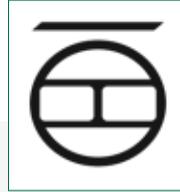


Denmark



Name: Danish Tunnelling Society

Type of Structure: non-profit, open association

Number of Members: 35 corporate members, 230 individual participants

ASSOCIATION ACTIVITIES DURING 2020 AND TO DATE

During 2020 all activities related to organising events for members were put on hold due to covid-19.

CURRENT TUNNELLING ACTIVITIES

The Fehmarnbelt Fixed Link is an 18km long immersed tunnel connecting the island of Fehmarn in Germany with the island of Lolland in Denmark. The tunnel will comprise a four lane motorway and dual track railway.

The fixed link will close a gap in the rail network between Scandinavia and central Europe and will be supported by the EU as one of the Community's prioritised railway corridors in Europe.

The immersed tunnel consists of 89



tunnel elements, that are cast in concrete and steel on land. The elements will then be transported out to the Fehmarnbelt and immersed in an excavated trench in the seabed, where they will be joined together one by one and covered.

When constructed, it will be the longest

immersed tunnel in the world.

Construction is ongoing with preparatory work reclamation works for the work site harbour and casting facilities for the immersed segments in ongoing on the Danish coast. The MEP contract will be tendered in 2021.

The Nordhavn Tunnel is a 1.4km road tunnel connecting the existing Nordhavnsvej tunnel with the urban development area of Nordhavn (Northern Harbour) in Copenhagen. Once finished the road will form a 3km tunnel connection with the Elsinore motorway and the road network North of Copenhagen. The project will connect with a new Ring Road to the East of Copenhagen. The Nordhavn Tunnel will be constructed as a cut & cover structure through an existing leisure boat harbour. The harbour area will be backfilled to construct a temporary dam, from which the tunnel will be excavated and cast. After construction of the tunnel the harbour will be re-established

Copenhagen Metro Extension Northern Harbour – In the Northern Harbour area the metro extension work was completed in

2020 and the line opened for passengers during the close down due to Covid-19. The line is the northern part of the M4 and consist of 2.5km of twin-tunnel, one underground station and two surface stations.

Copenhagen Metro Extension Southern Harbour – Extension of the Copenhagen Metro line M4 by 8km of TBM tunnels and five underground stations to join the southern harbour residential area into the network of the Copenhagen metro. The construction works started in 2018 and the line is due to open in 2024. Two EBPMs are engaged and will complete tunnelling in spring 2021.

Strandboulevarden Storm Water Tunnel – In Northern Copenhagen the Strandboulevarden Storm Water Tunnel consisting of 900m of 2m diameter TBM tunnel and 220m of 2.5m diameter TBM tunnel including four shafts is under construction.

Kalvebod Brygge Storm Water Tunnel is a 1.5km pipe jacked tunnel with ID: 2-3m and three shafts. The construction will start in mid 2021 and includes a huge pumping station. The tunnels will cross under existing railway tracks and in very close proximity to the Metro Circle line.

FUTURE TUNNELLING ACTIVITIES

The tunnelling activities in the coming years will increase with many new projects coming up. Some of the major projects that will start construction in the next 5 years are:

Svanemøllen Storm Water Tunnel consisting of 9km of bored tunnels, of which 2.5km is segmentally lined with an i.d. of 4.9m. The remaining 6.5km is pipe jacked tunnels with 2.2 – 3.2m i.d. The nine circular shafts vary in diameter from 15m to 20m and from 15m to 30m depth. The Environmental Impact Assessment and preliminary design is under preparation and the project is planned to be tendered for construction in 2023.

A study for a new **eastern bypass in Copenhagen** that will reduce traffic in the city centre has been completed in 2020. Two corridors have been investigated covering nine different alignments comprising both cut and cover tunnels, TBM bored tunnels and immersed tunnels have been investigated. The recommended alignment will run through tunnel from Nordhavn via Lynetteholmen and Refshaleøen



The Fehmarnbelt Fixed Link

along the east coast of Amager Island before joining the motorway network by the airport. The road will be designed for four lanes and a design speed of 80km/hour. The construction cost is estimated to be between €2.6bn and €4.1bn (2019) depending on which alignment is selected.

A 3rd connection over Limfjord in Northern Denmark with a 23km new road including an immersed tunnel to the island of Egholm has been added to the government's infrastructure investment plan. Construction cost is estimated at €1bn (2019).

Further studies into a road tunnel and a rail tunnel between the Danish city Helsingør and the Swedish city Helsingborg have been undertaken. Separate alignments are being investigated for the road and rail connection. Both connections include a subsea tunnel under the Øresund Sea, connecting Helsingborg in Sweden and Helsingør in Denmark

The Copenhagen-Malmö Metrolink is an 18km subsea metro line connecting Malmö

in Sweden with Copenhagen in Denmark. The connection will provide a second link between the two cities and reduce travel time from 40 minutes to 20 minutes with departure every two minutes. This will free capacity on the Øresund Railway connection which will be required when the Femern Belt link is put into operation. The fourth phase of the feasibility study was completed in spring 2021.

The Copenhagen Metro extension line M5 - a study for new metro lines connecting to Lynetteholm Island (which is a proposed new development area for new housing) was issued in 2020. Three different alignments are being proposed comprising between nine and 11 stations. Construction costs are estimated at €3bn (2019).

The Kattegat Fixed Link connecting Zealand with Jutland passes the island of Samsø and will carry rail and road. Several alignments combining bridges, bored and immersed tunnels are being considered.