

## VIENNA - ST. PÖLTEN RAILWAY LINE, REINFORCEMENT OF EMBANKMENTS

Client: Austrian Railways Infrastructure AG

Development Period: since 2008

### THE PROJECT

The old western railway line between Vienna and St. Pölten, which exists since the year 1858, is - besides the new high performance line - an essential part of the four-tracked railway artery between Vienna and Salzburg.

In correspondence with the morphology of the Vienna Woods, the track often runs on high embankments, partly in crosswise sloped terrain, and along deep cuts. The more than 150 year old embankment constructions predominantly consist of excavated material of the Flysch zone and are characterized by a high sensitivity to displacements and landslides. For this reason, instabilities occurred in the last decades, that lead to considerable restrictions of the railway services.

In order to provide a stable reliability of service, concepts for the reinforcement of the existing embankments were worked out and partially already implemented, based on extensive preliminary investigations.

### OUR FUNCTION

First of all, BGG Consult was commissioned for this project with the assessment of the current situation in the sense of a geotechnical risk analysis. For this, a geological and geotechnical field mapping of the earth structures and the relevant surroundings of the railway line was done. Subsequently, underground investigation works were planned, supervised and evaluated for selected sections. In the course of these, numerous inclinometer and geodetic measuring points were installed and monitored for a longer period of time.

Based on the results, the earth structures were assessed with regard to a possible requirement of a reinforcement and the appropriate construction measures determined. Finally, the tender and the implementation of these measures were overseen from a geotechnical and geological point of view.

#### *Reinforcement of Embankment, km 27.99 to km 28.33:*

This line section is situated in the area of an embankment at crosswise sloped terrain with fill heights between 4 m and 13 m. The fill is built up very heterogeneously by fine-grained, mixed-grained and coarse-grained material. Finegrained fill as well as fine-grained valley deposits also exist at the transition to the underlying Flysch of which the upper edge is mostly gently and locally also moderately inclined towards the valley.

For the reinforcement of the embankment, pre-stressed ground anchors and anchor beams of reinforced concrete were used. The anchors hold lengths between 22 m and 30 m and a characteristic strength of 650 kN. The grouted section of the anchors integrate at least 10 m into the Flysch rock. In addition, a support system for the path accompanying the line was implemented, also built by reinforced concrete, braced by grouted soil nails.



*Anchoring works in the area of the embankment reinforcement between km 27.99 and km 28.33 (right side of line)*