

Enhanced Rock Strength Modelling, Combining Triaxial Compressive Tests, Non-Destructive Index Testing and Well Logs



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Presentation:

Knowledge of rock mechanical properties including unconfined compressive strength (UCS) is essential for accurate geomechanical evaluations. Reliable quantitative data on UCS can only be derived from core tests typically through destructive tests. Rock strength evaluation is primarily based on well log strength indicators, calibrated against limited measurements on cores. A number of non-destructive techniques including Scratch and Schmidt hammer exist to supplement plug based destructive tests with the ability to provide continuous or semi-continuous, fine-scale measurements of rock mechanical properties. In this presentation we show results from conventional triaxial testing on plugs and (semi) continuous non-destructive index testing along entire core section and well log calibration for a series of rocks with a range of strengths from different geological settings. We show that albeit the use of generalized (global) correlations of index testing versus UCS may provide reasonable estimates, a local calibration based on triaxial tests would still be required for more accurate UCS profiling. Once calibrated to few conventional plug tests, the continuous index test results can be correlated with petrophysical logs to generate a reliable strength log coupled with sedimentological and diagenetic classification. Index tests can be used as a screening tool to optimize plug sampling to characterize the range of heterogeneity of cored interval and also filling the gaps in the core strength data where plugging is practically impossible or difficult.

About the Presenter:

Abbas Khaksar is a Global Discipline Lead in Geomechanics and Subject Matter Expert for sanding evaluation with Reservoir Development Services-Baker Hughes. He holds BSc. in Mining Eng., MSc. in Petrol. Geol. & Geophy. & PhD in Rock Physics, has 24 years of experience with 16 years in petroleum geomechanics consultancy. He worked 3 years for Iran geological survey as a field engineer (1989-1992). Between 1995 and 2000 he worked at the University of Adelaide as research associate and then as a postdoctoral fellow in rock physics. In 2000 he moved to Perth to work for GeoMechanics International (GMI). He joined Helix-RDS in 2005 (Perth and London) until Baker Hughes acquired Helix-RDS in 2009.

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Cost: Members \$30.00; Non Members \$40.00; Students/Retirees \$10.00
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