

Abstract Submitted
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Spanwise correlation in the wake of circular cylinder and normal plate placed inside a pipe AMIT AGRAWAL, ARUMURU VENUGOPAL, S.V. PRABHU, Indian Institute of Technology Bombay India — The spanwise correlation of a circular cylinder and normal plate placed inside a pipe in fully developed turbulent regime is studied using hotwire anemometer. The present configuration possesses complex fluid structure interaction owing to the following features: high blockage effect, low aspect ratio of the body, upstream turbulence and interaction of axisymmetric flow with a two dimensional bluff body. Three different blockage ratios (0.14, 0.19 and 0.28) are considered. Correlation coefficient was observed to be improved with increase in blockage ratio. Compared to a circular cylinder, a normal plate possesses high correlation length. The near wall effects tend to increase the phase drift, which is reflected in low correlation coefficients. The results show that the simultaneous effect of curvature, low aspect ratio and upstream turbulence reduces the correlation coefficients significantly as compared to unconfined and confined (parallel channel) flows. The three dimensionality of vortex shedding for normal plate with a blockage ratio of 0.28 was observed to be lower compared to circular cylinder and all other blockage ratios. Low frequency modulations were found to be responsible for weak vortex shedding from a circular cylinder compared to a normal plate.

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