

IN-SITU STRESS TEST USING OVERCORING IST

The Sigra stress measurement tool is a biaxial device that measures the deformation of the borehole perpendicular to the tool. To calculate the stress field an assumption is made for the axial stress. This is usually considered to be the overburden stress in the case of vertical exploration holes.

Requirements

A drill rig set up for normal Boart Longyear HQ or HQ-3 wireline coring. A good mud pump and pressure gauge.

Procedure

The last HQ core run is pulled as normal. A countersink tool is pumped in place of the inner barrel and is used to grind any upstanding core away leaving a cone depression in the top of the rock immediately below the HQ bit face mark. This countersink tool is retrieved on a wireline and replaced by a pilot hole drill. This is then used to drill a 500mm long by 26 mm diameter pilot hole.

Once the pilot hole has been drilled and flushed, the drill is pulled on a wireline and the stress tool is lowered on a wireline suspended setting tool through the drill string into the pilot hole. The stress tool is locked in mechanically. The tool measures the pilot hole diameter at six locations through the action of pins which press against the pilot hole wall. The remainder of the stress tool protrudes up from the pilot hole and contains an orientation system comprising three magnetometers, three accelerometers and a temperature sensor. It also contains a logging system to measure the diameters across the pins and the orientation devices.

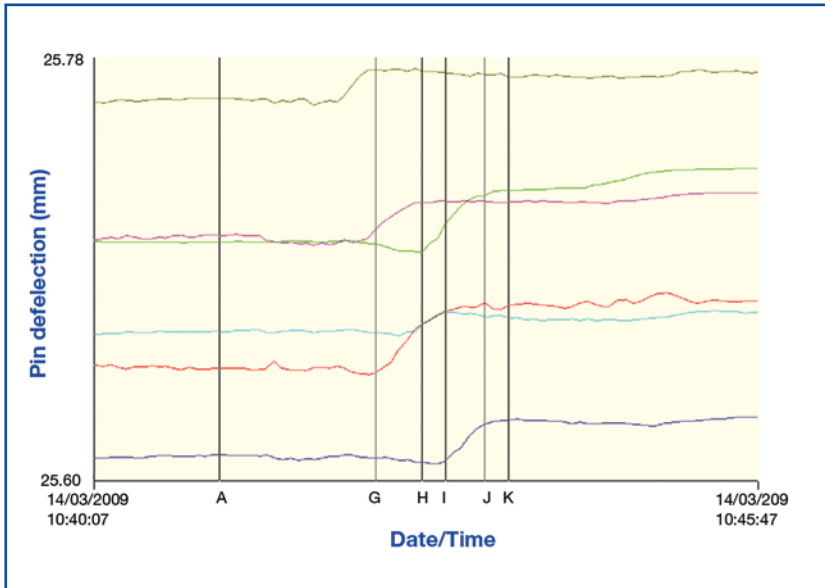
The inner barrel is then dropped back into the rods and drill string pulled back so that the magnetometers may operate free from their influence on the magnetic field. After a set period the rods are lowered to bottom and coring commences over the tool. As the bit progresses past the sets of pins located in the pilot hole a change in pilot hole diameter is measured by the tool.

At the end of the core run (usually one metre long) the core is pulled as normal but with the tool inside. When on the surface the tool and core are photographed and the tool extracted from the core. The overcore material is wrapped and sent to a laboratory for the measurement of its Young's modulus, Poisson's ratio and uniaxial compressive strength. Data stored within the stress tool is extracted to a laptop and processed.

Sigra provides a report that includes a material test report, stress and tectonic strain analysis (qv) and the ratio of material stress to strengths. We will also endeavor to interpret the stress regime.

This service is only available from Sigra.

Siga IST Example Overcore Pin-Set Traces



Siga IST Example Principal Effective Stress and Direction

