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Vortex shedding from cylinders with circular fins JEFF MCCLURE, SERHIY YARUSEVYCH, University of Waterloo — The flow development around uniform cylinders with circular fins is investigated experimentally. Finned cylinders with a diameter ratio (D/d) of two, a fin thickness ratio (t/d) of 0.027, and a range of fin pitch ratios $0.083 \leq c/d \leq 1.0$ are studied at a Reynolds number (Re_D) of 3150, which pertains to the separated shear layer transition regime. All experiments are performed in a water flume facility using time-resolved, two-component, planar Particle Image Velocimetry measurements in spanwise and transverse planes, as well as Laser Doppler Velocimetry. The independent PIV measurements in two different planes capture spatio-temporal development of the main vortical structures in the cylinder wake. A comparative analysis of the results obtained for uniform and finned cylinder models is performed to investigate the effect of circular fins and their spacing on turbulent wake development. The experimental data is used to characterize the near-wake development, vortex formation, and the evolution of coherent structures. The results show that vortex shedding characteristics exhibit strong dependence on the fin pitch ratio and, for a given pitch ratio, differ significantly from those observed for a uniform cylinder of equivalent diameter.

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