

Simultaneous Crack and Metal Loss Inspection

In a Single Run



Challenge

As part of a major oil and gas production company's pipeline integrity plan, a scheduled MFL metal loss inspection of a 48" diameter offshore loop line was halted when the caliper run encountered a severe dent. This 48 km (30 mile) pipeline is a crucial asset of the operators.

Due to the identification of a severe dent, successful inspection had now become a difficult challenge as a new technology would be required to inspect the loop line. The selected tool must be capable of negotiating the substantial ID reduction anomaly and inspect for mechanical damage, metal loss, gouges, and crack-like anomalies, all in a single run. Achieving high accuracy whilst maintaining a critical reporting threshold for cracks (1 mm depth, 25 mm length) was an essential element for the operator's post inspection Finite Element Method integrity assessments. It was also essential that the ILI report clearly and concisely interprets the results providing thorough analysis for future survey reference.


The entire program had to be completed within 6 months, from contract award to submission of final report, Fitness for Purpose assessment and Finite Element Method report.

Solution

After evaluating available solutions, the operator asked NDT Global to inspect the pipeline. A combined inspection run consisting of EVO 1.0 UC, EVO 1.0 UMP and EVO Geometry tools delivered a comprehensive inspection in a single run. These technologies accurately detect, locate, and size metal loss and axially oriented crack-like anomalies, providing high-resolution mapping and XYZ coordinates for the pipeline. In particular, the company's innovative Enhanced Sizing for ultrasonic crack inspections removes depth sizing boundaries that previously existed for depths above 4 mm (0.16 in).

NDT Global's technology is unique in its ability to perform a combination UT compression wave type ILI tool run, with XYZ mapping, for the detection of metal loss and lamination anomalies, while having the ability to simultaneously complete crack detection.

 Axial Cracks

 Circumferential Cracks

 Metal Loss

 Geometry Ovalities

 Mapping



Results

- **High-accuracy inline inspection** using NDT Global's ultrasonic technologies successfully detected metal loss and crack-like features.
- **Critical reporting threshold** for cracks 1 mm (0.04 in) depth, 25 mm (0.98 in) length was maintained.
- **Results will guide future inspection frequency**, using trend analysis, and anomaly tracking, while applying only the most stringent internationally accepted codes, standards and specifications.
- **Data and recommendations** enable the operator to prevent pipeline failures by removing or repairing significant defects, determining the intervals between future inspections with or without repair of identified defects and by calculating maximum allowable operating pressure (MAOP).

Technology Selection Guide

		Metal loss			Crack			Milling		Deformation			Mapping			
		Internal	External	Narrow axial	Gouges	Axial	Hook	Circumferential	Lamination	Lack of fusion	Dents	Wrinkles	Roof topping	Ovalities	Bends	Pipe coordinates
Metal loss	Internal	●														
	External		●													
	Narrow axial			●												
	Gouges				●											
Crack	Axial	●	●	●	●	●	●	●								
	Hook	●	●	●	●	●	●	●								
	Circumferential	●	●	●	●	●	●	●								
Milling	Lamination	●	●	●	●	●	●	●	●	●						
	Lack of fusion	●	●	●	●	●	●	●	●	●						
Deformation	Dents	●	●	●	●	●	●	●	●	●	●	●	●			
	Wrinkles	●	●	●	●	●	●	●	●	●	●	●	●	●		
	Roof topping	●	●	●	●	●	●	●	●	●	●	●	●	●		
	Ovalities	●	●	●	●	●	●	●	●	●	●	●	●	●		
Mapping	Bends	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Pipe coordinates	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

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