

# Tunnel Drainage

Invert Drainage, Deckdrain, Plabutsch Road Tunnel, Graz, Austria



## Project Description

The federal region of Styria has some 100km of tunnel in operation. In the 10km long Plabutsch tunnel, a second bore was opened in January 2004 making it the longest unidirectional road tunnel in Europe. The tunnel was equipped with the most up to date safety installations. The original Plabutsch tunnel was opened in 1987 as a single bore tunnel with bi-directional traffic and was built to take the traffic away from the old town of Graz with its famous Eggenberg Palace. The continuing increase in traffic forced the construction of a second tunnel. Both bores were brought up to the latest standards.

## The Challenge

The increased safety for tunnel users was one of the main objectives of the design. The costs of the safety installations in both tunnels amounted to some 33M€. Improvements to the materials in both bores meant meeting high fire and smoke resistant standards. The first bore needed upgrading and it was found that some areas of the invert of the tunnel were suffering from groundwater infiltration, causing soft ground and a breakdown of the cement stabilised base layer under the structural concrete. To provide a satisfactory structural solution with adequate drainage capacity using traditional methods, would have required the excavation of an additional 250mm of rock from the tunnel invert and the installation of a gravel drainage layer with associated separation and filtration geotextiles along with a geomembrane to protect the base course. A large number of service ducts were below the invert which would also have to be carefully removed and replaced before the replacement concrete floor was placed.

## Project Information

Client	Provincial Government of Styria
Contractor	Östu-Stettin and G. Hinteregger u. Söhne
Consultant	Geoconsult ZT GmbH
Products	Deckdrain 6S500/NW8
Quantity	12,220m <sup>2</sup>

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| Benefits | <ul style="list-style-type: none"><li>• Resist installation and operational loads</li><li>• Shallow build with high flow capacity</li><li>• Easy transport and placement</li><li>• Fire resistant solution to tunnel regulation standards</li><li>• Impermeable upper surface preventing water ingress into slab</li><li>• Avoid need for services replacement</li></ul> |
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ABG Deckdrain

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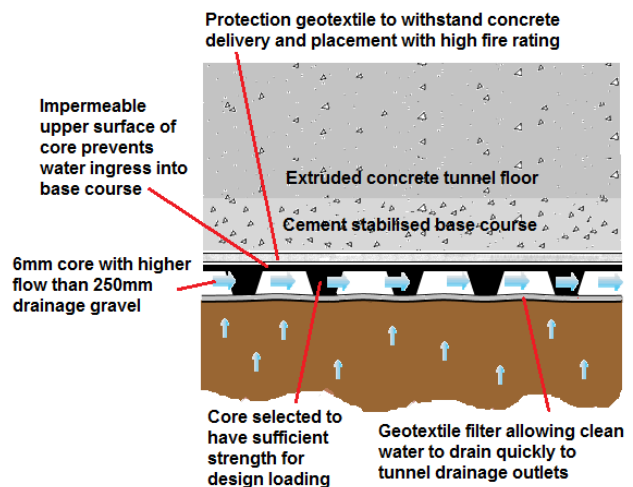


## The Solution

**Deckdrain 6S500** geocomposite with an integrated fire retardant **Terrex Protector** geotextile was used instead of the drainage stone, providing higher flow and reducing the dig from 250mm to 20mm thereby avoiding the need to lift and reinstall service cables. The high strength core was able to withstand the wheel loads of the concrete delivery vehicles to the extruder which laid the floor slab onto **Deckdrain**. The **Deckdrain** core has an impermeable upper surface to prevent water ingress into the cement stabilised base course. Lateral drainage pipes every 52m under **Deckdrain** took water to the main invert drainage system.

## The ABG Service

Provided drainage and loading calculations. Supplied pre-welded 4.5m wide rolls with a 300mm overlap on one edge to integrate with other drainage systems



Reduced dig from 250mm to 20mm using the **Deckdrain** geocomposite instead of drainage stone



Concrete extrusion plant placing concrete onto the **Deckdrain**



4.5m welded **Deckdrain** thermally bonded to **Terrex Protector** geotextile

Contact ABG today to discuss your project specific requirements and discover how ABG past experience and innovative products can help on your project.