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### First Commercial Deployment of New Third Generation Rotary-Shouldered Connections Demonstrates Cost Savings

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#### CASE HISTORY:

The first commercial deployment of the 3rd Generation Double Shoulder Connection (DSC), was on the Transocean Discoverer Deep Seas drill ship for Chevron's St. Malo Prospect at Walker Ridge 678 in 7,016 feet of water.

The rig deployed 8,500 feet of the 5 7/8 inch, 26.30 ppf, 0.415 inch wall thickness, S-135, Range 2 3rd Gen DSC was used as part of a tapered string consisting of 6 5/8 inch Full Hole, 5 7/8 inch 2nd Gen DSC and 5 7/8 inch 3rd Gen DSC. The 3rd Gen DSC was picked up as a stinger when the well reached 22,600 feet and used to drill to 28,000 feet total depth. The Deep Seas is a fifth generation rig that handles quads, 124 foot stands, rather than triples, 93 foot stands.

The 3rd Gen DSC had tool joint dimensions of 7 inch OD by 4.5 inch ID and was made-up to 62,100 ft-lbs which is the maximum MUT. Initially, since the connection had almost 2/3 fewer rotations for make-up and break-out than the 2nd Gen DSC, the rig crew put the iron roughneck in collar mode to prevent excessive bouncing after the connection is broke out. After an initial adjustment period, during which the crew found the right balance for make-up/break-out speed, the well was drilled to TD with no pipe handling issues. The rig engineer, company-man and contractor tool-pushers were initially apprehensive about running a new connection but were also aware of the positive potential. They were impressed with the speed and handling of the connection.

A total of 13 trips were made with the 3rd Gen DSC consisting of drilling and coring runs. The rig tracked makeup and breakout time as compared to the 2nd Gen DSC pipe utilized in the string. The time savings for making up the pipe ranged from 5.3 minutes to 22.67 minutes per trip for 68 stands of 3rd Gen DSC with 10.15 minutes per trip being the average. This equates to approximately a time savings of nine seconds when making up a connection. The variation in make up time could be contributed to the adverse winter weather conditions, which at times tended to make stabbing and

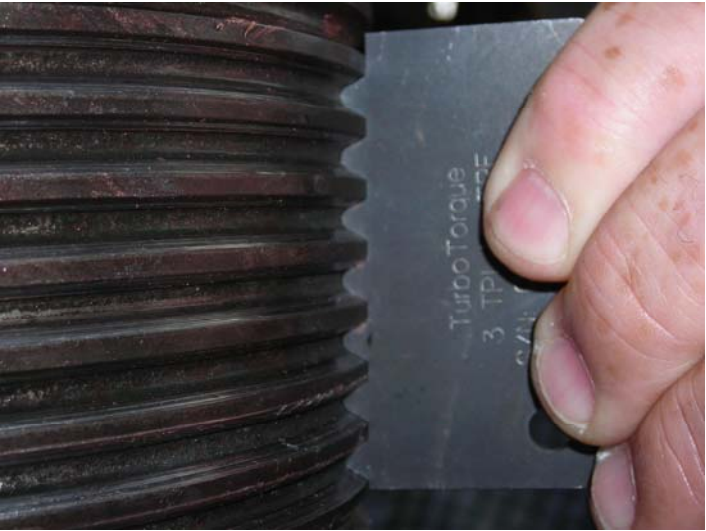
making up pipe more difficult, especially when making up quads. The time savings for break out ranged from 5.3 minutes to 6.8 minutes per trip with an average of 5.94 minutes per trip. This equates to approximately a time savings of five seconds when breaking out a connection. Even though a small amount of 3rd Gen DSC was used, the rig time savings for 13 trips was a minimum of 2.1 hours.

A DS-1 Category 5 level inspection of the returned 3rd Gen DSC was witnessed by a manufacturer's representative and a third party inspection representative. The inspection revealed damage on three pins and two boxes that required re-machining (recut). The 5 damaged connections were from a total of 276 joints, therefore 552 connections, equating to a damage rate of less than one percent. Typically, recuts of 2nd Gen DSC used on the Deep Seas averaged in the 15 percent range.

Even though it was a new thread that required the rig crews a few trips to become familiar with the make up and break out characteristics, the 3rd Gen DSC proved to be a very robust connection. The 3rd Gen DSC improvements of higher torque capacity, improved hydraulics and larger tool joint ID of 4.5 inches were not a factor in drilling this well.

The benefits of the 3rd Gen DSC for this case history were the following:

- 1. Savings of 2.1 hours of rig time equating to approximately \$60,000 of cost savings. This savings can pay for days of drill pipe rental costs.
- 2. Repair cost savings of less than 1% damages. The cost to recut 5 7/8" premium connections is currently ranging from \$225 to \$325 per connection.
- 3. The life of the tubular is extended with minimizing recuts to the connection. With the replacement cost of the asset running in excess of \$5000 per Range 2 joint, managing damages is of high importance to the contractor or rental company.



3<sup>rd</sup> Gen DSC post-run inspection