Abstract Submitted
for the SHOCK13 Meeting of
The American Physical Society

Shockless compression (loading rate of 5 x 10^5/s) of ballistic gel to 1 GPa YOSHIMASA TOYODA, YOGENDRA GUPTA, Washington State University — Ballistic gel has been commonly used as a soft tissue simulant in ballistic experiments for decades. However, experimental results needed to develop material models at stresses and loading rates comparable to ballistic loading are lacking. To examine the dynamic response of ballistic gel at the desired stresses and loading-rates, shockless uniaxial-strain compression experiments were conducted on 10 and 20 weight percent ballistic gel to 1 GPa peak stress. Plate-impact experiments were conducted using the following target configurations: fused silica/gel/PMMA optical window. The anomalous compression of fused silica resulted in a near-linear, shockless compression (5 x 10^5/s). Velocity histories at the front and the rear ballistic gel interfaces were simultaneously recorded using laser interferometry (VISAR). From the velocity histories, the loading paths (in the pressure-volume plane) for each gel concentration were determined. The 20 wt.% ballistic gel resulted in the steeper loading path, demonstrating that the dynamic compression response of 20 wt.% gel is stiffer than the 10 wt.% gel. The wave profiles and the quantitative results will be discussed. Dr. D. P. Dandekar (ARL) is thanked for his help and insightful discussions. Work supported by ARL and DOE/NNSA.

Yogendra Gupta
Washington State University

Date submitted: 19 Feb 2013 Electronic form version 1.4