

# Unique Solutions for Niche Inspection Challenges from Innospection

The challenges of offshore operations in ever hostile and complex environments also present challenges in the inspection of splash zone and subsea assets. Very often, operators and integrity management companies seek customised solutions to solve their niche offshore and subsea inspection challenges, such as:

- How can the extent of damage of a ship-impacted platform leg be determined?
- How can the corrosion suspected to exist on the external surface of a 24" casing placed inside a 30" conductor pipe at the splash zone be determined?
- How to inspect the complex flexible risers to determine the integrity issues at the different inner layers?

Bringing to the market innovative technologies, application developments and equipment to provide optimum inspection solutions for niche inspection challenges is the foundation strategy of Innospection's business.

These above mentioned challenges presented to Innospection were resolved by Innospection's creative R&D team with new and available inspection technologies, as well as the development of innovative submersible inspection tools able to deliver the best quality and comprehensive inspection data within a single inspection deployment.

One of the most suitable techniques for subsea inspection is the Saturation Low Frequency Eddy Current (SLOFEC) technique which has over the past years proven its suitability for splash zone and subsea inspections due to the easy deployability, low surface preparation requirement and high scanning speed. The next generation of SLOFEC based subsea inspection tools, branded under the name MEC (Magnetic Eddy Current), are innovative submersible inspection tools able to incorporate other supporting inspection techniques and high pressure cleaning system.

## Ship-Impacted Platform Leg Inspection

As a result of an impact from a ship, one of the legs from an offshore platform was damaged at the splash zone area and it was necessary to determine the extent of the damage for a fitness-of-purpose analysis.

To perform an efficient inspection, Innospection developed a carrier frame system to be placed in the splash zone which operates the high pressure cleaning system and various inspection techniques in an encoded scan pattern axially and circumferentially above and below the splash zone after deployment from the installation.

The inspections performed within the same deployment include crack detection using Multiple Eddy Current Sensor Array, localised defect detection by SLOFEC, absolute thickness measurement with Ultrasonic, internal crack detection by TOFD as well as geometry scan using laser triangulation system to deliver the best possible condition data.

## Inspection of Casing within a Conductor Pipe

An offshore operator in the UAE suspected that the 24" casing located within a 30" conductor pipe suffered from external corrosion at various and unpredictable areas above and below the splash zone. However, the challenge was the deployment of an inspection tool into the limited space to perform the inspection.

Due to the operator's decision to assess the internal corrosion condition of the conductor in order to conclude an external wall condition of the casing, Innospection proposed to perform an external combined SLOFEC and Ultrasonic inspection on the conductor pipe using the MEC-MPS200+ Scanner to determine if corrosion exists on the internal surface of the conductor pipe.

The SLOFEC technique uses the Eddy Current principle in combination with a magnetic field. By superimposing the DC-magnetisation, the depth of penetration is increased such that corrosional attack even on the inside can be detected from the external wall. As the inspection system provides a colour mapping image of the external and internal wall condition either separately or combined, the more interesting internal condition was well assessed.

Main Image: MEC-MPS200+ scanner performing the scans on the 30" conductor pipe

## Flexible Risers Inspection

Responding to the market demand for a technology able to deliver an external fast screening of the flexible risers in-situ, with visibility of the multiple wire layers and without the risk of damaging the integrity of the flexible risers, the patented MEC-FIT™ technique was developed to provide a reliable and technically advanced solution for the inspection of flexible risers operated either directly from offshore installations or by ROV deployment.

This electromagnetic technique combines magnetic field lines with eddy current field lines to allow the deeper penetration into the various armour layers to detect cracks and corrosion in the inner layers.

No annulus flooding is required to perform the inspection which minimises the risk of damage to the inner layers of the flexible risers.

The MEC-Combi Hug inspection tool was developed not only to deploy the MEC-FIT™ technique but also to address the very specific challenges of accessing and inspecting the flexible and rigid risers in its working locations. A sophisticated self-crawling inspection system, it is able to move horizontally or vertically on its own while performing the inspection after being deployed by ROV or rope access personnel. A change out of the sensor system enables MEC-Combi Hug to be used for the inspection of rigid risers and general pipes.

Right: MEC-Combi Hug being deployed onto flexible risers in the North Sea

