Abstract

Aerodynamic characteristics of inverted single element airfoil with and without ground effect had been investigated experimentally in Low-Speed Wind Tunnel of test cross section area (0.7x0.7 m²) and maximum velocity 55 m/s to quantify the aerodynamic characteristics of inverted CLARK-Y smoothed airfoil. The ground effect was introduced by using a fixed flat board moves vertically to produce the required distance between the airfoil and ground board. The model was tested with and without ground effect and at various wind tunnel velocities (Reynolds numbers), ride heights (ground clearances) and angles of attack. Data obtained in airfoil experiments include sectional forces and surface pressure data. Results are compared with the free-drive case and with published works. Data indicated that the pressure distribution increased at the upper and lower surfaces in ground proximity, at low angles of attack, and increased also with incidence. The negative lift coefficient increased with angle of attack except the angles of attack larger than 10° and with ground effects except at ride heights of less than 0.1c due to the force reduction phenomena. The drag coefficient increased with the ground effect which caused a decrease in the airfoil efficiency. The aerodynamic characteristics remain relatively an affected
by the velocity change. The experimental data were compared with published works and showed good results.

References


Index Terms

Computer Science  Applied Sciences
Keywords