



Tunnel des Nations (CH) Double Layer Vacuum System

Country	Switzerland
Type	Motorway Tunnel
Client	République et canton de Genève ; DETA / DGGC
Main Contractor	Marti Tunnelbau AG
Execution of the work	Renesco AG
Designer	Groupement NATIF, p/a T-Ingénierie
Construction Period	2021-2022

Project Description

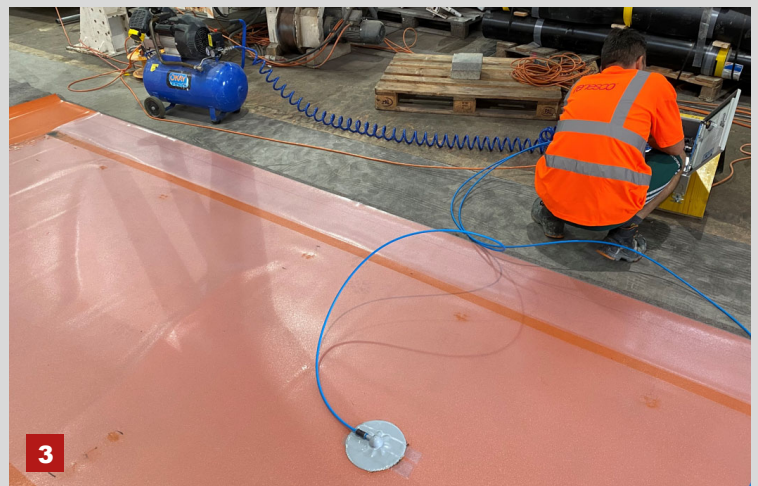
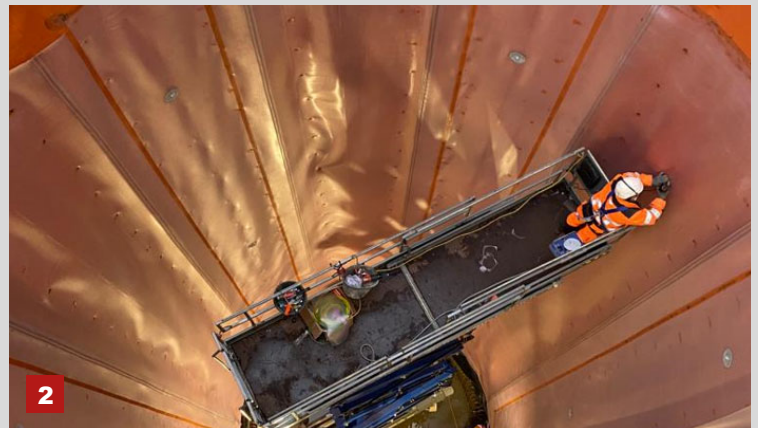
Two-lane underground motorway junction joining the airport of Geneva with the Palais des Nations (Via Appia roundabout and the Ferney motorway junction) crossing the Grand- Saconnex hill via a 491m tunnel construction in complex geological and hydrogeological conditions (loose, heterogeneous ground, very permeable gravel bodies separated by very poorly permeable strata, clay, and sand layers with several aquifers with different groundwater levels). Execution in section with top, bench and invert, shotcrete, reduction of the groundwater table by drainage over the entire length of the section, plus additional geotechnical measures of pipe umbrella and long anchors. From north to south, the underground structure consists of a 52m cut & cover structure, the mined tunnel part and another 297m cut & cover section.

Scope of Service

Sheet waterproofing under high water under pressure, complex waterproofing works of a double-layer vacuum system based on prefabricated PVC-P sheet membrane panels with a compartment size of max. 100m² according to SIA 272 (Swiss standard).

Geotextile, PVC-P membranes of 3mm (with signal layer) & 2.5mm (translucent incl. studs/nobs) and protection sheets (3mm invert & 2mm crown). All compartment fields are tested via vacuum to allow a full-surface detection/control to minimize the risk of potential leakage, even after placing the reinforcement (spot-wise) or continuously during the whole construction (active-control-system).

- PP Geotextile, 1'000g/m²
- PP Drainage sheets, 8mm
- PVC-P, 3mm with signal layer
- PVC-P, 2.5mm, translucent with studs/ nobs
- PVC-P Protection sheet of 2mm and 3mm
- PVC-P water barriers
- Injection/ Vacuum System
- Loose-Steel-Flange construction to connect the well pots vacuum tight
- Shaft waterproofing with vacuum system
- Adhesive strips/ tapes
- Contact grouting



1. Invert, Vacuum system
2. Shaft, vacuum system
3. Prefabricated PVC-P sheet membrane panels