Tunnels: Design and Construction. Feasibility studies

1 Purpose and scope

This chapter sets the purpose and scope of engineering geological feasibility studies.

2 Feasibility studies

The purpose of engineering geological studies is to gain an adequate geological knowledge of the area in question, this knowledge then being used as a basis for making decisions on the route of the line. Any problems and decisions must be defined as early as possible in the planning process. It is particularly important for comprehensive and thorough feasibility studies to be conducted if full-profile boring is being considered as an excavation method. A cost-benefit analysis of the scope of the study should be carried out.

a) When designing railway tunnels, engineering geological feasibility studies must be carried out along a corridor in the area in question.

b) The scope of the studies must be tailored to suit the geological and topographical conditions, and must provide an adequate basis on which to make the type of decisions that are necessary.

c) The scope of the engineering geological studies during the various planning phases must be determined by the problems facing the project and by the kind of decisions that must be made.

An example of the scope of engineering geological studies that should be included in the various planning levels is described in Statens vegvesens Håndbok 021 Vegtunneler.

The value creation of engineering geological studies is normally at a peak when the results are at enquiry stage. The main emphasis of surveys and assessments should be on elements that are particularly significant and costly (areas with minimal top cover, noted weakness zones, areas with special requirements for watertightness, tunnel entrances, etc.) as well as feasibility criteria. The feasibility studies are conducted before work begins on a site, but surveys of the conditions also continue during excavation. Feasibility studies can rarely, if ever, reveal all of the bedrock conditions, and there is always a possibility that unexpected conditions may be encountered. It is therefore important for feasibility studies to be carried out and for follow-up work to continue during excavation.