



Job Report Cold Recycling

WR 4200: Foamed bitumen recycling project, Marmirolo / Italy



Wirtgen Cold Recycling:

WR 4200: Foamed bitumen recycling project Road SS 236, Town of Marmirolo

Walter Grüber, July 2003

Location



District of Mantova

Approximately 150 km East of Milan, Italy

Project background

The main road through the town of Marmirolo has seen a significant increase in traffic within a few years.

- ▲ Average vehicles per Day 25,000
- ▲ Average percentage of trucks 20 % – 25 %

The road through the town is a short cut for commercial trucks to the nearby North – South highway A22, the road also allows local traffic to avoid paying tolls on the nearby highway. The engineers from the District of Mantova decided that the road through the town needed to be strengthened to accommodate this traffic growth.

While investigating their options for the project the engineers had to take the following into consideration:

- ▲ No alternative route for traffic
- ▲ No long term road closure possible
- ▲ No long term lane closure possible
- ▲ Speed of operation to least disrupt local business & residents
- ▲ Cost
- ▲ Use of local resource

Finally the decision was made to recycle the existing pavement, this was determined to be the most effective rehabilitation process to meet the above requirements.

Preparation



In order to maintain the finished recycled pavement level relative to footpaths and other business access points, the existing pavement was pre-milled to a depth of 40 mm.

Foamed bitumen recycling design

Recycling depth	200 mm	Asphalt
Foam bitumen	2.5 %	By mass
Cement	1.5 %	Cement injected into mix as a slurry via Wirtgen WM 1000
Water for compaction	1.5 % – 2 %	Injected into the mix via the water spray bar on the Wirtgen WR 4200
Finish wearing course	40 mm	Asphalt

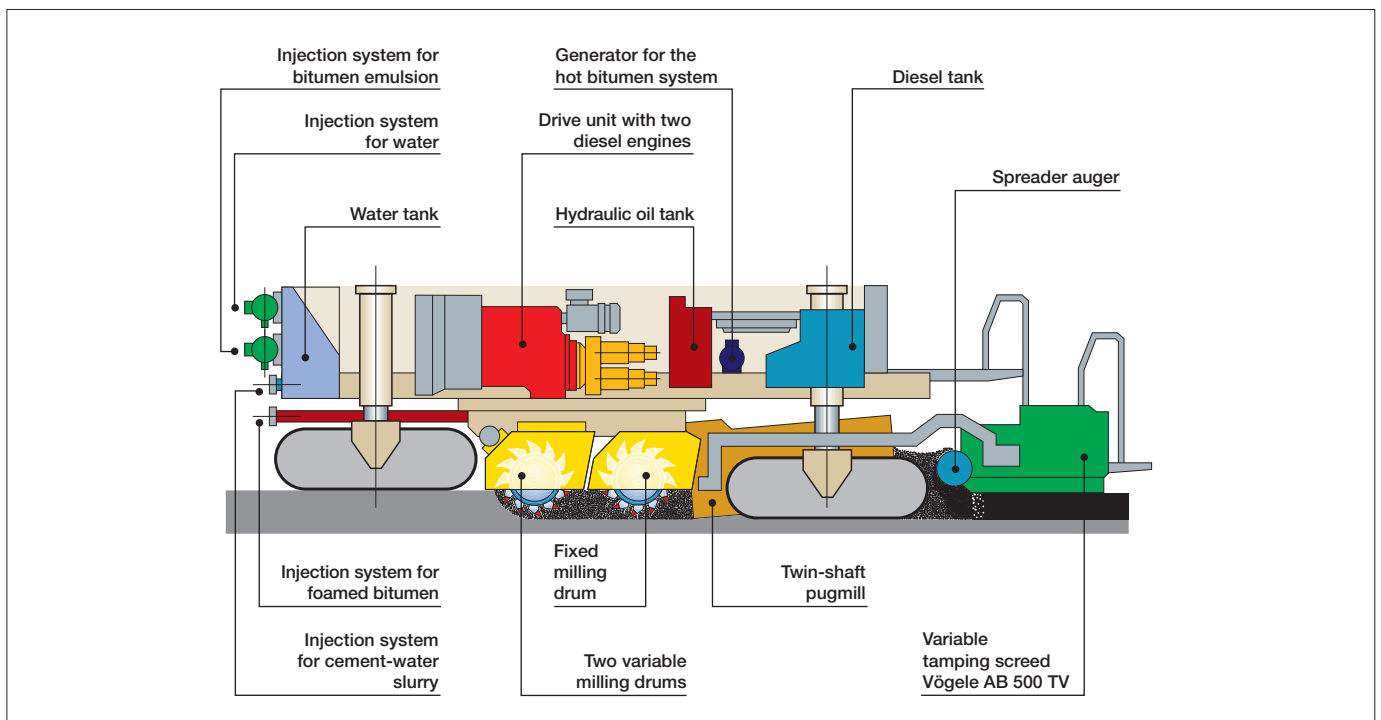
Foamed bitumen recycling train

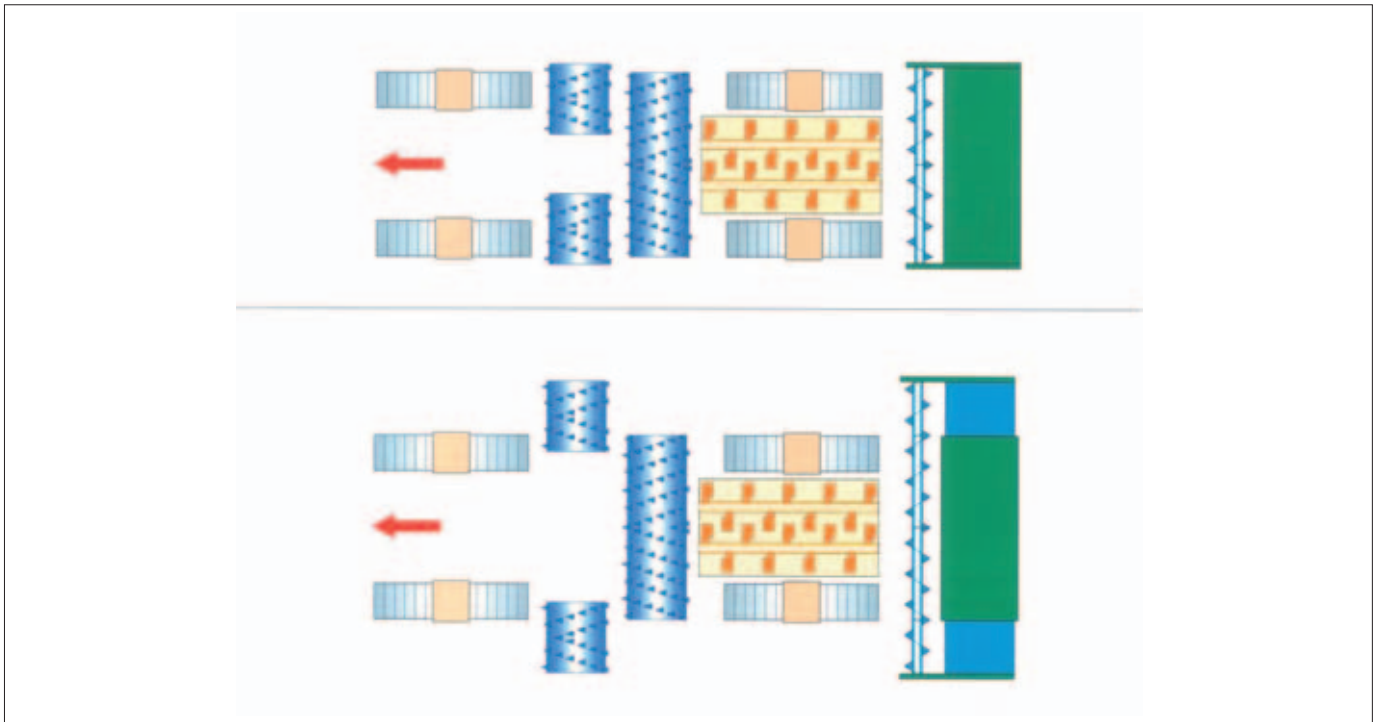


The recycling train consisted of:

- Insulated oil tanker
- Wirtgen WM 1000 slurry mixer
- Wirtgen WR 4200 recycler

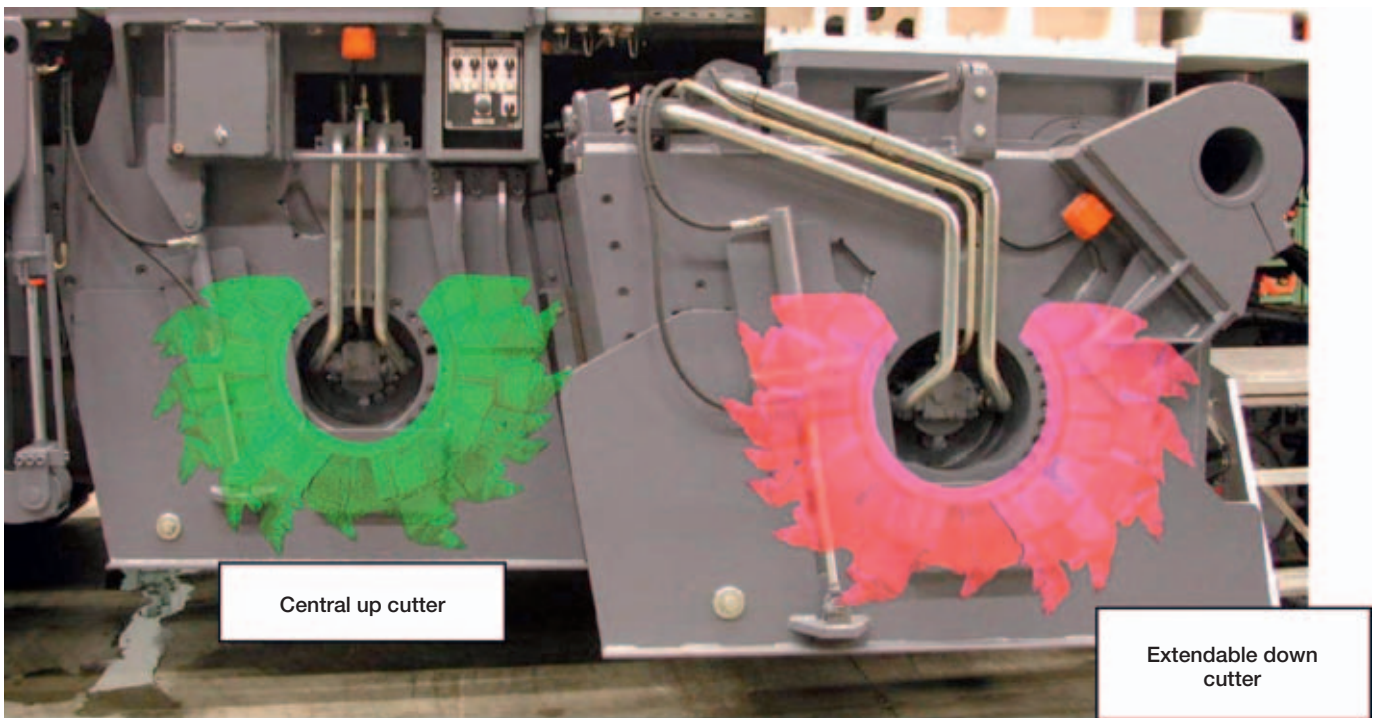
WR 4200 recycler





WR 4200 fitted with one central up cutting drum 2800 mm wide, plus two extendable down cutting drums, each 1200 mm wide.

Recycling width: 2,800 mm to 4,200 mm.



WR 4200 cutter configuration.



Mill existing pavement to a depth of 200 mm x 3,800 mm width in one/pass, simultaneously

- adding 2.5 % foamed bitumen
- adding 1.5 % cement slurry
- adding moisture for compaction
- paving & compacting the recycled mix.



Milling width 3,800 mm.



Extendable cutter set to cut 600 mm (allowing for 100 mm overlap in centre line).



Hydraulically operated gradation beam fitted to central up cutter maintains particle sizing.



For reference, gradation beam coloured green.



View of extendable down cutter.



The recycled material is processed with foamed bitumen inside the pug mill, it is then discharged to the screed auger.



Recycled material exiting pugmill into screed auger.



Recycled material evenly fed to outside of cut.



Vögele AB 500 tamping & vibrating screed, set to 3,800 mm paving width.



Recycling / paving speed:
Average 3,20 m per minute.



Average paving 345 tons per hour.



Finish compaction using Hamm 3520 single drum vibratory compactor, plus double steel drum vibratory compactor.



Finished compacted recycled lane prior to traffic.



Recycled lane, surface finish.



Traffic using recycled lane within 3 hours of recycling.



5,000 to 6,250 trucks per day.



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