

# Sweden



**Name:** Swedish Rock Engineering Association

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

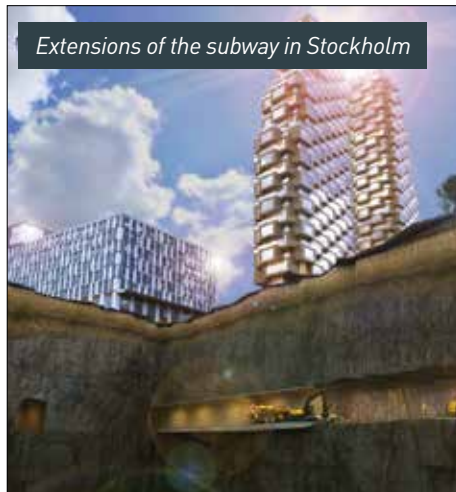
**Number of Members:** 100 corporate members from public and private clients, contractors, suppliers, mining companies, consulting firms, institutions and research organizations

## ASSOCIATION ACTIVITIES DURING 2021 AND TO DATE

Five committees constitute the backbone of the Swedish Rock Engineering Association (Svenska Bergteknikföreningen). These working groups are: Yearly Congress, Young Members, International, Competence Development and the national group of Rock mechanics. The association works towards the sustainable use and development of underground space. The main activity of the association is the annual Swedish congress where a significant part of the Swedish industry gathers. Due to the pandemic the physical event was cancelled. The Young Member's mentor program, DevelopYM, that was launched in 2018 continues. 'International' has been working towards an increased Swedish participation in ITA activities. We are now represented in all relevant Working Groups within the ITA. Competence Development (since 2020) is the group within the Swedish Rock Engineering Association that is responsible for accreditations of educators and certification of grout, bolt and shotcrete workers. During 2021 this was developed

to include shot fire licensees as well. The national group of Rock mechanics is the Swedish representative of the ISRM.

The association's proudest accomplishment of 2021 was the development of the Children's book "Vinnie and the Metro" (in Swedish "Bojan och Tunnelbanan"). The book has been distributed for free to more than 12,000 children between the ages of 3 and 6 years old where they learn how to build tunnels in hard rock. It is planned to be a giveaway at the WTC 2022



Extensions of the subway in Stockholm



West Link - Korsvagen station

## CURRENT TUNNELLING ACTIVITIES STOCKHOLM BY-PASS (E4 FÖRBIFARTEN, STOCKHOLM)

This project includes an 18km long road tunnel. When ready this tunnel will be one of the longest and most complex highway tunnels in the world.

### West Link - Korsvagen station (Västlänken, Gothenburg)

The West Link is a new double-track rail tunnel to strengthen the labour market in Gothenburg and West Sweden. Giving commuter and regional trains their own tracks in a tunnel beneath central Gothenburg will double the capacity of Gothenburg's Central Station. The expansion of the rail infrastructure in Gothenburg also enables future development of the city above ground. The Korsvagen section, is approximately 3.2km, and has a tunnel system of very complex geometries as well as tunnels with low rock overburden.

### Extensions of the subway in Stockholm

Building the new Hagastaden metro station is a large-scale and highly technical complex project below central Stockholm. It is surrounded by residential buildings, Karolinska university hospital and Gustaf Vasa Church. Traffic above and below ground will go on as usual. Hagastaden Station consists of four entrances, one in the hospital, two ticket halls and the metro tunnel with an accompanying service tunnel and connection with the existing metro system. A high requirement for health and safety and sustainability using the classification CEEQUAL is required.

### Reconstruction of Slussen Stockholm incl new underground bus terminal

Slussen is a central area of Stockholm, by the lock between Lake Mälaren and the Baltic Sea. This is an important hub in the city, and a large underground bus station is under construction in the area. The construction works were ongoing through 2021.

### City Link tunnel

This tunnel project has a length of 13.4km and a diameter of 5m and is sited approximately 50-100m below central Stockholm and began construction during 2020. The project will provide northern and southern parts of Stockholm with a new electricity supply. The project includes six ventilation shafts, elevator systems and the construction of technical buildings for electrical equipment. A 100m deep shaft was completed during 2020. From this

shaft a 250m long tunnel will run under the Stockholm's ström lake. The TBM tunnelling works started in 2020.

### **HYBRIT: A unique hydrogen storage facility in Luleå**

The HYBRIT initiative was launched in 2016

by the three owners; SSAB, LKAB and Vattenfall. The pilot plant for the Hydrogen Storage facility will play a very important role in the overall value chain for fossil-free iron and steel production. Rock caverns and connecting tunnels have been constructed in the rock and a ventilation

shaft drilled from the top of the rock down to the upper part of the rock cavern. At the end of 2021, the compressor that will pressurise the hydrogen gas for storage was lifted into place.

### **FUTURE TUNNELLING ACTIVITIES**

#### **Ostlänken, the East Link high speed rail**

The new high-speed rail system south of Stockholm. Design and planning is ongoing. The project includes 12 single rail tunnels and 15 double rail tunnels. The longest tunnel will be 6km and the shortest will be 100m long. Construction is planned to start in 2024.

#### **SKB Forsmark, final repository nuclear fuel**

Planning is continuing for Sweden's final repository for spent nuclear fuel. The process of obtaining the necessary permits is ongoing. The construction is ready to start as soon as permission is granted.

#### **Hydrogen storage in Gällivare**

This is a large, lined rock cavern project in northern Sweden, in the Gällivare municipality. It will be the world's largest facility for Hydrogen storage when completed.



*HYBRIT: Hydrogen storage facility in Luleå*

## **EDUCATION ON TUNNELLING IN THE COUNTRY**

Civil Engineering 3 years (BSc) or 5 years (MSc) as well as PhD studies is offered at several technical Universities. Courses include engineering geology, site investigation, rock mechanics and hydrogeology.

Chalmers University of Technology (Gothenburg), KTH (Stockholm), Luleå University of Technology (Luleå), and Lund University (Lund).

At Uppsala University (Uppsala) courses focus on geology, engineering geology and geophysical investigations.