

عنوان مقاله:

Numerical Analysis of Effects of Gurney Flaps Considering Deflected Configurations

محل انتشار:

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خلاصه مقاله:

The aerodynamic forces and flow structures of two airfoils (NACA 0012-NACA 0015) with several configurations and Gurney flaps, a tab of small length (1–4% of the airfoil chord) that protrudes perpendicular to the chord at the trailing edge, at different Reynolds numbers, considering different turbulence models, are investigated by numerically solving the Navier-Stokes equations. Both two-dimensional and three-dimensional studies have been conducted, by utilization of quadratic meshes, low computation time has been achieved. Both 2D and 3D computations agree with experimental data in lift and drag coefficient and shows that the addition of a Gurney flap increases the maximum lift coefficient, however there was a drag increment at low-to-moderate lift coefficient. In addition, the boundary layer profile measurements were taken. In case of NACA 0012, the effective Gurney flap height is about 2% of chord length, which provides the highest lift-to-drag ratio among the investigated configurations when compared with the clean NACA 0012 airfoil. In this case, the device remains within the boundary layer. For lift increment with very little penalty in drag, deflected Gurney flaps are investigated numerically. Results make deflected Gurney flaps more .feasible in case of load limitations such as applications to wind turbine, racing-car spoilers and UAV's

کلمات کلیدی:

Numerical analysis, Deflected Gurney Flaps, Aerodynamic Coefficients

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