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# Investigations of Flow Field with Different Turbulence Models on NREL Phase VI Blade

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**Abstract :** Wind energy is one of the clean renewable energy. However, the low frequency (20-200HZ) noise generated from the wind turbine blades, which bothers the residents, becomes the major problem to be developed. It is useful for predicting the aerodynamic noise by flow field and pressure distribution analysis on the wind turbine blades. Therefore, the main objective of this study is to use different turbulence models to analyse the flow field and pressure distributions of the wing blades. Three-dimensional Computation Fluid Dynamics (CFD) simulation of the flow field was used to calculate the flow phenomena for the National Renewable Energy Laboratory (NREL) Phase VI horizontal axis wind turbine rotor. Two different flow cases with different wind speeds were investigated: 7m/s with 72rpm and 15m/s with 72rpm. Four kinds of RANS-based turbulence models, Standard k-ε, Realizable k-ε, SST k-ω, and v2f, were used to predict and analyse the results in the present work. The results show that the predictions on pressure distributions with SST k-ω and v2f turbulence models have good agreements with experimental data.

**Keywords :** horizontal axis wind turbine, turbulence model, noise, fluid dynamics
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