

Developments in high-temperature, online ultrasonic integrity and corrosion inspection & monitoring

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In the oil and gas and power generation sectors, it is predicted that 25% of the costs involved in outages could be avoided by replacing conventional risk-based inspection strategies during periodic planned shutdowns, with in-service inspection and monitoring. Online, non-intrusive, ultrasonic corrosion monitoring and asset integrity transducers are becoming increasingly popular to enable both maintenance and operations teams to enhance process unit productivity, reduce shutdowns and defer maintenance whilst not compromising on safety. Presented here is a review of the current and emerging technologies for ultrasonic inspection and monitoring to detect, track and assess corrosion in high-temperature (upto 550 °C / 1022 °F) assets. From the development and challenges with the selection of piezoelectric elements, transducer design and coupling, to the availability and application of commercial systems in the field. Selecting what data to collect, who will benefit from it, how it will be stored, and the value of increased frequency of collection to data quality will be explained. Their use within the constraints of NDT regulations and standards, including calibration and temperature compensation will also be covered. The location and environment of UT data collection is considered, including hazardous and potentially explosive environments, working at height /rope access and the integrity of insulation or cladding. Finally, a case study, highlighting a field example using the HotSense platform is presented for monitoring corrosion and explores the key factors which must be considered when selecting an in-service ultrasonic system. Whilst the focus is on oil and gas, the development of these extreme environment resilient platforms also lends themselves to be developed to assess other damage mechanisms such as weld defects and material flaws in a range of other sectors including nuclear and fossil fuel energy generation, and process control.