

A CFD Study of the Performance Characteristics of Vented Cylinders as Vortex Generators

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Abstract : This paper mainly researched on influence of vortex generator on lift coefficient and drag coefficient, when vortex generator is mounted on a flat plate. Vented cylinders were used as vortex generators which intensify vortex shedding in the wake of the vented cylinder as compared to base line circular cylinder which ensures more attached flow and increases lift force of the system. Firstly vented cylinders were analyzed in commercial CFD software which is compared with baseline cylinders for different angles of attack and further variation of lift and drag forces were studied by varying Reynolds number to account for influence of turbulence and boundary layer in the flow. Later vented cylinders were mounted on a flat plate and variation of lift and drag coefficients was studied by varying angles of attack and studying the dependence of Reynolds number and dimensions of vortex generator on the coefficients. Mesh grid sensitivity is studied to check the convergence of the results obtained. It was found that usage of vented cylinders as vortex generators increased lift forces with small variation in drag forces by varying angle of attack.

Keywords : CFD analysis, drag coefficient, FVM, lift coefficient, modeling, Reynolds number, simulation, vortex generators, vortex shedding

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