

Crush & Shear™ Hybrid Bit Technology Improves Drilling Efficiency in the Curve

OPERATOR IMPROVES DIRECTIONAL STABILITY WITHOUT SACRIFICING PENETRATION RATE IN A SINGLE BIT RUN

STEPHENS COUNTY, OKLAHOMA

CHALLENGE

- » Drill curve section in one run, while maintaining directional control at a higher ROP than in offset runs

SOLUTION

- » Crush & Shear hybrid bit technology to achieve steerability without sacrificing ROP

RESULT

- » Successfully completed the curve section of the subject well in just one run
- » Achieved an ROP of 25 feet/hour (7.6 meters/hour), beating the ROP in the offset wells by over 5 feet/hour (1.5 meters/hour)
- » Reduced the cost of the interval, saving the customer over USD 120,000

OVERVIEW

An 8-3/4 inch curve interval in a field in Stephens County, Oklahoma, consisted of challenging formations with varying rock strengths. These tough transitions could cause cutting structure damage to the drill bit, making it difficult to maintain tool face control. Many operators in this field struggled to consistently complete the curve section in just one run.

The challenge set by one of our customers was to drill the curve section in a single bit run while maintaining the targeted build rate of 14°/100 feet (14°/30.5 meters) and improving on the offset runs' rates of penetration (ROP).

TECHNOLOGY ADVANTAGES

In certain formations or applications, a hybrid drill bit is required to ensure that directional targets are achieved, while also allowing the operator to maintain drilling efficiencies. Hybrid drill bits have been successful in demanding applications where steerability is critical, and/or where durability is required due to formation inconsistencies.

Crush & Shear™ hybrid bit technology is engineered to take advantage of rock failure mechanics while providing lateral stability. It has the ability to withstand high weight on bit (WOB) while reducing torque fluctuations, thus improving toolface control and enabling smoother drilling. The Crush & Shear drill bit reimagines hybrid bit technology by placing the PDC elements in parallel with the rolling elements, instead of in series. By optimizing PDC element placement and positioning rolling cones in the center to crush the rock (where PDC shearing action is inefficient), the Crush & Shear hybrid bit achieves higher ROP, improves lateral stability, and minimizes torque fluctuations – thus increasing drilling efficiency and extending the life of PDC elements.

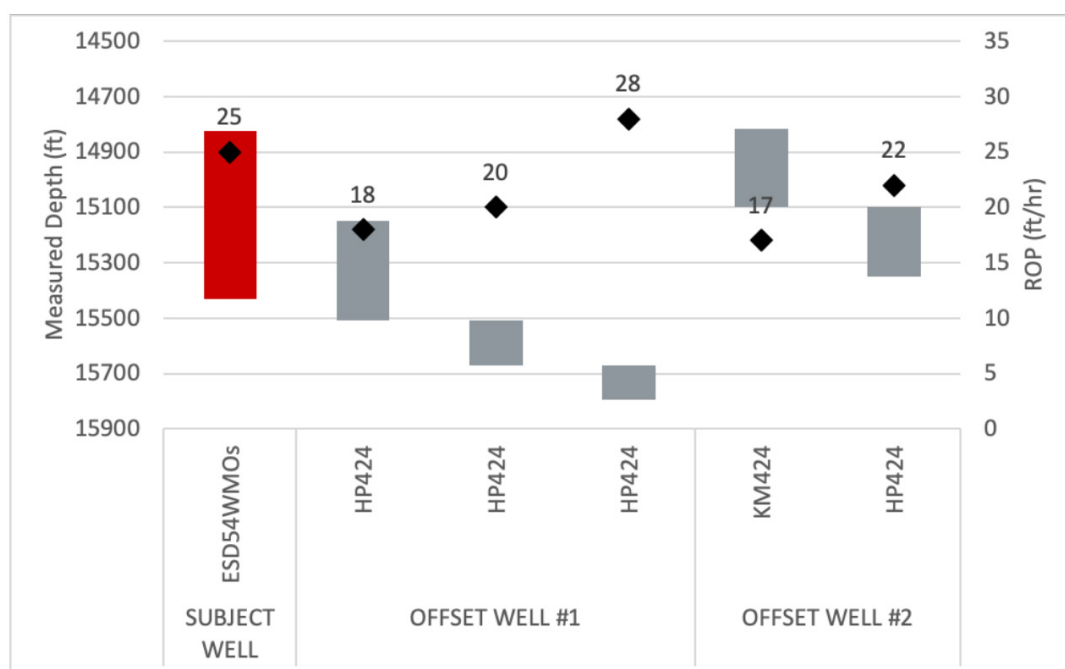
RESULTS

For this challenging application, Halliburton Drill Bits and Services Crush & Shear technology was utilized to design a bit that could complete a one-bit run curve while still being able to meet the directional and ROP requirements set by the customer.



CASE STUDY

Utilizing Crush & Shear hybrid bit technology enabled the operator to successfully complete the curve section of the subject well in just one run – achieving an ROP of 25 feet/hour (7.6 meters/hour), beating the ROP in the offset wells by over 5 feet/hour (1.5 meters/hour). Additionally, this solution reduced the cost of the interval, saving the customer over USD 120,000.



Performance Details

Well	Bit Type	Depth In (ft.)	Depth Out (ft.)	Footage	Hours	ROP
Subject Well	ESD54WMOs	14,825	15,430	605	24.5	25
Offset Well #1	HP424	15,147	15,507	360	19.5	18
	HP424	15,507	15,669	162	8	20
	HP424	15,669	15,795	126	4.5	28
Offset Well #2	KM424	14,815	15,100	285	16.5	17

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