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An investigation into blockage corrections for cross-flow hydrokinetic turbine performance ROBERT CAVAGNARO, BRIAN POLAGYE, University of Washington — The performance of hydrokinetic turbines is augmented in confined channels, such that the coefficient of performance is elevated versus free-stream conditions. This often introduces uncertainty when characterizing prototype-scale turbines in flume or tow tank facilities. Performance of a one-quarter scale helical, cross-flow turbine is characterized over a range of operating conditions (inflow velocity and tip-speed ratio) at blockage ratios (ratio of rotor swept area to channel area) of $\sim$10 and $\sim$25%. Particle image velocimitry is used to characterize rotor induction, as well as the turbulent wake produced by the turbine. Performance at the different blockage ratios is compared to corrections derived from actuator disk theory and to full-scale field performance in the absence of blockage.

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