

High-Density Internal Pitting Corrosion

EVO UMp⁺ Service



Challenge

A pipeline operator with known high-density internal pitting corrosion located at the bottom of a 6" condensate water pipeline, required a high-resolution inline inspection.

Using a different ILI provider, the operator previously inspected this pipeline using magnetic flux leakage technology (MFL). This inspection identified anomalies with a diameter of less than 10 mm (0.39 in.). When using MFL, it is extremely challenging to detect and accurately size these defects.

The MFL inspection correctly identified corrosion, but accurately sizing, and classifying the corrosion was beyond the limitations of this inspection. This MFL inspection was completed before reaching out to NDT Global in 2020. This original inspection did not achieve reliable results that could be used as input for an efficient integrity management plan.

The operator contracted NDT Global to conduct a high-resolution ultrasonic metal loss (UMp⁺) inspection in February 2020.

 Axial Cracks

 Circumferential Cracks

 Metal Loss

 Geometry Ovalities

 Mapping

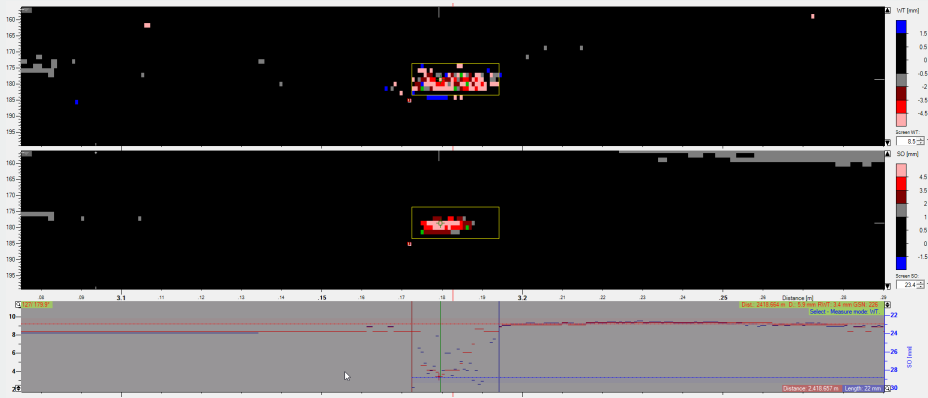
Solution

The UMp⁺ configuration is specified to detect 5 mm (0.20 in.) diameter pinholes at $\geq 90\%$ probability of detection (POD). The results of this dig verification program could verify the depths as identified by the UMp⁺ inspection, so the operator was now aware of the true dimensions and depths of the corrosion anomalies.

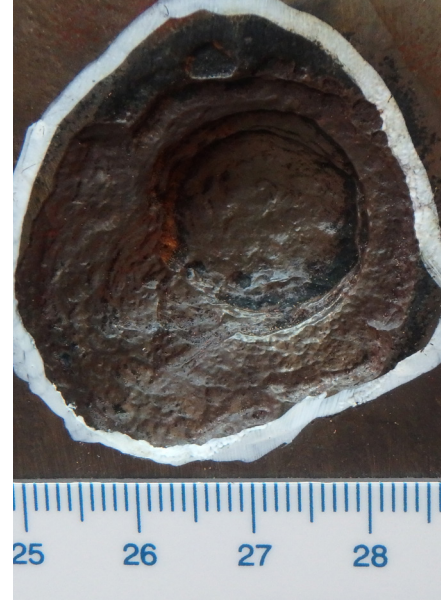
However, due to the sizing uncertainties of the inspections conducted before 2020, the operator was unable to determine accurate growth rates to properly prioritize repairs.

To overcome this, NDT Global was contracted to re-inspect the pipeline in December 2020 (10 months after the 1st UMp⁺ inspection) and to perform [a corrosion growth and remaining life assessment](#), enabling the operator to prioritize repairs and introduce measures to reduce internal corrosion growth.

The pipeline was again inspected in December 2021 to investigate if the corrosion inhibitors are successful. Close collaboration between multidisciplinary teams within NDT Global supports the success of these inspections and ongoing corrosion management.



Ump+ inspection data of internal pitting corrosion: The upper part of the screenshot shows the wall thickness C-scan, the middle part the stand-off (distance between sensor and inner pipe wall) C-scan and the bottom part the B-scan (corrosion profile).



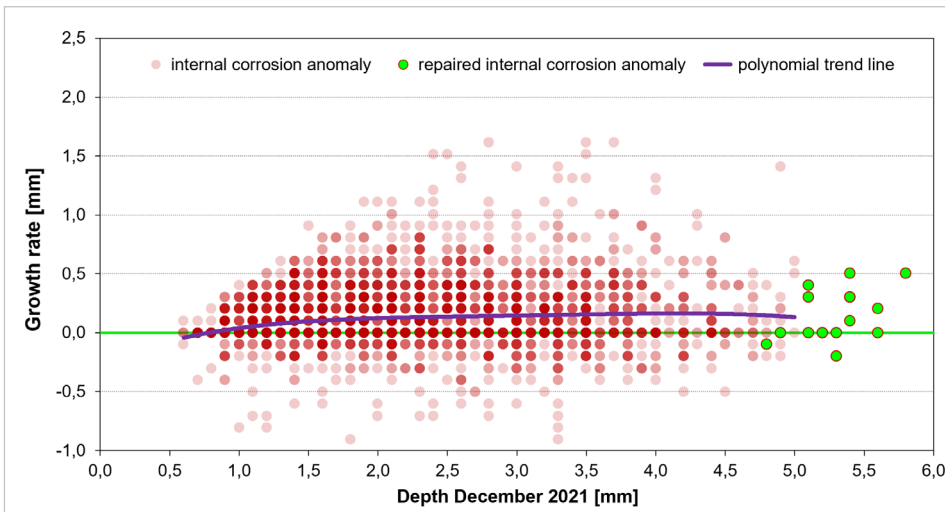
Results

- **Accuracy:** NDT Global provided the highest accuracy measurement of steep-sided, deep pits and pinhole corrosion in this pipeline. This highlights the capability of NDT Global's Ump+ configurations to detect and size difficult-to-find anomalies with small diameters. Such accuracy enables operators to maximize the impact and return on investment of their dig programs.
- **Assurance:** Following the inspection results and based on thorough studies conducted with the data the operator had confidence in knowing the true corrosion state of this pipeline. The proven accuracy of the data provided helps to reduce risks associated with the pipeline integrity plan. Such results allow operators to improve their ability to maintain critical assets.



NDT Global's highest accuracy enables operators to optimize their dig programs.

- **Significant savings:** The accuracy of inspection data and resulting integrity assessments that NDT Global provides ensures that appropriate and cost-efficient rehabilitation measures are conducted. The operator can monitor developing anomalies and implement a long-term remediation program with strategically selected digs.



Internal growth rates (Dec 2020 vs. Dec 2021) and corresponding polynomial trend line versus depths of Dec 2021:
No considerable dependence of the growth rates from the depths can be deduced. The deeper anomalies do not show higher growth rates than the less deep anomalies.