



# UNDERWATER INSPECTION

## UNDERWATER INSPECTION WITH SMART MEC-COMBI INSPECTION TOOLS

By Andreas Boenisch of Innospection.

Corrosion is a constant challenge and a substantial threat to the structural integrity of the offshore and subsea oil and gas production installations. The mature and ageing assets in the North Sea, in particular, have become subjects of increasing inspection demand and condition assessment. The target of such assessments is not only for lifetime extension but also to demonstrate fitness-for-service in order to ensure the safe operation of the assets, both for Operators' own interest as well as to demonstrate proactiveness to the authorities.

Maintaining the integrity of the subsea assets such as coated and uncoated subsea pipelines, subsea structures, subsea manifold pipes, Flowlines, flexible risers, mooring lines as well as FPSO and ship hulls is a huge challenge due to accessibility issues and difficult inspection conditions such as the water depth, visibility and temperature.

Underwater inspection missions led by divers inevitably bring challenges such as poor navigational accuracy, human operator limitations and safety concerns which add up to incomplete or inaccurate data coverage. At the same time, traditional subsea inspection methods such as General Visual Inspection (GVI) or Close Visual Inspection (CVI) are no longer sufficient to allow a sensible integrity assessment. In addition, not all advanced Non-Destructive Testing (NDT) technologies proven for the onshore inspection are suitable or easily deployed in the underwater environment.

In respond to the market demands, Innospection has developed and launched over the past few years a series of smart, multi-function MEC-Combi inspection tools that has been designed and built to target inspection, deployment and subsea accessibility challenges.

Based on the next generation MEC (Magnetic Eddy Current) technique which has demonstrated the capability of detecting the smallest pitting corrosion, cracks and thinning, the MEC-Combi inspection tools are designed to provide comprehensive inspection data within a single deployment. Supporting add-on inspection techniques

such as high resolution Ultrasonic mapping, Pulsed Eddy Current, laser triangulation system and camera system can easily be incorporated to provide high density inspection data.

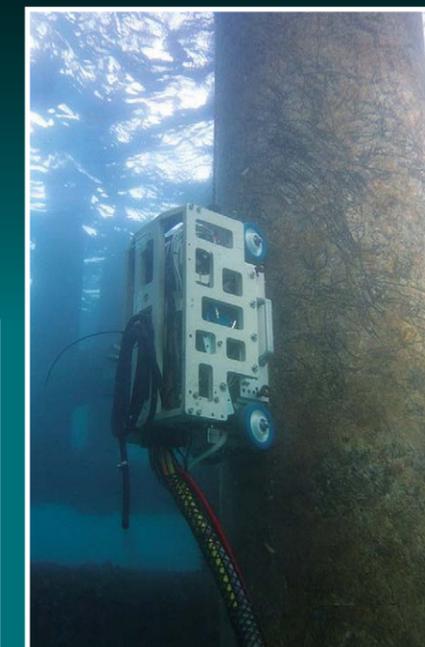
Deployed by divers or work-class / inspection-class ROV systems, the MEC-Combi inspection tools are capable of self-crawling along the inspection surface to perform the scanning while maintaining its stable contact despite the turbulences due to its integral buoyancy, hydraulic wheels and magnetic system. The signal data with encoded position details is transferred in real time via the umbilical to the inspection computer located on the support vessel or installation. The advanced reporting software utilises a combination of comprehensive C-Scan mapping of the internal and external wall condition, individual defect sizing analysis as well as matrix data to provide a reliable and extensive condition assessment.

Some successful projects where the MEC-Combi inspection tools have helped the Operators solved their particular inspection challenges and saved on inspection time and costs include the External Subsea Pipeline Inspection Solution Package for the external

inspection and condition assessment of subsea pipelines which are largely non-piggable and traditionally requiring costly internal inspections. A combination tool for the subsea corrosion mapping and geometry measurement of structural legs and conductors at the splash zone and subsea area has been deployed in Trinidad and the North Sea where such assessments are especially important for

subsea structures which may be reused and repaired.

To further support the challenging subsea inspection projects, Innospection's large in-house R&D team has made progress to the ongoing developments related to the extended inspection scope for flexible risers and an automated inspection system for hull inspection.



In these pictures: External underwater inspection of subsea pipelines and assets with the smart, multi-function MEC-Combi inspection tools.

