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Effect of surface morphology on drag and roughness sublayer in flows over regular roughness elements MARCO PLACIDI[1], BHARATHRAM GANAPATHISUBRAMANI, University of Southampton — The effects of systematically varied roughness morphology on bulk drag and on the spatial structure of turbulent boundary layers are examined by performing a series of wind tunnel experiments. In this study, rough surfaces consisting of regularly and uniformly distributed LEGO^{TM} bricks are employed. Twelve different patterns are adopted in order to methodically examine the individual effects of frontal solidity (λ_F, frontal area of the roughness elements per unit wall-parallel area) and plan solidity (λ_P, plan area of roughness elements per unit wall-parallel area), on both the bulk drag and the turbulence structure. A floating element friction balance based on Krogstad & Efros (2010) was designed and manufactured to measure the drag generated by the different surfaces. In parallel, high resolution planar and stereoscopic Particle Image Velocimetry (PIV) was applied to investigate the flow features. This talk will focus on the effects of each solidity parameter on the bulk drag and attempt to relate the observed trends to the flow structures in the roughness sublayer.

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