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Numerical Simulation and Validation of Damage In AA1100 Aluminum Symmetric Taylor Impact (ROR) NICOLA BONORA, Univeristy of Cassino and Southern Lazio, NEIL K. BOURNE, SERAFINA C. GARCEA, University of Manchester, ANDREW RUGGIERO, DOMENICO GENTILE, GIANLUCA IANNITTI, GABRIEL TESTA, Univeristy of Cassino and Southern Lazio — Impact velocities for incipient and developed damage condition for AA1000-O aluminum alloy in symmetric Taylor impact tests (rod-on-rod, ROR) were predicted by means of numerical simulation. The material plastic flow was modelled using a modified version of the Rusinek-Klepaczko model and damage calculations were made using a continuum damage mechanics model updated to account for pressure effect on material damage model parameters. There were identified independently using traction test results. 3D numerical simulations of ROR, using a stochastic variation of the damage parameters, were performed to predict development of the damage pattern at different impact velocity. Successively, ROR tests were performed at several impact velocities. Soft recovered samples were scanned using X-ray tomography and analysed to produce 3D maps of nucleated voids that were then used to validate numerical simulation results.

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