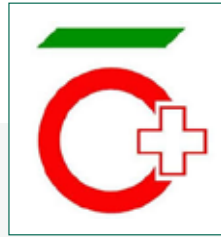


# Switzerland

**Name:** Swiss Tunnelling Society (STS)

**Type of Structure:** Non profit, open association

**Number of Members:** 507 members (thereof 85 young members), 90 corporate members



## ASSOCIATION ACTIVITIES DURING 2021 AND TO DATE

- **August:** General Assembly in Aarau, Switzerland
- **September:** Swiss Tunnel Colloquium in Lucerne, Switzerland
- **November:** European Underground & Tunnel Forum (EUTF) annual meeting in Madrid, Spain  
Additionally, the STS young members (STSym) hosted the following events.
- **August:** Geological Hike, Leglerhütte Glarus, Switzerland
- **Nov/Dec:** STSym - Drinks in Lucerne, Lausanne and Zurich, Switzerland
- **December:** Part of the young member digital celebration of World Tunnel Day

## CURRENT TUNNELLING ACTIVITIES

### Construction of new safety gallery at Kerenzerberg Tunnel

Located in the canton of Glarus on the west-east axis of the motorway A3, the Kerenzerberg Tunnel plays an important role from both a local and trans-regional perspective. After 30 years of operation, Switzerland's fifth longest road tunnel is being refurbished and upgraded in terms of safety, with completion scheduled for 2026. A key component of the project for the Federal Roads Office (FEDRO/ASTRA) is the construction of a safety gallery. The new gallery is being built next to the road tunnel and will have a length of 5,504m. Approximately every 300m there will be a cross passage between the two tubes (emergency exits). In the upper section of the safety gallery, an exhaust duct will be provided to extract the fumes in the event of a fire in the road tunnel. The excavation work began in summer 2020 from both portal sides, largely by blasting. Since July 2021, the main section of the gallery has been excavated from the western portal using a TBM. The new safety gallery is expected to be completed in 2024.

### Second Gotthard Tunnel Tube

Located on the north-south axis of the A2 motorway, the Gotthard Tunnel connects the cantons of Ticino and Uri between Airolo and Göschenen. The existing two lane

motorway tunnel was opened in 1980. As part of the 'Gotthard conservation concept', efforts were made to identify and investigate different feasible options for conservation. The best option to ensure the vital north-south connection remains open during the renovation of the existing tunnel tube was the construction of a second tunnel. On 27th June 2012, the Swiss Federal Council decided in favour of this option. This solution significantly increases the level of safety in the Gotthard Tunnel. When the project is complete, both tubes will provide single-lane operation with one standard lane and one service lane in each direction.

The planned second tunnel tube through the Gotthard has a total length of 16,866m. It runs at a standard clearance of 70m from the existing tunnel and 40m from the service and infrastructure tunnel located east of the existing Gotthard Tunnel. After preparing works in 2020 for securing the installations sites from avalanches and other natural hazards the tunnelling construction works has in 2021 with the blasting of the new exits of the service and infrastructure tunnel. To reduce the risks and optimise the overall

construction programme, the northern and southern fault zones (approx. 570m) will be conventionally excavated in advance. Once this has taken place, two TBMs will be pushed through the areas. The fault zones will be reached from the north via separate access tunnels of approx. 4.4km, and from the south of approx. 5km. These also started construction in 2021. The tunnels will be excavated using TBMs with a diameter of approximately 7m. The tender for the two main lots using a 12.3m diameter TBM each for the excavation of around 7km tunnel is ongoing. Their adjudication is planned for spring 2022.

### Bypass road for the Evouettes

The Evouettes Tunnel is a bidirectional, single-tube, 657m long road tunnel under construction in Wallis, Switzerland. The commissioning is planned for 2024.

The ground conditions, comprising loose materials, are technically challenging in terms of de-sign and construction, with the presence of scree materials at the start of the excavation, followed by debris-flow cone formations and finally the local moraine.

The decision was taken to design and undertake a sub horizontal jet-grout umbrella. This technique also allows for a full-face excavation, thanks to the presence of 45 jet columns around the excavation perimeter and 13 in the face.

Lastly, the jet grouting has induced over-consolidation of the loose ground surrounding the tunnel. The project is currently in the processing stage to restart using a new pre-support solution of



umbrella vaults and GFRP anchors.

In 2021, the project achieved several milestones:

- 371m/657m of the tunnel has been excavated from the north
- 81m has been excavated from the south
- 50% of the safety tunnel with a cross section of 12m<sup>2</sup> has been built
- North and South cut & cover has been concreted
- Lining works in the tunnel has started

**Expansion of Bern RBS Station:**

The “Expansion of Bern RBS Station” (Switzerland) project involves building a new underground station as well as the railway line accessing it. The new RBS Station consists of two 200–210m long, 26m wide and 17m high station caverns, which lie 12m beneath the existing railway tracks of the Bern Central Station. The 1.5km access railway line has different cross sections and runs both underground and above ground (open cut).

In 2021, the project achieved several milestones:

- The access tunnel (Ø = 7m) to the station caverns, which underpasses several tracks west of Bern Central Station, was successfully completed.
- The main construction works for the two station caverns (200 m long, 26m wide and 17m high) started and progressed as scheduled.
- The main construction works for the access line started and is progressing as scheduled. The excavation works (heading and benching) for the double track tunnel (sections “Henkerbrünli” and “Bierhübeli”) celebrated break-through on April 30th.

**STATISTICS**

**1. Length of tunnels excavated during 2021**

5,000m/40% TBM

**2. Amount (USD or EUR) of tunnelling / underground space facilities awarded in 2021:**

€500M.

**3. List of tunnels completed**

Tunnel Neuhof (Kt. AG, 362m)

**4. List of tunnels under construction**

*Rail Tunnels:*

Albula Tunnel (RhB, 5,860m), RBS Bern Station Expansion (RBS, 1,200m), Ligerz Tunnel (SBB, 2,119m), Wylerfeld Tunnel (SBB, 300m), LEB Tunnel Lausanne (LEB, 1,700m)

*Road Tunnels:*

Second Gotthard Tunnel Tube (ASTRA, 16,918m), Safety Gallery Leissigen Tunnel (ASTRA, 2,200m), Safety Gallery Cholfirst Tunnel (ASTRA, 1,250m), Safety Gallery Kerenzerberg Tunnel (ASTRA, 5,504m), Visp Tunnel 2nd Tube (Kt. VS, 2,600m), Rehabilitation Tunnel Belchen (ASTRA, 3,200m), Gubrist Tunnel 3rd Tube (ASTRA, 3,230m), Safety Gallery Crapteig Tunnel (ASTRA, 1,984m), Riedberg Tunnel (Kt. VS, S: 555m, N: 483m), Safety Gallery Rofla Tunnel (ASTRA, 1,018m), Tunnel de déviation des Evouettes (Kt. VS, 657m), Tunnel des Nations (Kt. GE, 870m), Gallery Schwamendingen and Schöneich Tunnel (ASTRA, 1,680m), Kaiserstuhl Tunnel (Kt. OW, 2,081m)

*Other Projects:*

Nant de Drance Pumped Storage Power Plant, Hydro Power Plant Ritom, CERN HILUMI LHC Project

**EDUCATION ON TUNNELLING IN THE COUNTRY**

ETH Zurich, Department of Civil, Environmental and Geomatic Engineering  
University of Applied Sciences, in various cities

- The excavation works (under cover) in the “Eilgut” sector (east of Bern Central Station) continues successfully.

**FUTURE TUNNELLING ACTIVITIES**

**Rail Tunnels**

Lötschberg Basetunnel II (BLS, 35,000m),

Stadelhofen Tunnel (SBB, 7,000m), Brüttener Tunnel (SBB, 11,000m), Zimmerberg Tunnel II (SBB, 11,000m), Crossrail – Lake Crossing Luzern (SBB, 5,500m), Geneve Station Expansion (SBB, 1,500m), Heitersberg Tunnel II (SBB, 5,000m), Grimsel Tunnel (SBB, 21,720m)

**Road Tunnels**

Morschacher/Sisikon Tunnel (Kt. SZ/UR, 8,037m), Vingelz Tunnel (Kt. BE, 2,300m), City Tunnel (Kt. BE, 700m), Port Tunnel (Kt. BE, 1,800m), Weidteile Tunnel (Kt. BE, 1,400m), Safety Gallery Fäsenstaub Tunnel (ASTRA, 1,460m), Bypass Luzern (ASTRA, 3,450m), Bypass Bern Ost (ASTRA, 4,000m), Rosenberg Tunnel 3rd Tube (ASTRA, 1,435m), Safety Gallery Tunnel Gei and Brusei (ASTRA, 485m), Twann Tunnel (ASTRA, 1,700m), Nischenberg Tunnel (ASTRA, 1,640m), Rhein Tunnel (ASTRA, 4,500m), Tunnel Melide-Grancia (ASTRA, 1,800m), Tunnel Cargo Station St. Gallen (ASTRA 2,400m)

**Other Projects:**

Cargo Sous Terrain Zurich – Haerkingen (CST, 70,000m)

