CASE HISTORY

Application:	**Structural Soils**
Technology:	**PS Logger®, Formation Density, Optical and Acoustic Televiewers, Borehole NMR**
Location:	**HS2 - Phase 2a, West Midlands towards Cheshire, United Kingdom**

This section:

The £3.48 billion, 36-mile scheme will run between the new Curzon Street station in Birmingham city centre to Crewe station, with six services per hour planned.

The Department of Transport said the Act of Parliament now means HS2 Ltd will be allowed to begin work on constructing the next phase of the new high-speed railway between Crewe and Birmingham, creating thousands of jobs.

The scheme is expected to support around 5,000 jobs during construction of this phase, with many more in the supply chain.

The track will include 17 viaducts, 65 bridges and 36 embankments. This amount of infrastructure requires a colossal undertaking for geotechnical ground investigations.

To meet this challenge, Robertson Geo Operational Services have been mobilising two field crews simultaneously with both running 9-11 (To log 8 probes per borehole is considered to be a comprehensive suite of tools) probes per borehole. Showcasing both the depth of their equipment resources and the logistical capabilities to deliver a first-class service and often doing so at short notice.

Infrastructure = Geotechnical tools and a lot of data

Reliable and consistent data from wireline borehole logging provides an important understanding of rock strength and the presence of fractures that is essential for the location and positioning of new build construction and its foundations.

Logging provides accurate and reliable data and is especially important in locations where collecting core samples is difficult and from poorly consolidated facies, weathered zones, soft formations and shallow boreholes as examples.

Rock strength:

Can be estimated using measurements derived from Sonic (PS Logger Probe) and

Density (Formation Density Probe) logs. One common technique uses the seismic compressional (P) velocity to estimate Unconfined Compressive Strength (UCS). The P-wave velocity can also be combined with the shear (S) wave velocity and density to give stress/strain properties including Poisson's ratio, bulk modulus and Young's modulus.

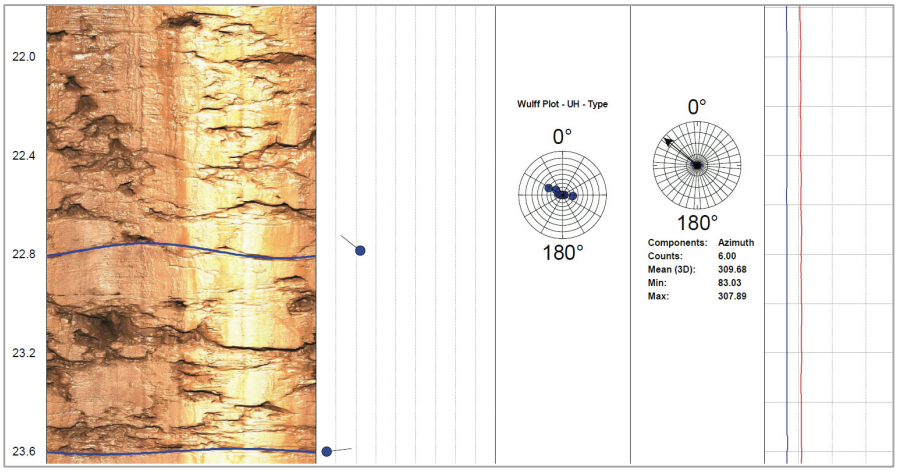
Fractures faults and voids:

Can be detected using various imaging tools (Optical and Acoustic Televiewers) to characterise features intersecting the borehole wall, including bedding, drilling-induced/natural fractures and faults. Integrated orientation measurements allow the inclination and direction of features to be understood relative to the borehole dip direction, or true or magnetic north.

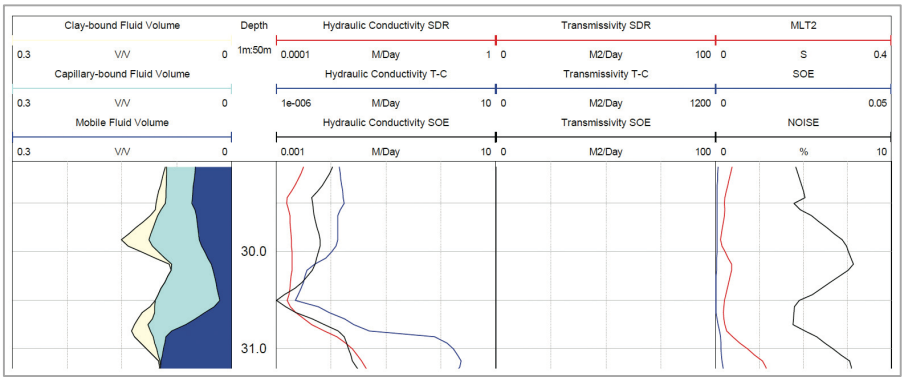
Porosity:

Borehole NMR is a technique that measures fluid volumes and the distribution of those fluids as a function of pore geometry enabling detailed characterisation of the storage and flow capacity of subsurface formations. Accurate and precise mapping of subsurface porosity and permeability can ensure that any underlying sediment formations are suitable for intended construction.

The Data:



Optical



NMR