HAMM 322 compactors followed for secondary compaction, completing three passes in vibration mode at high amplitude plus three passes at low amplitude with a compaction speed of 3 km/h.

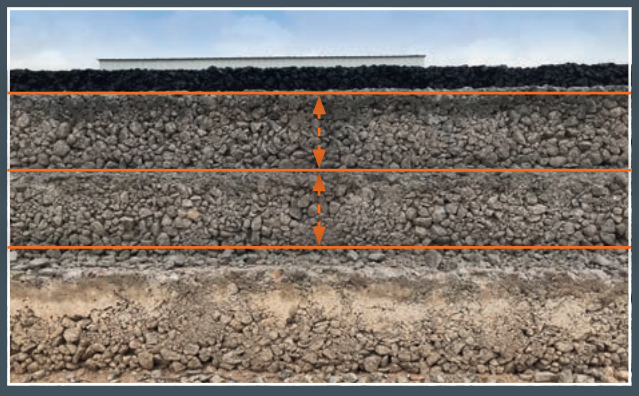
Hydraulic drive makes the difference

A closer look at compaction performance shows that the hydraulic drive of the HAMM compactors is key to the big difference when compared to mechanical or semi-mechanical single-drum vibratory compactors. These machines are not able to meet the requirements when compacting CTB with a thickness of 50 cm. The 22 t fully hydraulically-driven HAMM 322 compactor is able to do this as it features a different weight distribution. The front section, i.e. the drum part, can reach a weight of about 15 t. Mechanical or semi-hydraulic compactors cannot distribute that much weight to the front section, because they need the weight in the rear part of the machine for traction. In the 22 t class, the drum can only be applied with a maximum of 50% of total machine operation weight, namely 11 t. This means that the HAMM hydraulic compactor has a much higher static load. Combined with its powerful vibrator, it performs far better and more efficiently than models of the same (or even higher) weight classes with mechanical or semi-hydraulic drive.

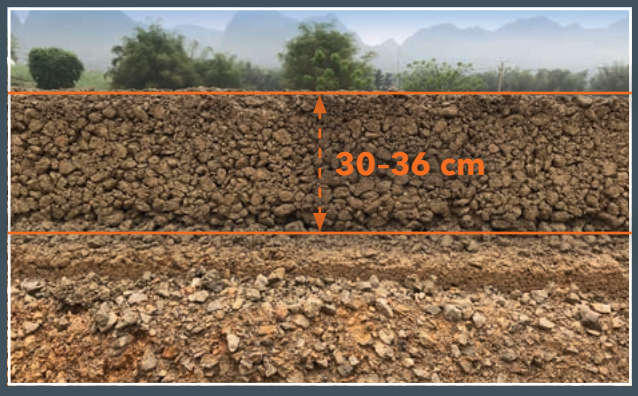
Compacting a thick CTB course

Thick layers of a CTB course can be built up much more quickly when the thick layer is paved and compacted in one pass. There are two essential prerequisites:

- pavers with a correspondingly high capacity and
- compactors with the corresponding compaction performance and depth effect.



CTB course paved in two layers, each approx. 15 cm thick after compaction.



CTB course paved in one pass, average thickness 36 cm after compaction.

Even surface

Another advantage of the 322 compactor is the evenness of the surface. As its hydraulic drive starts and stops the compactor smoothly, effects such as undulations, for example, are avoided. These are often caused by mechanically or semi-hydraulically driven compactors starting and stopping.

The resulting evenness and bearing capacity of the CTB course, achieved thanks to very efficient compaction by the HAMM 322, was an excellent foundation for the subsequent asphalt paving. Results of analysis of the drilling core samples from the test section were good, showing that the required compaction quality was delivered.

All in all, the VÖGELE pavers, HAMM rollers and HAMM compactors worked together very efficiently, enabling Henan Guangda Road & Bridge Engineering Co. to complete construction of the 50 cm-thick CTB course of this section successfully in not much more than a week. As bearing capacity met project requirements, the customer was once again convinced by the outstanding performance of VÖGELE pavers and HAMM compactors.

VÖGELE SUPER 1880 L with 1,000 t/h laydown rate

Paving a 50 cm-thick base course requires extremely powerful and durable pavers. The VÖGELE SUPER 1880 L is well-known as a powerful multi-functional paver for cement-treated base courses and asphalt. Its long extended hopper with a maximum capacity of 15 t permits fast unloading of trucks while its powerful conveyor system delivers a high throughput rate and continuous material flow. These features enabled the two SUPER 1880 L to do a very good job when paving the 50 cm-thick CTB course in Qingfeng county.

The two pavers are equipped with an SB 300 HDT Fixed-Width Screed.

High output, high efficiency: highlights of the SUPER 1880 L

- ErgoBasic operating concept: super-easy paver and screed operation and excellent view of the entire machine and job site
- Heavy-Duty kit: abrasive wear counteracted by reinforced guards for conveyor tunnel and chassis, as well as modified auger blades
- SB 300 HDT Fixed-Width Screed: with Heavy-Duty kit and Heavy-Duty tamper – ideal for paving CTB – as well as electric, dual-circuit screed heating for rapid warming of the screed plates when paving hot mix asphalt
- Extra-long and particularly low material hopper: for easy feeding with mix by all types of trucks common in China
- Rated power: 158 kW

SUPER 1880 L

Linked operation: the KLEEMANN plant train automatically regulates the speed at which material is conveyed through the plant. This prevents material blockages resulting from overloading of a plant – whilst increasing energy efficiency and performance.

Henan | **Wugang**

Mobile PRO line crushers increase efficiency:

"KLEEMANN plants help us save costs."

In Wugang, a fleet of mobile KLEEMANN crushing and screening plants show what they're made of. They include the KLEEMANN PRO line plants, the MC 120 Z PRO jaw crusher and the MCO 11 PRO cone crusher. An MS 953 EVO screening plant classifies the crushed rock into a total of four aggregate fractions. In Henan province, the Henan Baorui Construction Engineering Co., Ltd. uses the source material obtained for a number of purposes, including CTB layers in road construction.

MC 120 Z PRO

In Wugang, two linked PRO line crushers work with a KLEEMANN MS 953 EVO classifying screen.

Masters of basalt hard rock:
KLEEMANN MOBICAT jaw crushers.

- Basalt is a vulcanite – an extremely hard and durable volcanic rock. The density of the hard rock is 3 t/m³ and is thus higher than that of granite – making it the ideal material for road construction. If we include the sea bed, it is the most commonly occurring rock on the planet.
- The mobile jaw crushing plants in the MOBICAT series are particularly suitable for processing hard rock such as basalt in the first crushing stage, whilst those in the MOBICONE series are ideal for the second crushing stage.

KLEEMANN PRO line plants crush over 240 t/h

In Wugang, PRO line crushing plants have been proving for some time that they are ideal for demanding operation in quarries. Here, rugged KLEEMANN engineering crushes rock for the road construction division of Henan Baorui Construction Engineering Co., Ltd. Strictly speaking, this rock is basalt, the majority of which is processed further into cement or asphalt-bonded mix. Basalt is an abrasive hard rock for which MOBICAT plants are ideally used in the first crushing stage. This is how it works in Henan, where a mobile MC 120 Z PRO jaw crusher breaks up the rock and discharges it or passes it on to a second-stage crusher.

Allows high hourly outputs of up to 650 t: the new KLEEMANN MC 120 Z PRO jaw crusher.

Linked operation increases productivity

This is because the new MC 120 Z PRO is a real team player: as a representative of KLEEMANN's PRO line, it has been optimized for linked operation with the MCO 11 PRO, making it possible to detect if any of the linked plants becomes overloaded. The automatic Continuous Feed System (CFS) then feeds less material into the crushing chamber for a short time until the crusher affected has returned to the normal load range. This ensures a high degree of machine availability, because material blockages are extremely rare and so do not have to be eliminated manually. "KLEEMANN plants make our work really easy," reports Che Mingqiang, deputy general manager at Baorui Construction Engineering Co., Ltd.

PRO line

Happy faces after the joint commissioning operation: the chemistry between the Henan Baorui Construction Engineering Co., Ltd. team and members of the KLEEMANN team from the WIRTGEN GROUP in China works well.

The low fuel consumption of the PRO line crushers helps us save money.

Che Mingqiang, Deputy General Manager
Baorui Construction Engineering Co., Ltd.

Efficient crushing technology reduces diesel consumption

"The engineering works perfectly and is a lot more efficient than we were used to. At 80–85 l/h, diesel consumption is much lower, saving us cash. WIRTGEN GROUP performance and quality are spot-on anyway, so I am completely delighted with our investment." Che Mingqiang and his team get 240 t/h out of the plants, ten hours a day, seven days a week. This is a total of 16,800 t of high-quality basalt a week, which a mobile KLEEMANN MS 953 EVO screening plant eventually classifies into four precise aggregate fractions from 0–6 mm to >25 mm. Each of the plants has significant power reserves over and above this: when working as a standalone plant, the MC 120 Z PRO jaw crusher can process up to 650 t of rock per hour. The crushed material is discharged and/or transferred to the MCO 11 PRO cone crusher downstream. This crusher achieves up to 470 t/h.

MS EVO, commissioning, SPECTIVE

It's no coincidence that right from the outset, you see only happy faces on the job site in Wugang. "During the commissioning process, WIRTGEN CHINA staff showed us what is important. How to obtain as much high-quality material as possible economically, what maintenance looks like and what we can do to maintain an optimum flow of material when feeding with the excavator. I really appreciate this experience of partnership and proximity to users," says Che Mingqiang.

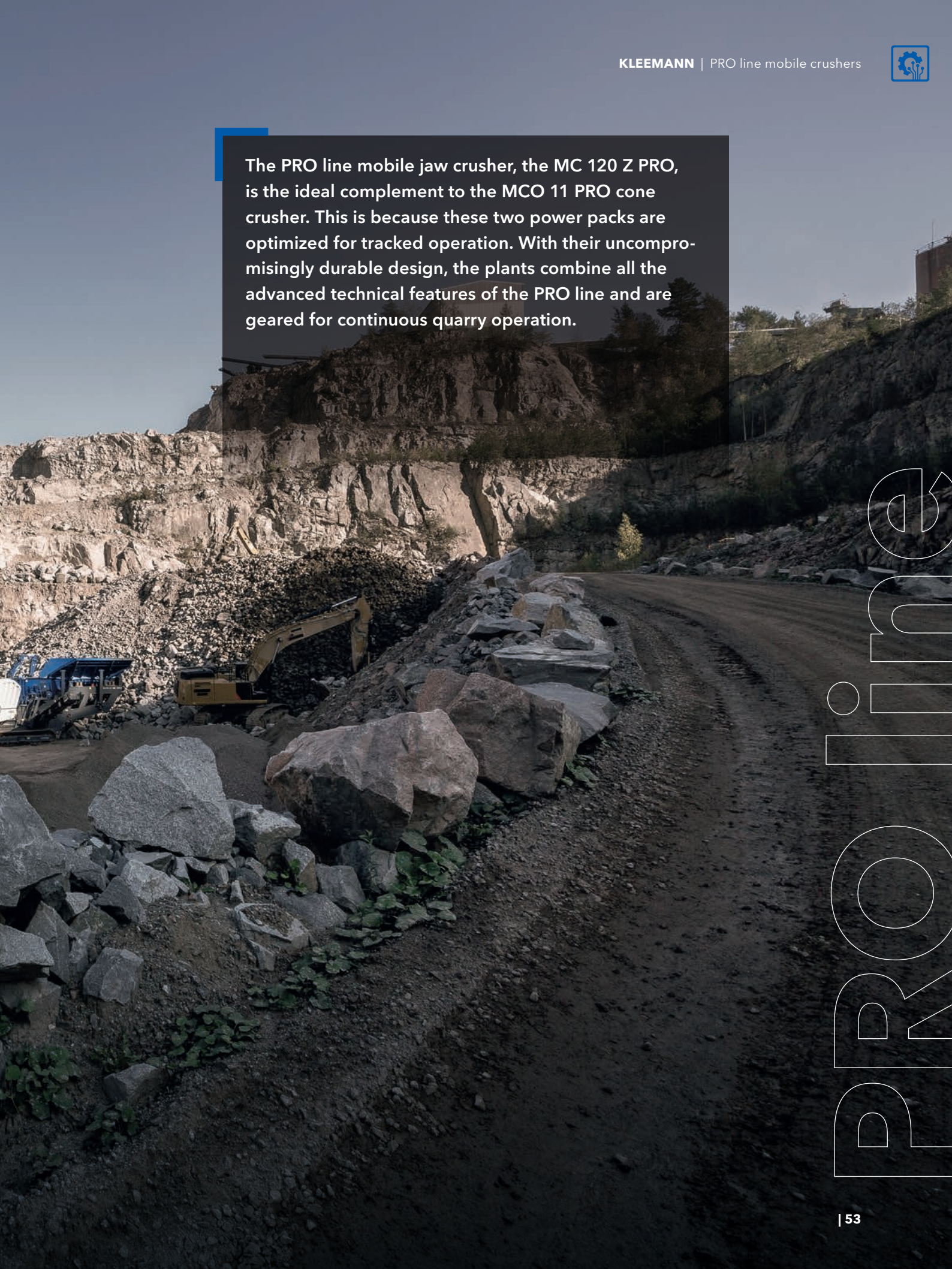
Kevin Guo from the KLEEMANN team of the WIRTGEN GROUP in China explains that the plants themselves are also set up in a particularly user-friendly way: "One important benefit of a KLEEMANN product always becomes clear as soon as it is delivered: the intuitive SPECTIVE control system concept, which is set up identically for the whole current generation of plants. This allows users to operate the technology guided by a touch panel and to have functional standby of all areas displayed, for example, which also allows any problems arising to be solved rapidly. It also makes it much easier for users to switch from other manufacturers."

80–85 **is the fuel consumption of the PRO line crushers in Henan.** **l/h**

MC 120 Z PRO from KLEEMANN complements PRO line plants

Strong performance, team-oriented technology

Crushing big blocks of rock, producing precise grain sizes and shapes, using energy efficiently: KLEEMANN's PRO line plants deliver a strong performance.



The PRO line mobile jaw crusher, the MC 120 Z PRO, is the ideal complement to the MCO 11 PRO cone crusher. This is because these two power packs are optimized for tracked operation. With their uncompromisingly durable design, the plants combine all the advanced technical features of the PRO line and are geared for continuous quarry operation.

PRO line

MC 120 Z PRO

Efficient drive system:
high output, high efficiency

Progress pays off: the mobile PRO line crushers are equipped with efficient, powerful diesel-electric drives, with the crusher unit and all conveyors being electrically driven. This entails a whole raft of benefits – the oil lines usually required by hydraulic drives are eliminated, meaning less oil and longer intervals between oil changes. Compared to a conventional drive, this system is easier on the environment and saves money.

Their drive concept makes KLEEMANN PRO line plants save fuel right from the outset to reduce costs. The option of fully electric operation, i.e. with an external power supply, has a strong appeal in terms of cost effectiveness. This mode further reduces energy costs, emissions and noise.

Intuitive SPECTIVE control system:
easy-to-control technology

Focusing on the user: PRO line plants are operated via touchscreen with the easy-to-use SPECTIVE control system. All the important information is visible at a glance and all components and functions can be conveniently controlled from the ground.

The 12-inch touchscreen is dustproof and always easy to read with its good light intensity and high contrast. The start screen shows an image of the entire plant and all its adjustable functions at a glance.

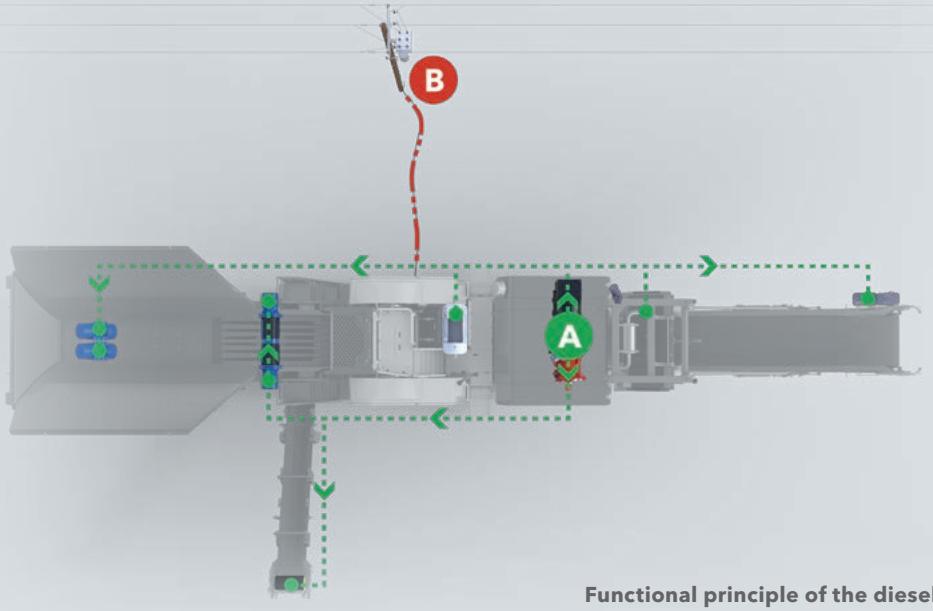
High performance in the first crushing stage:
MOBICAT MC 120 Z PRO jaw crusher

Recommended applications

- Processing natural stone (e.g. limestone, granite, basalt)
- Mining
- Recycling (e.g. rubble, concrete, reinforced concrete)
- For a continuous process: in combination with the MOBICONE MCO 11 PRO cone crusher and a MOBISCREEN screening plant

Highlights

- Diesel-electric drive system
- Possibility of an external electric power supply (optional)
- Independent, double-deck prescreen (3.5 m²)
- Automatic crushing gap adjustment
- Continuous feed to the crusher with the Continuous Feed System (CFS)
- Crusher discharge chute (optional)
- Crusher unblocking system (optional)



Functional principle of the diesel-electric drive

A | Efficient and powerful diesel-electric drive for low fuel consumption: the crusher unit and all conveyors are electrically driven.

B | External power supply for even more cost-effective quarry operation.

MCO 11 PRO

Accessibility and safety: consistently integrated in the development of the system

The advantages of user-friendly design are above all evident in the area of maintenance. The easier it is to access plant components, the sooner servicing can be completed. That's why KLEEMANN PRO line plants have large hinged panels providing easy access to the engine compartment. The plant can even be refuelled easily from the ground – in the case of the MC 120 Z PRO, with the aid of an optional refuelling pump.

KLEEMANN also made no compromises on the safety of its PRO line plants. One example is the use of safety valves. These make sure that every hydraulic cylinder stays in its current position in the event of malfunction or shutdown to protect both the operator and the plant itself.

Linked operation: smooth crushing processes

Made for each other: the mobile MC 120 Z PRO jaw crusher and the equally mobile MCO 11 PRO cone crusher are a perfect match in terms of performance, dimensions and material flow concept. This means that these PRO line plants can be linked together using the line coupling option. It automatically optimizes the crushing process between the plants, ensuring that material is conveyed with maximum efficiency at all times.

A probe installed on the crusher discharge conveyor of the upstream plant monitors the fill level of the downstream plant. If this reaches a defined level, the feed rate is temporarily reduced to prevent the overfilling of individual plants. The Continuous Feed System (CFS) ensures optimum utilization of the individual machines.

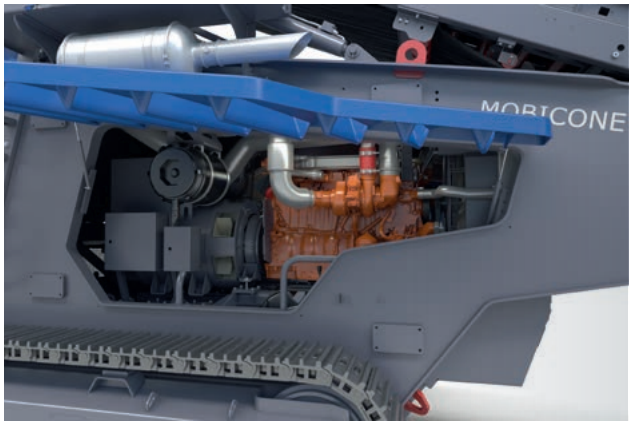
Efficiency and maximum final product quality in the second crushing stage:
MOBICONE MCO 11 PRO cone crusher

Recommended applications

- Secondary and tertiary crushing
- Medium-hard to hard, abrasive natural stone
- Mining
- For a complete process: can be combined with MOBICAT MC 120 Z PRO jaw crushers and a MOBISCREEN screening plant

Highlights

- Generously-dimensioned feed unit with simple slide mechanism
- Continuous feed to the crusher with the Continuous Feed System (CFS)
- Tramp release and ringbounce detection systems for reliable protection against overloading
- Automatic crushing gap adjustment
- Diesel-electric drive system
- Possibility of an external electric power supply (optional)



Servicing made easy: large hinged panels provide easy access on all PRO line machines.

LED lighting makes the PRO line machines even more user-friendly. An optional premium lighting system can provide even better illumination of all the relevant plant components.

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