



Job Report Cold Recycling

WR 4200: Structural rehabilitation project Modena / Italy





Wirtgen Cold Recycling:

WR 4200: Structural rehabilitation of the Modena bypass

Walter Grüber, December 2003

Recycling machine used: WR 4200
Client: Engineering department of
Modena road department
Contractor: Viastrade Srl

to provide “extraordinary” services whenever there is traffic congestion on the A1 on the stretch between Bologna and Modena. Aware of this situation, the local government, through the Engineering Department of the Modena municipality, had for some time been seeking a permanent solution for the road pavement maintenance problem.

Background

The Modena bypass is heavily trafficked by vehicles exiting the A1 motorway heading towards Ferrara/Bologna and in the direction of the ceramics centre of Sassuolo. In addition to this “ordinary” role, the bypass is often also called upon

This led to a series of extensive tests and assessments, from which rehabilitation of a 70,000 m² section was chosen for structural rehabilitation using cold recycling with foamed bitumen in combination with cement as binding agents.



Typical early morning traffic. This was before rush-hour.



Traffic during rush-hour!

Rehabilitation method

Cold recycling with foamed bitumen was chosen to guarantee greater load bearing capacity and durability of the base course in the upper pavement region of the motorway. A convinced Mirka Ferrari, the surveyor of the Engineering Department of the Municipality of Modena, has decided, “to continue with foamed bitumen because it has proved to be a sound solution. Faced with higher realisation costs, this

technique aims at improving the load bearing capacity considerably in addition to huge savings over time, which allows a more targeted use of the resources available. This is a big advantage for those who have to manage a road, which is of national importance, with budget allowances typical of an urban road network. What’s more, this result has been achieved giving motorists a safer road which will not be subject to further road works and interruptions for a much longer time than that offered by conventional systems.”

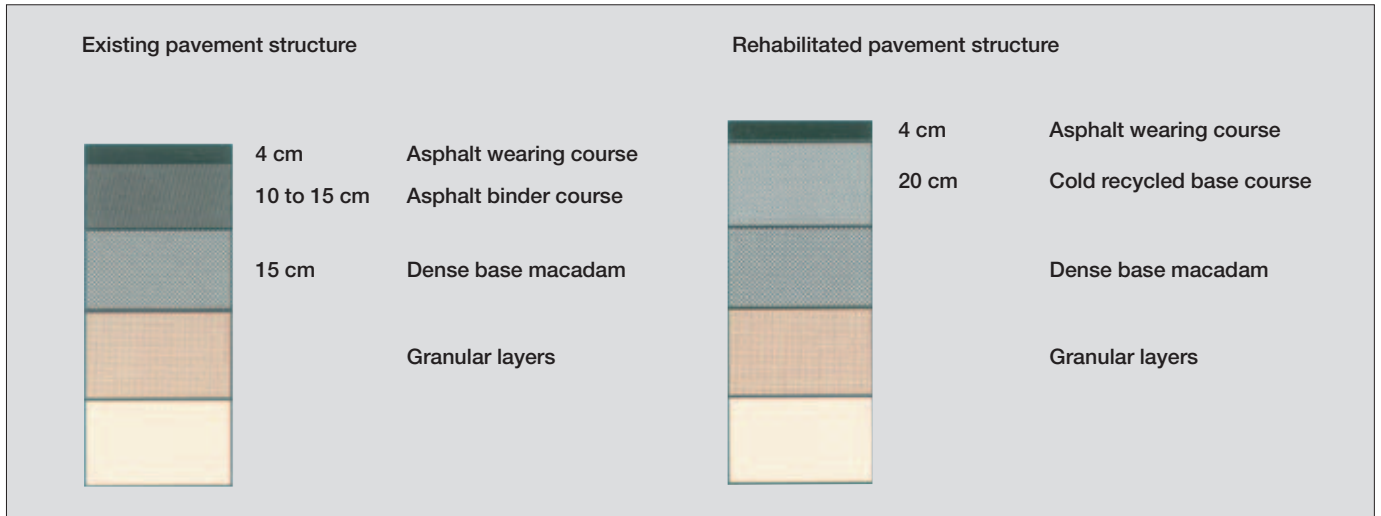
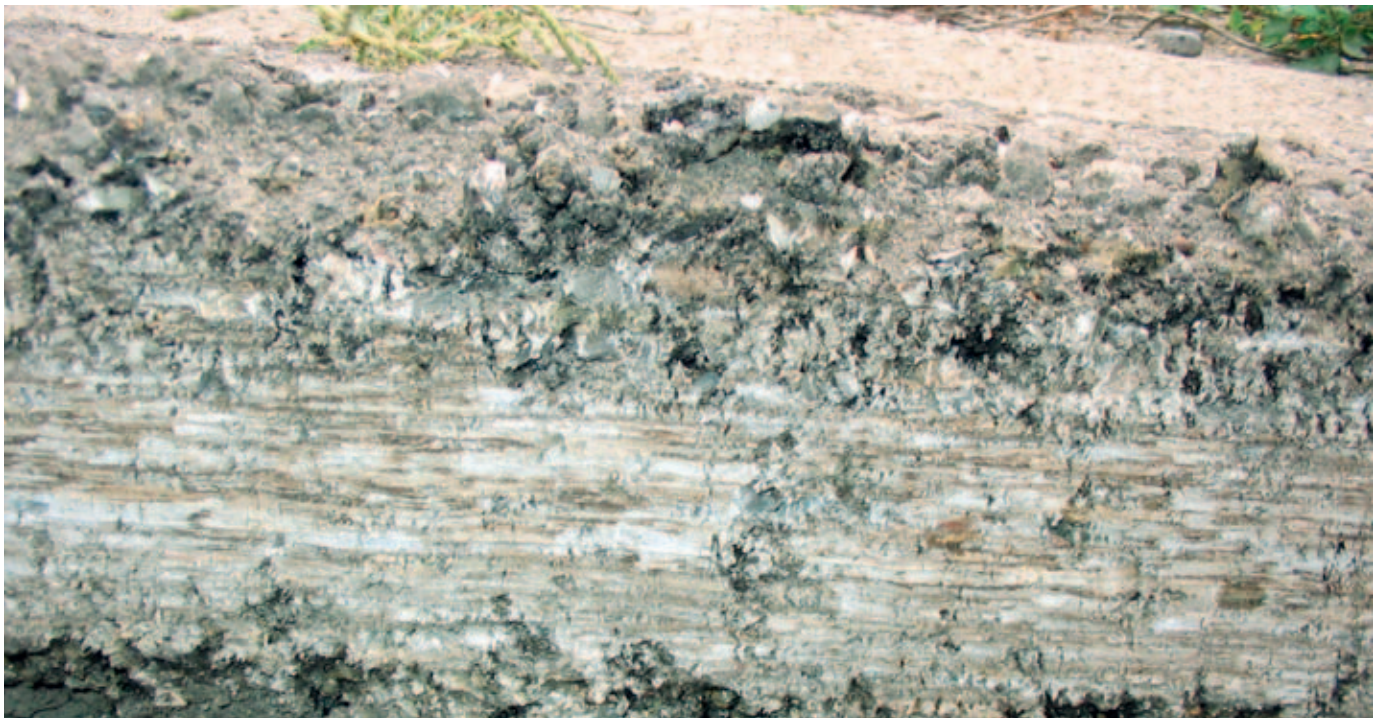


Fig. 1: Schematic showing the pavement structure before (left) and after (right) rehabilitation.

The rehabilitation of the bypass involved both carriageways of the motorway, each 8.4 m wide and the particular section was 1.2 km long. This works out to 20,160 m² recycled to a depth of 20 cm, giving a volume just over 4,000 m³. The existing asphalt, which had an average thickness of 15 cm, had heavily deteriorated due to the effects of fatigue. Analyses performed in advance by the Engineering Department of the

Municipality had moreover demonstrated the good state of preservation of the load-bearing sub-base, at the time made with macadam, also adequate to bear the traffic loads of today. The structural rehabilitation improved the quality of the bituminous aggregate by producing a 20 cm foamed bitumen treated base course, which was subsequently covered with a 4 cm thick asphalt-wearing course.



15 cm asphalt layers overlying a DBM.



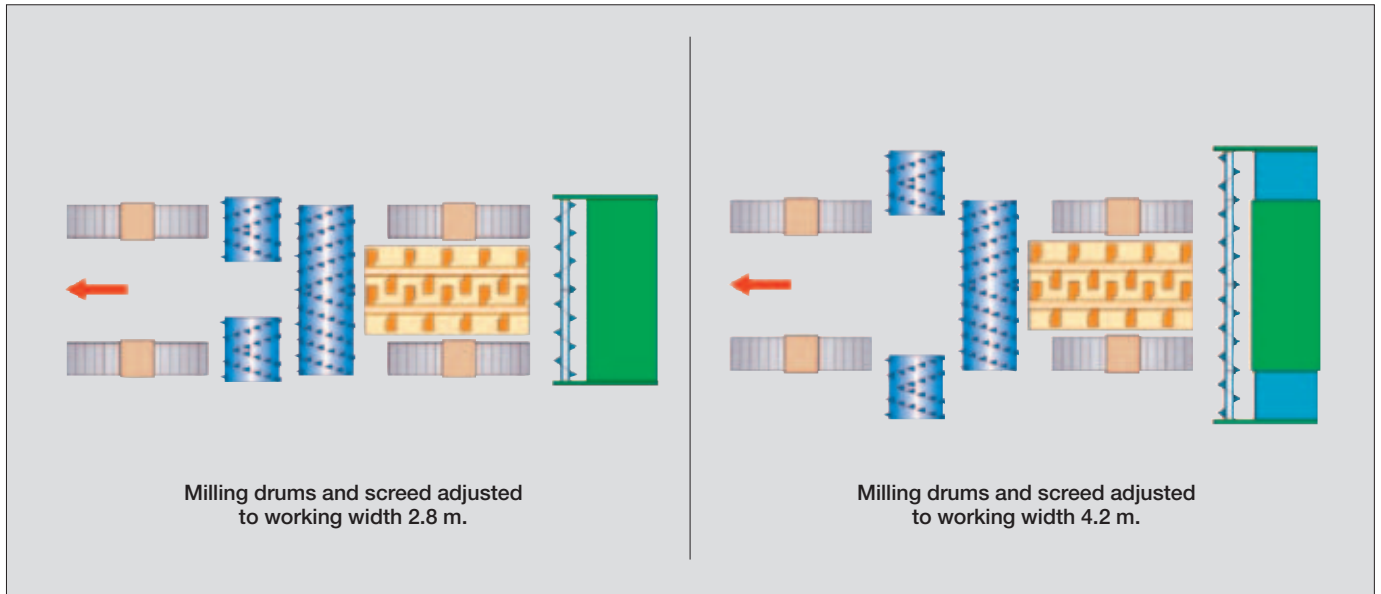
20 cm of asphalt in the existing pavement.

Equipment details

The good rehabilitation result were achieved thanks to the paving quality of the WR 4200, which moved forward at between 2.5 and 3.5 m/min, thus achieving a production of approximately 6000 m²/day. Wirtgen asked the engineer, Luigi Brescia, to give his opinion on the machine and its application potential: “This is without doubt a highly productive machine, and I’m saying this also by virtue of the considerable experience built up with both the WR 2500 and the WR 2500 S which we have been using regularly for some time. As far as the specifics of cold recycling are concerned, I can say that the possibility of paving a width of up to 4.2 m really makes the difference in terms of productivity. The fact that this machine has three partially overlapping milling

drums eliminates further overlaps, consequently also producing better quality. But the advantages do not end here: having a real paving screed (an AB 500 TV made by Joseph Vögele AG) not only immediately gives you a perfect road surface, but you can also do away with the grader, which with other recycling machines is essential. This inevitably results in a logistically more streamlined job site and considerably increases productivity. These factors obviously do not make the WR 2500 S obsolete – it is and remains an unbeatable machine in terms of application flexibility, power and reliability.

Nonetheless, the WR 4200 will give cold recycling a considerable boost in many countries. Maybe it is also for this reason that delegations from all over the world visited us during our work on the project.”



The variable width of the WR 4200 between 2,8 m and 4,2 m is achieved by the two front hydraulically adjustable milling drums. In addition the binding agents, in the form of foamed bitumen and cement slurry premixed by the WM 1000

cement slurry mixer, are mixed to the milled material in the twin-shaft pugmill mixer. The material is then finally distributed by a distribution auger and paved by a paving screed equipped with tampers and vibrating plates.

Some images from the job site:



Road before rehabilitation showing severe deformation in the form of rutting and also crocodile cracking in places.



Approx. 30 % of the traffic is medium to heavy goods transport.



The recycling train with the WR 4200 at work.



The recycling equipment coupled together by push bars to form one cold recycling unit consisting of the bitumen tanker in the front, the WM 1000 cement slurry mixer in the middle and the WR 4200 recycler at the rear, milling and finishing the cold recycled base course.



The compaction of the cold recycled base course is achieved by a Hamm 3520, which is a 20 ton single smooth drum vibratory roller, together with a pneumatic tyred roller.



The finished cold recycled base course ready for short-term traffic and the asphalt wearing course.



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