

Abstract Submitted
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Effect of rib length on characteristics of separation and reattachment JACQUES W. VAN DER KINDERE, BHARATHRAM GANAPATHISUBRAMANI, University of Southampton — Ribs reproduce key elements in engineering. Their aerodynamics can be detrimental to vehicles, or harnessed favorably in motors, and heat exchangers. The flow around such obstacle includes separation upstream of the obstacle, separation and reattachment on the top surface, and separation downstream. The interaction between these different recirculation regions is affected by the obstacle's length. This study examines experimentally how the interaction between different recirculation regions evolves with rib length. The rib is submerged in a fully turbulent boundary layer ($\delta/H = 1.37$, where δ and H are respectively incoming boundary layer thickness and rib height), and the Reynolds number based on rib height is $Re_H = 20,000$. Particle Image Velocimetry synchronized with pressure measurements was carried out on the flow past ribs of different lengths. The length of the rib (distance between the two vertical faces) varied between $L = 0.1H$ and $L = 8H$. Results from this experiment will be used to compare the mean recirculation lengths of the different separation regions. Pressure distribution within the separation regions will also be examined and compared. Finally, the interaction between the different shear layers will be examined and contrasted across all cases.

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