Enhanced service life with high-temperature corrosion surveys

Longer lasting, higher availability of UT tools for on-stream, high-temperature corrosion surveys to maximise plant availability, productivity and safety.

Overview

A large chemical refinery sought a solution for conducting multiple point and scan measurements for on-stream, in-service corrosion surveys across their facilities infrastructure. Ultrasonic testing (UT) is critical to the plants needs and used extensively for corrosion surveys but the refinery includes assets with surface temperatures over 250 °C including gas boilers, pressure vessels, piping and chemical storage during service, requiring robust transducers which can reliably make high-temperature remaining wall thickness measurements to prevent the need for unplanned shutdown and maintain productivity while reducing costs.

The Challenge

The primary challenges for the refinery were:

- Transducers were required to **operate continuously up to 260 °C** to undertake a high volume of spot measurements and scans of remaining wall thickness in pipes carrying various fluids including steam, water, gas and process fluids used for the process.
- Regular spot measurements and scans for remaining wall thickness are needed to be **conducted while the plant was operational** and running through a wide temperature range.

The Solution

Ionix HS582i dual element, 5 MHz transducers based on the HotSense™ ultrasonic platform were applied with the operators own industry standard UT flaw detectors making for immediate implementation.

+44 (0) 1484 505 859
contact@ionix.at
ionixadvancedtechnologies.co.uk

- The HS582i transducers were chosen because of their wide operating temperature range; -55 to +550 °C, reducing the need for intermittent cooling and re-calibrating (duty cycling) to reduce the inspection time and prevent the need for shutdown or isolation of assets.
- Increased wear resistance increased productivity and measurement collection up-time, and allowed extensive coverage by scanning on asset surfaces.
- Manufactured in compliance with international standards made it easy to fit directly into existing site UT inspection procedures and NDT professionals' qualifications.
- Compatible with commercial high temperature couplants.

Execution

- One transducer was able to cover over 2,900 spot measurements, and 511 scans (80 to 230 cm^2 sections at a time) of wall thickness from 100 to 260 °C
- An additional 34 pipe surveys were conducted with the same transducer up to 150 °C with multiple spot and scan measurements in each survey, using UT flaw detectors and equipment owned by the sites NDT team without additional training or integration.

Highlights

- One HS582i transducer enabled the refinery site NDT team to reduce the number of transducers used to complete the corrosion surveys required across the plant, without degradation and maintain accurate measurement data.
- The HotSense™ transducer allowed 4-5X more asset coverage than the previous incumbent transducers before needing to be replaced.

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- The HS582i enabled the refinery site NDT team to increase the efficiency and productivity of their corrosion surveys without the need for shutdown, improving the safety and maintaining production at the site.