



Rijnlandroute (NL) Cross-Passage Waterproofing

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| Country | Netherland |
| Type | Motorway Tunnel |
| Client | Provincie Zuid-Holland |
| Main Contractor | COMOL 5 Consortium (Mobilis, Croonwolter & Dros, VINCI, DIMCO-DEME) |
| Execution of the work | Renesco GmbH |
| Designer/ Project Management | Rijkswaterstaat |
| Construction Period | 2021 |

Project Description

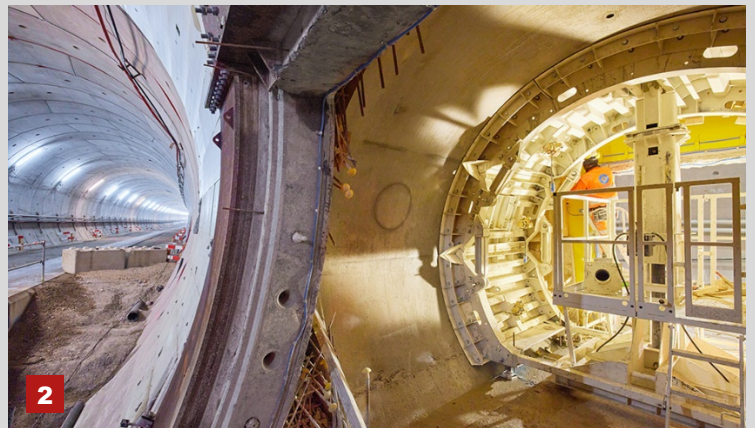
The project, which has been awarded to the COMOL5 consortium, calls for construction of an expressway connecting the cities of Katwijk (via A44) and Leiden (on A4) including a 2.25km bored segment tunnel. Eight cross-passages are excavated using mechanized methods for digging the soil including ground-freezing and shotcrete technology. The cross-passages are sealed via a loose-laid geomembrane system.

Scope of Service

Forming watertight terminations for connecting tunnel cross passages onto the precast tunnel lining segments, represents a technical challenge, especially in view to the complex geometry, hydrostatic pressure, generally rough & curved segment lining surfaces, crossing of segment joints/offsets and the possibility of differential settlement between the main tunnel and the cross-passage. The choice of the waterproofing system must scope with the above, which requires a multi-axial elongation, an elastic flexible and robust material behavior, even for the joints, which is practical easy for thermal hand welding.

Installation of a loose-laid FPO/TPO based waterproofing system acc. to ZTV-ING (German standard), full-round (360°) with an adhesive tape/strip termination at the external pre-cast concrete segment face/opening including all necessary pre-treatments, installation of a back-up grouting system and all grouting/injection works.

- FPO/TPO 3mm sheet waterproofing
- 950g/sqm polypropylene (PP) geotextile
- 600mm/ 6 ribs FPO/TPO water barriers
- 3mm FPO/TPO protection sheet membrane/ full surface.
- All relevant pre-treatment works, like sand-blasting, water stoppings, cleanings, pre-injections, joint treatments
- Application of an adhesive tape/strip termination system with epoxy resin
- Installation of an injection/grouting system as back-up waterproofing
- Installation of hydrophilic waterstops
- Installation of a contact grouting system
- All relevant grouting/injection works



1. Ground-freezing
2. Main tunnel/ Cross-passage formwork
3. Shotcrete, invert waterproofing