

## Experimental Study of Flow Characteristics for a Cylinder with Respect to Attached Flexible Strip Body of Various Reynolds Number

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**Abstract :** The aim of the present study was to investigate details of flow structure in downstream of a circular cylinder base mounted on a flat surface in a rectangular duct with the dimensions of 8000 x 1000 x 750 mm in deep water flow for the Reynolds number 2500, 5000 and 7500. A flexible strip was attached to behind the cylinder and compared the bare body. Also, it was analyzed that how boundary layer affects the structure of flow around the cylinder. Diameter of the cylinder was 60 mm and the length of the flexible splitter plate which had a certain modulus of elasticity was 150 mm ( $L/D=2.5$ ). Time-averaged velocity vectors, vortex contours, streamwise and transverse velocity components were investigated via Particle Image Velocimetry (PIV). Velocity vectors and vortex contours were displayed through the sections in which boundary layer effect was not present. On the other hand, streamwise and transverse velocity components were monitored for both cases, i.e. with and without boundary layer effect. Experiment results showed that the vortex formation occurred in a larger area for  $L/D=2.5$  and the point where the vortex was maximum from the base of the cylinder was shifted. Streamwise and transverse velocity component contours were symmetrical with reference to the center of the cylinder for all cases. All Froude numbers based on the Reynolds numbers were quite smaller than 1. The flow characteristics of velocity component values of attached circular cylinder arrangement decreased approximately twenty five percent comparing to bare cylinder case.

**Keywords :** partial image velocimetry, elastic plate, cylinder, flow structure

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