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Modeling Small-Scale Damage Experiments with TEPla ANN KAUL, Los Alamos National Laboratory — Small-scale experiment simulations provide both focused model validation and parameter value development. Material response to loading is a complex mixture of simultaneously occurring processes such as hardening, melting and failure. The work presented here concentrates on the TEPla model of ductile failure development and evolution. Simulation results for two small-scale experiments are presented. A biaxial loading experiment is described in "Plastic Deformation and Fracture of Steels Under Dynamic Biaxial Loading" (C.K. Syn, et al., UCRL-CONF-205148). A gas-gun driven flyer plate impacts a buffer plate. The generated non-planar shock is transmitted through the buffer into a target plate, which is very thin in comparison to its diameter. The result is a biaxial tensile load which causes the target to stretch and fracture and provides a non-uniaxial test of TEPla. The RDamage experimental series studies damage initiation and fracture followed by spall layer recollection (A.M. Kaul, et al., Proc. APS-SCCM-2009). An electromagnetically-driven cylindrical shell impacts a cylindrical target shell, producing a failure surface and released spall layer. An extended EM drive allows recollection of this layer. Simulation tests parameter values for development and crush-out of porosity.

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