

Experimental Investigation of S822 and S823 Wind Turbine Airfoils Wake

Authors : Amir B. Khoshnevis, Morteza Mirhosseini

Abstract : The paper deals with a sub-part of an extensive research program on the wake survey method in various Reynolds numbers and angles of attack. This research experimentally investigates the wake flow characteristics behind S823 and S822 airfoils in which designed for small wind turbines. Velocity measurements determined by using hot-wire anemometer. Data acquired in the wake of the airfoil at locations(c is the chord length): $0.01c - 3c$. Reynolds number increased due to increase of free stream velocity. Results showed that mean velocity profiles depend on the angle of attack and location of data collections. Data acquired at the low Reynolds numbers (smaller than 10^5). Effects of Reynolds numbers on the mean velocity profiles are more significant in near locations the trailing edge and these effects decrease by taking distance from trailing edge toward downstream. Mean velocity profiles region increased by increasing the angle of attack, except for 7° , and also the maximum velocity deficit (velocity defect) increased. The difference of mean velocity in and out of the wake decreased by taking distance from trailing edge, and mean velocity profile become wider and more uniform.

Keywords : angle of attack, Reynolds number, velocity deficit, separation

Conference Title : ICFSFMAD 2016 : International Conference on Flow Sciences, Fluid Mechanics and Aerodynamic Design

Conference Location : Istanbul, Türkiye

Conference Dates : January 25-26, 2016