Semmering Basistunnel SBT Los 2.1

SHORT DESCRIPTION

The planned Semmering Base Tunnel (SBT) is currently one of the most important large-scale infrastructure projects in the heart of Europe, and forms part of the new Austrian southern railway, a central axis on the trans-European route from the Baltic to the Adriatic. With an overall length of 27.3 km, the SBT links Lower Austria with Steiermark. Österreichische Bundesbahn [Austrian Railways] has appointed Implenia as part of a consortium with Swietelsky for the construction of central Lot 2.1, a section about 13 km in length.

THE PROJECT

Starting with two shafts at Fröschnitzgraben, this central section of the SBT, comprising two single-track tunnel tubes, will be excavated in the Mürzzuschlag direction using excavators and blasting (approx. 4.3 km) and in the Gloggnitz direction using two TBMs [tunnel-boring machines] (approx. 8.6 km). These two shafts have been constructed by blasting down to a depth of up to 400 metres and have diameters of 11 m and 8.5 m respectively. The TBM operation, downhill in the Gloggnitz direction, is being performed by two single-blade TBMs (Ø = 10,17 m) and the final stage of construction will comprise reinforced tubbing sections with an internal diameter of 9.2 m. These two tunnel tubes will be interconnected by 26 cross-passages.

On completion of the construction work, these starting shafts will be used as ventilation shafts, and extended to create an emergency stopping point about 1 km in length. At surface level in Fröschnitzgraben, an operations and ventilation building will be constructed.

CHALLENGES

A major challenge lies in the supply of materials to the construction site, and in the confined conditions below ground. The removal of excavated material through the two shafts at Fröschnitzgraben constitutes another such challenge. The excavated material will be taken to the nearby landfill site of Longsgraben using a conveyor belt system.

FURTHER INFORMATION

Implenia at the construction site
Implenia Schweiz AG,
Fröschnitz 25A
8685 Steinhaus a. Semmering

Task
Technical management
Share in consortium 50%

Services delivered
Tunnel construction

Construction method

- Fröschnitz shafts 1 and 2
- Blasting, D = 400 m, Øi = 11 and 8.5 m
- TBM operations
- Single-blade TBM, L = 2 x 8.6 km, Ø = 10.17 m, A = 81.2 m^2, Reinforced tubbing construction, 5+1, Øi = 9.2 m, d = 0.3 m, L = 2 m
- Site-mixed concrete inner shell
- Excavation and blasting operation L = 2 x 4.3 km, Ø = 10 m, A = 78.5 m^2, Two-shell cladding with shotcrete outer shell and site-mixed concrete inner shell
- Landfill site - earthworks
- Handling of 4.4 mill. m^3 in conjunction with excavated earth and construction residue

Geology
Phyllite, gneiss, slate

FACTS

Location	Steiermark , Austria
Status	Under construction
Construction volume (value of our services)	623 M EUR
Start of construction	January 2014
Completion	January 2024

Project management	Bauherr: Österreichische Bundesbahn ÖBB; Ingenieur: Baumanagement iC, IGT, Vigl Consult ÖBA ILF, 3G, Tecton; ARGE: ARGE Tunnel Fröschnitzgraben;
Length	12900 m
Cross-sectional area	81 m^2

SERVICES

Tunnelling