Wirtgen | In-Plant Cold Recycling – Quick Trips During Highway Rehabilitation in Denmark

A CO₂ reduction of more than 50% and a completed project in half the time

In the vicinity of the famous Legoland in Denmark, a 6.5-km (4-mi) stretch of the E 45 highway needed to be thoroughly renewed in both directions. The tender for the job prescribed a 20-cm (8in) base layer of cold mix produced by complete recycling of the material from the existing asphalt pavement. In addition to the KMA 240i mobile cold recycling plant and Wirtgen‘s large milling machines, the project used Vögele pavers and Hamm compaction rollers.

**Cost-Effective and Environmentally Friendly**

Cold recycling of road surface material is the most sustainable construction method available for structural rehabilitation. The cold mix that is produced with foamed bitumen and which makes up the new base layer is ideal for roads of any traffic level and is being used around the world.

As the deadline for the completion of the project was extremely tight, it was essential that everything went smoothly. “We produced up to 300 tons of cold mix per hour with the KMA 240i,” reports Morten Wold, Divisional Manager at SR-Gruppen A/S, which was managing the project.

The E 45 highway was milled at a width of between 3.15 and 5.9 m (11.25 and 19.3 ft) and a depth of 28 cm (11 in) using Wirtgen‘s large milling machines, W 210i and W 250i. The milled material was then transported to the KMA 240i mixing plant set up nearby, where it was prepared. The mobile cold mixing plant enables the contractor to stay close to the asphalt removal and paving location, minimizing material transport and significantly reducing the overall CO₂ emissions of the construction project. A suitability test was carried out on the reclaimed asphalt pavement (RAP) before the start of the construction phase. The ideal mix formula included 2.2% foamed bitumen, 6% lime and 0.8% cement.

Precise Dosing for Optimal Results

Next, the mix was loaded into an impact crusher and reduced to a kernel size of 0–32 mm (0–1.25 in), loaded by wheel loader into the KMA 240i’s large-capacity receiving hopper, and fed into the twin-shaft continuous mixer. The two feed augers with a double-trough system and precision weighing took care of the separate addition of lime and cement binding agents. Wirtgen expanded the capabilities of the KMA 240i on the spot by installing an additional feed auger. The continuous weighing system ensured that the additives were precisely dosed. The foamed bitumen was added using the integrated, microprocess-steered dosing system.

**A Jobsite Without Complete Closures**

The stabilized bituminous cold mix was loaded directly into large 36.5-ton trucks and transported immediately to the jobsite. Graders and Hamm rollers prepared and compacted the frost protection layer beneath the milled off asphalt pavement as a stable roadway for the pavers and trucks following on behind. A MT 3000-2i mobile feeder from Vögele served as a material feeder to ensure smooth and seamless material flow on the construction site. The MT 3000-2i makes it possible to stockpile large amounts of cold mix. As no complete road closures were permitted during the project, the material transport logistics involved were extremely challenging. The MT 3000-2i provided the necessary flexibility to completely rehabilitate two lanes of highway without complete road closure.

A Vögele SUPER 1900-3i paver laid down the material true to grade and slope, creating a 20-cm base layer of cold mix as the new foundation of the busy highway. Particular care was taken during the subsequent compaction process. A Hamm HD 120i tandem roller with an operating weight of over 12 t provided the necessary compaction. A Hamm GRW 280i pneumatic-tire roller handled the final surface treatment.

After only two days, they were able to lay down a binder course and a surface layer with a thickness of 8 cm (3.15 in). For this, they chose an asphalt modified with polymers that suits the requirements of the high-traffic trucking lane and perfectly complements the base layer of recycled cold mix and foamed bitumen. The Vögele SUPER 1900-3i and MT 3000-2i completed this work in cooperation as well.

Jobsite parameters:

Length of section: 6,500 m (4 mi)

Width of section:all lanes, 20.45 m (67 ft)

Reduction of material transport requirements: > 70%

Cold mix qty. paved: 51,000 metric tons (about 56,000 US tons)

CO₂ reduction: > 50%

Project speed: about 50% faster

**Photos:**

  
W\_pics\_js\_KMA240i\_SR-Gruppe-DK\_2023\_0076

The KMA 240i mobile cold mixing plant produced 300 metric tons of stabilized cold mix per hour from the milled asphalt.

  
W\_pic\_js\_KMA240i\_SR-Gruppe-DK\_2023\_Portrait\_MWold

“For the base layer, we needed a binding agent of cement and lime. A ready-mixed binding agent of this type was not available in Denmark. With the new KMA 240i, we are able to create this mixture ourselves as part of the process,” explains Morten Wold, SR-Gruppe Divisional Manager.

   
W\_pic\_js\_KMA240i\_SR-Gruppe-DK\_2023\_0007

A Vögele SUPER 1900-3i and a MT 3000-3i Offset took on the job of paving the 20-cm-thick cold recycling base layer.

  
W\_pic\_js\_KMA240i\_SR-Gruppe-DK\_2023\_0049

The base layer, surface layer, and binder course were compacted using Hamm rollers.

  
KMA\_in\_Plant\_BSM\_221121\_closed\_v1 Kopie

Schematic of sustainable in-plant cold recycling jobsite with short transport routes, like the one on the E 45 in Denmark.

Please note: the photographs shown here are only previews. If you wish to publish them in other media, please download the higher resolution (300 dpi) versions from the link provided here.

For further information, please contact us at:

WIRTGEN GROUP

Public Relations

Reinhard-Wirtgen-Strasse 2

53578 Windhagen

Germany

Phone: +49 (0)2645 131 1966

Fax: +49 (0)2645 131 499

Email: PR@wirtgen-group.comPR@wirtgen-group.com

www.wirtgen-group.com