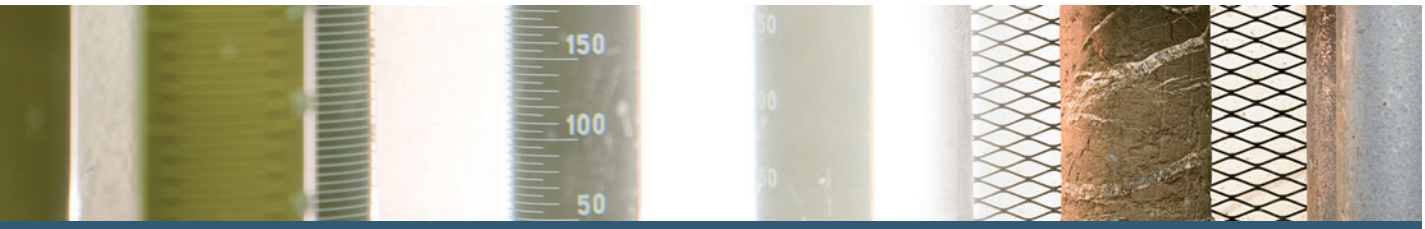
Laboratory Testing



At Fugro Engineering Services Limited we have our own laboratory offering a wide range of soil and rock testing.

Description

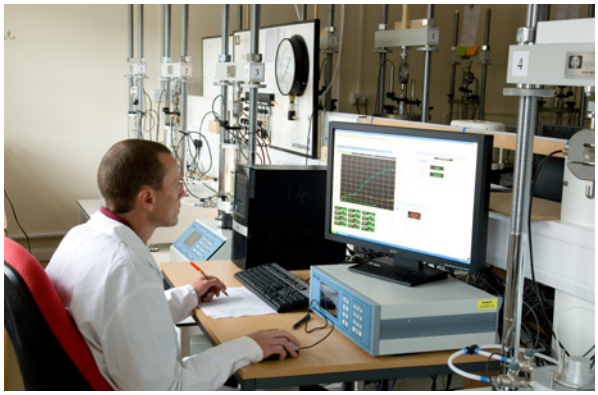
Laboratory testing of soil and rock is an essential element of geotechnical analysis and foundation engineering and is the main activity to be undertaken after the completion of the fieldwork and prior to the production of a site investigation report.

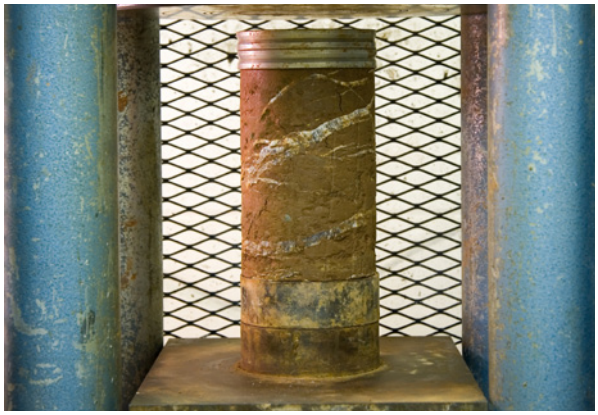
The principal geotechnical testing laboratory for the company is based in Consett, County Durham and offers a wide range of both soil and rock testing capabilities carried out in a purpose built, modern facility utilising state-of-the-art equipment and undertaken in accordance with the latest testing standards.

Once samples and rock cores have been successfully retrieved from the field, the next stage in the SI process is to test the samples obtained to the requirements of the Client/Engineer, in accordance with the Contract Specification and the relevant British and International Standards.

Our laboratory is externally accredited by UKAS to ISO 17025 and our team of 18 experienced laboratory technicians led by the laboratory manager have many years of experience in undertaking geotechnical testing on a wide range of soil and rock types.

All work is carried out in accordance with our Integrated Management System for which we hold external registration to the quality, environment, health and safety management standards.





Laboratory Testing

Soil Testing

Our principal soil testing equipment comprises:

Total Stress	
UU triaxial systems	2 no.
Small shear box	3 no.
Large shear box	1 no.
Oedometers (incremental)	16 no.
Effective Stress	
Isotropic triaxial (ie CID/ CIU)	18 no.

This equipment enables us to carry out the following range of tests, generally in accordance with BS 1377:1990 or other international testing standards:

Classification tests

Atterberg Limits, Relative Density, Sieve and Pipette, Natural Density, Saturation Moisture Content.

Material performance related tests

Compaction (2.5kg-4.5kg, vibrating rammer), CBR, Moisture Condition Value, Chalk Crushing Value, Maximum and Minimum Density.

Compressibility, permeability and durability testing

Oedometer Testing (50mm & 66mm specimens), Permeability by Permeameter, Dispersibilty (pinhole, crumb, dispersion methods), Oedometer Permeability, constant head Permeability in a Triaxial Cell.

Shear Strength Total Stress Determinations

Hand Vane, Laboratory Vane, Immediate and Drained Peak and Residual Shear Strength using 60mm and 300mm Shear Boxes, Single and Multistage Quick Triaxial Testing on typical specimen sizes of 38, 54, 66, 76 and 100mm.

Shear Strength Effective Stress Determinations

Isotropically Consolidated Drained or Undrained Single or Multistage Compression Tests with measurement of volume change or pore pressure on typical specimen sizes of 38, 54, 66, 76 and 100mm.

Rock Testing

Our principal rock testing equipment comprises:

Rock saw	1 no.
2000kN Compression machine	1 no.
250kN Triaxial compression machine	1 no.
Hoek shearbox	1 no.

The scope of rock testing undertaken includes:

- Porosity and Density
- Point Load Index
- Slake Durability
- Uniaxial Compressive Strength
- Determination of Young's Modulus and Poissons Ratio
- Brazilian Tensile Test
- Direct Shear Testing

We have collaborated with sister companies (Fugro Alluvial, Fugro GeoConsulting, Fugro Seacore) in providing laboratory testing services for nearshore, offshore and overseas projects for example:

- UK offshore wind farms – Lynn and Inner Dowsing, London Array, Gwynt Y Mor, Triton Knoll
- Overseas port development and LNG storage – Takoradi, Ghana; Durban, South Africa; Brindisi, Italy; OKLNG, Nigeria
- Oil and gas pipelines – Galsi Pipeline Route, Algeria to Italy; Balearics pipeline Route, Ibiza to Mainland Spain.

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