

Abstract Submitted
for the SHOCK09 Meeting of
The American Physical Society

Shock-Less High Rate Compaction of Porous Brittle Materials¹

GREGG FENTON, TERRY CAIPEN, Applied Research Associates, GLENN DAEHN, The Ohio State University, DENNIS GRADY, Applied Research Associates — The dynamic behavior of granular materials such as granular silica (sand), technical ceramics, and porous geological substances has importance to a variety of engineering applications. Although the mechanical behaviors of sand and other granular ceramics have been studied extensively for several decades, the dynamic behavior of such materials remains poorly understood. This paper will describe how instrumented electromagnetic tube compression driven by capacitive discharge can be used to measure compaction of model materials at high and controlled strain rates. The technique relies on electromagnetically crushing a powder-filled conductive tube. By measuring the current as a function of time and the tube displacement through Photon Doppler Velocimetry (PDV) sufficient data can be obtained to reveal the behavior of the porous material. The method will be described in detail and example data will be shown for compaction of silica sand.

¹We gratefully acknowledge support granted under Contract PO 208726 from Sandia National Laboratories.

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Date submitted: 20 Feb 2009

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