Abstract Submitted
for the SHOCK07 Meeting of
The American Physical Society

Implementation of the TEPLA Damage Model in a 3D Eulerian Hydrocode KATHLEEN S. HOLIAN, SEAN P. CLANCY, PAUL J. MAUDLIN, Los Alamos National Laboratory — A sophisticated damage model (TEPLA) has been implemented into a three-dimensional (Cartesian) computer code (Pagosa) used here at Los Alamos National Laboratory. TEPLA was originally an isotropic damage model based upon the Gurson flow surface (a potential function used in conjunction with the associated flow law) that models damage due to both porosity growth and plastic strain. It has since been modified to model anisotropic elasto-plastic material strength as well. Pagosa is an Eulerian hydrodynamics code that has the following special features: a predictor-corrector Lagrangian step that advances the state variables in time, a high-order advection algorithm that remaps the problem back to the original mesh every time step, and a material interface tracking scheme with van Leer monotonic advection. It also includes a variety of equation of state, strength, fracture, and high explosive burn models. We will describe the physics of the TEPLA model (that models both strength and damage) and will show preliminary results of test problems that are used to validate the model. The four test problems (simple shear, stretching rod, Taylor anvil, and plate impact) can be compared with either analytic solutions or with experimental data.

Kathleen S. Holian
Los Alamos National Laboratory

Date submitted: 23 Feb 2007 Electronic form version 1.4