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Damage Characterization in Copper Deformed Under Hydrostatic Stress - Experimental Analysis PHILIP FLATER, Air Force Research Laboratory, ROBERT DE ANGELIS, University of Florida/GERC, JOEL HOUSE, Air Force Research Laboratory, NICOLA BONORA COLLABORATION[1] — This paper presents an experimental investigation to characterize the effect of damage created by hydrostatic tensile loading on the properties of copper. Three metallurgical conditions were investigated: half-hard OFHC copper in the as worked, annealed 2hr at 400°C (∼40 micron grain diameter), and annealed 2hr at 800°C (∼80 micron grain diameter). Quasi-static testing of each condition included uniaxial tension and compression, round notched bar tension, and flat tapered bar tension. Dynamic properties under uniaxial tension and compression were tested using a split-Hopkinson pressure bar. Damaged structures were created employing Taylor impact tests and rod-on-rod impact experiments. The resulting damage was characterized employing optical and scanning electron microscopy. Quasi-static compression samples machined from recovered samples were tested to determine the influence of damage on deformation behavior and elastic modulus. The compression experimental results will be discussed in relationship to the starting microstructure and subsequent damaged material.

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