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Re-building of the underground railway Potsdamer Platz, Berlin

Until the year 2001, in the sector of the underground line of the Potsdamer Platz in Berlin there was an old multitrack underground, which no longer met the modern demands on protection against vibration and noise. Execution time: From September until November 2001



Illustration 1: Spatial narrowness in the underground railway tunnel in the sector Potsdamer Platz



Illustration 2: Single sided track closure during the nocturnal re-building

In the re-building the Heitkamp Rail GmbH employed an innovative system for the protection against vibration and noise.

The narrowness of the underground tunnels and the fact that the re-building could only be carried out during short nocturnal track possessions at only one track respectively, traditional safeguard measures were not suitable. The system used instead is a so-called "light mass spring system", in which the ballast superstructure is replaced by a reinforced concrete slab made from site concrete, which rests on a bearing made from high-quality sub ballast.

The plate produced in the re-building (actually a "solid track system") itself consists of the **V2/80 PAGEL GROUT**, in which the bi-block sleepers of the track panels were integrated. The production of the system for the track conversion section by section was automated in such a manner that it is legitimate to speak of a clocked production.

Each night, for the conversion only the time from 10:00 pm to 4:00 am was available for all required works. Then on each night shift a section of 5.00 meters could be completely re-newed. First of all, in sections of 5 m the track geometry was "frozen". Then, the track was lifted on a length of 5.00 m. After the removal of the ballast, the tunnel invert was cleaned. Subsequently, the sub ballast mat of the new system was built-in. In parallel, the exchange of the sleepers with the mounting of the two-block sleepers to the position of the frozen tracks as well as the pre-layering of the reinforcement took place.

In the last step, a new track panel was positioned in the track and grouted with the quick-setting cast concrete.



Illustration 3: Lowered section track element prior the grouting



Illustration 4: Grouting of the section track element





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Neither water nor sufficient electricity was available in the underground railway tunnel with its height of only 2.30 m. Because of this, in the course of the automatisisation, the complete equipment and grouting material, including the mixing and conveyor plant, had to be assembled on carriages respectively a wagon of the German railroad company Deutsche Bahn and the fully loaded wagons were driven in for the single sided track closure at 10:00 pm.



Illustration 5: Machine construction for the positioning of the mounted track section in the testing stage



Illustration 6: Machine construction for the positioning of the mounted track section in the practical application

The **V2/80 PAGEL GROUT** was used on-site with a mobile grout feeding and mixing station constructed by the company **Baumaschinen Beckschulte KG**.



Illustration 7: Upgrading of the DB wagon with conveyor, power set, water tanks and hard and software control systems



Illustration 8: Prepared wagon with all mixing and equipment components

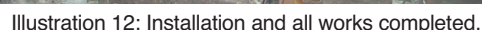
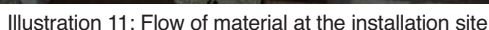


Illustration 9: Installation of the mixer and conveyor on the DB wagon



Illustration 10: Mixing and conveying capacity at 50% performance at 8,000 kg ≤ 40 minutes of conveying the mix in gutters to the installation site





Since the end of November 2001, the new system is installed in both directions and has fully met the high demands on protection against vibration and structureborne noise. The underground railway cannot be sensed any more in the residential and business premises situated above.

The cast concrete used was the **V2/80 PAGEL GROUT** which had for the hydration a time frame of only 2 hours until the track clearance at 4:00 am.

During the re-building phase of 3 months there were no delays in the commissioning. The time-table of the underground railway of the BVG (Berlin public transport operator) was not affected by the reconstruction work.

Due to the expertise and dedication of the companies and employees involved in the re-building, this system seems predestined for comparing applications in underground railway tunnels and pits where the necessary re-building must hamper utilisation as minimal or not at all.

Heitkamp Rail - Baumaschinen Beckschulte KG - PAGEL Spezial-Beton GmbH & Co.KG