Industrial Member Report Summary – Key Findings for Industry

Detection and characterisation of stress corrosion cracking in austenitic weld overlay cladding for non-intrusive inspection

TWI Core Research Programme

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Introduction

Weld overlay cladding in stainless steel is used in pipelines and processing vessels to protect against corrosive fluids. Stress corrosion cracking (SCC) is a known damage mechanism in these cladding systems and could lead to a catastrophic failure of the component. Hence, detection of SCC at onset and assessment of the size of cracking is a key requirement to allow for safe and effective management of these components.

Industrial Challenge

There is need in industry to inspect the internal clad surfaces of components using non-intrusive inspection (NII) techniques and this project identifies those techniques that could be implemented in NII programmes.

Key Findings

- Phased array (PAUT) and post-processing (FMC/TFM) ultrasonic techniques can be implemented from the outside surfaces of vessels and piping to detect and characterise SCC
- Electromagnetic acoustic transducers (EMATs) and eddy current arrays (ECAs) are effective at detecting SCC when applied from the cladding surface
- X-ray computed tomography (CT) is also able to characterise SCC with good resolution and establish its full geometry; however CT is very difficult to implement on components in-situ
- All techniques investigated and found capable for detection and characterisation of SCC in this report were implemented using portable instrumentation which are readily available in the market
- TWI has developed a method to artificially create SCC in weld overlay cladding for use in calibrating and setting the sensitivity of the inspection techniques

How to benefit from this work:

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