

## Tunnel Hallandsås (S) Sheet Waterproofing

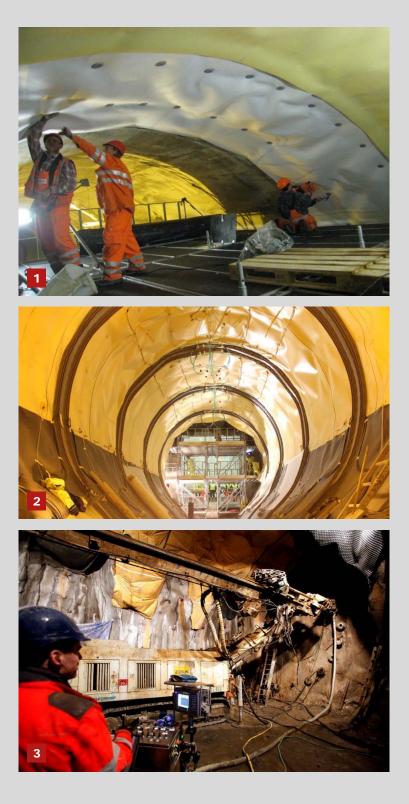
Country Type Client Main Contractor Execution of the work Construction Period Sweden Railway Tunnel Trafikverke (Swedish Transport Administration) Skanska-Vinci Renesco a.s. 1992-1997, 2004-2014

## **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-inplace concrete. 2004-2014: TBM driven incl. pre-castconcrete 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