Key Figures – raw construction Ceneri Base Tunnel

Lengths, depths and distances

Total length of the entire tunnel and passage system 39,780 km
Length of the Ceneri Base Tunnel, north portal Camorino to south portal Vezia
   East tube 15,452 km
   West tube 15,289 km

Drive

Total length driven by drilling and blasting (entire tunnel, cross-passages, exploration tunnels, caverns, etc.) 37,49 km
Tunnel boring machine drive 2,321 km
Daily advance race with conventional blasting
   Average advance rate in favourable rock conditions 5.8 m/wd
   Average advance rate in unfavourable rock conditions ca. 2.6 m/wd

Heights above sea level and height differences

Height of top edge of rail at north portal Camorino 216.5 m
Height of top edge of rail at south portal Vezia 329 m
Height difference from north portal at Camorino to south portal at Vezia 112.5 m

Spoil management

Total volume of excavated rock 7.9 mil t
Concrete 1.1 mil m³
Steel rings 4'200 t
Steel mesh 1 mil m²
Rock anchors 1'123 km
Reinforcement 20'000 t
Sealing and drainage foil for vault 650'000 m²

Geometrical parameters of the track inside the tunnel

Horizontal radius (excl. Vezia junction) Rh,min 5’000 m
Vertical radius Rv,min 25’000 m
Maximum gradient inside tunnel 6.8 ‰
Maximum gradient inside tunnel from Sarè junction 12.5 ‰

Geometrical parameters of the track outside the tunnel

Horizontal radius Rh, min 300 m
Vertical radius Rv, min 10’000 m
Maximum gradient overground section Nodo di Camorino 15 ‰

Various facts and figures

Standard distance between tunnel axes 40 m
Maximum distance between tunnel axes 210 m
Total number of cross passages 48 units
Standard distance between the cross passages 325 m
Maximum rock overlay 1040 m
Maximum rock temperature approx. 19 °C
# Key Figures - Railway Infrastructure Ceneri Base Tunnel

## Railway track
- **Ballasted trackbed**: 3,9 km
- **Ballastless trackbed** (incl. track crossover link): 29,4 km
- **Concrete**: 33,500 m³
- **Rails** (incl. track crossover link): 66,6 km
- **LVT single-block system**: 98'000 units
- **Points**: 3 units

## Overhead conductor
- **Overhead conductor in tunnel** (approx. 97% overhead conductor rail): 2 x 15 km
- **Overhead conductor in overground sections**: approx. 3 x 1 km
- **Overground mast foundations**: approx. 100 units
- **In-tunnel supports**: approx. 4'200 units

## 50 Hz electric power supply and cable systems
- **Optical-fibre cable**: 10'500 km
- **Copper cable**: 900 km
- **Electrical connection cabinets for cross-passage** (50 % air-conditioned): 530 units
- **Electrical connection cabinets for the central infrastructure systems**: 80 units
- **Luminaires**: 800 units
- **Transformers**: 60 units
- **Handrail with integral LED illumination**: 32 km
- **Signs**: 2'600 units
- **No-break systems** (emergency electric power supply): 4 units
- **Medium-voltage control panels**: 230 units

## Telecommunication systems
- **Stand-alone control computers**: -
- **Tunnel control system data points**: 25'000 data points
- **Emergency call columns**: 100 units
- **Telephone instruments**: 32 units
- **Network components**: 166 units
- **In-tunnel wireless communication amplifiers**: 72 units
- **Antenna cable**: around 70 km

## Safety systems
- **Balises**: 422 units
- **Axle counters**: 191 points
- **ETCS halt signals**: 65
- **ETCS position signals**: 76
- **Signal boxes**
  - 1 principal position at Vigana
  - 1 remote points computer for Vezia
- **Radio Block Center (ETCS)**
  - 1 RCB together with the SFR Giubiasco project
- **Railway control system**
  - Integrated in the existing control system of Bellinzona
  - 1 operating station in the BEZP
  - 2 on-site operating stations
  - 1 Tunnel Automatik (TAG)