

Numerical Simulation of External Flow Around D-Shaped Cylinders

Authors : Ouldouz Nourani Zonouz, Mehdi Salmanpour

Abstract : Investigation and analysis of flow behavior around different shapes bluff bodies is one of the reputed topics for several years. The importance of these researches is about the unwanted phenomena called flow separation. The location of separation and the size of the wake region should be considered in different industrial designs. In this research a bluff body with D-shaped cross section has been analyzed. In circular cylinder flow separation point changes with Reynolds number but in D-Shaped cylinder there is fix flow separation point. So there is more wake steadiness in D-Shaped cylinder as compared to Circular cylinder and drag reduction because of wake steadiness. In the present work CFD simulation is carried out for flow past a D-Shaped cylinder to see the wake behavior. The Reynolds number regime currently studied corresponds to low Reynolds number and nominally two-dimensional wake. Also the effect of D-Shaped cylinders on the rate of heat transfer has been considered. Various results such as velocity, pressure and temperature contours and also some dimensionless numbers like drag coefficient, pressure coefficient and Nusselt number calculated for different cases.

Keywords : D-shaped, CFD, external flow, low Reynolds number, square cylinder

Conference Title : ICMME 2015 : International Conference on Mechanical and Materials Engineering

Conference Location : Amsterdam, Netherlands

Conference Dates : May 14-15, 2015