Abstract Submitted
for the SHOCK07 Meeting of
The American Physical Society

Experimental Series on Behavior of Post-Damage Recollected Material ANN KAUL, GEORGE RODRIQUEZ, Los Alamos National Laboratory — Spallation damage, a typical method of failure for ductile materials, results from the nucleation, growth and coalescence of voids caused by high tensile stress. Specific areas of research on spallation damage include the damage initiation regime in convergent geometry, behavior of material recollected after damage, and effects of convergent geometry (shear stresses, etc.) on the material response. Currently, models of spallation phenomena are typically based on experiments using a planar configuration, where a significant body of data exists from gas gun, laser and high-explosive experiments. Planar experiments allow for one-dimensional analysis of the evolution of failure characteristics. Using a cylindrical configuration to study spallation damage, however, requires the consideration of physical effects not present in the planar configuration. Cylindrical experiments allow for a careful analysis of the effect of convergence and two-dimensional strains and shear stresses on the spallation profile of a material. These experiments challenge existing computational material models and databases and provide motivation to improve these models and increase the predictive capabilities of codes. A series of experiments (R-Damage-0, -1 and -2) previously provided data about failure initiation of a well-characterized material (aluminum) in a cylindrical geometry. This presentation will cover the theory, design and results for the next series of experiments (R-Damage-3, -4 and -5), which studied the behavior of material recollected after damage from pressures in the damage initiation regime.

Ann Kaul
Los Alamos National Laboratory

Date submitted: 16 Feb 2007 Electronic form version 1.4