

Hyperbolic Bit Enhances ROP by 17% While Maintaining Complex Well Trajectory

Durable HyperBlade bit easily manages interbedded hard sandstone stringers and maintains steerability, Gulf of Thailand

The HyperBlade* hyperbolic diamond element bit drilled faster than high-ROP benchmark bit with good directional control and little affect from drilling hard stringers interbedded in shale.

The operator's concerns

An operator wanted to drill an 8½-in interval in an interbedded shale and sandstone formation in the Gulf of Thailand that was very soft at its top but increased in unconfined compressive strength (UCS) from 3,000 to 5,000 psi at the bottom of the interval. Undesired bit dulls and cutter damage occurred from impact with hard formation stringers in combination with high rpm and high ROP ranging from 4,000 to 5,000 ft/h [1,219 to 1,524 m/h].

What was tried first

The benchmark bit drilled with high ROP, but the operator wanted a bit that could deliver higher ROP while withstanding impact with the formation.

What Schlumberger recommended

To increase durability while optimizing ROP through the interbedded shale and sandstone formations, Schlumberger recommended the HyperBlade hyperbolic diamond element bit. It incorporates Hyper* hyperbolic diamond cutting elements with a thicker, precision-molded diamond table to increase overall bit durability, enabling the bit to better withstand impact damage caused by formation transitions. The unique geometry of the cutting element breaks rock into smaller pieces that are easier to remove.

Featuring a positive rake that cuts up to 20% deeper into the formation, the Hyper element improves ROP over conventional flat cutters. The Hyper elements also require less vertical load and circumferential force to penetrate and shear rock. Thus, the HyperBlade bit improves drilling efficiency and toolface control in soft formations.

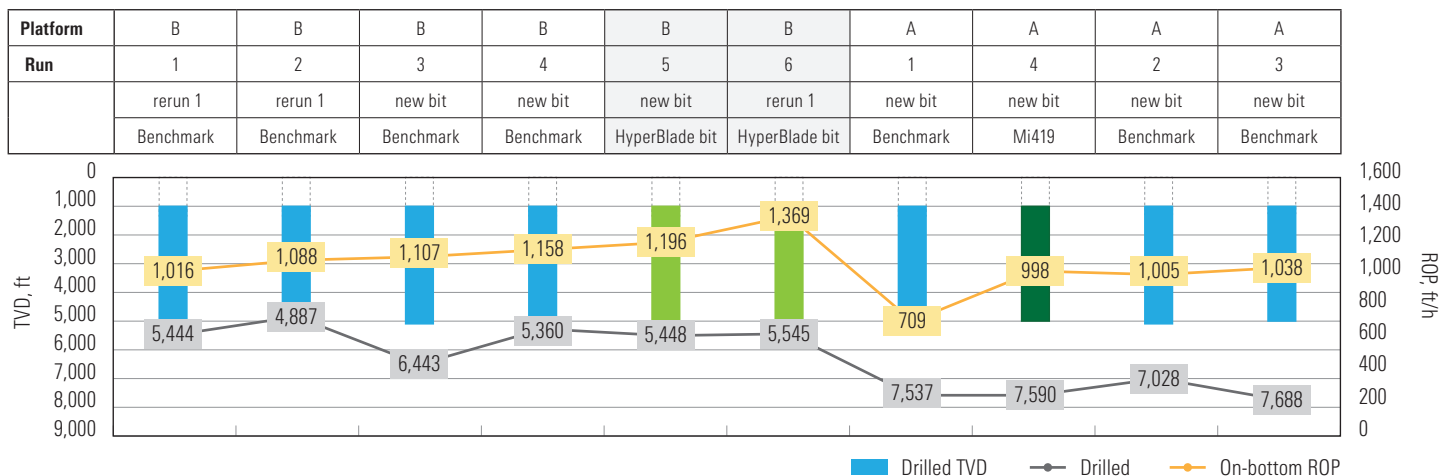
What was achieved

The HyperBlade bit drilled the 8½-in interval with an average 1,282-ft/h ROP, a 17% increase in ROP over the average 1,092-ft/h benchmark bit while using 16% less WOB. The HyperBlade bit also maintained steerability more effectively—with less reactive torque—than the benchmark bit and was better at staying true to build and turn.



The HyperBlade bit maintained steerability and drilled faster than the high-ROP benchmark bit.

Bit Performance



The two runs of HyperBlade bit improved average ROP by 17% over that of the benchmark bits.

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