Abstract Submitted
for the DFD09 Meeting of
The American Physical Society

A two-phase micromorphic model for compressible granular materials SAMUEL PAOLUCCI, WEIMING LI, JOSEPH POWERS, University of Notre Dame — We introduce a new two-phase continuum model for compressible granular material based on micromorphic theory and treat it as a two-phase mixture with inner structure. By taking an appropriate number of moments of the local micro scale balance equations, the average phase balance equations result from a systematic averaging procedure. In addition to equations for mass, momentum and energy, the balance equations also include evolution equations for microinertia and microspin tensors. The latter equations combine to yield a general form of a compaction equation when the material is assumed to be isotropic. When non-linear and inertial effects are neglected, the generalized compaction equation reduces to that originally proposed by Bear and Nunziato. We use the generalized compaction equation to numerically model a mixture of granular high explosive and interstitial gas. One-dimensional shock tube and piston-driven solutions are presented and compared with experimental results and other known solutions.

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Date submitted: 07 Aug 2009 Electronic form version 1.4