

LUKOIL-Komi Increases ROP 70% in Horizon Previously Undrillable with PDC Bits in One Run

Using high-impact-resistant bits, the operator saved 9.2 rig days and set field records for maximum ROP and minimum bit runs, Russia

CHALLENGE

- Drill a highly abrasive formation in Russia with PDC bits in a single run.
- Maintain cutter integrity and reduce trips.

SOLUTION

Run StingBlade* conical diamond element bits featuring Stinger* conical diamond elements with a PowerPak* steerable motor for increased ROP through improved impact strength and durability.

RESULTS

- Drilled with a PDC bit, for the first time, in one run in the Starooskolsky horizon.
- Reduced drilling requirements to two bits in two runs for the entire section.
- Increased average ROP 70% versus other drilled wells.
- Saved 9.2 days versus AFE and 1.1 days compared with the best previously drilled well.

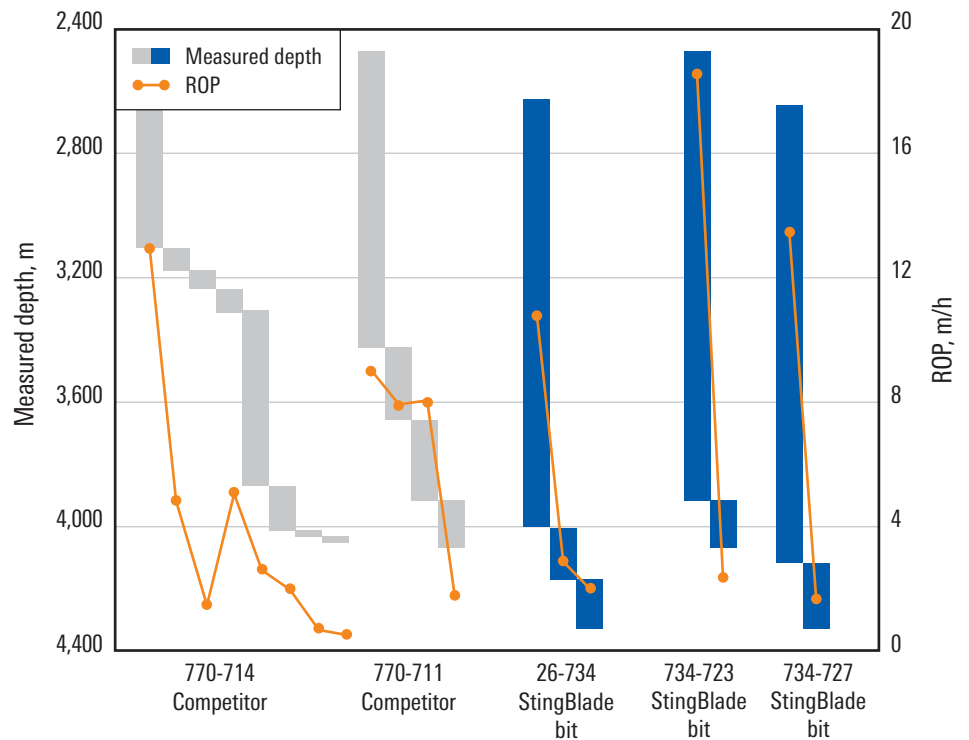


Maintaining cutter integrity through a highly abrasive horizon

The onshore Oshskoye Field is in the Timan-Pechora region of northwestern Russia and is characterized by a complex geology. In terms of rock failure, the field’s most complex interval is the Starooskolsky horizon of the Devonian system. The horizon is up to 558-ft [170-m] thick and consists of highly abrasive, strongly cemented quartzitic sandstones. These rock properties can considerably reduce the life of bits of any type or classification.

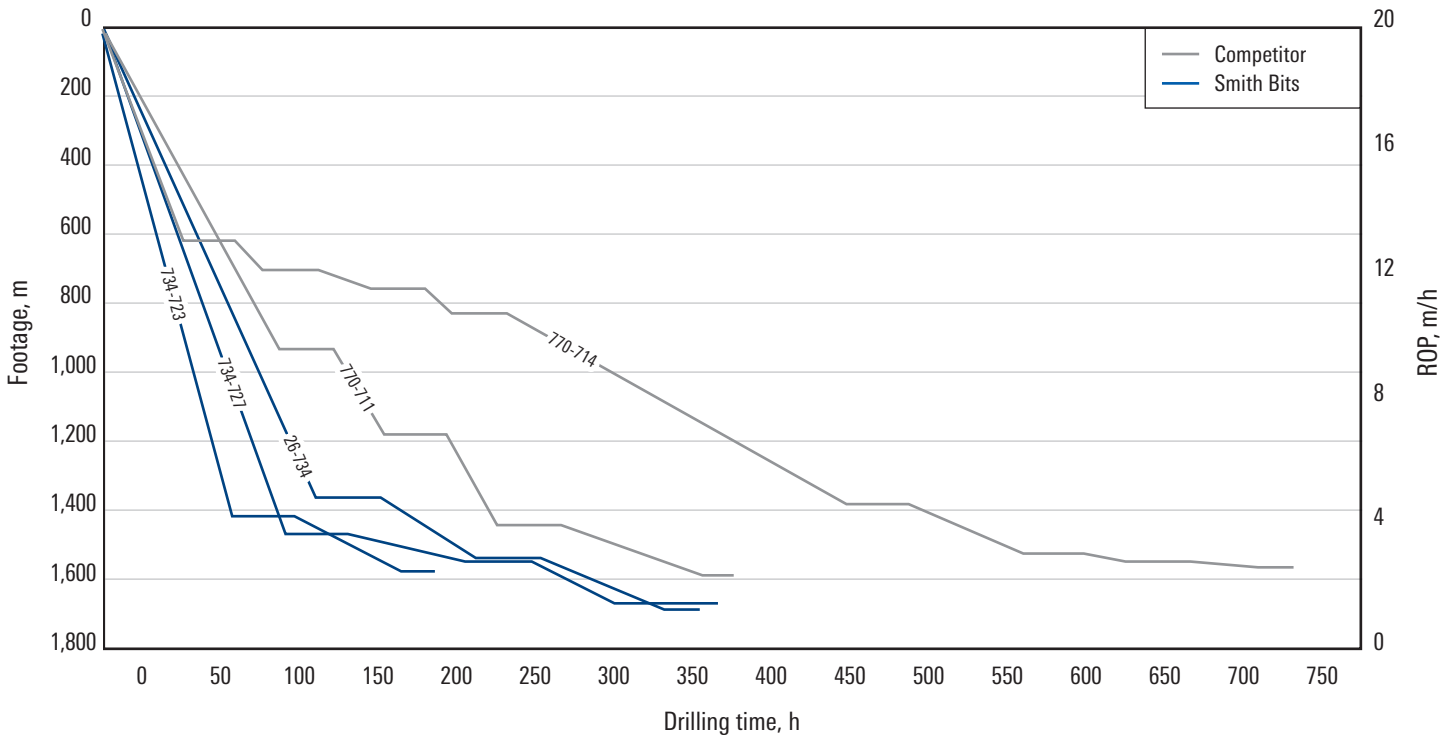
Previously, LUKOIL-Komi drilled wells with five sections requiring liner completions in the Starooskolsky horizon. The liner interval was drilled with diamond-impregnated 6½-in [155.6-mm] bits in combination with either turbodrill systems or high-speed downhole motors. The average footage was 574 ft [175 m] at an average ROP of 4.6 ft/h [1.4 m/h]. This well construction strategy in the high-abrasion sandstones often resulted in cutting structure wear across the bit gauge and gauge loss.

When LUKOIL-Komi decided to shift from five sections per well to four sections, the 6½-in bit was eliminated and the aim was to drill the Starooskolsky horizon with 8½-in [219.1-mm] bits. With this move, LUKOIL-Komi sought a PDC bit design that would tolerate abrasion in the field and maintain the same or better ROP and durability as diamond-impregnated bits, while drilling the section without unnecessary trips.



Compared with the performance of competitor bits and conventional PDC bits used previously by LUKOIL-Komi, StingBlade bits successfully tolerated abrasion to achieve higher average ROP in the Starooskolsky horizon (depth of the horizon in the competitor wells is unknown).

CASE STUDY: Using high-impact-resistant bits, the operator saved 9.2 rigs days and set field records



StingBlade bits enabled the operator to drill into the Starooskolsky horizon in one run with a PDC bit for the first time, while also increasing ROP. This was first achieved in Well 734-723 and was later repeated with the same success in Well 734-727.

Drilling with unique cutting structure for maximum ROP and minimal trips

Schlumberger drillbit engineers suggested using the 8 $\frac{5}{8}$ -in [219.1-mm] Z813 StingBlade bit with uniquely shaped Stinger elements combined with a PowerPak motor. StingBlade bits have been shown to enable operators to achieve increased footage and ROP with improved durability and impact strength as well as low vibration levels.

The engineering service within the LUKOIL-Komi drilling department worked with directional drilling engineers from Schlumberger to implement the integrated approach. Together the teams developed a directional drilling program to reduce well construction time in S-type wells through the use of StingBlade bits in the Oshskoye Field.

Boosted ROP 70% over wells drilled previously in the same formation

The first well drilled with the new bit and drilling program (Well 723) was on Pad 734 of the Oshskoye Field. For the first time in the history of the field, the highly abrasive Starooskolsky horizon was drilled with a PDC bit in one run using the StingBlade bit. LUKOIL-Komi drilled the entire 8 $\frac{5}{8}$ -in [219.1-mm] section at a record-high ROP of 36.8 ft/h [11.2 m/h] in two runs using two bits.

In Well 723, average ROP increased 70% compared with other drilled wells. Construction time of the section was reduced by 9.2 days and 1.1 days compared with the best well drilled previously with diamond-impregnated bits from a third-party oilfield services provider.

slb.com/stingblade

SMITH BITS
A Schlumberger Company