

Talsinkifix – new challenges for engineering geologists

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The capital areas of Helsinki in Finland and Tallinn in Estonia have grown enormously during the last 20 years. About 5 million inhabitants live in the daily working area of the cities. Today 30,000 people commute weekly or monthly from Estonia to Finland. Eight million passengers crossed Gulf of Finland year 2014. The idea of a tunnel between Tallinn and Helsinki was presented in early 1990's known today as Helsinki-Tallinn fixed link, "Talsinkifix". Prefeasibility studies and the assessment of socio-economic impacts show that the planning of a tunnel should be continued. The tunnel will connect the two cities with trains operating with maximum speed 250 km/h to achieve 30 minutes travel time. The tunnel will be an extension of the future Rail Baltic line railway offering north-south connections among European Union Member States. Construction could start 2025–2030 and would take eight to ten years. The tunnelling and bedrock construction share of the costs is estimated to 3,6 - 4,1 billion €. The total cost estimate is 9 – 13 billion €.

The tunnel area is located at the border of the East European Platform and the Fennoscandian Shield. The investigations of bedrock construction conditions of the area in Gulf of Finland will present great challenges for geologists. Most important in undersea tunnelling is the elevation of bedrock surface and location of major bedrock fracture zones. Tunnelling will be challenging especially in the vicinity of Tallinn in the about 1.2 billion years younger sedimentary rocks. In buried valleys the Quaternary sediment thickness may reach up to 150 m with high groundwater pressures. The blue clay stratum is a good environment for tunnelling because of low water conductivity. The Ediacaran water saturated silt and sandstones, reaching up to 60 m in thickness, are an important source of water supply for the Tallinn city and thereby one of the main challenges.

References:

Ikävalko, Ossi; Vähäaho, Ilkka; Suuroja, Sten 2013. Soil and bedrock conditions to be expected in Tallinn – Helsinki tunnel construction. In: *Strait Crossings 2013 : proceedings / Tor Erik Frydenlund, Kaare Flaate, Håvard Østlid*