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Flow Through Surface Mounted Continuous Slits A. TARIQ, M.A. ALI, Department of Mechanical & Industrial Engineering Indian Institute of Technology, Roorkee 247 667, INDIA, M. GAD-EL-HAK, Department of Mechanical & Nuclear Engineering Virginia Commonwealth University, Richmond, VA 23284, USA — Ribs are used inside certain gas-turbine blades as passive devices to enhance heat transfer. Slits in those ribs are utilized to control the primary shear layer. The role of secondary flow through a continuous slit behind a surface mounted rib is investigated herein in a rectangular duct using hotwire anemometry and particle image velocimetry. Changing the open-area-ratio and the slit's location within the rib dominate the observed shear layer. The behavior of discrete Fourier modes of the velocity fluctuations generated by different configurations is explored. Two distinct flow mechanisms are observed in the rib's wake. Both mechanisms are explained on the basis of large-scale spectral peak in the shear layer. The results show the successful impact of changing the open-area-ratio by manipulating the small-scale vortices at the leeward corner of the rib, which is suspected to be the potential cause of surface "hot spots" in a variety of engineering devices with heat transfer. Eventually, the size and location of the slit are seen to be an additional parameter that can be used to control the fluid flow structures behind rib turbulators.

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