



Tunnel Feuerbach, Stuttgart (GER) Sealing Grouting Works

Country	Germany
Type	Rail tunnel
Client	DB Projekt Stuttgart-Ulm GmbH
Main Contractor	ARGE Tunnel Feuerbach (Baresel, Alfred Kunz, Walo Bertschinger)
Designer/Site Supervision	WBI Prof. Dr.-Ing. W. Wittke
Execution of the work	Renesco GmbH, Dept. Marti Geotechnik
Construction Period	November 2015 – December 2019
Contract Sum	Approx. 30.000.000 €

Project Description

As part of the project Stuttgart 21 PFA 1.5 Lot 2, the new two-tube tunnel will run from Stuttgart's main station to Feuerbach station and has a length of about 3,200m. All works are executed via a central access gallery.

Injection/Grouting Works

The tunnel lies partially in the anhydrite-formations of Gypsum Keuper, which swells when water enters. Many tunnels in the past have suffered considerable damage due to the apparent swelling processes. To inhibit these potential swelling process water is completely restricted for construction. The water-bearing leaching front is sealed by polyurethane (PU) injections during the course of the tunnel driving through pre-excitation drilling holes. Subsequently, the excavation-damaged zones in the anhydrite area are systematically grouted with acrylate resins. Additional water retention structures prevent seepage in longitudinal direction.

Scope of Services

Pre-excitation Injections

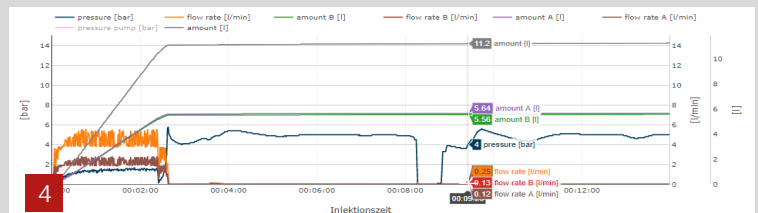
- Pump hours: approx. 4,500 h
- Polyurethane resin: approx. 230,000 l

Systematic injections

- Drilling: approx. 60,000 pcs
- Packer positions: approx. 120,000 pcs
- Pump hours: approx. 40,000 h
- Acrylic gel: approx. 2,500,00 l

Specialties

For the first time in the grouting industry, a digital injection data management system was introduced and optimized during the construction phase. This enabled, among other things, immediate access to the injection data for data control, automated mass determinations, interactive visualizations and accurate documentation of the processes. A fully equipped grouting container with automatic pump control, acrylic resin pumps, measuring sensors from the process/ pharmaceutical industry as well as a mixing plant, ensures the quality of the works.



1. Water-bearing leaching front sealed by PU injections
2. Grouting Container
3. Detailed Visualization of the injection quantities
4. Pressure/Quantity Diagram for a 2-component injection resin