

Geology

Print



In underground works, geology affects every major decision. Any underground infrastructure will need of excavation and ulterior support of the soil or rock mass where the infrastructure is to be built.

The excavability of the ground and the need of support will very much depend on the geology.

The reason is geological aspects are normally linked to the geomechanical properties of the ground (which rule its deformability and strength) and their possibility to be excavated.

So, geology will determine main aspects of the infrastructure as:

- Feasibility
- Location and alignment
- Constructability & Cost
- Usefulness and behavior of the completed structure
- Risk Analysis

Therefore, geology permits interpolation/extrapolation between borings & correlation of case histories, allowing us to forecast in advance possible approximations of cost and time for the construction of underground infrastructures, if the geology conditions are known.

Along with the geological conditions, hydrological condition is a prime factor in the successful construction and future use of any underground project.

The reasons are several:

- Groundwater pressures and inflow affect the stability of excavation faces and the strength of the permanent support required for any underground structure.
- The leakage of groundwater into a finished underground structure might affect strongly the quality of the space and its functionality.
- Underground construction may have to deal with existing groundwater pollution affecting personnel safety and raising costs
- Groundwater chemistry might affect the rate of corrosion of underground structures
- The excavation and use of underground structures might cause pollution of the groundwater
- Groundwater movement can affect the stability of the surrounding ground
- Groundwater can provide the sealing mechanism for storage of certain products underground (oil, gas, etc)

It can be easily understood then the extreme relevance of hydro-geological conditions on the future design of the underground structures. This is why at the very beginning of any underground project a thorough site investigation of the geological and geotechnical conditions is needed.

Links:



- Tunnels and Shafts in Rock by US Army CE : Geology (Adobe Pdf 8mb)
- Geotechnical Site Investigations for Underground Projects. (Read this free online)