



## Tunnel Hallandsås (S) Sheet Waterproofing

|                              |   |
|------------------------------|---|
| <b>Country</b>               | Sweden  |
| <b>Type</b>                  | Railway Tunnel                                  |
| <b>Client</b>                | Trafikverket (Swedish Transport Administration) |
| <b>Main Contractor</b>       | Skanska-Vinci                                   |
| <b>Execution of the work</b> | Renesco a.s.                                    |
| <b>Construction Period</b>   | 1992-1997, 2004-2014                            |

## Project Description

Rail tunnel, twin-tubes including 19 cross-passages and located close to the coastal resort of Båstad. Boring on the 8.6km long link through a ridge of geological material with a high groundwater content up to a water pressure of 15bar, involved major operations of a closed slurry mode TBM and NATM, pre-consolidation pre-grouting, and an extensive ground freezing installation. The single, Ø10.6m TBM on the project, cleared the 250-300m frozen section through the Mölleback zone.

## Scope of Service

1992-1997: pre-sealing by grouting, NATM incl. shotcrete, 1<sup>st</sup> concrete liner (cast-in-place), loose-laid waterproofing membrane system, TPO/FPO, 4mm thick, compartments via water stops and injection system, 2<sup>nd</sup> liner of cast-in-place concrete. 2004-2014: TBM driven incl. pre-cast-concrete elements (approx. 65% of the total tunnel). Cross-passages: NATM, shotcrete, loose-laid plastic sheet membrane, FPO, 3mm according to the ZTV-ING/Ril853 (German standard) and cast-in-place concrete, adhesive tape to connect the segments with the waterproofing membrane. Environmental initiatives are a central part of the construction work (groundwater, chemicals and ecology).



1. Sheet waterproofing application
2. Cross-passage waterproofing
3. Pre-grouting