Abstract Submitted
for the SHOCK17 Meeting of
The American Physical Society

Effect of Initial Grain Size on Ductile Damage of AA1100-O at High Strain Rate and Stress Triaxiality GABRIEL TESTA, NICOLA BONORA, ANDREW RUGGIERO, GIANLUCA IANNITTI, DOMENICO GENTILE, University of Cassino and Southern Lazio — The effect of the initial grain size on ductile damage development in AA1100-O aluminum at high strain rate and severe stress triaxiality was investigated. Symmetric Taylor impact (rod-on-rod, RoR) specimens were machined from extruded bars and annealed at 350 °C for different times to obtain three grain sizes (147, 159 e 189 μm). Numerical parametric investigation to assess the impact velocity for incipient damage development were made using a modified formulation of Rusinek-Klepaczko constitutive model and the Bonora damage model considering pressure effect and stochastic material variability on the damage parameters. Tests at estimated impact velocities, for incipient and fully developed damage condition, were performed. Soft recovered specimens were sectioned and polished to evaluate damage extension to compare with numerical simulation results.

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Date submitted: 27 Feb 2017 Electronic form version 1.4