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Wake behaviour behind circular disks with different aspect ratio

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ABSTRACT

Flow past a disk was investigated experimentally in a low velocity water channel in the range of intermediate Reynolds number. It is presented systematic experiments with flow visualisation (Fig.1) and PIV measurements in order to measure the velocity field in the wake of a disk. Different disks with aspect ratio ($AR=d/h$) varying from 1 to 24 were investigated. The measurements were performed in the range of the Reynolds numbers from 50 to 500, where stationary and oscillatory instability appear. It was determined the value of the on-set instability, distance between two counter-rotating vortices, length changes in recirculation zone and vorticity evolution, as a function of aspect ratio. Next, research was focused on evolution of hairpin shedding after second bifurcation. On basis of gathered data it is shown the evolution of perturbation and obtained bifurcation branches on the instability (Fig.2).

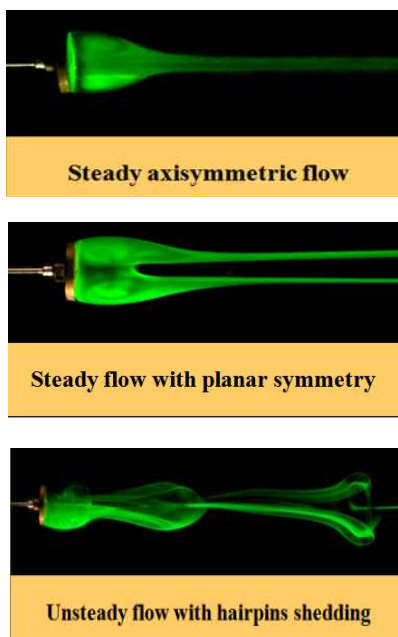


Fig.1. Visualisation patterns (top view)

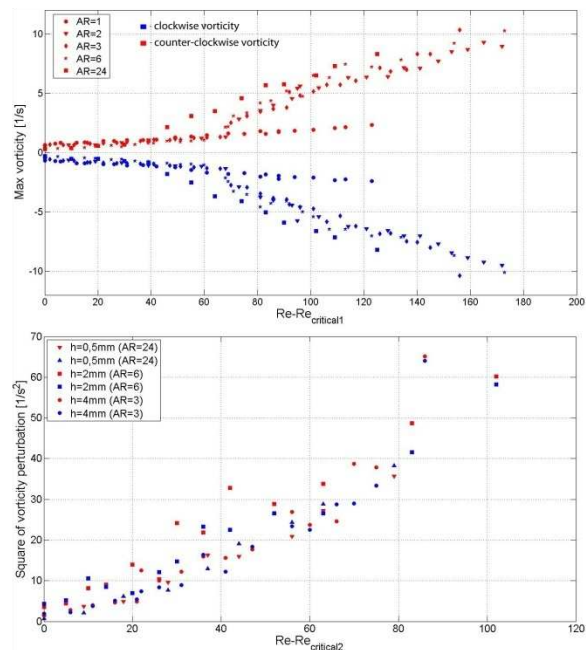


Fig.2. Vorticity bifurcation curve and square of vorticity perturbation for different aspect ratios.

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