

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

Author: Channa Nageswaran

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

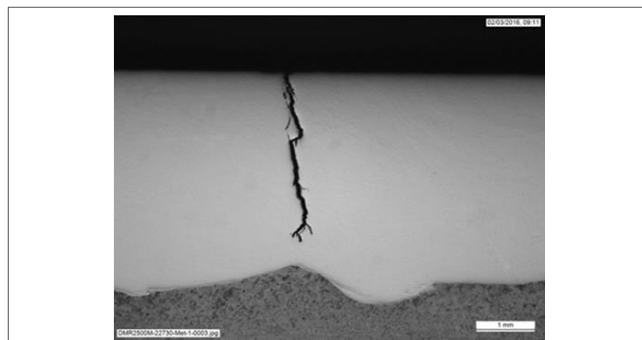
There is need in industry to inspect the internal clad surfaces of components using non-intrusive inspection (NII) techniques and this project identifies those techniques that could be implemented in NII programmes.

Key Findings

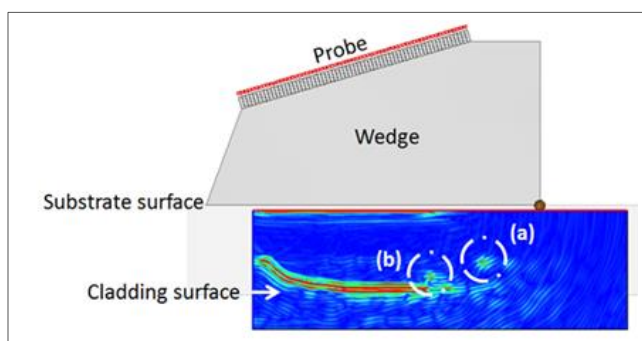
- Phased array (PAUT) and post-processing (FMC/TFM) ultrasonic techniques can be implemented from the outside surfaces of vessels and piping to detect and characterise SCC
- Electromagnetic acoustic transducers (EMATs) and eddy current arrays (ECAs) are effective at detecting SCC when applied from the 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:

- As an Industrial Member of TWI, you have free access to the [full report](#).
- If you are not an Industrial Member of TWI, find out how your company could benefit from Membership www.twi-global.com/membership
- Read more: <https://www.twi-global.com/news-events/connect/2013/connect-may-june-2013/phased-array-ultrasonic-inspection-of-stress-corrosion-cracking-in-austenitic-cladding/>
- Contact integritymanagement@twi.co.uk to learn more



A SCC in stainless steel weld overlay cladding.



Detection by ultrasound of (a) disbond between the cladding and substrate, and (b) SCC in the cladding