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Tunnelling in weakness zones containing swelling clay represent one of the most difficult conditions in hard rock tunnelling, which could result in large excavation problems and in extreme cases even tunnel collapses. To enrich the engineering experience for such ground, the case of rock fall at the twin-tube Hanekleiv road tunnel is studied in the paper. The rock fall occurred ten years after tunnel completion in the southbound tube, approximately 1.1 km from the northern entrance, in a fault zone containing swelling clay. Laboratory testing results indicate gouge material in the collapse zone was not very active on swelling and the content of swelling clay was low. The long lasting, gradual process of mobilization of instability is hard to define explicitly, and it has been focused in numerical simulation on several selected mechanical states, particularly the one representing the long term loading on rock support. Both the detected shotcrete cracks during tunnel excavation and the tunnel collapse have been verified.

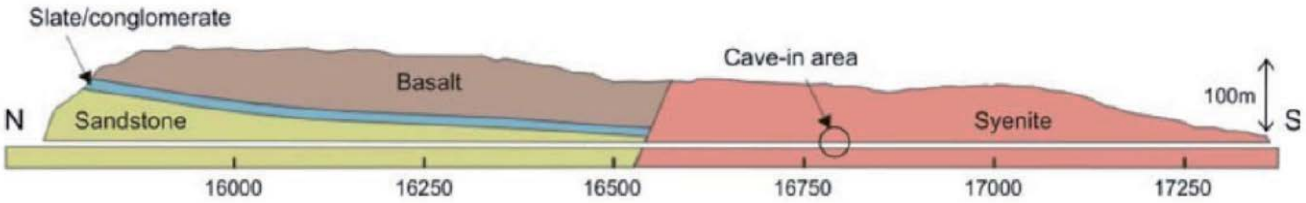

Figure 1 – Simplified presentation of topography and geology along the tunnel alignment

Figure 2 – Cave-in section of the fault zone

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