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Deformation and Failure of OFHC Copper Under High Strain Rate Shear Compression ANDREW RUGGIERO, GABRIEL TESTA, NICOLA BONORA, University of Cassino and Southern Lazio, GIANLUCA IANNITTI, TECHDYN Engineering, ITALO PERSECHINO, University of Cassino and Southern Lazio, MAGNUS HÖRNQVIST, NOOSHIN MORTAZAVI, Chalmers University of Technology — Hat-shaped specimen geometries were developed to generate high strain, high-strain-rates deformation under controlled, prescribed conditions. These specimen geometries offer also the possibility to investigate the occurrence of ductile rupture under low (close to zero) or negative stress triaxiality where most of failure models fails. In this work, three top-hat specimen geometries were designed, by means of extensive numerical simulation, to obtain desired stress triaxiality values at the center of the adiabatic shear band that develops across the ligament. Material failure was simulated using CDM model formulation with unilateral condition for damage accumulation and validated comparing with quasi-static and high strain rate compression tests results on OFHC copper. Preliminary results seem to indicate that ductile tearing in the shear band initiates at the specimen corner location where positive stress triaxiality occurs because of local rotation and eventually propagates along the ligament.

Andrew Ruggiero
University of Cassino and Southern Lazio

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