BI-DIRECTIONAL HIGH-RESOLUTION INSPECTION OF A SUBSEA FLEXIBLE RISER PIPELINE

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Quote text:

ADVANCED, HIGH-ACCURACY ULTRASONIC ILI TECHNOLOGY OVERCOMES INSPECTION BARRIERS IN FLEXIBLE RISERS AND END FITTINGS

CHALLENGE

Equinor, a North Sea operator, required an inline inspection (ILI) of a subsea pipeline used for transporting gas and gas condensate from a subsea template to a platform that was essential to the company's ongoing operations. To assess the conditions of the critical parts of this asset, which had never been inspected, 720 m (2362 ft) of 10" diameter flexible riser and end fittings needed to be examined.

The flexible riser starts at the platform and descends 322 m (1056 ft) to the seabed, where it connects via end fittings to a 6.5 km (4.04 mi) long, 10" diameter subsea pipeline and ends at a subsea template. Due to the system layout, a bi-directional inspection tool was required to complete the inspection.

To obtain reliable data about the condition of this pipeline section, the chosen inline inspection solution must be capable of performing a high-resolution measurement of the pitch between the carcasses throughout the length of the riser, and the critical end couplings, as well as the end fitting positions.

SOLUTION

After careful evaluation of different technology options, Equinor chose NDT Global's EVO high-resolution bi-directional, free-swimming ILI ultrasonic technology (UT) tool.

This bi-directional tool is equipped with two modules offering axial resolution of 0.75 mm (0.03 in) and circumferential resolution of 6.2 mm (0.24 in). The recorded ultrasonic standoff signals are the basis of a detailed analysis of the inner surface and spacing of the pitch between the flexible riser carcasses.

Reliable and high-resolution recordings of pitch irregularities enable early detection and sizing of axial stretching of the flexible riser. Additionally, the inspection data delivered high-accuracy measurements of the current position of end fittings, allowing the pipeline operator to take appropriate measures to avoid system failures caused by flexible riser defects or displacements related to the flexible riser coupling points.

RESULTS

NDT Global provided accurate inline inspection measurements of the distances between the individual increments of the flexible riser carcasses, indicating any potential areas of over-expansion or compression. The recorded inspection data was also used to evaluate the condition of the end fittings and decide what, if any, remediation was necessary. No damage was detected.

NDT Global provided Equinor with a comprehensive, timely, post-inspection data analysis report. The report included an in-depth analysis of data collected from the ILI run, as well as an evaluation of the pipeline condition with regards to the flexible riser carcasses and the end fittings. Proprietary algorithms for data analysis improved the operator's confidence in the quality and accuracy of the data.

The superior data accuracy of this inspection enabled Equinor to substantially reduce ongoing risk and extend the life of their pipeline.

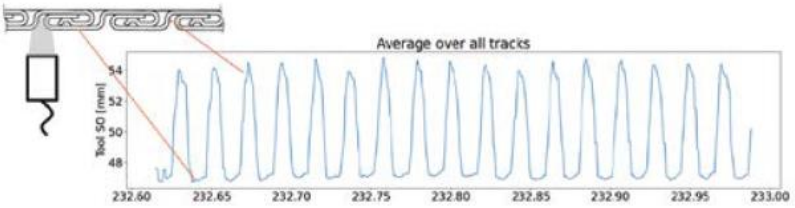

Figure 1: Stretch measurement of the carcass

EVO Bi-Di Ultrasonic Service

For flexible riser evaluation, the recorded inspection data forms the basis of early detection and sizing of any potential over-expansion or compression areas of the carcasses. Additionally, the high-accuracy measurement of the actual position of end fittings enables the pipeline operator to take appropriate actions in case they have slipped from their initial position and avoid pipeline failures caused by cracks.

NDT Global's service offers

- UT based high-accuracy bi-directional inline inspection solutions for difficult to inspect offshore pipeline sections like flexible risers and end fittings.
- Reliable detection of pitch irregularities enabling the early detection and sizing of geometric attenuation of the flexible riser.
- Reliable measurement of the actual carcass position in the end fitting compared to the initial position.