

6<sup>th</sup> International Conference on

# Aerospace and Aerodynamics

August 02-03, 2018 | Barcelona, Spain

## Research on dynamic wind tunnel test technology for wind turbine airfoil

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The dynamic oscillation process of wind turbine is usually accompanied by pitching and lag. The pitching oscillation will cause the actual limit load of wind turbine to be higher than the design and calculation value, while the lag motion may reduce the limit load at most time. Due to the unclear understanding of many dynamic problems previously, the engineering design tends to be safer at the cost of increasing the weight of blade structure. Therefore, the influence of lag oscillation is usually ignored. Research on the dynamic characteristics of wind turbine airfoil is mainly focused on pitching, while research on the lag oscillation problem is lack in the public literature. In order to obtain more comprehensive and accurate wind turbine load value, and obtain the design scheme of multi-objective optimization, it is necessary to study the influence of lag oscillation on the dynamic load characteristics of wind turbine airfoil, which will be of great significance to the design of large diameter wind turbines. In view of this, the wind tunnel test method for research on dynamic aerodynamic characteristics of pitching and lagging oscillating wind turbine airfoil was established in this paper, and the electronic cam technology was used instead of the mechanical cam to drive the oscillating mechanism directly, the stepless adjustment of the oscillating frequency and angle was realized. Besides, dynamic pressure measurement, PIV and fluorescent silk test were carried out respectively. The accuracy of the test results is high, the regular pattern is reasonable. Research shows that: there is also obvious hysteresis effect on the dynamic aerodynamic parameters of lag oscillation airfoil with the changing of the angle of attack. The dynamic test technique of lag oscillation established in this paper can provide technical support for the study of the dynamic swept effect of the wind turbine airfoil.

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