

## Characterization and 3D -modelling of the brittle structures in Westmetro tunnels

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The tunnels of the western part of the Helsinki region subway network (“Län-simetro”) locate within the Svecofennian domain of the crystalline Paleoproterozoic bedrock. The metro tunnels are total 21 km in length. The pilot area for the detail models is situated in the Hannusjärvi area in Espoo.

Geological Survey of Finland has done detailed field work and analysis of the structures from the pilot area which gives good basic knowledge for this study. They have interpreted geophysical and geological data during 2000-2008. Pajunen ed. (2008) has attributed the structures to specific deformational events.

The main aim of this study is to construct detailed 3D-models over the networks of brittle structures and to identify the kinematic indicators of the structures and the factors controlling the fluid flow through the fracture networks. This helps the underground construction planning.

The first part of the study is to map and characterize the brittle structures of the pilot area, from the tunnels. The mapping results will subsequently be correlated with ground surface LiDAR data and existing structural interpretations (Pajunen ed. 2008), and tentative structural 3D-models will be constructed. The initial models will be refined by drill hole, geophysical, and groundwater well data from the study area, available through collaboration with the subway constructor.

We have now collected all the drill hole data to an Access -database and created a 3D visualization from the weakness zones in the drill holes. We have also created a database from the outcrop mapping data covering the whole study area.

The second part of the study is to create the kinematic indicators to study the fluid flow in the structures. This is carried out after the fracture network model is completed and the fractures are properly chracterized.

### References:

Pajunen, M (eds.) 2008. Tectonic evolution of the Svecofennian crust in southern Finland -a basis for characterizing bedrock technical properties. 329 p.