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High-precision study of friction between stainless steel and aluminium alloy RONALD WINTER, STEWART STIRK, AWE, Aldermaston, UK, MARK COLLINSON, Imperial College, London, UK — We have studied dynamic friction by using an impacting copper plate to drive a tapered aluminium alloy plug into a matching hole in a stainless steel outer sheath. The velocity of the back surface of the plug was measured using velocity interferometry. Unfortunately it was found that apparently identical configurations gave significantly different velocity profiles. This was taken as an indication that friction was very sensitive to the preparation or assembly of the components. Therefore a series of experiments were conducted in which the manufacturing tolerances were tightened and the assembly procedure was more carefully controlled than previously. Five experiments have been performed at the same impact velocity, (300m/s). Comparing the recent results with those fired previously it is clear that the results form three distinct groups which are different from each other, but within which the results are highly reproducible. Previous work suggested that melting of a thin layer of aluminium at the rubbing interface, an inherently unstable phenomenon, may be controlling the behaviour of the assembly. This contention is supported by post-shot metallography of the aluminium cones recovered from the latest batch of experiments

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