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Offshore Technology Conference 2010 - OTC-20823

2,500,000 Pound Landing String Challenges: Have we Reached the Limit of Today's Technology?

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Abstract

Two-million-pound landing strings have been successfully manufactured and deployed. However, operators are setting larger diameter and heavier casing to ever-increasing depths requiring landing strings with increased setting capacity. Drilling rigs, top drives, and associated equipment with capacity of 1,250 tons are in use. Landing strings with 2,500,000 pound capacity will be required by the drilling industry. This paper describes the design challenges of developing and manufacturing a 2.5 million pound landing string.

To meet the design objectives, 6-5/8 inch 150,000 psi yield strength pipe would require wall thickness of nearly 1-1/8 inches. To provide the required tensile capacity and decreased string weight, a new high-strength pipe with 165,000 psi specified minimum yield strength was developed. Slip-crushing resistance and elevator capacity requirements challenged existing manufacturing limits requiring unique designs and new high-strength materials in the slip-contact area.

The 6-5/8" FH connection is a popular choice for landing strings. However, these higher load requirements have reached the limitations of the connection's ability to maintain shoulder engagement, provide a sealing mechanism, and maintain stress levels in the torque shoulder and counterbore below yield. Unique connection modifications and higher strength tool joints were required to meet performance objectives.

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