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Flow Interference between a Square (Upstream) and a Circular Cylinder: Flow Pattern Identification NITHIN S. KUMAR, AJITH KUMAR R, JAYALAKSHMI MOHAN, Department of Mechanical Engg, AMRITA University, Amritapuri Campus, Kerala, India — In this paper, flow interference between an upstream square cylinder and a circular cylinder of equal size is studied in tandem arrangement. The main objective of this investigation is to identify the possible flow patterns at different spacing ratios, L/B where L is the centre-to-centre distance between the cylinders and B is the characteristic dimension of the bodies. All the experiments are conducted in a water channel and the test Reynolds number is 2100 (based on B). L/B is varied from 1.0 to 5.0. The flow visualization experiments are videographed and then analyzed frame-by-frame to capture the finer details of the flow patterns. Flow over single square and circular cylinders is analyzed first. Then, flow interference between two square cylinders is investigated. Subsequently, flow over a square-circular configuration is investigated. No such systematic studies are reported so far. Different flow patterns are observed for the square-circular configuration. Additionally, the time of persistence of each flow pattern have been recorded over a sufficiently long period of time to see the most dominant flow pattern. The schedule of occurrence of flow patterns have also been studied during this investigation. This study bears considerable practical relevance in the context of possible interference effects occurring in engineering structures such as buildings, bridges etc.

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