

A vortex ring travelling across a thin circular cylinder

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Some specific features, primarily observed by smoke visualization, are described for a vortex ring interaction with a thin bluff body in the shape of a circular cylinder. Secondary vortices were found to be induced by boundary layer separation from the cylinder surface when the vortex ring travelled across it, and played a crucial role in the subsequent flowfield. The main vortex ring itself underwent distortion and moved like an elliptical ring. The ratio of the cylinder diameter to the core diameter of the vortex ring was found to be an essential parameter which governs the vortex motion after crossing the circular cylinder. In particular, the velocity of the vortex ring decreased as the ratio increased from 0.0063 to 0.25, but then increased as the ratio increased from 0.25 to 0.38. Increasing the ratio above 0.38 resulted in the velocity again decreasing after crossing the cylinder

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