Abstract Submitted
for the SHOCK13 Meeting of
The American Physical Society

The Sakharov Experiment Revisited for Granular Materials[1]
TRACY VOGLER, Sandia National Laboratories — Sakharov and co-workers in 1965 proposed an experiment in which a sinusoidal perturbation in a planar wave evolves as it travels through a material. More recent, Liu and co-workers utilized gas gun techniques rather than explosives to drive the shock wave, resulting in a better defined input. The technique has been applied to liquids such as water and mercury as well as solids such as aluminum. All analyses of the experiments conducted to date have utilized a viscous fluid approach, even for the solids. Here, the concept of the decay of a perturbation in a shock wave is revisited and applied to granular materials. Simulations utilizing continuum models for the granular materials as well as mesoscale models in which individual particles are resolved are utilized. It is found that the perturbation decay is influenced by the strength (deviatoric behavior) used in the continuum model. In the mesocale calculations, the simulation parameters as well as the computational approach influence the results. Finally, initial experimental results for the technique using granular tungsten carbide are presented.

[1]Sandia National Laboratories is a multi-program laboratory operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin company, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

Tracy Vogler
Sandia National Laboratories

Date submitted: 26 Feb 2013 Electronic form version 1.4