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Pressure Distribution and Velocity Profiles Around Smooth and Corrugated Cylinders of Finite Span MIKE PARKER, DOUG BOHL, Clarkson University — In this work the pressure distribution and velocity profiles around two finite aspect ratio (AR$\sim$1) cylinders is investigated for Reynolds numbers ranging from 1x10^5 to 9x10^5. The first cylinder is smooth, while the second cylinder has a corrugated surface with channels cut in the r-θ plane. The channels are approximately half the diameter in depth and twenty percent of the diameter in width. The apparent aspect ratio was increased by the addition of endplates and the resulting pressure and velocity distributions were compared. The results show that the cylinder with corrugations has a significantly higher minimum pressure coefficient compared to the smooth cylinder at all Reynolds numbers tested. Adding end plates to the cylinders caused the minimum pressure coefficients to decrease and approach that of an infinitely long smooth circular cylinder. Velocity profiles indicate that the corrugated cylinder has a significantly thicker viscous/separated region compared to the smooth cylinder. A strong dependence on Reynolds number was shown for both pressure and velocity in the range investigated.

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