

McLellan, P.J., Core and Log Derived Rock Mechanical Properties and Their Application to Well Construction, Presentation to the Canadian Well Logging Society, January 21, 2003.

Abstract

Rock mechanical properties are used in a variety of well construction applications including bit selection, drilling fluid optimization, perforating, sand control, and hydraulic fracturing. For most of these applications core-derived “static” mechanical properties measured at relevant in-situ conditions are preferred, however this is not usually technically nor economically feasible. Log-derived “dynamic” elastic properties have been used now for many years to estimate rock deformation and strength properties for such purposes. This talk will describe some of the practices and pitfalls of using log-derived elastic properties for well design and construction. The effects of the scale of investigation, natural fracturing, rock property anisotropy and stress dependency will be outlined with several field cases. Examples will be cited from a sand production prediction problem from the East Coast of Canada, borehole instability in Foothills shales, hydraulic fracturing in Alberta, and a caprock and casing stability issue for a SAGD project.

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