

## Numerical Analysis of Passive Controlled Turbulent Flow around a Circular Cylinder

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**Abstract :** In this study, unsteady two-dimensional turbulent flow around a circular cylinder and passive control of the flow with groove on the cylinder was examined. In the CFD analysis, solutions were made using turbulent flow conditions. Steady and unsteady solutions were used in turbulent flow analysis. Numerical analysis of the flow around the circular cylinder is difficult since flow is not in a stable regime when Reynold number is between 1000 and 10000. The analyses in this study were performed at a subcritical Re number of 5000 and the results were compared with available experimental results of the drag coefficient (Cd) and Strouhal (St) number values in the literature. The effect of different groove types and depths on the Cd coefficient has been analyzed and grooves increase the Cd coefficient compared to the smooth cylinder.

**Keywords :** CFD, drag coefficient, flow over cylinder, passive flow control

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