Abstract Submitted
for the SHOCK13 Meeting of
The American Physical Society

Shock-Induced Deformation in Dry and Wetted Particle Beds
BRADLEY MARR, OREN PETEL, DAVID FROST, ANDREW HIGGINS, McGill University, Department of Mechanical Engineering, Montréal, QC, H3A 0C3, Canada — The high strain rate response of granular media has received considerable attention due to increasing interest in granular penetration. It has been shown under high-rate dynamic loading dry sand particles undergo a transition in the dominant mechanism of global deformation of the particle bed from a response governed by particle slippage to one governed by particle deformation. In the present study, we investigate the response of packed particle beds, both wetted and dry, under varying flyer plate induced shock loadings. We investigate the critical conditions for the onset of particle deformation in systems of spherical macroscopic particles of various materials. Resulting particle deformations from the shock compression are characterized using scanning electron microscopy with the recovered samples, and the effects of shock strength, particle size, and particle material properties are compared.

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Date submitted: 22 Feb 2013 Electronic form version 1.4