Abstract Submitted
for the SHOCK15 Meeting of
The American Physical Society

Visualization of Stress Propagation in Dynamically Compacted Wetted Particle Beds BRADLEY MARR, DAVID FROST, McGill University — 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 that 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. Introduction of a liquid phase into the particle bed alters the global deformation response of the system as the liquid is capable of supporting stresses. In the present study, we investigate the stress propagation through an array of stacked glass rods immersed in liquid, under varying drop weight-induced stress loadings. Using the photoelastic nature of the glass rods, the propagation of a stress wave through the two-phase system can be visualized. Understanding the system response at the strain rates associated with drop weight testing can provide insight when extending the loading to higher strain rates achieved with flyer plate impacts. The effects of stress magnitude, array size, and rod diameter on the stress propagation are examined.

Bradley Marr
McGill University

Date submitted: 30 Jan 2015 Electronic form version 1.4