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Light Weight – Ultra-High Strength Drill Pipe for Extended Reach and Critical Deep Drilling

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Abstract

Current and future extended-reach drilling (ERD) and other critical projects exceed the capabilities of conventional steel S-135 drill string assemblies. Drilling teams are evaluating alternative materials and advanced technologies to expand the ERD envelope. One solution under development incorporates a new ultra-high strength steel with minimum 165 ksi yield strength combined with thinner wall. This results in lighter weight tubes compared to conventional steel drill strings.

By combining ultra-high strength steel with thin wall, light weight tubes, steel drill strings can offer strength to weight ratios in air that exceed Aluminum drill pipe, are comparable to Titanium drill strings, and hydraulic performance that surpasses both materials. Buoyancy tends to improve the strength to weight ratios of Aluminum and Titanium drill pipe relative to steel drill strings and should be considered during engineering of any drill string for critical drilling applications. The paper details the development, evaluation and qualification of the light weight, ultra-high strength drill pipe system, provides comparisons with conventional S-135, Aluminum and Titanium drill pipe, outlines the advantages and considerations of UD-165 light weight drill strings, provides design examples of the new system for world-class ERD applications, and provides field trials summaries.

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