Advanced Blade Testing and Digitalization for Large Offshore Wind Turbines

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Abstract: Advancing beyond the historic feasibility limits deemed by designers, wind turbine rotor blades have eventually surpassed the 100m milestone, making them reside among the largest single components in the world made of fiber composite materials. For wind turbines to operate continuously and cost-efficiently, rotor blades must maintain their structural integrity and reliability. This is particularly so when large offshore wind turbines are installed in typhoon- and hurricane-prone regions. In this presentation, advances and critical issues will be addressed on advanced blade testing, high-performance modeling, and digitalization using Industry 4.0 technologies. This presentation will identify the established knowledge, the latest achievements, the topical research fields and the current challenges for future research and development of composite rotor blade structures for large offshore wind turbines. Field observations, laboratory experiments, numerical simulations and data analytics will be covered in this presentation.

Speaker Bio: Xiao Chen

Xiao Chen is Associate professor in the department of wind energy at Technical University of Denmark. He received his doctoral degree in structural engineering in 2011 from Nagoya University in Japan and worked as a postdoctoral research fellow in the National Wind Energy Center at the University of Houston, Texas, USA. From 2013, he was an assistant professor and then associate professor at the Chinese Academy of Sciences in Beijing before he joined DTU Wind Energy in 2017. He is currently a member of several international scientific and technical committees such as International Ship and Offshore Structures Congress, Villum Center for Advanced Structural and Material Testing, International Conference on Composite Structures, and International Conference on Mechanics of Composites. He is work package leader in the DARWIN project funded by the Innovation Fond of Denmark, and also in the RELIABLADE and RELIFE projects, both supported by the Danish Energy Agency through the Danish Energy Technology Development and Demonstration Program. He has published more than 20 research articles and supervised Ph.D. students and research projects in advanced testing and high-performance modeling of large composite structures with a focus on structural integrity and digitalization.

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