



Helping operators get more out of workstrings

A comprehensive trial in Brazil proves how, when it comes to demanding workstring applications, TenarisHydril Wedge Series 500™ technology is in a class of its own.

Summary

The need for tougher strings

Looking to improve the reusability rate of its workstrings, one of the world's largest oil and gas exploration and production operators entered into a technical cooperation agreement with Tenaris. The aim of the project was to test and evaluate the TenarisHydril Wedge 563™ premium connection as a potential replacement for the API EU, Drill Pipe and premium connections (double shoulder tubing) that the company was using, respectively, for onshore and offshore operations.

Challenges

Dealing with unexpected conditions

Unlike casing and production strings, which are always designed with a specific purpose in mind, workstrings are expected to do a multitude of tasks, on occasion in more than one well. Their usage is characterized by short, frequent trips up and down the hole, which introduces an important degree of unpredictability to the requirements for both pipes and connections.

Workstrings must also be able to respond adequately to varied and unexpected operating conditions after several make-ups and break-outs.

Since the operator's intention was to evaluate the Wedge 563™ connection for use in offshore wells – where logistical complexity, HSE risks and operational cost are all significantly higher – reusability and reliability of the workstring were critical. Tests were therefore intentionally designed to take the strings to the limit, presenting a series of unpredictable and extraordinary challenges.

Solution

A total of 297 pipes and 15 pup joints (all 2 7/8" with TenarisHydril Wedge 563™ connections) were used in the trial. The products were distributed throughout five different onshore

PROJECT PROFILE

Location

Northeastern Brazil

Type of wells

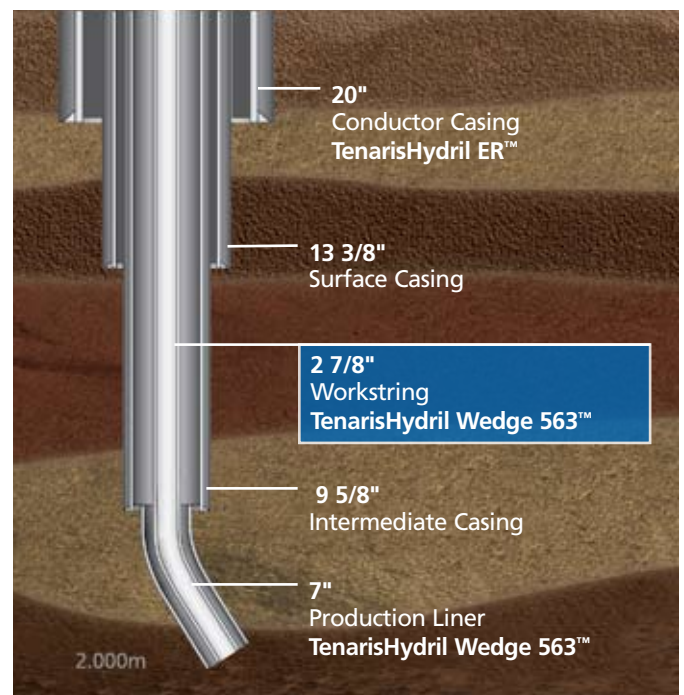
Onshore; vertical and directional

Products highlighted

- 2 7/8" pipes with TenarisHydril Wedge 563™

Services provided

- Onsite training
- Field inspection
- Running assistance
- Accessories supply



▲ Typical onshore well schematic.

producing wells in Northeastern Brazil that were undergoing workover operations at the time.

Thanks to its unique thread design, the Wedge 563™ has the mechanical ability to boost safety margins in such instances where down-hole torque is highly unpredictable. Its negative angles of load and stab flanks form a dovetail that locks the pin and box together, creating the largest possible contact surface area at make-up.

The result is a more rigid connection with several times the torque strength of most competing technologies, superior compression and a bending efficiency of 100% of the pipe body.

The first tested workstring consisted of 150 pipes, which were run 13 times in one well, 19 times in a second well and eight times in a third. At each of these 40 trips, a different tool was attached to the end of the string to perform a series of tasks such as drilling, completion, stimulation and workover services.

The heavily used 150 joints were then taken to a fourth well, where 75 new pipes were added to obtain a larger workstring. This new string was used for another seven operations, bringing the total number of round trips to 47.

The remaining 72 tubes were turned into a new workstring, which was exclusively tested on the fifth well. This particular string was subjected to 325 hours of extreme fishing work, which demanded 57 trips and operational torque values frequently exceeding those of the connection's yield torque.

Onsite training makes the difference

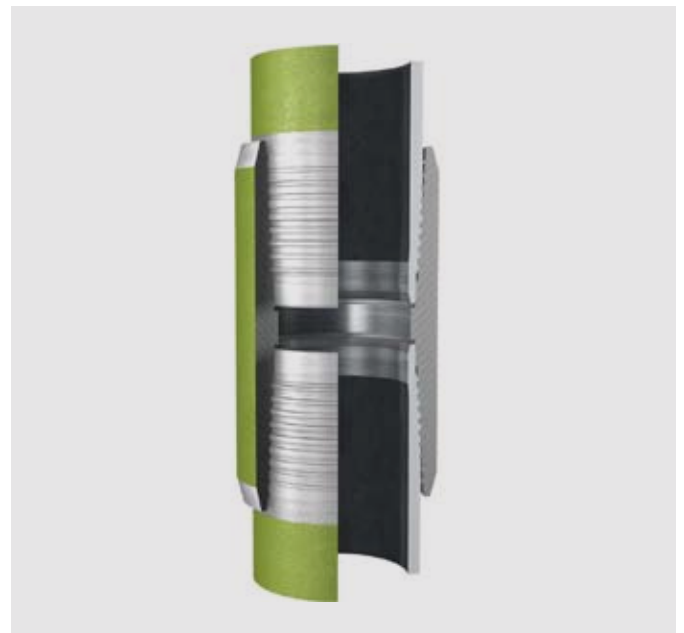
The trial was preceded by a two-day training session led by Tenaris specialists. After learning the operational characteristics of the connection and carrying out a visual inspection of it, delegates were field-trained on correct handling procedures.

Results

Validation for offshore use

Following 104 completed trips and several hundred hours of multiple workstring applications under extreme operating conditions, subsequent visual inspection of the connections revealed that – while almost half of them had been clearly overtorqued – the robust design of the Wedge 563™ connection ensured there were no failures.

Staying within its recommended torque values, the connection was able to support cutting work using BHA tools, and a single



▲ TenarisHydril Wedge 563™ premium connections proved to be reliable for workstring applications.

workstring was shown to be capable of conditioning, testing, stimulating and completing wells.

Tests showed the connection's metal-to-metal seal provided enhanced hydraulic performance. Additionally, the fact that the Wedge 563™ connection features a roller-stenciled make-up confirmation band eliminated the need to deploy a torque monitoring system.

Based on a thorough evaluation of the trial results, the customer approved the use of the Wedge 563™ connection for both its onshore and offshore operations. The product has since been used extensively, including in combination with the interchangeable TenarisHydril Wedge 533™.

Potential beyond workstrings

Having verified the reliability of the Wedge 563™ for workstrings, the company could contemplate extending its adoption to include production tubing strings. This would allow the operator to, first, use each workstring for as long as it needs. Then, instead of having to purchase and run a new set of tubulars for the production string, the workstring could simply be left inside the well – effectively doubling its functionality to obtain further savings on both materials and rig costs.