World Academy of Science, Engineering and Technology
International Journal of Mathematical and Computational Sciences
Vol:9, No:03, 2015

Numerical Simulation of Flow Past Inline Tandem Cylinders in Uniform Shear Flow

Authors : Rajesh Bhatt, Dilip Kumar Maiti

Abstract : The incompressible shear flow past a square cylinder placed parallel to a plane wall of side length A in presence of upstream rectangular cylinder of height 0.5A and width 0.25A in an inline tandem arrangement are numerically investigated using finite volume method. The discretized equations are solved by an implicit, time-marching, pressure correction based SIMPLE algorithm. This study provides the qualitative insight in to the dependency of basic structure (i.e. vortex shedding or suppression) of flow over the downstream square cylinder and the upstream rectangular cylinder (and hence the aerodynamic characteristics) on inter-cylinder spacing (S) and Reynolds number (Re). The spacing between the cylinders is varied systematically from S = 0.5A to S = 7.0A so the sensitivity of the flow structure between the cylinders can be inspected. A sudden jump in strouhal number is observed, which shows the transition of flow pattern in the wake of the cylinders. The results are presented at Re = 100 and 200 in term of Strouhal number, RMS and mean of lift and drag coefficients and contour plots for different spacing.

Keywords : square cylinder, vortex shedding, isolated, tandem arrangement, spacing distance
Conference Title : ICTCM 2015 : International Conference on Theoretical and Computational Mechanics
Conference Location : Paris, France
Conference Dates : March 30-31, 2015