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PIV Measurement Downstream of Perforated Cylinder in Deep Water

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ABSTRACT

The flow structure of perforated circular cylinders was thoroughly scrutinized by using the technique of high-image-density Particle Image Velocimetry (PIV). The perforated circular cylinder diameter (D=100 mm), was kept constant during the experimental investigation and corresponding Reynolds number was Re=10000 based on the cylinder diameter. Turbulent statistics e.g., planar turbulent kinetic energy, stream-wise Reynolds normal stress, transverse Reynolds normal stress and Reynolds shear stress were computed in the wake region in order to reveal the differences among various porosities in the range of $0.25 \leq \beta \leq 0.80$. It would be noted that by increasing porosity, β the flow fluctuations are substantially reduced in the wake region according to the PIV results. As a result, the prevention of Karman Vortex Street was accomplished by the use of perforated cylinders because of elongated and fragmented shear layers and reduced magnitudes of vortices.

KEYWORDS

Flow structure; Deep water; Perforated cylinder; PIV

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