CASE STUDY

DRS™ INSPECTION VALIDATION ON A 30" PIPE WITH COMPOSITE REPAIR

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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.

DRS™

Dynamic Response Spectroscopy (DRS™) was developed by Sonomatic to address the issue of ultrasonic attenuation in coatings. It utilises 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 meaurements.

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 ±0.5mm (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.

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.

OUTCOME

The validation showed that DRS™ is capable of measuring the steel thickness through the composite repair, the DRS™ thickness measurement accuracy is typically ±0.5mm, it can detect corrosion pits with diameter down to 10mm and no major flaws were identified in the composite repair.

Conventional UT Prior to Application of Repair

DRS Through Repair