

In-service corrosion survey of high-temperature chemical refinery

In-service, high-temperature corrosion surveying to maximise productivity, safety and plant availability.

Overview

A solution was sought by a large chemical refinery for conducting 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 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 chemical refinery were focussed around:

- Transducers were required to **operate continuously up to 250 °C** to maximise productivity and **reduce the need for duty cycling** to measure remaining wall thickness in pipes carrying various fluids including steam, water, gas and process fluids used for the ore refining process.
- Regular surveys needed to be conducted while the plant was operational and running at high temperature.

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.

- 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.
- 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

- NDT operators placed HS582i transducers and UT step blocks on to the asset to be surveyed to soak to the same temperature before calibration. Calibration at the process temperature removes the need for compensation increasing measurement accuracy.
- Calibration and remaining wall thickness measurements were undertaken using conventional UT flaw detectors owned by the sites NDT team, allowing immediate integration without additional training or setup.
- To date over 1500 wall thickness measurements, both spot readings and substantial scans, have been taken without the need to re-surface the probe.
- Pipe sizes varied from NPS 2" up to NPS 48" with surface temperatures from ambient up to 250 °C.

Highlights

- Heat soaking the transducer and removing the need for duty cycling retains the calibration for longer periods, increasing the NDT operator's productivity and minimising down time waiting for cooling and repeat calibration.
- 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.