

The WR model series in a variety of applications.

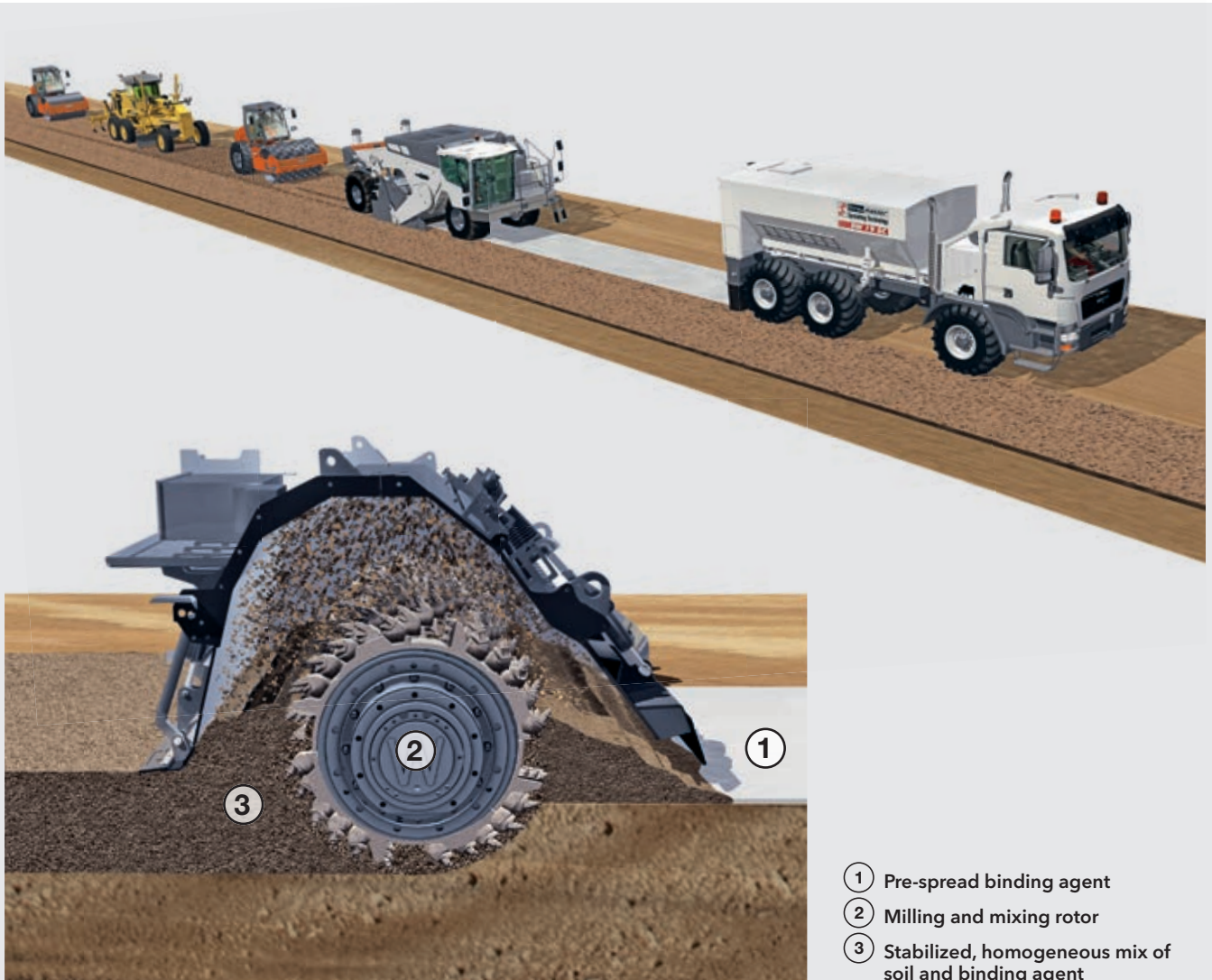
Successful operations in soil stabilization and cold recycling



**JOB REPORTS
AND REFERENCES**

Powerful soil stabilization produces homogeneous subgrade

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Stabilizing soils of poor bearing capacity on a large scale.

When operating as a soil stabilizer, the WR uses its powerful milling and mixing rotor to mix pre-spread binding agents, such as lime or cement, into existing soil of insufficient bearing capacity at a working depth of up to 56 cm, thus converting it into a construction material of high quality in an in-situ process. Following treatment, the soil-binder mixture is levelled by graders and then compacted by rollers. During the operation, the WR effortlessly pushes a preceding water tanker truck which delivers the required water via a hose connection. The resulting homogeneous soil-binder mixture offers the specified tensile strength, compressive strength and shear strength as well as lasting water resistance,

frost resistance and volume stability. Typical applications include the construction of traffic infrastructure such as roads and railway lines, parking lots and sports grounds, industrial estates or facilities, airports, embankments, backfills or landfills. Soil stabilization is an economical, fast and environmentally friendly process that dispenses with the necessity of extensive soil exchange. It scores top marks compared to soil exchange as it requires fewer truck transports, shortens completion times, saves on resources and reduces CO₂ emission.

High-quality cold recycling for stable base layers



- ① Milling and mixing rotor
- ② Injected foamed bitumen
- ③ Injected water-cement slurry
- ④ Recycled, homogeneous construction material

The WR is used as a cold recycler in projects requiring the structural rehabilitation of traffic surfaces. It is equipped with a powerful milling and mixing rotor which mills and granulates asphalt pavements, injecting binding agents and water in precisely metered quantities and mixing them with the pavement material to be recycled. After processing, the homogeneous construction material is levelled precisely using graders and compacted by means of rollers. The new base layers are distinctive for their exceptionally high bearing capacity. Preceding tanker trucks providing water and binding agents via coupled hose connections are pushed by the WR. The WR is the ideal choice for a wide variety of applications rang-

ing from recycling thin asphalt layers on minor roads with low traffic volumes to recycling 25 cm thick asphalt layers on heavily trafficked motorways.

The range of suitable binding agents includes water, cement, bitumen emulsion and foamed bitumen. Foamed bitumen for the production of highly durable base layers is produced in the cold recycler.

Perfect mixing quality and utmost metering accuracy.

WR 240

Subgrades of the highest quality for an ICE line

In the first step, the WR 240 mixes pre-spread binder into the backfilled soil at a layer thickness of 50 cm.

As part of the new construction of an ICE line between Ebensfeld and Erfurt (Germany), the surplus soil excavated during the production of line cuts and tunnels is transported to a nearby stockpile where it is stabilized by add-

ing binders and then used to backfill bridge approaches, sewer trenches or similar along the railway line. Highest quality standards have been agreed:

In order to achieve a highly homogeneous mixing quality (particle size < 25 mm), the client specifies thorough mixing in three machine passes. In the first step, the WR 240 therefore mixes pre-spread binder (up to 90 kg/m²) into the soil at a layer thickness of 50 cm to produce a homogeneous mix. In the second step, it thoroughly re-mixes the soil while adding precisely metered quantities of water. In the final step, the WR 240 homogenizes the existing soil to make it suitable for placing. The quality of stockpile production is scrupulously monitored by an independent testing laboratory.





In addition, restricted space conditions in the stockpile yard require frequent repositioning and reverse travels of the WR 240, as well as skilful handling of the machine by the operator.

The operator can control all important basic functions easily and conveniently via the highly precise multifunctional joystick integrated in the right-hand armrest. Automated processes, such as automatic lowering and raising of the milling and mixing rotor, ergonomic workplace design and the innovative reverse assist feature greatly increase operator comfort. The rear axle features an extra large steering angle, allowing swift turning manoeuvres at

the end of the short passages and in restricted space conditions. These advantages are reflected in improved operator performance. High engine power and optimal traction enable the WR 240 to easily work its way through the heavy soil. The powerful, direct mixing rotor drive, rotor speeds adjustable from the operator's cab, and perfectly matched rotor bars ensure a consistently high mixing quality - which is confirmed by every check performed by the testing laboratory.

1 | *The high-quality end product is used to backfill trenches or similar along the high-speed railway line.*

2 | *Final homogenization produces material of a fine-grained quality.*

PROJECT DATA

Contract volume	240,000 m ³
Spreading quantity of binder:	20 to 90 kg/m ²
Working width	2.4 m
Working depth	50 cm
Advance rate	6 to 16 m/min





PROJECT DATA

Total area	16,000 m ²
Total amount of subbase binder	240 t
Working width	2.4 m
Working depth	30 cm
Advance rate	8 to 18 m/min

WR 240 Stable base layers for the A7 motorway

The powerful milling and mixing rotor creates an excellent, homogeneous mix of high quality.

As forecasts anticipate high traffic volumes with a correspondingly high percentage of heavy traffic, rehabilitation of the A7 motorway near Langenau (Germany) calls for both a subgrade and upper pavement structure of superior bearing capacity. In order to meet these requirements, the WR 240 is commissioned to produce a hydraulically bound base layer of high quality. In a first step, water and road binder (15 kg/m²) are distributed on the subgrade level previously

produced by graders. In the following step, the WR 240 thoroughly and accurately mixes the hydraulic binder into the existing gravel material at a working depth of 30 cm to produce a homogeneous mix. The WR 240 stabilizes an area of 16,000 m² altogether, thus enabling the hydraulically bound base to be handed over to the subsequent project divisions on time. The hydraulically bound base is characterized by perfect evenness, superior bearing capacity, water and frost resistance, all of which combine into a stable foundation for the new section of the A7 motorway.

The WR 240 impresses by paving the base true to line and level as the automatic cross slope control prevents any displacement of material on the previously produced subgrade level. The mixing concept with perfectly matched rotor and rotor housing produces mixes of superior quality in a short period of time, enabling the WR 240 to stabilize at high advance rates.



WR 200

Complex operations during motorway construction

Working in the extension of an 8-km long section of the A3 motorway close to Weibersbrunn (Germany), the WR 200 completes a whole bundle of complex operations. A total mass of 1,500,000 m³ of earth and rock needs to be moved and then placed again in this large-scale project.

500,000 m³ of the material to be moved consists of sandstone which is mostly granulated by the Wirtgen machine in layers and without any additives to produce material suitable for compaction. 750,000 m³ of the entire earthwork volume is subjected to various processing operations which the WR 200 completes layer after layer: these consist of extensive soil stabilization operations in the areas of slopes, line cuts and embankments on the one hand and high-quality backfilling of bridge abutments on the other. In a first step, extremely hard rock is pre-crushed by a Hamm single-drum compactor with rock drum, and binder is spread by the Streamaster binding

agent spreader. The WR 200 then stabilizes the subgrade while adding water in precisely metered quantities. In the final step of the operation, the WR 200 produces a hydraulically bound base layer with high binder content on an area of 280,000 m² which will later serve as subgrade support for the overlying asphalt structure.

The WR 200 makes the most of its potential when working in difficult geological conditions.



PROJECT DATA

Contract volume	1,500.000 m ³
Spreading quantity of cement	10 to 60 kg/m ²
Working width	2.0 m
Working depth	30 to 50 cm
Advance rate	6 to 18 m/min



WR 240

Construction of a dam for effective flood control

Excellent traction and off-road mobility thanks to the four-fold full-floating system are the keys to success on heavy ground.

In the event of floods, a dam of up to 6 m in height will in future divert inflowing water into a landscaped detention basin near Tübingen (Germany) in order to better protect the town from flooding. For this technically very demanding construction process, the contractor in charge relies on the Wirtgen WR 240 recycler. Construction of the dam core by means of soil

improvement is effected by backfilling soil at a layer thickness of 50 cm and pre-spreading binder (50 % lime/50 % cement), which is then homogeneously mixed in by the WR 240 while adding water at the same time. In a final step, the WR 240 creates the water-tight dam surface by means of soil stabilization, mixing backfilled material with pre-spread binder (30 % lime/70 % cement) and water just as homogeneously at a depth of 50 cm.

Specifications in terms of mix quality are high to ensure resistance of the dam against erosion and washout. Needless to say that the state-of-the-art metering and mixing technology installed in the WR 240 meets customer requirements with the greatest ease.



PROJECT DATA

Contract volume	15,000 m ³
Spreading quantity of lime-cement mixture (50/50)	1,103 t
Spreading quantity of lime-cement mixture (30/70)	168 t
Working width	2.4 m
Working depth	50 cm
Advance rate	5 to 12 m/min



WR 240

High productivity – even when things get tight



PROJECT DATA

Total area	1,350 m ²
Spreading quantity of lime-cement mixture	50 t
Working width	2.4 m
Working depth	30 cm
Advance rate	6 to 12 m/min

The WR 240 carries out a soil stabilizing job on a school playground in the Bavarian village of Frensdorf (Germany). Following pre-spreading of 37 kg/m² of binder, totalling 50 tonnes, on the 1,350 m² large area, the high-powered recycler homogeneously mixes in the lime-cement mixture at a working depth of 30 cm. Extremely restricted space conditions, existing fixtures, and building walls directly adjoining the job site make good manoeuvrability and an excellent view of the various obstacles an absolute must. The WR 240 completes this assignment in next to no time.

The WR 240 does an excellent job also on this small job site, which is characterized by short lanes, reverse travels and turning manoeuvres in extremely cramped conditions. Being able to choose from three different steering modes offers an advantage, and additional steering of the rear wheels increases mobility even further. The individually adjustable comfort driver's seat and innovative visibility concept enable the operator to complete the

entire job in an ergonomic seating position. A comprehensive camera system is the main feature of the visibility concept: four cameras, installed in optimal positions around the recycler, and the reverse assist feature allow important work situations to be displayed on two screens in the cabin.

The operator always has a perfect view of both the milling edge and various obstacles like man-hole covers.



WR 250

Extensive soil stabilization in an industrial estate

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PROJECT DATA

Total area	350,000 m ²
Spreading quantity of cement	15 kg/m ²
Working width	2.4 m
Working depth	40 cm
Advance rate	12 to 18 m/min

Oversteering of the rear axle grants exceptional manoeuvrability, saving time at the end of each cut and thus increasing productivity.

The construction of a large industrial estate in the vicinity of Ramstein (Germany) calls for the WR 250 to stabilize around 350,000 m² of soil. The WR 250 is the most powerful machine in the WR model series and has been specifically designed for stabilizing, on a large scale, the type of material that requires mixing in this project.

Following pre-spreading of 15 kg/m² of cement, the high-performance machine uses its high engine power, mixing performance and superior traction to work its way through the sandy soil at tremendous productivity rates, mixing it homogeneously at a depth of 40 cm. The special rotor design (tool spacing of 30 x 2 mm) not only increases productivity, however, but also improves mix quality. From his cabin, the machine operator can easily respond to changing ground conditions as six different rotor speeds can be selected via the controls integrated in the right-hand armrest. In this project, the operator selects a high rotor speed. In addition, the machine's excellent manoeuvrability enables quick repositioning at the end of the long cuts and thus a regular increase in production. Despite the high mixing requirements, the WR 250 thus achieves extremely high daily production rates at advance rates of between 12 and 18 m/min.



WR 240

Soil stabilization with cement for extremely resilient surfaces

Stabilizing an area of 125,000 m² is on the WR 240's schedule as part of the construction of a container terminal in Heilbronn (Germany). Heavy containers and loading vehicles require the subgrade support to be exceptionally resistant to extremely high point loads.

The WR 240 mixes the existing gravel and pre-spread cement homogeneously at a working depth of 40 cm, adding water in precisely metered quantities at the same time by means of microprocessor control. Ideal adjustment of the rotor speed via the right-hand armrest allows the stabilizing operation to continue at maximum mixing performance. Good visibility and the camera system installed in the WR 240 are particularly effective when working around fixed obstacles: despite numerous areas on site offering poor visibility and including manholes or storm drains, the operator can always work at ease and in an ergonomic body

posture. In addition, this helping feature turns into hard cash for the construction company as it dispenses with extensive soil removal by means of excavators.

The WR 240 creates a subgrade support of high quality that will be able to cope with future peak loads.



PROJECT DATA

Total area	125,000 m ²
Spreading quantity of cement	2,000 t
Working width	2.4 m
Working depth	40 cm
Advance rate	8 to 12 m/min



WR 250

Pulverizing on a large scale for stable granular base layers



The WR 250 pulverizes the existing pavement material and added gravel at a working depth of up to 56 cm.

The development of large oil deposits in the primarily agricultural region of Bismarck (North Dakota/USA) and the resulting tremendous increase in truck traffic require Highway 85 and Country Road 22 to be upgraded on a total length of several 100 km.

The pavement structure mostly consists of a 35-cm thick asphalt layer and frost blanket. The WR 250 uses its milling and mixing rotor to pulverize the existing pavement in a single pass, homogeneously mixing the different materials in the process. Where asphalt thicknesses are lower, additional gravel is spread at a thickness of up to 15 cm prior to pulverizing and mixing. The granulated material, which is subsequently levelled by graders and compacted by rollers, is suitable for immediate use as a high-quality base layer. The most powerful machine in the Wirtgen WR model series, the WR 250, is the ideal candidate for this job: its high operating weight, special rotor with a tool spacing of 30 x 2 mm for an exceptionally fine mix quality, high advance speeds allowing high productivity and engine performance of 571 kW/777 PS enable the WR 250 to complete this endurance test in record time.

PROJECT DATA

Total area	> 500,000 m ²
Working width	2.4 m
Working depth	30 to 56 cm
Advance rate	5 to 8 m/min





PROJECT DATA

Total area	80,000 m ²
Working width	2.4 m
Working depth	50 cm
Advance rate	12 to 22 m/min

WR 240

Efficiently granulating coarse rock

Areas directly adjoining the nearby Main river need to be stabilized as part of the new construction of an ICE high-speed railway line between Ebensfeld and Erfurt (Germany). Slate with a grain size of up to 350 mm resulting from a tunnel excavation is transported to the relevant areas where it is heaped up by means of dozers and then pre-compacted and de-tensioned by means of Hamm earth compactors. To produce grains of smaller size, the extremely coarse-grained material is then homogeneously granulated by the WR 240 at a milling depth of 50 cm and in a single machine pass, preparing it for thorough recompaction in a final step. On the job site, the WR 240 achieves high daily output rates of up to 12,000 m².

The WR 240 is the ideal candidate for this truly tough job. Operating in difficult terrain, it granulates the material in a single pass thanks to its large working depth. To be able to do so, a high-powered engine, powerful direct belt drive, impressive cutting perfor-

mance and high advance rate are a "must". The performance-optimized, heavy-duty rotor housing including rotor is crucial for producing the specified small-sized material at a high advance rate. In addition, the high vibrations prevailing under these tough operating conditions are greatly reduced by the anti-vibration mounted operator's cabin.

In this job, the source material consists of extremely coarse rock of poor quality and a grain size of up to 350 mm.



WR 240i

Road rehabilitation using two recycling trains

The W 2000 is in charge of removing the surface course.



The SP 467 Pedemontana is a heavily trafficked provincial road near Maranello, not far from the world-renowned testing ground of the "Scuderia Ferrari". Cracking in the asphalt layers and structural damage in the subgrade of the SP

467 were not caused by race cars, however, but by the large number of heavy trucks.

In a first step, rehabilitation of the road calls for the W 2000 large milling machine to mill off a 20 cm thick asphalt layer. The Wirtgen machine removes the asphalt without difficulty in a single pass, completing the milling process right on time for the subsequent recycling process. A Streamaster SW 16 MC binding agent spreader with electronic discharge control then pre-spreads a layer of cement on the entire surface to be recycled. In order to meet the extremely tight deadline set for completion of the project, two recycling trains are taken to the starting grid, each comprising a water tanker truck, an emulsion tanker truck and the WR 240i cold recycler. In addition, several Hamm rollers and a grader are in charge of compaction.





Their tremendous engine power enables the WR 240i machines to push the two tanker trucks travelling ahead which deliver water and bitumen emulsion to the recycler via coupled hose connections.

1.5% of emulsion and 3.0% of cement are added as binding agents. The powerful milling and mixing rotor installed in the WR 240i mills the existing gravel to a depth of 30 cm, simultaneously mixing it both with the pre-spread cement and with the water and emulsion injected into the mixing chamber to produce a homogeneous construction material. The

material is compacted by a range of different Hamm rollers following behind the two recycling trains. A vibratory single-drum compactor pre-compacts the material right behind the WR 240i. It is followed by a motor grader cutting the required final shape before a pneumatic-tired roller effects final compaction.

The resulting pavement structure is much more flexible and will improve the road's bearing capacity in the long term while effectively preventing renewed cracking.

1 | Travelling ahead of the recycling trains, the SW 16 MC spreads precisely the specified amount of cement.

2 | The high-tech machines produce a base layer that is distinctive for its flexibility and reduced proneness to cracking.

PROJECT DATA

Total area	115,000 m ²
Emulsion content	1.5%
Spreading quantity of cement	18 kg/m ²
Working width	2.4 m
Working depth	30 cm
Advance rate	9 m/min



WR 250

Quick rehabilitation of asphalt surfaces at a toll station

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PROJECT DATA

Total area	4,000 m ²
Emulsion content	2.3%
Spreading quantity of cement	3 kg/m ²
Working width	2.4 m
Working depth	20 cm
Advance rate	6 to 8 m/min

The WR 250 injects emulsion and water into the mixing chamber via injection bars installed in the front part of the rotor housing.

The inadequate load-bearing capacity of an access road to a toll station is rectified as part of a rehabilitation project on the A4 motorway near Verona (Italy). A powerful recycling train comprising water tanker truck, emulsion tanker truck, WR 250, Hamm 3520 vibratory single-drum compactor and grader moves in to complete the job. The powerful milling and

mixing rotor installed in the WR 250 mills the layer in need of repair to a depth of 20 cm, mixing the granulated material with cement previously spread in an amount of 3 kg/m². At the same time, 2.3% of emulsion and water are injected in precisely metered quantities. The two tanker trucks deliver bitumen emulsion and water via coupled hose connections. After pre-compaction by the single-drum compactor, the grader is used to finish grade the recycled, homogeneous construction material, followed by the single-drum compactor which effects final compaction to the specified bearing capacity. The operator controls all important basic functions easily and conveniently via the multifunctional joystick integrated in the right-hand armrest. The clear, coloured display of all major metering parameters gives the operator full control of the process. Any adjustments are made via the controls integrated in the left-hand armrest. Ergonomic workplace design and perfect visibility are additional features which significantly increase operator comfort.



WR 240

Recycling the subgrade to ensure reliable flow of traffic

Structural rehabilitation of the subgrade by means of cold recycling is on the agenda for the new construction of a section of the A3 motorway near Campo Tenese (Italy). The recycling train comprises a bitumen tanker truck, the WR 240 and a Hamm 3520 vibratory single-drum compactor. Pre-spread cement in an amount of 18 kg/m² and 3.0% of foamed bitumen are added as binding agents. The large water tank integrated in the WR 240 delivers the water required for the foaming process.

The WR 240 pushes the bitumen tanker truck. In the process, the powerful milling and mixing rotor installed in the WR 240 mixes the granular gravel together with the pre-spread cement while foamed bitumen and water are simultaneously injected via microprocessor-controlled injection bars. The operator enters the specified parameters conveniently via the control screen in the operator's cabin. Via

flow meters, microprocessors govern the added quantities precisely in accordance with the working depth, working width and machine advance rate. A bituminous base layer of high quality is thus produced which only requires compacting by the single-drum compactor from Hamm.

The new base layer will withstand the loads caused by high traffic volumes on the heavily frequented motorway.



PROJECT DATA

Total area	40,000 m ²
Foamed bitumen content	3.0 %
Spreading quantity of cement	18 kg/m ²
Working width	2.4 m
Working depth	30 cm
Advance rate	8 m/min



Wirtgen WR model series

Other international reference projects

Project: **PULVERIZING, STATE HIGHWAY 23,
JASPER / USA**

Machine model: WR 250
Total area: 390,000 m²
Working width: 2.4 m
Working depth: 25 cm (asphalt/subgrade)
Advance rate: 12 m/min



Project: **PULVERIZING, MADISON STREET,
INDIO / USA**

Machine model: WR 240i
Total area: 12,800 m²
Working width: 2.4 m
Working depth: 22 cm (asphalt/subgrade)
Advance rate: 9 m/min



Project: **PULVERIZING, STATE HIGHWAY 52,
CANTON / USA**

Machine model: WR 250
Total area: 50,000 m²
Working width: 2.4 m
Working depth: 20 cm (asphalt)
Advance rate: 14 m/min



Project: **SOIL STABILIZATION, STATE
HIGHWAY 114, FORT WORTH / USA**

Machine model: WR 240i
Total area: 80,000 m²
Spreading quantity
of lime: 38 kg/m²
Working width: 2.4 m
Working depth: 20 cm
Advance rate: 18-24 m/min



Project: **SOIL STABILIZATION,
STATE HIGHWAY 78, WYLIE / USA**

Machine model: WR 240i
Total area: 23,000 m²
Spreading quantity
of lime: 15 kg/m²
Working width: 2.4 m
Working depth: 25 cm
Advance rate: 15 m/min



Project: **COLD RECYCLING, A22 MOTORWAY,
MANTUA / ITALY**

Machine model: WR 250
Total area: 15,000 m²
Foamed bitumen/
cement content: 3.0%/2.5%
Working width: 2.4 m
Working depth: 30 cm
Advance rate: 7-8 m/min



Project: **SOIL STABILIZATION, COUNTRY ROAD,
ROVIGO / ITALY**

Machine model: WR 240i
Total area: 22,000 m²
Cement content
in percent: 3.5%
Working width: 2.4 m
Working depth: 40 cm
Advance rate: 14 m/min



Project: **SOIL STABILIZATION, BICYCLE PATH,
APPENWEIER / GERMANY**

Machine model: WR 200
Total area: 15,000 m²
Spreading quantity
of road binder: 25 kg/m²
Working width: 2.0 m
Working depth: 40 cm
Advance rate: 10 m/min





Wirtgen GmbH
Reinhard-Wirtgen-Str. 2 · 53578 Windhagen · Germany
Phone: +49 (0)26 45/131-0 · Fax: +49 (0)26 45/131-392
Internet: www.wirtgen.com · E-Mail: info@wirtgen.com

