

Detection of chloride corrosion in offshore stainless steel pipework

MEC technique for detection of very small mid-wall chloride pitting defects in stainless steel pipes



APPLIED TECHNOLOGY

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Offshore stainless steel pipes are subjected to potential chloride corrosion due to the high salt content in the atmosphere.

Such chloride corrosion is typically seen as very minor openings to the outer wall of the pipes. While they are externally visible as minor defects, the chloride corrosion causes very small pitting defects to grow internally in the mid-wall through to the inner wall of the pipes.

The microscopic view (see picture) shows a cut-out 316 stainless steel pipe from an offshore gas field in the North Sea with identified leaks and chloride corrosion defects in the wall areas.

Such defect types with very minor openings are not only difficult to visually identify in terms of the location but are also challenging to determine the extent or depth of such defects with conventional NDT (non-destructive testing) techniques.

As a Norwegian operator had re-

cently identified leaking areas in the form of minor openings to the external pipe wall in its offshore installed stainless steel 316 pipes which appeared comparable to chloride corrosion defects, Innospection had been requested to perform a verification test to determine if and how well the MEC (magnetic eddy current) technique could detect the very minor defect sizes. A 500mm section of a stainless steel pipe from the offshore job-site with OD (outside diameter) of one inch, WT (wall thickness) 338mm and a known leakage area was provided.

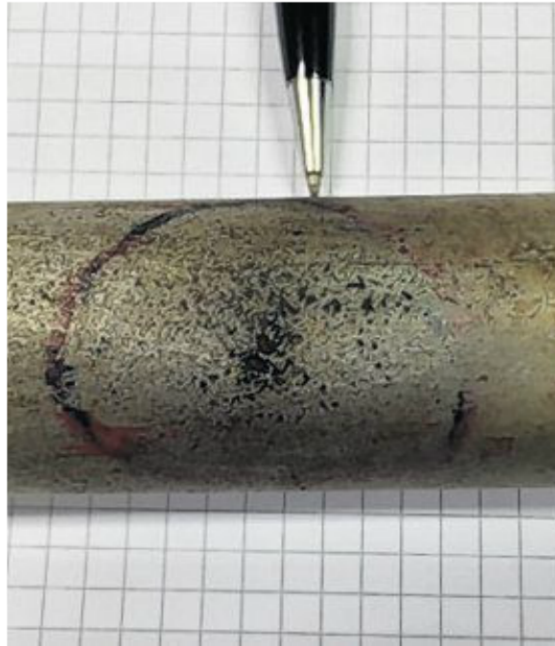
The MEC technique combines a DC magnetic field with multiple eddy current sensors that induce an eddy current field penetrating through the entire pipe wall.

Defects cause the eddy current field line configuration in the pipe wall to change which is then measured as an impedance change of the specific individual sensor.

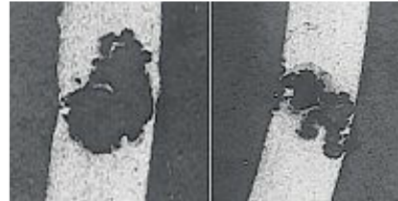
The changes in the signal amplitude and signal phase are displayed and compared to the calibration for the defect size and wall loss analysis.

Utilising the MEC-P9 pipescanner with a permanent magnet typically used for carbon steel pipe inspection, the MEC technique was proven in the verification test to demonstrate a very high probability of detecting the small volumetric mid-wall pitting defects.

Distinction of the different defect locations – externally, internally or mid wall of the pipe material was



Above: Cut-out 316 stainless steel pipe sample with identified leaking areas, and, right, microscopic view of stainless steel pipe wall with chloride corrosion defects



also achieved by means of analysing the signal phase angle while the wall loss severity was determined by the signal amplitude.

Dedicated smaller and light MEC-pipescanners will be built to achieve

the faster detection and mapping of chloride corrosion in the stainless steel pipes.

Andreas Boenisch is a co-owner of Innospection

Kreus names new DSV at Vard yard

Kreus Subsea of Singapore has named its second new-build dive support vessel the *Kreus Challenger* at the Vard Soviknes yard in Norway.

The vessel is due to enter service in Q2 next year and will be providing inspection, repair and maintenance services to Brunei Shell under a long-term contract secured last year.

Bourbon Evolution and Supporter have been standing in meantime.



ABB renews Topaz contract

UAE company Topaz Energy and Marine has secured renewal of its long standing contract with ABB for the Topaz Installer, a cable laying vessel.

Under the terms of the contract, the Topaz Installer will provide ABB with cable-laying services in support of wind-farms in the North Sea for a period of one year plus options of at least 12 months. The contract was first signed in 2010.

Change at top of Royal IHC

Dutch group Royal IHC has changed the guard at the top.

Bram Roelse stepped down as CEO on September 1 and was replaced by Dave Vander Heyde who has been CFO at the company since 2011.

New research ROV SuBastian set for Mariana Back-Arc offshore Guam after deepwater trials

After a month of completing rigorous tests in the open ocean off the island of Guam in the western Pacific a new, large research ROV named SuBastian is nearly ready for work.

The Schmidt Ocean Institute (SOI) has been working this summer, testing and integrating its new ROV from aboard its oceanographic research vessel Falkor.

The 25-day proving session saw SuBastian working in real-world conditions, demonstrating its functionality as a modern research tool.

Trials included 22 dives and more than 100 hours underwater. Now that the vehicle has been tested, the team is working on making tweaks and improvements so that SuBastian is ready for its first research cruise later this year, visiting the Mariana Back-Arc in Guam.

The 4K high-resolution video



SuBastian being prepped aboard mother ship Falkor

footage collected with SuBastian during the trials will be openly shared with scientists and interested public around the world.

SuBastian weighs in at 3.2 tonnes and resembles a workclass ROV.

Equipment includes a Tritech (of Aberdeen) Super SeaKing DST scanning sonar and Teledyne BlueView M900 imaging sonar.

The vehicle can work for 4,500m water depth.

Thursday 6 October 2016

AEC, 8.30 am – 5.00 pm

OIL&GASUK

Health and Safety Seminar

Keynote address from Chris Flint, Interim Head of Energy Division with Health & Safety Executive.

Oil & Gas UK's upcoming Health & Safety Seminar will highlight various issues and also turn the spotlight on some of the hazards, risks and key industry issues.

It will give insights into the latest developments in the management of health and safety hazards and the promotion of the well-being of the workforce.

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