

**Client:** BRIS  
**Main contractor:** TV Smet-Tunnelling—Renotec  
**Execution:** 2003  
**Machine:** spraying robot  
**Technique:** sewage rehabilitation with shotcrete

The 2 existing concrete tunnels had to be fitted with a shotcrete coat. At the same time, the joints between the different prefab concrete elements were replaced in order to restore/assure the watertightness of the tunnels. Total length of the tunnels was 1,400 m what resulted in 15,500 m<sup>2</sup> concrete surface to treat.

**Preliminary activities**

By means of shifting, the tunnels could be put partly out of order one by one. Making use of heavy pumps, the remaining water was pumped over into the operational tunnel. After cleaning, the concrete surfaces were subjected to a thorough check-up on carbonation. Affected armouring was cleaned and had to be treated or replaced. At the same time, the joints were replaced. Finally, a reinforcing-mesh was installed over the entire concrete surface.



**Shotcrete**

The requirements, presented in the specifications, regarding coat thickness and smoothness of the finished concrete surface in particular, required a mechanized execution. Therefore, a special supporting structure was designed, on which the spraying robot



could move. In this way, a continuous speed and projection distance could be realised, both essential for obtaining a fine concrete surface. Supply of the shotcrete occurred through silos installed aboveground. The applied concrete was prefabricated in the factory and delivered on the site ready-to-use. A concrete with concrete quality C35/45 on the base of HSR-cement was applied. Application of the concrete was done by the dry-shot method.

