

REVit® Integrated Soft Torque System improves Rate of Penetration (ROP) by 29% while reducing severe stick-slip by half, Eagle Ford Basin application, Q4 2019

Challenge

Severe stick-slip was experienced throughout the 9-7/8” intermediate interval, resulting in reduced ROP and inefficient drilling.

Solution

Utilize the REVit Integrated Soft Torque System for real-time stick-slip mitigation and improved drilling efficiency.

Results

Drilled 9-7/8” sections to KOP in 71 rotary hours for a total reduction of 21 hours vs. the non-REVit offsets, with a 29% increase in ROP and a 50% reduction in severe stick-slip.

An operator in DeWitt County, TX was searching for a way to improve drilling performance in the 9-7/8” intermediate section by mitigating the damaging effects of stick-slip.

Four wells were drilled within one mile of each other – two without stick-slip mitigation, and two utilizing the Nabors REVit Integrated Soft Torque System. A drilling data assessment of the two non-REVit offset wells revealed severe stick-slip throughout the interval. Continued increases in WOB throughout the interval resulted in increased stick-slip with no corresponding improvement to ROP.

REVit was utilized in the subject wells to mitigate stick-slip, allow the use of higher drilling parameters, and extend the bit life. Well performance data for the intervals drilled is summarized in Table 1.

Table 1. Well Performance Summary

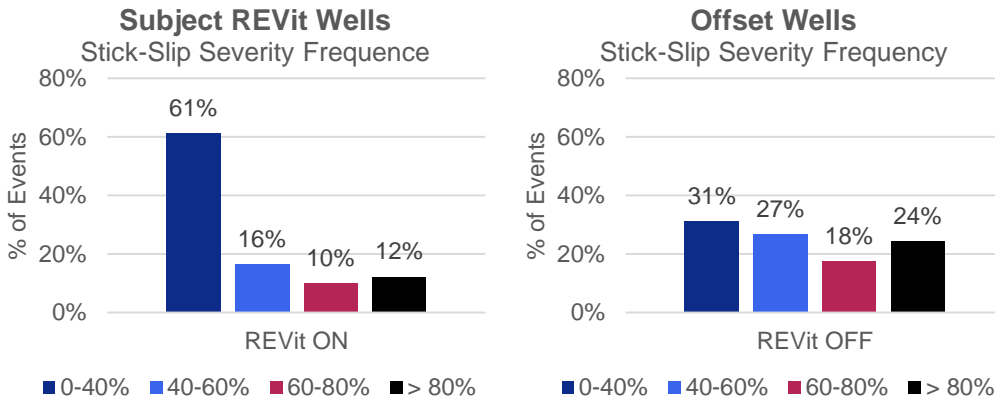
Well Name	Interval (ft MD)	Rotary Interval (ft)	Rotary ROP (ft/hr)	Rotary Hours	Severe SS (%)
Offset A	941-12258	10693	271	39.4	35%
Offset B	942-12196	10894	205	53.1	49%
Offset Avg		10794	233	46.3	42%
Subject A	939-12218	10679	293	36.4	14%
Subject B	933-12188	10774	309	34.9	28%
Subj Avg		10727	300	35.7	21%

After implementing REVit, the operator drilled the sections to interval TD with substantially reduced severe stick-slip and higher ROP. The ROP improvement was dramatic past 5500 ft MD, indicating that the bit retained its cutting structure for longer.

Overall, subject wells running REVit system had a 29% faster ROP with a lower WOB versus the offset wells.

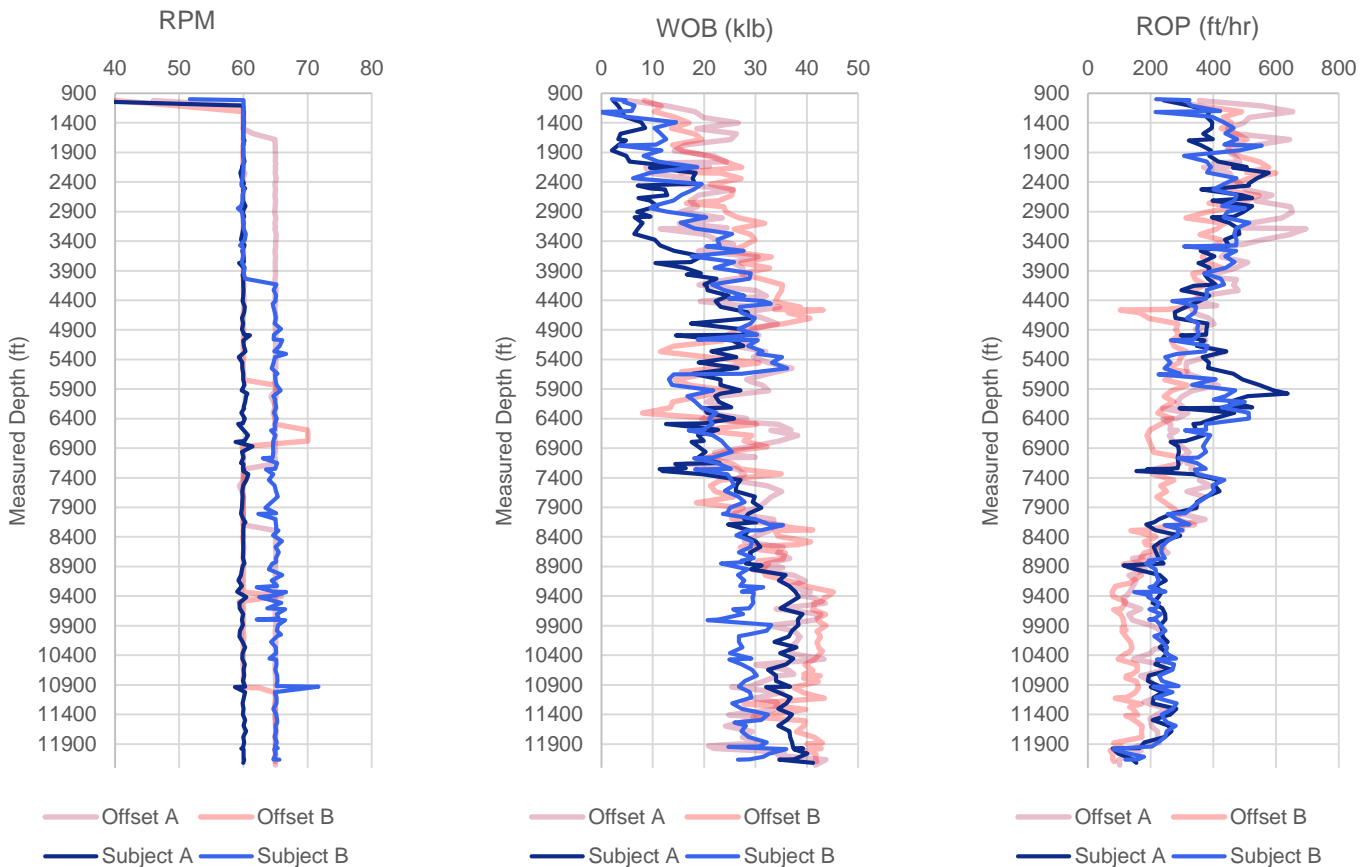
The occurrence of stick-slip throughout a well can be assessed with a histogram indicating the frequency and severity of stick-slip events. Figure 1 below illustrates the reduction in stick-slip severity between REVit and non-REVit wells.

Figure 1. REVit stick-slip severity histograms.



Stick-slip severity is grouped into four levels, with “severe” stick-slip typically referring to a value of > 60%. The use of REVit is demonstrated through the reduction in overall stick-slip severity.

Figure 2. Drilling Parameters Summary.



REVit lets the top drive manage stick-slip, enabling the driller to focus on drilling parameters and ROP optimization. As a result of managed stick-slip, REVit ON wells show improved ROP when running lower WOB versus the offsets.