



CASE STUDY

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DRS INSPECTION VALIDATION ON A 30" PIPE WITH COMPOSITE REPAIR

1. INTRODUCTION

The aim of the validation was to determine the capabilities of DRS in penetrating the repair and measuring the thickness of the underlying steel by comparison with ultrasonic (UT) corrosion mapping data collected prior to the application of the repair.

2. DRS

Dynamic Response Spectroscopy (DRS) was developed by Sonomatic to address the issue of ultrasonic attenuation in coatings. It utilizes low frequency ultrasound to penetrate coatings and induce the underlying steel to vibrate at its natural frequencies. Advanced signal processing algorithms are used to extract these frequencies and convert them to wall thickness measurements.

3. PROCESS

The validation sample was a 30", schedule 40 pipe with extensive internal natural corrosion. The UT and DRS inspections were carried out using Sonomatic's automated Nautilus scanner, a conventional UT transducer and a custom DRS transducer. The scans were collected in 1mm increments axially and 4mm circumferentially. They were then processed to create maps showing the steel thickness.

4. RESULTS

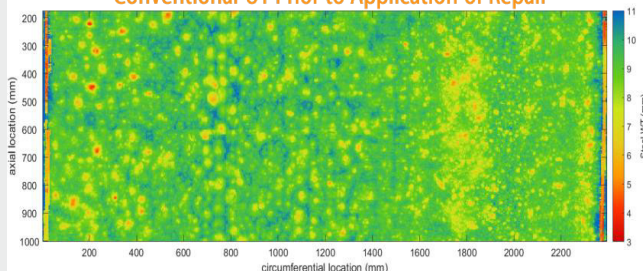
The validation showed that:

- DRS is capable of measuring the steel thickness through the composite repair.
- The DRS thickness measurement accuracy is typically $\pm 0.5\text{mm}$.
- DRS detects corrosion pits with diameter down to 10mm.
- No major flaws were identified in the composite repair.

5. BENEFITS OF DRS

Inspection of the steel under a composite repair allows an estimation of the corrosion growth rate. The reliability of the estimate is determined by the accuracy of the technique, typically $\pm 0.5\text{mm}$ (80% tolerance) for DRS. The DRS technique is also used for locating flaws in the composite repair such as delamination, poor saturation of the fibres and contamination. Understanding the condition of the composite repairs and underlying steel means that the risk of ongoing operation is effectively managed, the cost of replacement can be deferred or avoided and production is maintained - a shut down is not needed.

Conventional UT Prior to Application of Repair



DRS Through Repair

