عنوان مقاله:

On the Reliability of Eddy Viscosity Based Turbulence Models in Predicting Turbulent Flow past a Circular Cylinder Using URANS Approach

نویسندگان:

B. N. Rajani - *CTFD Division, National Aerospace Laboratories(CSIR), Bangalore, ۵۶۰ ۰۱۷ India*

A. Kandasamy - *DMACS, National Institute of Technology Karnataka, Surathkal ۵۷۵ ۰۲۵, India*

S. Majumdar - *Dept. of Mech. Engg., NITTE Meenakshi Institute of Technology, Bangalore ۵۶۰ ۶۴۰, India*

خلاصه مقاله:

Turbulent flow past circular cylinder at moderate to high Reynolds number has been analysed employing an secondorder time accurate pressure-based finite volume method solving two-dimensional Unsteady Reynolds Averaged Navier Stokes (URANS) equations for incompressible flow, coupled to eddy-viscosity based turbulence models. The major focus of the paper is to test the capabilities and limitations of the present turbulence model-based ۲D URANS procedure to predict the phenomenon of Drag Crisis, usually manifested in reliable measurement data, as a sharp drop in the mean drag coefficient around a critical Reynolds number. The computation results are compared to corresponding measurement data for instantaneous aerodynamic coefficients and mean surface pressure and skin friction coefficients. Turbulence model-based URANS computations are in general found to be inadequate for correct prediction of the mean drag coefficients, the Strouhal number and also the coefficients of maximum fluctuating lift over the range of flow Reynolds number varying from ۱۰۴ to ۱۰۷.

کلمات کلیدی:

Drag crisis, Turbulent flow, Circular cylinder, Unsteady RANS procedure, Eddy viscosity based turbulence models, Implicit finite volume method

لینک ثابت مقاله در پایگاه سیویلیکا:

https://civilica.com/doc/1385274