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X-ray microtomography study of the spallation response in Ta-W SAMUEL MCDONALD, School of Materials, University of Manchester, Manchester, M13 9PL, United Kingdom, MATTHEW COTTON, JEREMY MILLETT, NEIL BOURNE, AWE, Aldermaston, Reading, Berkshire, RG7 4PR, United Kingdom, PHILIP WITHERS, School of Materials, University of Manchester, Manchester, M13 9PL, United Kingdom — The response of metallic materials to high strain-rate (impact) loading is of interest to a number of communities. Traditionally, the largest driver has been the military, in its need to understand armour and resistance to ballistic attack. More recently, industries such as aerospace (foreign object damage, bird strike, etc.), automotive (crash-worthiness) and satellite protection (orbital debris) have all appreciated the necessity of such information. It is therefore important to understand the dynamic tensile or spallation response, and in particular to be able to observe in three-dimensions, and in a non-invasive manner, the physical damage present in the spalled region post-impact. The current study presents plate impact experiments investigating the spallation damage response of recovered targets of the tantalum alloy Ta-2.5% W. Using X-ray microtomography the damage resulting from differing impact conditions (impact velocity/stress, pulse duration) is compared and characterised in 3-D. Combined with free surface velocity measurements, the tensile failure mechanisms during dynamic loading have been identified.

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