



## Industrial Member Report Summary – Key Findings for Industry

### Evaluation of a New Corrosion Under Insulation Test Method

TWI Core Research Programme

Author: Henry Begg

#### Industrial need

Thermal insulation applied to process piping and vessels to maintain temperatures and minimise energy loss can result in unexpected corrosion and, in the most severe cases, lead to dangerous plant equipment failure. Much data concerning corrosion under insulation (CUI) come from field and in-plant measurements, where corrosive conditions are not necessarily known in any detail, making fundamental study of corrosion processes difficult.

There is therefore a requirement for laboratory studies where expected CUI conditions can be simulated in a controlled manner and corrosion characterised or quantified. A prior TWI members' report reviewed the current state-of-the-art regarding laboratory CUI simulation and found that no current test method accurately simulated CUI service conditions and provided quantitative electrochemical monitoring data. The present report details the evaluation of a novel test method for CUI that aims to address this shortcoming.

#### Key Findings

A modular corrosion rig was designed and trialled with:

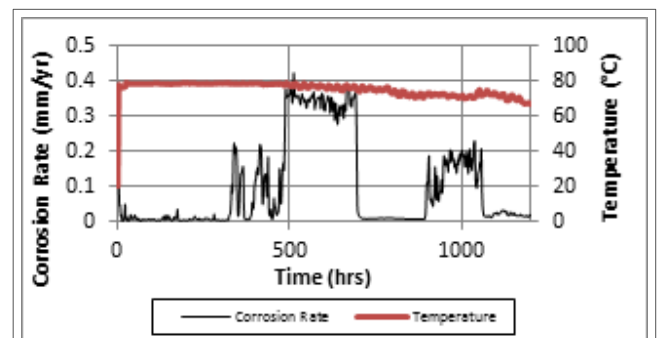
- Representative cylindrical geometry;
- Flexibility to simulate a range of process conditions (temperature, wet-dry cycles, insulation material);
- Bespoke corrosion sensors that provided electrochemical measurements without altering simulated conditions.

Corrosion data was evaluated over a 60 day period and exhibited noisy, variable corrosion rate data, reflecting the non-uniform nature of the CUI corrosion process.

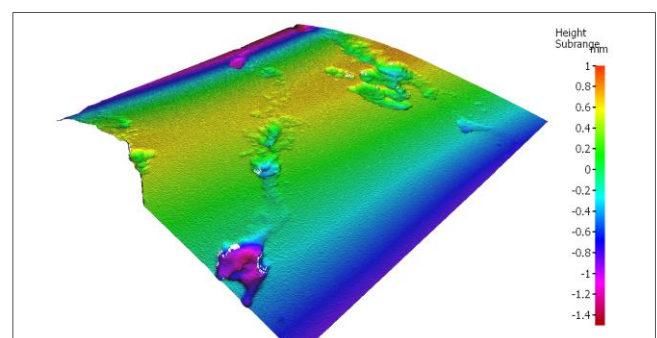
Non-contact profilometry was therefore used to complement the analysis and provide further quantification of corrosion damage.

#### 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](http://www.twi-global.com/membership)
- Contact [materials@twi.co.uk](mailto:materials@twi.co.uk) to learn more



Plot of corrosion rate and temperature during CUI testing using a bespoke corrosion rig.



Pseudocolour image of the surface of a pipe section after 60 days exposure to simulated CUI conditions.