

# Petrobras Saves 11 Hours, Reaches Interval TD in One Run with StingBlade Bit Offshore Brazil

Application-specific conical diamond element bit improves overall ROP by 11.5% compared with best offset runs in the presalt Santos basin

## CHALLENGE

Reach interval TD of complex presalt well in a single run with an average ROP greater than 2 m/h.

## SOLUTION

Use an application-specific StingBlade\* conical diamond element bit from Smith Bits for increased cutting structure durability and improved ROP.

## RESULTS

- Drilled entire planned interval 11 hours ahead of schedule and in one run.
- Achieved an 11.5% faster ROP while drilling 25% farther than in the best offset wells.
- Reached TD in 28.8 days.
- Produced significantly larger cuttings, enabling improved surface formation evaluation.



## Drill 12¼-in interval in a single run, exceed 2-m/h ROP

As part of a campaign to develop the Iracema Norte field in the Santos basin offshore Brazil, Petrobras was drilling a well with a J-shaped profile in the hard heterogeneous carbonates characteristic of this presalt basin. The reservoir interval targeted by this well, located in the Lula field, is composed of organic microbial carbonates and other sediments such as silicate nodules and layers of low porosity.

In the reservoir intervals of offset wells, Petrobras encountered ring-out dull characteristics on the shoulder of the bit, low penetration rates, and stick/slip vibration, which often resulted in unplanned bit trips. Petrobras wanted to avoid these performance issues and reach TD of the 12¼-in interval in one run at an average ROP greater than 2 m/h for its ultradeepwater well.

## Increase ROP and cutting structure durability with StingBlade bit

As part of a joint presalt optimization project, Schlumberger and Petrobras selected a customized StingBlade conical diamond element bit for the presalt cluster of the Santos basin that would improve bit durability and mitigate stick/slip. Using the IDEAS\* integrated drillbit design platform, Schlumberger designed a bit that combined Stinger\* conical diamond elements and PDC cutting elements and features:

- adjusted rake angles for cutters
- new gauge pad configuration
- higher impact resistance for cutters with larger-size bevels
- optimized hydraulics for improved cutter cooling on shoulder area.

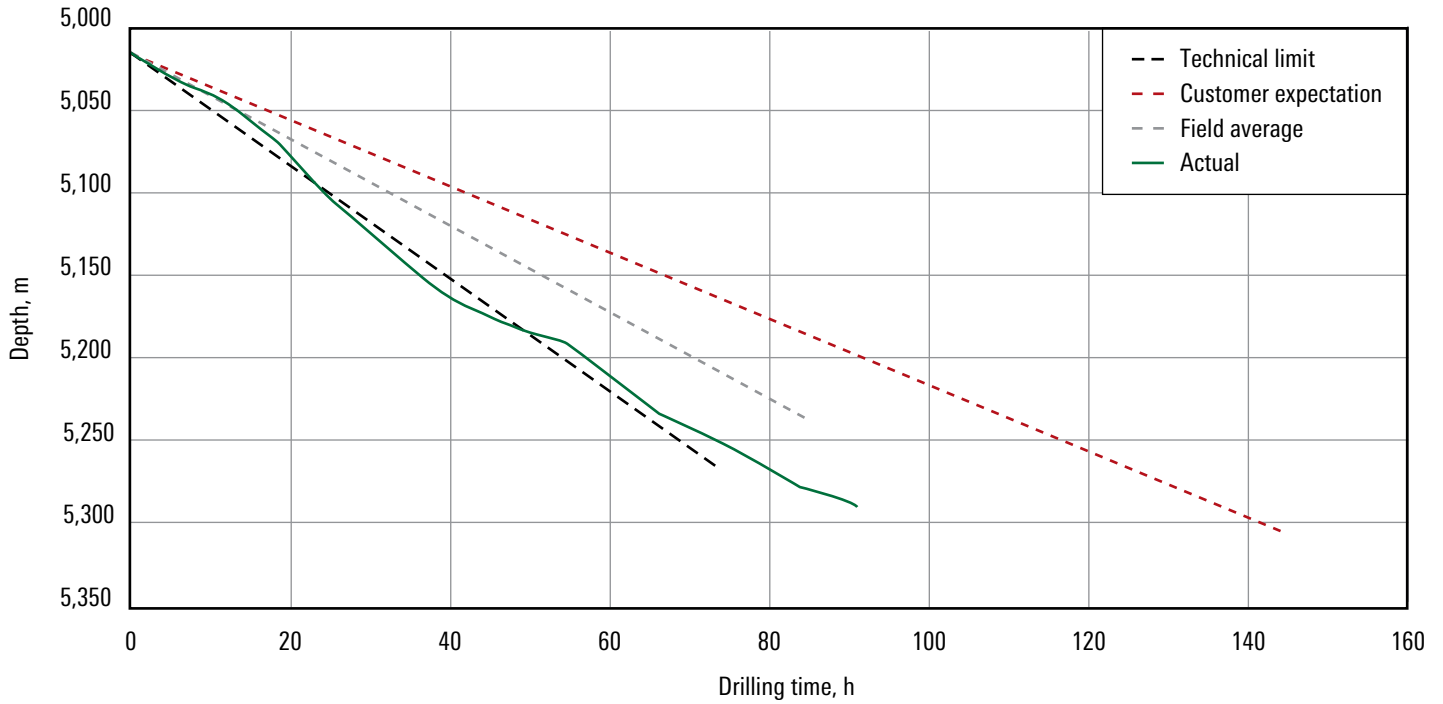
To enhance drilling performance, optimal drilling parameters would be defined and simulated in the i-DRILL\* engineered drilling system design, and drilling performance would be monitored continuously in real time.

## Drilled 274-m interval to TD in one run, saving 11 hours

Using the StingBlade bit, Petrobras achieved an average ROP of 2.9 m/h—45% higher than the goal set by Petrobras—and reached interval TD in 95.5 hours—11 hours ahead of schedule. Petrobras drilled the 274-m interval in one run with only minor damage observed to the StingBlade bit (graded at 2-3-WT-A-X-1-CT-TD). Compared with the 12¼-in intervals of offset wells, this hole interval was drilled 25% farther and at 11.5% greater ROP.

The StingBlade bit also produced cuttings that were significantly larger than in offset wells, making it easier for mud loggers to identify the characteristics of the formation drilled. Schlumberger monitored downhole conditions in real time, and drilling parameters were adjusted throughout the entire run to mitigate stick/slip. Petrobras intends to apply the successful performance improvement measures from this well interval to future operations in the Santos basin.

## CASE STUDY: Petrobras improves ROP by 11.5%, reaches interval TD in one run using StingBlade bit offshore Brazil



*The StingBlade bit enabled Petrobras to save 11 hours of drilling time in the 12¼-in hole interval, outperforming the operator's expectations and the average performance of offset wells in the Iracema Norte field of the Santos basin.*

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