

Abstract Submitted
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The Effect of Flow Curvature on the Axisymmetric Wake¹ MAR-LIN HOLMES, JONATHAN NAUGHTON, University of Wyoming — The swirling turbulent wake is a perturbation to the canonical axisymmetric turbulent wake. Past studies of the axisymmetric turbulent wake have increased understanding of wake Reynolds number influence on wake characteristics such as centerline wake velocity deficit and wake width. In comparison, the axisymmetric turbulent swirling wake has received little attention. Earlier work by our group has shown that the addition of swirl can change the characteristics of the wake. The goal of this current work is to examine how wake mean flow quantities are related to the wake Reynolds number and the swirl number, where the latter quantity is the ratio of the angular momentum flux to the axial momentum deficit flux. A custom designed swirling wake generator is used in a low turbulence intensity wind tunnel flow to study the turbulent swirling wake in isolation. Stereoscopic Particle Image Velocimetry is used to obtain three component velocity fields in the axial-radial plane. From this data, the wake Reynolds number, the swirl number, centerline velocity decay, wake width, and other relevant wake mean flow quantities are determined. Using these results, the impact of swirl on wake development is discussed.

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