

# **Improving methods of guided wave inspection for detecting corrosion in pipes and pipelines**

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Guided Wave Testing (GWT) of pipeline is a widely accepted and standardized NDT method of inspecting pipelines for corrosion. However, there are many parameters that need to be considered for optimum testing both in terms of the technique and equipment design. This is currently a rich area of research with new and exciting advancements for pipelines in development. This paper will look at the improvements made in this technique over the last number of years including the different methods for transmitting and receiving ultrasonic waves; each with their advantages, disadvantages, and preferred applications. This presentation will describe the use of piezoelectric, magnetostrictive and EMAT methods and their potential for inspection of buried pipelines. Long-Range Ultrasonic Testing (LRUT) is currently dominated by equipment using piezoelectric transducers for transduction and reception. This type of transducer is particularly useful in this application because they are dry-coupled, which is good for productivity as they require no bonded components or couplant. It is also straightforward to segment the tool which allows for circumferential analysis of the signal which can be related to circumferential extent of defects. Magnetostrictive EMAT systems have also been used for LRUT of pipelines, but this technology presents a less efficient process to the operator due to the requirement of bonding the sensors to the pipeline. Limited circumferential information in the data also makes interpretation more uncertain. However, overcoming these current limitations has the possibility of broadening the appeal of this technology to pipeline integrity engineers responsible for a large range of pipes and applications due to improved probe performance and defect detection capability. This paper will also document design improvements to guided wave equipment and the use of advanced collection techniques designed to optimize a guided wave inspection.