AlpTransit Gotthard San Gottardo

Gottardo 2016 Ceneri 2020

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	m^3
Steel rings	4’200	t
Steel mesh	1 mil	m^2
Rock anchors	1’123	km
Reinforcement	20’000	t
Sealing and drainage foil for vault	650'000	m^2

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	aproxx. 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	m^3
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 x1	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)