Development of ultrasonic guided wave inspection technology for the condition monitoring of offshore structures

Results in Brief

Novel non-destructive testing of offshore structures

EU-funded researchers developed new non-destructive testing (NDT) technology for offshore structures such as oil platforms and wind turbines.

Inspections of the structural integrity of offshore oil platforms and wind turbine towers require diverse and expensive remotely operated vehicles subject to hazardous sea conditions. In addition, current techniques facilitate inspection of only small parts (on the order of a few square centimetres) and cannot evaluate the deeper bases where large loads from sea currents are particularly detrimental.

Given that offshore oil and gas platforms are nearing the end of their functional life-cycles and offshore wind turbine towers are currently being installed by the thousands, the possibility of major disasters resulting in loss of life and environmental damage is increasing at an alarming rate.

European researchers addressed the need for safe, cost-effective and continuous monitoring of such structures via the ‘Development of ultrasonic guided wave inspection technology for the condition monitoring of offshore structures’ (OPCOM) project.
Ultrasonic guided wave (UGW) testing, one of the latest NDT methods and evaluation, is currently used to investigate many engineering structures including piping systems in petrochemical facilities, suspension bridges and structural components ‘buried’ in shallow ground.

Using the UGW technology, OPCOM researchers developed UGW sensors and systems for permanently-mounted marine use to detect fatigue cracks, corrosion and defects in tubular components.

Two different types of apparatus were designed, one for either splash-zone or sub-sea level structures on oil and gas installations and one to be attached to the large tubular piles acting as the foundation of offshore wind turbines. Investigators tested the former at the Statoil Hydro Sleipner B production platform in the Norwegian sector of the North Sea.

Potential economic, societal and environmental benefits of OPCOM project results are tremendous. Significant cost reductions can be expected related to minimising the use of divers and expensive remotely controlled devices, reduction in inspection time and thus loss of production time and minimisation of product losses and clean-up following structural failure.

Automated NDT minimises worker hazards and even worker stress. Finally, implementation of the OPCOM systems could reduce oil platform accidents that harm marine environments and livelihoods as well as encourage future investment in renewable wind power.

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**Project Information**

**OPCOM**

Grant agreement ID: 516993

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**EU contribution**

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