Jacket Substructure Fatigue Mitigation through Active Control

As offshore wind farms are being installed farther and in deeper waters offshore, new, and more sophisticated marine substructures such as jackets need to be used. Herein, a 10MW wind turbine mounted on a jacket sub structure at a mean water depth of 50 meters is investigated with regards to the fatigue design loads on the braces of the jacket. Since large wind turbines of 10MW rating have low rotor speeds (p), the modal frequencies of the sub structures approach 3p at low wind speeds, which leads to a modal coupling and resonance. Therefore an active control system is developed which provides sufficient structural damping and consequently a fatigue reduction at the substructure. The resulting reduction in fatigue design loads on the jacket structure based on the active control system is presented.

General information
Publication status: Published
Organisations: Department of Wind Energy, Aeroelastic Design, Wind Turbines
Contributors: Hanis, T., Natarajan, A.
Number of pages: 9
Pages: 3767-3775
Publication date: 2014

Host publication information
Title of host publication: Proceedings of the 11th World Congress on Computational Mechanics (WCCM XI)
Volume: 4
Publisher: International Center for Numerical Methods in Engineering
Editors: Onate, E., Oliver, X., Huerta, A.
ISBN (Print): 978-84-942844-7-2
Keywords: MATHEMATICS,, MECHANICS, Fatigue load, extreme load, active control, foundation structure
Electronic versions:
Jacket_Substructure.pdf
Source: Findit
Source ID: 275122672
Research output: Chapter in Book/Report/Conference proceeding › Article in proceedings – Annual report year: 2015 › Research › peer-review