ECN Wind Energy Industrial Support

Wind Turbine Noise Evaluation

EWIS

Being one of the leading institutes on wind energy research, ECN established the EWIS (ECN Wind Industrial Support) group in 2009 to better bring the R&D results to the market. During the last three decades, ECN has developed expertise on aerodynamics, structural analyses, turbine control, offshore operation and maintenance, and grid connection. With the growing wind industry, ECN received more requests for assistance and EWIS has become the vehicle to support the wind energy industry in their product developments.

EWIS's focus is on the high end of the market which means that we will make use of tools and knowledge that have been developed in-house and include the latest R&D results!

The EWIS team is a mixture of young professionals and experienced researchers which ensures a fast response and high quality.

More information

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Description of service

The Service

Acoustic noise is an important driver for wind turbine rotor design. A quiet blade design allows turbines to be sited more easily and in addition, for the same noise levels, higher rotational speeds may be chosen resulting in a higher energy production. Preferably the noise constraints should be taken into account at an early stage during the rotor design. In practice however, noise evaluation is often performed after the aerodynamic blade design has been completed. ECN Wind Energy evaluates the acoustic emission of a rotor in close cooperation with the customers by taking into account all the requirements and restrictions according to the customers' particular requirements.

The Noise Evaluation Approach

Experienced researchers of ECN use the sophisticated and validated tools SILANT and BLADMODE for the rotor noise evaluation. These tools are continuously being improved at ECN using the latest field and wind tunnel measurements. The evaluation starts with obtaining the required input on the blade geometry and operational conditions from the client. Using these inputs, a prediction is made of the strength of the various noise sources on the blade.

The Results

At the end of the evaluation the noise emission of the rotor is quantified. The turbulent trailing edge noise (including separation-stall noise) and inflow noise source distributions along the blade span are given in terms of non-weighted as well as A-weighted Sound Power Levels. In addition to that, an estimate is given for tip noise due to the tip vortex interaction with the trailing edge of the tip region. Both the frequency content (1/3-Octave Band levels) as well as the overall noise levels are given.

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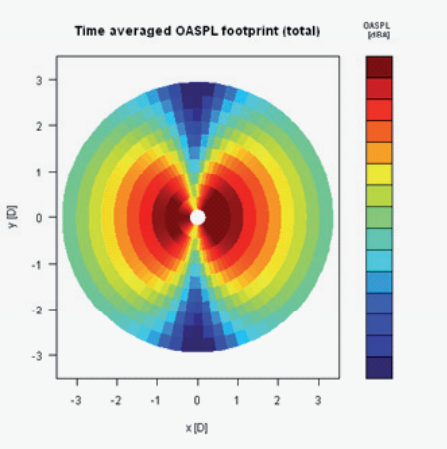
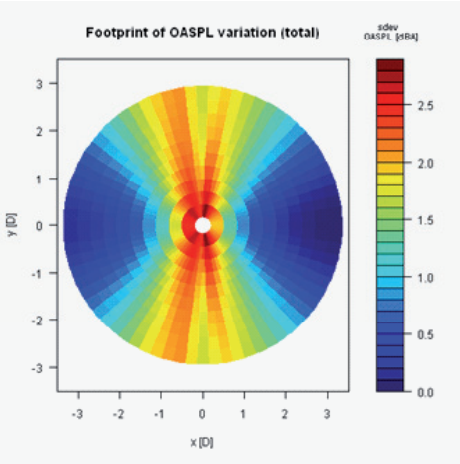
Additional Services

In addition to the determination of the rotor noise sources, optionally, the noise immission can be calculated, by taking into account the relevant propagation effects. The noise footprint in the vicinity of the turbine can be determined as a function of rotor azimuth angle assuming flat surroundings.





A unique feature of the ECN noise analysis is that the software packages used in the process can be acquired. This enables the in-house analyses of the effect of changes to the blade design. Please check www.ewis.nl for more details about software packages and other services.

The Experience

Over the last years ECN has performed many blade noise assessments for a variety of wind turbine manufacturers. The comparison of ECN noise predictions to field measurements have provided us with confidence in the accuracy of our evaluation tools. The comparison performed within the framework of the EU project SIROCCO serves as an excellent example.

Ask ECN for a competitive offer for the noise analysis of your blades.
EWIS will provide the results using the state-of-the-art tools developed at ECN Wind Energy delivered by experienced researchers.

For more information about this service:

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