MasterSeal 345
Rehabilitation Selzthaltunnel
Description of the project
The Selzthal tunnel is a double-tube motorway tunnel on the A9 Pyhrnautobahn near Selzthal in Austria. The about 1000-meter-long west tunnel was built at the end of the 1970s and the east tunnel at the end of the 1990s. The full extension, which is one tube with two lanes in each direction, was completed in 2000.

The challenge
In the course of the renovation, according to the legal requirements of the Road Tunnel Safety Act (STSG), not only the tunnel itself has been updated to the latest state of the art technology, but also the area of the pre-portal, the six bridges, the open-air areas as well as parts of the Liezen feeder. The rehabilitation in the tunnel also included the production of two new walk-in cross-cuts and the elimination of the shortcomings of the waterproofing system and drainage system in the west tunnel. In the southern section of the west tunnel, the complete exposed concrete surface (approx. 10'000 m²) and the structure holistically rehabilitated. Since the existing waterproofing and drainage system showed deficits, a new sealing level in front of the existing inner shell and facing shell was needed. The facing shell had to be as thin as possible so that the necessary clearance gauge remains intact. The additional sealing layer between the existing inner shell and the facing layer prevents the penetration of interior work in the old building and the leakage of residual water into the driving space. To avoid the build-up of water pressure, longitudinal and circumferential drainage strips were provided.

The project engineer for the redevelopment was looking for a waterproofing solution that had to meet requirements:
- Compatibility of the sealing with the pressure-relieving drainage strips
- No carry-over of water into the dry zones
- Bonding action between load-bearing and inner shell, in order to be able to make the inner shell as thin as possible

On the basis of these requirements, the client decided to implement a fully waterproofed injection moulding.

Our proposed solution
Because of the complex requirements, BASF proposed to the use of the sprayable sealing membrane MasterSeal 345.

The main advantages of this solutions are considered to be:
- Full-area, very good adhesion to concrete and steel
- No longitudinal circumferences due to full-surface adhesion
- Simple application even in complex geometries
- High application performance
- Rapid curing
- Single-skinned construction thanks to the composite concrete-waterproofing-concrete
- Sulfate resistant
- Simple elimination of any leaks through subsequent injections
- Minimal installation effort
Method

1. Milling Surface
   Milling and cleaning of the concrete surface

2. Milling and application of drainages
   Milling of recesses for drainage strips

3. Application of Sealing membrane
   MasterSeal 345
   With a modified Atlas Copco MEYCO Piccola (rotor 12-hole or “banana”, H = 90 mm), a minimum 3 mm thick layer of the spray diaphragm in the dry spraying process is applied. The layer thickness is continuously monitored during the spraying application by a person measuring with a control needle. Thereby the correct application of the required layer thickness is ensured. The spraying capacity was 70 to 100 m² per hour.

4. Reinforced concrete inner shell
   The 10 cm thick concrete inner shell can already be applied on the day after the application of the membrane. If the spray membrane remains uncoated for a longer period of time (several days or longer), it is necessary to thoroughly clean the membrane with water, before the spray application of the inner shell.

The result
The expectations of the planner, which he adapted to the properties of the waterproofing of the tunnel, could be fully met thanks to the use of the sprayed sealing membrane MasterSeal 345. Besides the geometric flexibility; even complex geometries are simple to seal; the simplicity of the connection to the existing waterproofing was convincing. The chosen system made a replacement of the entire system and interior fittings (inner shell and sealing) unnecessary. In addition, the high tensile adhesion values of the diaphragm on concrete or concrete on the membrane, made it possible to create such a thin inner shell, that the necessary clearance could be maintained. Liability also prevented the circulation of water between the drainage patrol. The sealed tunnel corresponded fully to the wishes of the planner and the client.

Customer benefit
- Full-area, very good adhesion to concrete and steel
- Simple application even on complex geometries
- Single-shell construction by means of composite concrete-waterproofing-concrete

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