Stinger Element Saves 6 Days in Parque das Baleias Presalt Field Offshore Brazil

Petrobras uses PDC bit with conical diamond element, increases ROP and reduces cost of drilling

CHALLENGE
Complete the entire reservoir section of a presalt carbonate reservoir in a single run while reducing the number of bits used.

SOLUTION
Design a fit-for-purpose 8.5-in PDC drill bit fitted with a central Stinger* conical diamond element for faster ROP, increased durability, and less risk of vibration.

RESULTS
- Drilled 437-m section in first well to reach section TD at 6.7 m/h, improving ROP by 65% and saving 47% in costs per meter.
- Drilled 646-m section in second well to reach section TD at 6.4 m/h, improving ROP by 57% and reducing cost per meter by 51%, the lowest in the field.
- Saved more than 6 days on both runs.

Reduce drilling costs in presalt Brazil basin
While drilling through the presalt layer offshore Espirito Santo, Brazil, Petrobras wanted to increase drilling efficiency by reducing the number of bits used. The primary goal was to drill the entire section in a single run in a formation with high unconfined compressive strength (UCS) composed of organic microbiolites, carbonates, and coquinas.

The main challenge Petrobras faced in the field was reducing drilling risks and NPT while managing drilling costs. In addition, maximizing ROP was important to meeting well plan objectives and remaining within the project’s timeline constraints. Bit selection was critical to improving overall performance.

Extend PDC bit lift with conical diamond element
To address the challenges of the field, Smith Bits, a Schlumberger company, designed a fit-for-purpose 8.5-in PDC bit fitted with a central Stinger conical diamond element, which replaced the center cutters of the bit. The element is manufactured from a synthetic diamond material that provides improved impact strength and resistance to abrasive wear. It is twice as thick as the diamond layer on conventional PDC bits, and coupled with the element’s conical geometry, it also extends bit life.

Drill Bits

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**Drill Bits**

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**Wells A and B were drilled using a PDC bit with a central Stinger element. Both bits drilled to TD, achieving significantly more footage compared with the field average.**
CASE STUDY: Stinger element saves Petrobras more than 6 rig days in presalt carbonate offshore Brazil

Increased ROP, saved 6 rig days
The 437-m section in the first well was drilled to section TD at 6.7 m/h, increasing ROP by 65% as compared with that of the best offset wells drilled. Using the PDC bit with the Stinger element resulted in a savings of more than 3 rig days and 47% in costs per meter.

Another drill bit was equipped with the Stinger element to drill the 646-m section of the second well to section TD at ROP of 6.4 m/h, an improvement of 57% in ROP compared with the average of offsets drilled in the area. This section was the fastest drilled in the field, saving Petrobras more than 3 rig days. When the bits were examined after POOH, they showed fewer signs of damage to the shoulder area and less wear.

The wells drilled using a bit with a central Stinger element drilled at 65% and 57% higher ROP compared with the field average.