Abstract Submitted
for the SHOCK11 Meeting of
The American Physical Society

Effect of Configuration on the Shock Compression Response of Cold-Rolled Ni-Al Laminates PAUL E. SPECHT, NARESH N. THADHANI, Georgia Institute of Technology, ADAM K. STOVER, TIMOTHY P. WEIHS, Johns Hopkins University — The effects of configurational changes on the shock compression response of cold-rolled Ni and Al laminates are investigated computationally. The laminate geometry provides a unique system with full density and intimate particle contacts. Orientation of the laminate layers and changes in the bilayer spacing are varied in order to understand the resulting changes in the shock wave response. Real heterogeneous microstructures, obtained from optical micrographs, were incorporated into the Eulerian, finite volume code CTH. The results show a marked dependence of the pressure, temperature, and strain response on the underlying microstructure. In particular, two-dimensional effects of strain are seen to increase the dissipation and dispersion of the shock wave, resulting in high levels of viscosity and attenuation. This effect is heightened by the extensive non-uniformities of the layering caused by cold-rolling. Research funded by ONR/MURI grant No. N00014-07-1-0740.

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Date submitted: 18 Feb 2011 Electronic form version 1.4