



Template inspection and intervention

Snake-like robot for subsea inspections and maintenance

RESEARCH PROJECT | Kongsberg Maritime and Statoil have signed an agreement with Eelume, a spin-off company of the Norwegian University of Science and Technology (NTNU), to accelerate a new technology that the Norwegian companies say will significantly cut the costs of subsea inspections, maintenance and repairs.

NTNU and the Norway-based independent research organisation SINTEF have conducted research on snake robotics for more than ten years. Eelume is now developing a disruptive solution for underwater inspec-

tion and maintenance in the form of a swimming robot. The idea is to let these robots do inspection and light intervention jobs on the seabed, reducing the use of large and expensive vessels. With its snake-like form, the slender and flexible body of the Eelume robot provides access to confined areas that are difficult to access with existing technology.

Eelume robots will be permanently installed on the seabed and perform planned and on-demand inspections and interventions, according to the project partners. The solution can be installed on both existing

and new fields where typical jobs include visual inspection, cleaning and adjusting valves and chokes. These jobs account for a large part of the total subsea inspection and intervention spend.

Bjørn Jalving, executive vice president of Kongsberg Maritime's subsea division, said the robot was "a new tool that will enable operators to realise large-scale cost savings by introducing new ways of conducting routine tasks and helping to prevent unscheduled shutdowns by reacting instantly when required".

Fatigue life analysis of gearboxes

DIGITALCLONE | For wind turbine operators wanting to extend the life of their gearboxes, Germany-based Rewitec® has developed the lubricant additives treatment DuraGear® W100. The company recently contracted US-based Sentient Science to use its DigitalClone® technology to predict and compare the contact fatigue life of key gear and bearing components with field-measured surface roughness inputs from the Winergy 4410.2 gearboxes before and after the treatment with Rewitec's DuraGear® W100 treatment.

Sentient Science developed a material-science-based predictive model of a GE 1.5 SLE Winergy 4410.2. This DigitalClone® gearbox model was used to study the fatigue life impact of W100 treatment on surface-damaged bearings and gears. As a result of the measured reduction in surface damage due to the W100 treatment, Sentient's DigitalClone® technology predicted that Winergy 4410.2 gearboxes would exhibit a significant improvement in life compared with untreated gearboxes. Under field-representative operating conditions, Rewitec's

DuraGear® W100 treatment is calculated to improve bearing life by a factor of 3.3 and overall gear life by a factor of 2.6. The effect of Rewitec DuraGear® W100 on gearbox performance is greater for relatively smooth bearing and gear surfaces with small pits and wear, supporting the application of DuraGear® W100 in the early stages of bearing and gear damage for better life improvement, the company says. Fleet- and asset-specific return on investment calculations can be performed with wind turbine operators who have deployed DigitalClone® Live.