Braving higher forces

Through its expertise in pipeline integrity, ROSEN Group used a combination of multiple technologies to save a subsea pipeline damaged by the strong forces of nature.

In some cases, pipeline operators cannot consider the weather as a variable when building a new pipeline or what possible impact it can have on existing assets, especially ones that lie hundreds of metres below sea level.

In this particular case, a cyclone disrupted the construction plans of a subsea pipeline, causing unforeseeable damage. Consequently, the pipeline required inspection to guarantee the integrity and safety of the asset.

Keeping failure at bay

A pipeline operator was in the process of installing a corrosion-resistant alloy (CRA) and carbon steel (CS) pipeline in the southern sea. During the construction stage, a cyclone crossed the plans of the operator and brought construction to a stop.

When work resumed after the tropical cyclone, a close examination of the pipeline showed seawater had leaked inside the pipe because the sealing of the pipe plug was lost, resulting in severe damage to the inside pipe wall. When the operator withdrew a spool out from the subsea environment, the findings were substantial: severe metal loss had occurred on the layer of the CRA, posing a great threat to the pipeline’s integrity.

The operator needed to evaluate the general metal loss in the CRA via an inline inspection (ILI), so ROSEN was contracted to carry out the inspection of the 18 inch (457 mm) pipeline with a thickness of 18 mm, this means some severe metal loss. For the re-inspection of the pipeline, meaning they still collect high-resolution data irrespective of how thick the pipeline walls are.

The ILI delivered a comprehensive picture of the pipeline’s status concerning all kinds of anomalies, such as internal and external corrosion or geometry defects.

- internal corrosion in heavy wall pipelines
- general thinning and pitting corrosions
- closely adjacent features

ROSEN carried out the ILI during the construction phase of the subsea pipeline before it was put into production, using water to move the tool through the pipeline. In total, the onsite team ran four tools through the subsea asset – two for cleaning, one IEC and one MFL-A tool.

That means that prior to the ILI, the pipeline was sufficiently cleaned with a foam pig and an 18 inch (457 mm) multi-holt cleaning pig with guiding disc, sealing disc and gauge plate fit for short-distance lines. Cleaning the pipeline beforehand helped avoid product contamination upon initial start-up of the asset, while two tools equipped with the IEC and MFL-A technologies were individually launched onwards.

The performance of the tools used is not influenced by the wall thickness of the pipeline, meaning they still collect high-resolution data irrespective of how thick the pipeline walls are.

The ILI delivered a comprehensive picture of the pipeline’s status concerning all kinds of anomalies, such as internal and external corrosion or geometry defects. In this case, ROSEN technicians and data analysts found severe anomalies in the inspected pipeline.

Two of the features were more than 7 mm deep, with the CRA only being 3 mm and the CS only 15 mm thick. With a total wall thickness of 18 mm, this means some features were almost halfway through the pipe wall.

The big picture

Ensuring the integrity of this subsea pipeline prior to its commissioning not only allows for optimal operation and likely an extended lifetime but also guarantees its safety. Taking a comprehensive look at this line, especially after having faced the force of nature, means not just sending a pig through the line but also taking into account, operational needs and environmental circumstances into consideration.

All elements of this solution – the cleaning, the metal loss and geometry inspections and the future inspection – have their purpose, both to ensure the success of the inspection and to provide a solid foundation for this pipeline’s future lifetime.

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