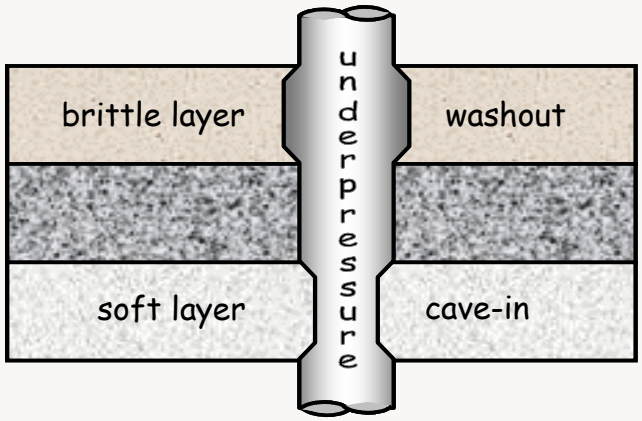
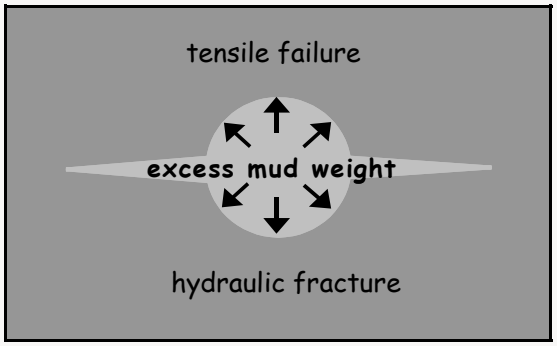
Wellbore Stability and Sand Control

Core Lab operates a full service geomechanics laboratory that provides customers with test data and unmatched engineering analyses to predict borehole stability. Detailed characterization of wellbore stability offers important solutions to both drilling and production phase problems that cost the industry billions annually.

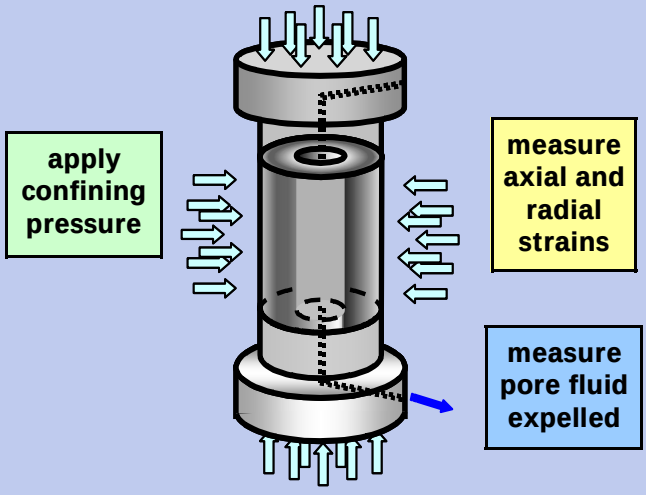




Wellbore instability causes problems such as sand production, lost circulation, stuck pipe, breakthrough, hole collapse, uncontrolled fracturing and casing failure.

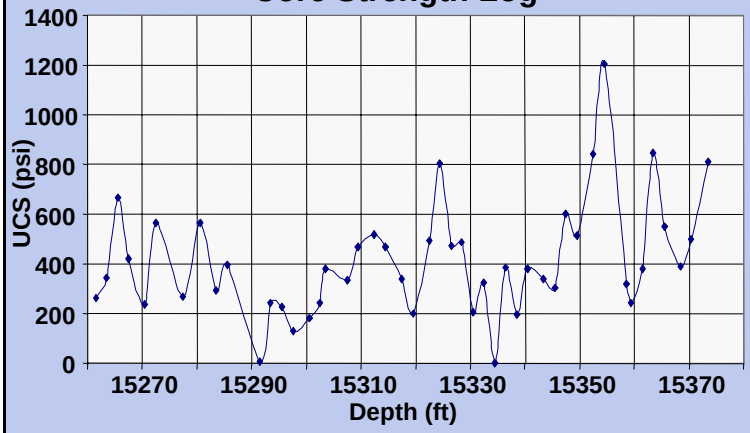
Core Lab's geomechanics lab is the most extensive facility of its kind. Triaxial rock testing measures rock strength and mechanical properties under various conditions. This information is valuable for reliably predicting borehole stability and for accurately calibrating dipole sonic logs.

Lab Simulation of Perforation Failure



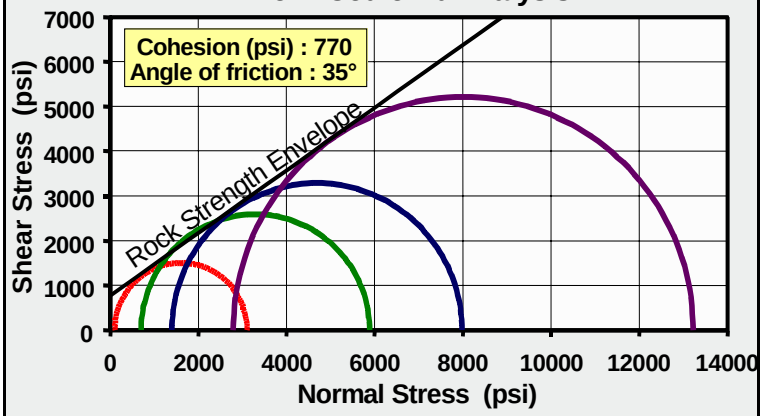
The thick-wall cylinder test employs a geometry that simulates actual loading conditions under downhole stresses. This provides direct measure of pressures under which a hole will start producing sand or cause other problems like casing collapse. Armed with this information, an operator can control conditions to maintain wellbore stability.

Core Strength Log



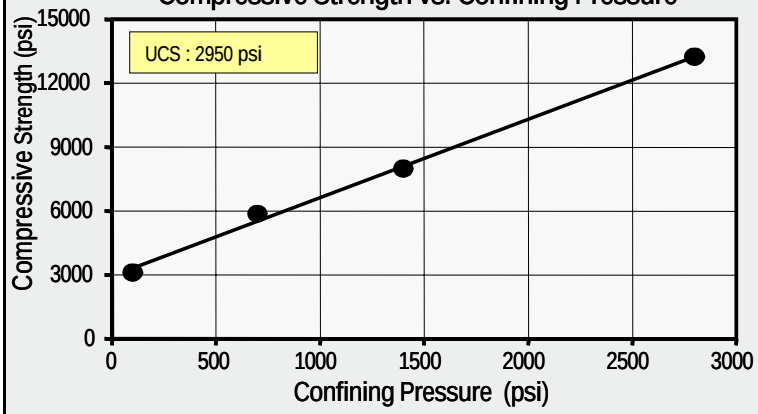
Unconfined compressive strength (UCS) logs are established using ultrasound to probe relative strength along a large depth interval of core. This test inexpensively locates important sections of rock for advanced triaxial testing.

Mohr-Coulomb Analysis



Mohr-Coulomb analyses provide formation cohesion (initial shear strength) and angle of internal friction. These are necessary parameters for reliable wellbore stability prediction, and are not measured with logs.

Compressive Strength vs. Confining Pressure



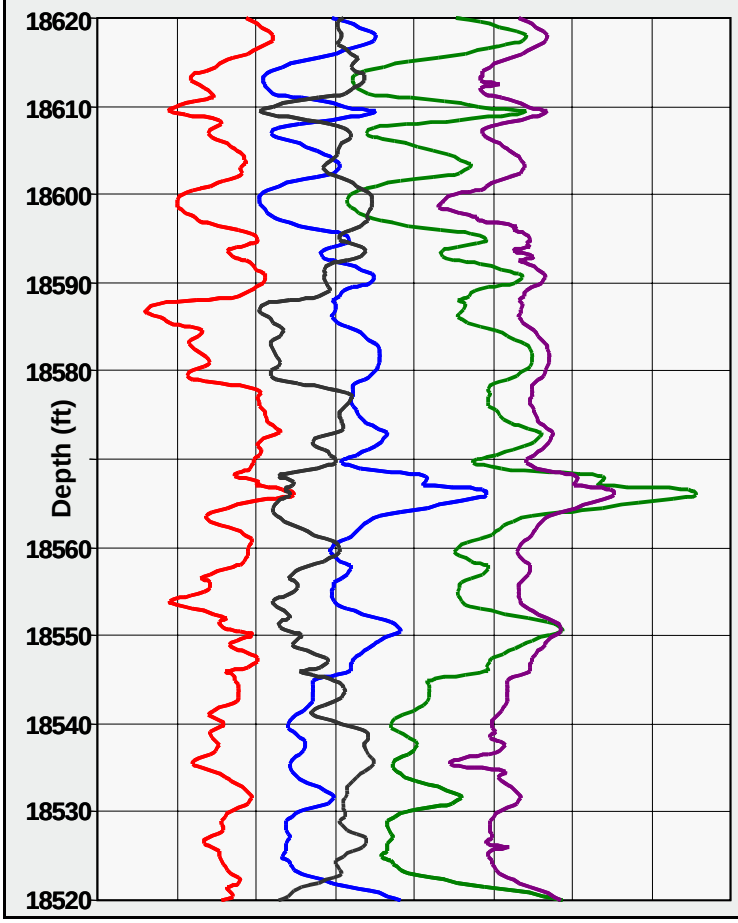
Compressive strengths from a series of triaxial compressive tests are plotted in order to determine the critical shear stress and predict conditions for hydraulic fracturing and borehole breakouts.

The problem: Dipole sonic logs are often found to be inaccurate for predicting borehole stability in many reservoirs. These inaccuracies cause engineering failures including poor fracture designs and unreliable wellbore stability analyses.

The solution: Static lab data are required for a reliable wellbore stability analysis and accurate calibrations of dipole sonic logs.

The results: These analyses have been successfully applied to hundreds of wells worldwide in many different types of reservoirs.

Calibrated Dipole Sonic Log



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