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Effect of surface finish on the onset of roughness effects in turbulent channel flow[1] MICHAEL SCHULTZ, KAREN FLACK, United States Naval Academy — The ability to reliably predict the onset of roughness effects in wall-bounded turbulent flows is an important yet elusive aim. This is especially relevant for the test engineer or experimental researcher who must specify the surface finish for a wind or water tunnel model. In this study, the effect of the surface finish resulting from sanding was investigated systematically using a turbulent channel flow facility. The experiments were conducted over a Reynolds number range of 6,000 – 64,000 based on the channel height and the bulk mean velocity. Painted surfaces sanded with a range of grit sizes were tested. The results indicate that all of these surfaces depart from hydraulically smooth behavior at roughness Reynolds numbers (k^+_{rms}) of between 0.5 and 0.7. The implications of these results with regard to model surface finish required in order to avoid roughness effects will be discussed.

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