

UNDERGROUND CONSTRUCTIONS

Multiconsult has been at the forefront of rock engineering and the development of underground construction technology for the last 3-4 decades, with extensive experience from numerous underground projects, large and small, both in Norway and overseas.

Multiconsult's experience from over 105 years of working with underground facilities is that underground solutions are both functional and economic, as well as often being the only alternative where surface space is limited.

In cooperation with other disciplines, our core staff of geologists and civil engineers are fully engaged with concept development, site investigations, feasibility studies, engineering and site inspections for a broad range of underground projects. They offer the best available underground technology and capability, drawing on valuable experience from national and international projects.

This competence is available to project developers, contractors or other consultants in the form of individual experts or teams of specialists who can participate in any phase of multidisciplinary projects. Particular benefit may be obtained where Multiconsult's civil engineering experience is combined with geotechnical knowledge and underground expertise in all project phases, from the first concept development and site investigations through to commissioning and start-up.

AREAS OF EXPERIENCE

- Hydropower projects
- Water and wastewater tunnels and treatment plants
- Traffic tunnels, including road, rail, metro and sub-sea tunnels
- Oil and gas caverns
- Oil and gas pipeline shore approach tunnels
- Parking facilities
- Sports arenas
- Military and civil defence projects
- Telecom projects
- Industrial waste disposal
- Industrial frozen storage
- Crushing plants

SERVICES

- Geology, hydrogeology & environment
- Soil mechanics and geotechnical engineering
- Engineering geological mapping
- Planning and execution of ground investigations
- Engineering geological planning and design
- Tunnel excavation methods, D&B, TBM, etc.
- Rock stability analysis
- Rock support, bolting, sprayed concrete, etc.
- Ground water control and grouting design
- Vibration and noise control

- Empowerment
- Excellence and capacity
- Acknowledged specialists
- More than 40 offices
- Subsidiaries in Norway, Sweden, Denmark, UK, Poland, Singapore, Tanzania and Uganda

ABOUT MULTICONSELT

Multiconsult is one of the leading consultancies companies in Norway and Scandinavia. We offer multi-disciplinary consulting, design, engineering, project monitoring, verification and inspection.

Drawing on nearly 110 years' experience, we continue to create history in partnership with our customers. For us, it's all about having experience, the necessary expertise and the right balance of skills amongst our 2900 employees. We encourage both our staff and our customers to see opportunities where other people see obstacles, and to break through barriers that others may be tempted to circumnavigate.

Multiconsult has more than 40 offices in Norway and overseas. Our head office is in Oslo, but all of our expertise is available through all of our offices. Multiconsult offers design and consulting services for all project phases.

Multiconsult's international business continues to grow. We are working on projects in Africa, Asia, South America, Canada and various parts of Europe.

Multiconsult's business areas:

- Buildings & Properties
- Industry
- Oil & Gas
- Transportation
- Renewable Energy
- Water & Environment
- Cities & Society

Multiconsult

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Underground Construction Technology

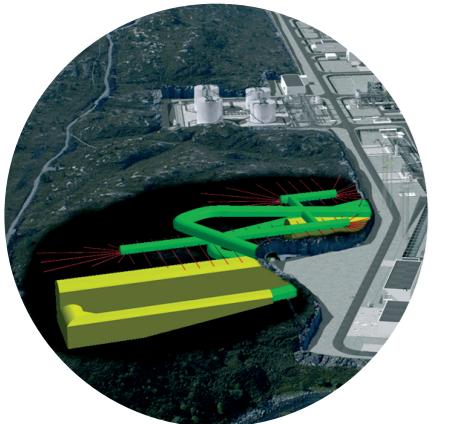


Multiconsult



100 years

of experience for a wide area of underground solutions



OIL & GAS

The oil and gas industry uses underground solutions for transporting (pipeline tunnels) and storing crude oil and petroleum products. Storage is often in unlined caverns well below the ground water level. Multiconsult has expertise in investigations, design, and construction supervision, and can provide extensive references from many such projects.



HYDROPOWER

Hydropower plants have largely been developed underground. Waterways and power stations are mainly underground due to environmental, safety and cost considerations. Multiconsult has been a major operator in this important part of the construction market. For more than 30 years, Multiconsult has been exporting its expertise in this field to countries around the world.



TRANSPORT

Norway has almost 1000 road tunnels, with a total length of more than 700 km. The longest road tunnel is more than 20 km long. Many sub-sea tunnels cross fjords and link islands to the mainland. A considerable number of railway tunnels have also been built over the last 150 years. Multiconsult has been a key player in this market for more than 30 years.



WATER SUPPLY AND SEWAGE

In urban areas, using tunnels to transport drinking water and sewage is often the most economic solution. For treatment plants, pumping stations and basins an underground location is often safer because it offers protection against contamination and sabotage. Multiconsult has been responsible for design and construction supervision in a number of such projects including both TBM and drill and blast excavations.



INDUSTRIAL PRODUCTION AND STORAGE

Underground solutions are widely used for industrial facilities (e.g. ammunition factories), crushing plants, and storage facilities. Storage of industrial waste in rock caverns has the advantage of high levels of protection against possible contamination of the environment, as well as controlled conditions for monitoring. Storage of frozen goods in caverns can greatly mitigate the consequences of power failure.



PUBLIC FACILITIES

Everyone is familiar with public facilities such as subway stations being located underground. In Norway, a number of public air raid shelters that are used as sports halls during peacetime have also been constructed. In urban areas with limited surface space, underground parking is very convenient. Multiconsult has been an active participant in the design and construction of such facilities for more than 30 years.



PROTECTED INSTALLATIONS

Military installations benefit from considerable security advantages when located in rock caverns and tunnels. Telecommunication centres are also built underground in order to protect vital infrastructure. Multiconsult has undertaken geological investigations, design and construction supervision for many such installations.



For more information about our competencies and completed projects, please visit multiconsultgroup.com