NUMERICAL AND EXPERIMENTAL STUDY ON AERODYNAMIC NOISE OF A SMALL WIND TURBINE

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This paper predicted and measured the aerodynamic noise of a small wind turbine, and validated the predicted results with that of the field measurements. The aerodynamic noise spectrum was predicted using semi-empirical models proposed by Lowson[1] and Brooks, Pope, and Marcolini[2]. The results indicated that the numerical method used in this study was a suitable tool for predicting the aerodynamic noise spectrum of small wind turbines. It is also found that trailing edge bluntness noise can be an important noise source for a small wind turbine.

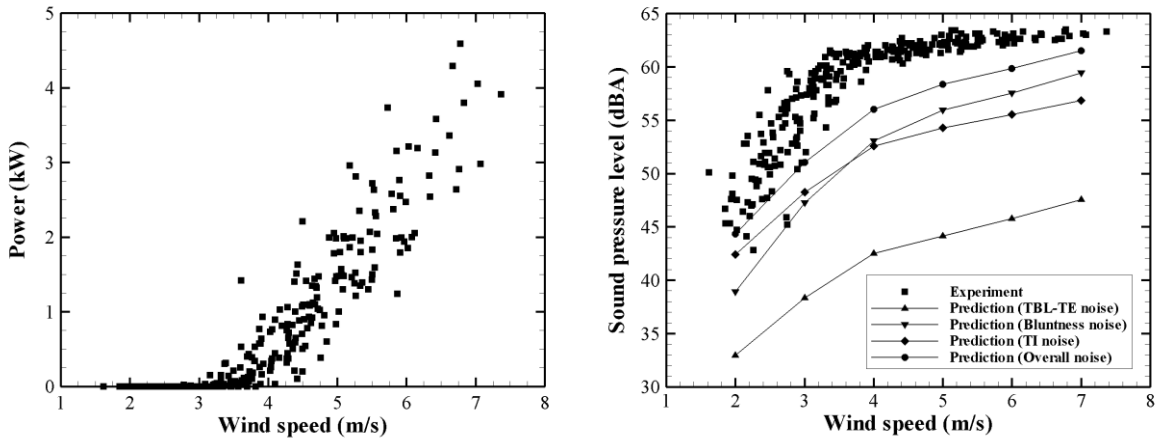

Figure 1. The wind turbine power output and A-weighted sound pressure level with respect to wind speeds

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References

[1] M. V. Lowson, Theory and experiment for wind turbine noise, AIAA Paper 94-0119, 32nd Aerospace Sciences Meeting and Exhibit (1994)

[2] T. F. Brooks, D. S. Pope, and M. A. Marcolini, Airfoil self-noise and prediction, NASA reference publication 1218 (1989)