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Appraisal of boundary layer trips for landing gear testing PHILIP MCCARTHY, GRAHAM FELTHAM, ALIS EKMEKCI, University of Toronto — Dynamic similarity during scaled model testing is difficult to maintain. Forced boundary layer transition via a surface protuberance is a common method used to address this issue, however few guidelines exist for the effective tripping of complex geometries, such as aircraft landing gears. To address this shortcoming, preliminary wind tunnel tests were performed at Re = 500,000. Surface transition visualisation and pressure measurements show that zigzag type trips of a given size and location are effective at promoting transition, thus preventing the formation of laminar separation bubbles and increasing the effective Reynolds number from the critical regime to the supercritical regime. Extension of these experiments to include three additional tripping methods (wires, roughness strips, CADCUT dots) in a range of sizes, at Reynolds number of 200,000 and below, have been performed in a recirculating water channel. Analysis of surface pressure measurements and time resolved PIV for each trip device, size and location has established a set of recommendations for successful use of tripping for future, low Reynolds number landing gear testing.

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