THE INFLUENCE OF TRAILING EDGE SHAPE ON VORTEX SHEDDING NOISE

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The effect of airfoil trailing edge shape on the wake dynamic and flow induced noise is investigated at Reynolds number, Re=3.7×10^5 to 6.7×10^6. Two flat-plates with blunt and wedged trailing edges and three wind turbine root blade airfoils with baseline, blunt and oblique trailing edges are simulated. The flow field is computed by Reynolds-averaged Navier Stokes simulation and large eddy simulation. The airfoil self-noise is computed using Ffowcs-Williams and Hawkings equation. A significant reduction of vortex shedding noise is obtained with the wedged and oblique trailing edges. The unequal distance between the upper and lower vortices in the near field, generated by the beveled trailing edge, is the main reason of the quasi-tonal airfoil self-noise reduction. The redistribution of wake field by the interaction between upper and lower vortices can be applied to the reduction of blunt trailing edge vortex shedding noise for flatback airfoils.

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