



WindEnergy

NETWORK

COMMUNICATION HUB FOR THE WIND ENERGY INDUSTRY

WindEnergy Hamburg 2016 Preview

WORKING AT HEIGHT

Focus on Whitby & Scarborough

Foundations

JACKET INTEGRITY MONITORING

As offshore wind energy developers exploit resources further offshore and in deeper waters, the use of 'jacket' structures as foundations for turbines and transformer platforms will become more common. Jackets are made up of a lattice of welded tubular members, and are a more efficient use of material for supporting structures in deeper waters than large monopiles.

EXPOSURE

Jacket structures are exposed to cyclic loading from the sea and from the equipment that they support. These loads can lead to failure of the welds that join the jacket components together. If such failures go undetected, and are consequently not repaired, they can lead to the collapse and loss of the structure, harm to personnel, and damage to the business.

It is therefore important that operators are able to identify weld failures when they occur, assess the criticality of the failures, and implement corrective actions.

STRUCTURAL INTEGRITY MONITORING

Historically, jacket structural integrity monitoring has been carried out by divers or remotely operated vehicles. Monitoring techniques have included close visual inspections and flooded member detection to identify structural members that have become flooded because of cracked welds. These types of inspections can be costly in terms of vessel time, and involve risks to personnel.

There are potentially smarter, more efficient means of monitoring the structural integrity of offshore wind energy structures.

ACCELEROMETERS

One approach uses accelerometers to monitor the structure's motion and frequency response as it reacts to forces imposed by the wind and waves. If a weld fails, then the characteristic motion of the structure changes, and this change can be used to alert the operator to the problem. Using motion monitoring in conjunction with computer models of the structure means that it is also possible to identify the likely location of any failure.

DETECTORS

A second method employs detectors that are installed inside the jacket's members during fabrication. If a crack subsequently occurs in a weld and the member floods, the detector is activated by the presence of salt water and transmits a signal to a detector on the structure's topsides, alerting the operator to the failure.

MMI Engineering has completed projects analysing offshore structures and advising on structural monitoring strategies for clients in offshore renewable energy and other sectors, in the UK and the USA.

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