

Validation of an Aero-Acoustic Wind Turbine Noise Model Using Advanced Noise Source Measurements of a 500kW Turbine - DTU Orbit (08/11/2017)

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The measurement of a 500 kW stall-regulated wind turbine is investigated. Microphones located relatively close to the wind turbine are used to measure its acoustic emission. The operational conditions of the turbine, such as wind speed, are simultaneously monitored. In parallel, a wind turbine rotor noise model is presented. It includes the main sources of aeroacoustic noise from wind turbines: turbulent inflow, trailing edge and stall noise. The noise measured by one microphone located directly downstream of the wind turbine is compared to the model predictions at the microphone location. A good qualitative agreement is found. When wind speed increases, the rotor noise model shows that at high frequencies the

stall noise becomes dominant. It also shows that turbulent inflow noise is dominant at low frequencies for all wind speeds and that trailing edge noise is dominant at low wind speeds and at frequencies above 200 Hz.

General information

State: Published

Organisations: Department of Wind Energy, Aerodynamic design

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Number of pages: 9

Publication date: 2016

Host publication information

Title of host publication: 2016 Proceedings of 16th International Symposium on Transport Phenomena and Dynamics of Rotating Machinery

Main Research Area: Technical/natural sciences

Conference: 16th International Symposium on Transport Phenomena and Dynamics of Rotating Machinery, Honolulu, Hawaii, United States, 10/04/2016 - 10/04/2016

Wind Turbine Noise, Field Measurements, Modelling, Code Validation, Turbulent Inflow Noise, Trailing Edge Noise, Stall Noise

Source: PublicationPreSubmission

Source-ID: 123938209

Publication: Research - peer-review › Article in proceedings – Annual report year: 2016