

Post Construction Caliper Survey

ART Scan Series



Challenge

A gas pipeline operator in Europe required a post-construction caliper inspection on a newly built pipeline.

Given the length of this pipeline, which was more than 900 km, the operator required a robust tool capable of withstanding the prolonged inspection duration and wear during the run.

Additionally, since the pipeline was not yet in service, the tool had to be propelled using a compressor spread. Given the cost of such an operation, proven reliability and track record played a major part in the technology selection process.

Ultimately, the operator decided that an acoustic caliper survey based on NDT Global's ART Scan™ system provided the best fit for this challenging project.






Solution

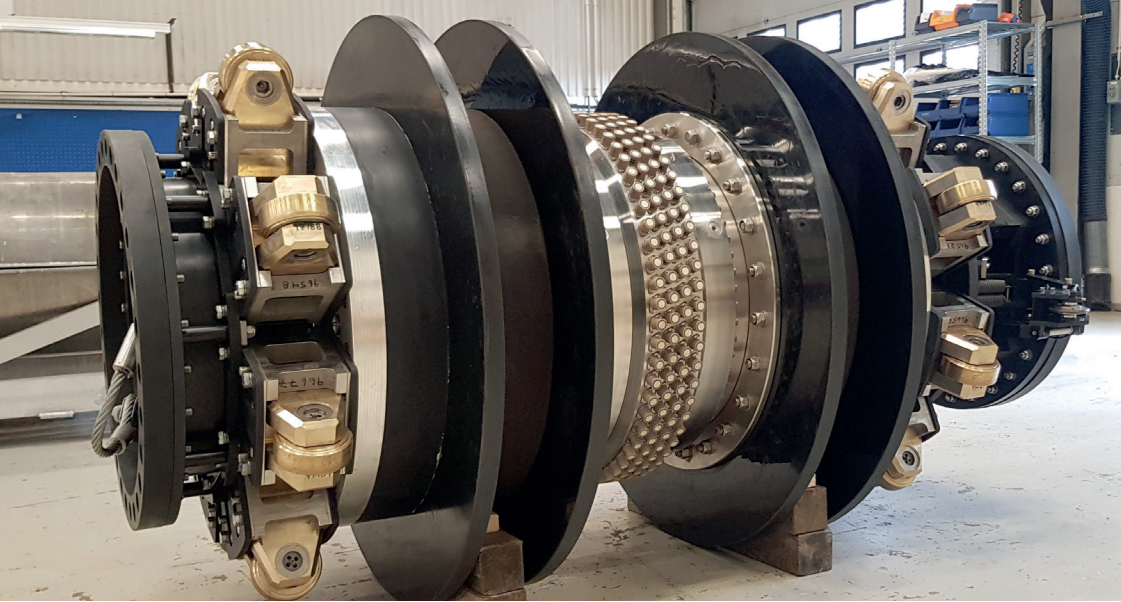
Faced with unique requirements, the NDT Global team worked closely with the operator to review the specific ART Scan configurations that would address the inspection goals.

A custom tool configuration was then developed based on field-proven ART Scan components, including sensors, data acquisition, pressure vessel, and power supply that could withstand the demanding operating conditions. Each component was rigorously tested individually, followed by further testing of the full assembly during factory acceptance testing.

To enable data storage for the full length of this pipeline, a system-wide upgrade of the digital electronics was needed. A state-of-the-art digital data storage upgrade was deployed, combined with system on chip (SoC) data capture and processing. Not only was this new data system capable of handling larger volumes of data, these new boards also consume less power and support future technological developments.

Since the operator only required geometry information about this pipeline, the ART sensor operation was slightly modified.

-  Axial Cracks
-  Circumferential Cracks
-  Metal Loss
-  Geometry Ovalities
-  Mapping



Instead of a frequency sweep (or chirp) to activate resonances in the pipe wall, a shorter signal can be used to provide a pulse-echo reading.

This reading reflects the stand-off between the sensor and the pipeline's internal surface, which is derived from the time-of-flight information. The pulse-echo signal provides high-accuracy geometry signal which is not affected by tool speed, or the dynamic behavior of a sensor arm as used by mechanical caliper tools.

The collection of stand-off readings was used to virtually re-position the ILI tool to the center of the pipeline and accurately report any out-of-roundness, dents and deformations which exceeds measurement specifications.

ART Scan tools are typically deployed on a wheeled suspension system to ensure centralization and rotation of the tool. Given the large diameter of the tool, the calculated load on each wheel would exceed earlier deployments. For this reason, a new wheel design was developed and subjected to full-scale load testing, simulating the full length of the pipeline and even severe girth weld protrusions.

The testing concluded that the wheels showed no signs of wear even though the testing program was designed to be much more severe than the actual run conditions. The wheels have demonstrated their reliability and durability during long runs (more than 900 km) in multiple inspections with no signs of wear on the wheel tread or bearings.

Results

Deployment of the customized ART Scan system was a success, and a full report was generated. Since the first deployment for this operator, NDT Global has performed several more inspection runs at low operating gas pressures capturing full pipeline geometry.

- Proved that ART Scan is an ideal solution for new construction (baseline) caliper surveys in extremely long, deepwater, and multi-diameter pipelines.
- Due to the low drag design of the ART Scan tool, speed excursions were avoided.
- Non-contact caliper sensors enable bi-directional configurations in all sizes.

ART Scan enables baseline geometry surveys even on the most challenging pipeline configurations, including bi-directional runs, multi-diameter configurations, and challenging elevation profiles. As operators design ever longer and deeper pipelines, ART Scan is suited for the most demanding inline inspection requirements.

ART Scan's total track record of low pressure runs exceeds 5,000 km (more than 3,000 mile)