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Aerodynamic Behavior at One Revolution Angle of Attack of Two-Dimensional Wings[1] YONG OUN HAN, School of Mechanical Engineering, Yeungnam University, EUN HA LEE, Graduate Student, JEONG HYUN KIM, Research Associate, YONG OH SHIN, WESTEC — In order to investigate aerodynamic behaviors at extreme angles of attack beyond the normal static stall angle and in the reversed flow, lift and drag have been measured at one revolution angles of attack by rotating the wing around the 1/4 chord with use of a dynamic balance in the low speed wind tunnel. Three different geometries of wing section; a flat plate, a symmetric airfoil, NACA0018, and a cambered airfoil, Goe222, were selected for these experiments. It was turned out that the lift coefficient maintains substantially even beyond the traditional stall AoA of the wing. Drag coefficients of these wings showed sinusoidal profiles, and polar plots of Cl versus Cd provided distinctive behaviors unseen in the calculation by the classical wing theory. Application of the cyclic aerodynamic characteristics to a vertical axis wind turbine and wake characteristics around the critical angle will be displayed.

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Yong Oun Han
School of Mechanical Engneering, Yeungnam University

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