

Abstract Submitted  
for the SHOCK09 Meeting of  
The American Physical Society

**Penetration Resistance in Granular Materials With and Without Fluid Injection** JOSHUA FELTS, HAROLD SANDUSKY, RAAFAT GUIRGUIS, IHDIV, NSWC — Investigating the different factors affecting the resistance of earth materials to penetration is important to both commercial and military applications. Both friction and resistance to deformation are involved, but the work presented in the paper focuses on friction and the effectiveness of reducing it by injecting a fluid at the interface with the penetrator. Measurement of the coefficient of friction between a granular material under pressure and a hardened steel surface sliding at velocities between 0.1 and 100 m/s are presented. Pressures above and below the crushing strength of the grains were considered. Two types of granular materials were tested - sand and glass beads, the latter a model material that allows a highly uniform bed of particles. The measurements with dry and pre-wetted beds are compared to those of initially dry beds as a fluid is being injected through the sliding steel surface.

Richard Granholm  
IHDIV, NSWC

Date submitted: 20 Feb 2009

Electronic form version 1.4