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On the compression of Aluminium foam structures under shock DAVID TOWNSEND, NEIL K. BOURNE, CMEC, The University of Manchester, Research Complex at Harwell Rutherford Appleton Laboratory, Didcot, Oxfordshire, OX11 0FA, United Kingdom., G.J. APPLEBY-THOMAS, A. HAMEED, D. WOOD, Cranfield Defence and Security, Cranfield University, Shrivenham, Swindon, SN6 8LA, United Kingdom — Foam-based materials have an important role as both blast and impact mitigators, with their extended sub-surface structures providing multiple redundant routes for load management and distribution in the event of failure. In order to further elucidate underlying stress management mechanisms at high strain-rates, here, a series of Aluminium foams manufactured via rapid prototyping techniques were investigated via the plate-impact technique. These experiments allowed the material to be loaded under a quasi one-dimensional state of strain. The nature of pore collapse was monitored via manganin stress gauges at the target rear surface, with resultant data related back to changes in microstructure via microstructural and topographical analysis of both un-impacted and recovered target material.

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