Abstract Submitted
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**Effect of stationary and dynamic transverse squared bars over the turbulent behavior in a channel flow** JESUS RAMIREZ PASTRAN, CARLOS DUQUE-DAZA, Department of Mechanical and Mechatronic Engineering, Universidad Nacional de Colombia, Colombia, OMAR D LOPEZ, Department of Mechanical Engineering, Universidad de los Andes, Colombia — Turbulent flows over rough surfaces are present in different industrial scenarios. Generally, roughness is used to modify the boundary layer behavior, in order to improve heat transfer rates and mixing processes, which is usually accompanied by an increase of skin-friction drag. In the present work two different techniques for modification of the turbulent boundary layer were explored: first, the use of an arrangement of transverse squared bars (synthetic roughness); second, the use of an oscillating movement of the squared bars. In both cases the goal was to assess the increase or decrease of the skin-friction drag and the changes in the turbulent behavior of the flow. Large Eddy Simulations were carried out in order to study a fully developed turbulent channel flow with a smooth upper wall and a synthetically roughed lower wall with a friction Reynolds number around 180. Channel flow over walls with stationary bars and with one of the bars oscillating in the spanwise direction were also considered. Consistency between skin-friction coefficient modification and evolution of Q-structures was observed. Finally, a comparison of changes on some of the TKE terms between smooth surfaces and synthetically rough surfaces allowed to identify the effect of the squared bars for each case.

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