



Ceneri Base Tunnel, Bellinzona – Lugano, Switzerland

The Ceneri Base Tunnel in the Ticino is part of the NEAT (New Railway Alpine Transversal) and also connects directly to the agglomerations Lugano, Locarno and Bellinzona. The base tunnel underpasses the Mone Ceneri and consists of 2 single track tubes, each 15.4km long.

Scope

- 2 single-track tubes, length almost 2 x 15.4km
- Cross passages every 325m
- Heading by drill & blast
- Excavation of access gallery Sigirino (2.7km) by TBM (9.70m diameter)

Challenges

- Very heterogeneous Geology, subparallelism
- Linea Val Colla: difficult Geology and poor rock quality in combination with an overburden of 600 m, strong deformations
- Low overburden at area of under crossing the national highway A2 in soft soil
- Highly sensible urban area at the south portal at Vezia regarding vibrations and structure-borne noise

Amberg Services

- Consulting for layout of the construction project
- Establishment of tendering documents
- Evaluation of offers, customer support for award procedure
- Final and detailed design
- Client representation



■ Portal north at Vigana



■ Sealing and establishment of lining



■ Branching cavern Sarè

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Engineering joint-venture ITC

Partner JV:
Pini Swiss Engineers SA et AF Toscano AG,
subcontractor: Amberg Engineering AG

Contracted value Amberg

- Total CHF 11.7 Mio.

Project Phases & Duration

- Planning & tendering/awarding 2005 – 2009
- Realization since 2006
- Expected completion 2020

Project Details & Challenges

- Complex, heterogeneous alpine geology. High demands on investigations during excavation works and decision-making processes at site, based on boundary conditions of the contract for work
- Linea Val Colla: changeable geology in combination with overburden up to 600m, including large plastic deformation. Application of flexible reinforcement measures and intensive geotechnical surveying
- Low overburden at under passing of national highway A2 in soft soil section at the Portal north. Planning and tendering of the complex construction process incl. jet grouting, pipe umbrella, rock support and lining
- South portal in Vezia in urban area. Shaking and structure-borne noise had to be kept to a minimum
- Complex coordination processes/activities between the different entities (3 tunnel construction lots), railway equipment and infrastructure
- Know-How-transfer from Gotthard Base Tunnel

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Overall costs

- Total CHF 2.2 Billion

Overview Project

- 2 single-track tubes, length almost 15.4km each, cross-section 65-80m²
- Excavation by drill & blast
- Cross-passages between the single-track tubes every 325m
- 3 branching caverns (2 branchings Sarè – for the future continuation of the NEAT, Vigana – branching towards Locarno)
- Access gallery Sigirino (2.7km) with TBM heading, diameter 9.70m
- Drained sealing and cast in place inner lining

Geology

- Faulted gneiss formations
- Fault zones of structural relevance, subparallelism
- Line Val Colla: complex geological conditions, in combination with high overburden, big deformations, requirement of flexible rock support and lining measures

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