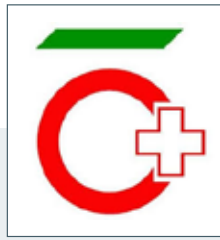


# Switzerland



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

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

**Number of Members:** 535 members (thereof 87 young members), 96 corporate members

## ASSOCIATION ACTIVITIES DURING 2019 AND TO DATE

**April** - General Assembly in Neuchatel, Switzerland

**June** - Swiss Tunnel Congress (STC) in Lucerne, Switzerland

**September** - DACH Meeting in Geneva, Switzerland

**October** - European Underground & Tunnel Forum (EUTF) Meeting in Lisbon, Portugal

Additionally, the STS young members (STSym) hosted the following events:

**March** - Field trip to Jörimann Stahl AG, Walenstadt, Switzerland

**June** - Reception as part of STC 2019 in Lucerne, Switzerland

**July** - Field trip to Project LEB Tunnel, Lausanne, Switzerland

**October** - BEFIPS ym meeting in Lisbon, Portugal

## CURRENT TUNNELLING ACTIVITIES

**LEB**  
The new 1.4km long railway tunnel in the centre of Lausanne is meant to replace the current above ground section. After completing the 42m deep access shaft in 2018, the main excavation works began in January 2019. More than 800m have already been completed, mainly by road header. Thanks to a nearby tunnel connected to the shaft by a temporary gallery, all excavated material is loaded on trains underground, reducing dramatically the number of trucks in the city centre.

Unexpected sulphurous gases released whilst excavating sandstone containing coal forced specific health and safety measures to be taken which significantly reduced the progress rate. The breakthrough is scheduled for summer 2020 and the tunnel will be put into service by the end of 2021.

## CERN

The Large Hadron Collider (LHC) is the most recent and powerful accelerator constructed on the CERN site. The LHC consists of a 27km circular tunnel, about 100m underground, with eight sites positioned around the tunnel's circumference. High-Luminosity LHC (HL-LHC) is a new project to upgrade the LHC, at Point 1 (ATLAS in Switzerland) & Point 5 (CMS in France) which consists at each the construction of an additional shaft and cavern, approximately 500m of tunnels connecting to the LHC tunnel, and additional technical buildings at the surface. The excavation of the shafts (at both Points) has been accomplished, the excavation of the cavern and of the tunnels/connections to the LHC tunnel is ongoing (70% done at Point 1 and 70% done at Point 5 as of 31.12.2019) and should be completed by the end of 2020, while lining works will continue and are scheduled to be finished by the end of 2021.

## 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 motorway tunnel was opened in 1980. As part of the 'Gotthard

conservation concept' study that began in 2009, efforts were made to identify and investigate different feasible options for conservation. These included constructing a second tunnel and subsequently renovating the first tunnel, as well as the possibility of enforcing complete closures lasting several years to enable the renovation of the existing tunnel. This latter option would have required the diversion of traffic via the pass and/or rail loading of the vehicles. On 27th June 2012, the Swiss Federal Council decided in favour of the construction of a second tunnel tube with renovation of the existing tube. The chosen solution significantly increases the level of safety in the Gotthard Tunnel and ensures that the most important north-south connection will remain open during the renovation of the existing tunnel tube. When the project is completed, both tubes will feature a 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 40m from the service and infrastructure tunnel located east of the existing Gotthard Tunnel. Construction work will start in 2021.

## Galgenbuckttunnel

After a construction period of over eight years, the Federal Roads Office (FEDRO/ASTRA) has completed the Galgenbuckttunnel in Schaffhausen on time and within budget. The new tunnel relieves the community of Neuhausen from through traffic and provides a long-term solution for the Schaffhausen South connection to the A4 motorway.





Galgenbucktunnel

Construction of the 1,138m long tunnel – with the Bahntal portal at one end and the Engi portal at the other – was a feat of precision planning that involved overcoming structural challenges and deploying modern technology. Inauguration of the tunnel marks the successful conclusion of this major project for Switzerland's national highway network.

### Taubenloch Nord

Taubenloch Nord is located near Biel in the Canton of Berne. The main part of the project is the deconstruction of the existing two 2-lane tunnels on the A16 motorway built in 1970. Other works are the refurbishment of a bridge in the north and the portal areas including a cut-and-cover tunnel in the south. In 2019 the works of tunnel 1 were completed in just 9 months while the traffic was directed through tunnel 2. 446m of the existing inner liner and excavation support have been demolished and widened by means of excavators equipped with hydraulic hammers and milling heads. The works on the second tube will be completed in 2020.

### CEVA

CEVA plays a crucial role in the mobility of Greater Geneva which encompasses nearly one million people. Since December 2019, this new trans-border line connects the stations of Geneva-Cornavin and Annemasse, linking the rail networks of Switzerland and France. Up to 80% of this connection is underground. It required the construction of two tunnels and several cut-and-cover sections.

The Pinchat tunnel is 2,024m long. Over the first 400m, the tunnel passes through clayey silts, then gradually penetrates the very compact gravels and locally cemented soil. It was excavated using the traditional method through loose ground with excavators. With an overall length of 1,600m, the Champel tunnel starts at its western end after the bridge over the river Arve, and leads, after a length of 502m, up to the Champel-Hôpital station.



Taubenloch Nord

The underground station will serve a very densely populated district with residential buildings and the university hospitals of Geneva. Over its entire length, the tunnel invert lies in the moraine gravels.

## FUTURE TUNNELLING ACTIVITIES

### Rail Tunnels

Lötschberg Basetunnel II (BLS, 35,000m), Stadelhofen Tunnel (SBB, 7,000m),

Brüttener Tunnel (SBB, 9,000m), Zimmerberg Tunnel II (SBB, 11,000m), Crossrail – Lake Crossing Luzern (SBB, 5,500m)

### Road Tunnels

Second Gotthard Tunnel Tube (ASTRA, 16,918m), Leissigentunnel (ASTRA, 2,200m), Tunnel Cholfirst (ASTRA, 1,250m), Safety Gallery Kerenzlerberg (ASTRA, 5,504m), Morschacher/Sisikoner Tunnel (Kt. SZ/UR, 7,680m), Vingeltunnel (Kt. BE, 2,300m), City Tunnel (Kt. BE, 900m), Portttunnel (Kt. BE, 1,700m), Tunnel Weidteile (Kt. BE, 1,300m), Tunnel Fäsenstaub (ASTRA, 1,460m), Bypass Luzern (ASTRA, 3,450m), Kaiserstuhl Tunnel (Kt. OW, 2,081m), Bypass Bern Ost (ASTRA, 4,000m), Rosenberg Tunnel 3. Röhre (ASTRA, 1,435m)

## STATISTICS

### 1. Length or volume excavated - % mechanized/% conventional during 2019

- 7,500m/30% TBM

### 2. Amount (USD or EUR) of tunnelling / underground space facilities awarded in 2019:

- €460M.

### 3. List of tunnels completed:

- Ruckhaldetunnel (AB, 725m),
- Coldrerio (SBB, 96m),
- Dragonato (SBB, 30m),
- Galgenbuck (ASTRA, 1,138m)

### 2. List of tunnels under construction:

#### Rail Tunnels:

Ceneri-Basistunnel (ATG AG, 15,400m), 5 Tunnel of CEVA (SBB/Kt. GE, 8,200m), Bözberg II Tunnel (SBB, 2,500m), Eppenbergtunnel (SBB, 3,114m), Albulatunnel (RhB, 5,860m), RBS Bern Station Expansion (RBS, 1,200m), Ligerz Tunnel (SBB, 2,000m), LEB Tunnel Lausanne (LEB, 1,700m)

#### Road Tunnels:

Tunnel Eyholz Haupttunnel (Kt. VS, 4,200m), Safety Gallery Tunnel Ligerz (ASTRA, 2,483m), Safety Gallery Tunnel Sachseln (ASTRA, 5,084m), Tunnel Visp 2. Röhre (Kt. VS, 2,600m), Safety Gallery Tunnel Bärenburg (ASTRA, 1,028m), Rehabilitation Tunnel Belchen (ASTRA, 3,200m), Gubrist 3. Röhre (ASTRA, 3,230m), Safety Gallery Tunnel Crapteig (ASTRA, 2,171m), Tunnel Riedberg (Kt. VS, S: 555m, N: 483m), Südumfahrung Küssnacht (Kt. SZ, 500m), Safety Gallery Tunnel Rofla (ASTRA, 1,017m), Tunnel de déviation des Evouettes (Kt. VS, 770m), Tunnel des Nations (Kt. GE, 870m), Gallery Schwamendingen and Schöneich Tunnel (ASTRA, 1,680m)

#### Other Projects:

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

## EDUCATION ON TUNNELLING

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