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**Wave Structures and Energetics of Compaction-Induced Particle Dispersal in a Gas**[1] MICHAEL CROCHET, KEITH GONTHIER, Louisiana State University — Shock wave propagation in gas/solid particle systems has been analyzed in the study of dust explosion suppression, as well as the post-detonation dispersal of metal particles in explosive mixtures. The predicted flow regimes exhibit considerable changes in the solid volume fraction; however, drag and heat transfer laws used in present models are restricted to either the dilute or dense flow regimes. Furthermore, the mechanisms primarily responsible for solid heating and possible ignition within each region are currently not well-characterized. Here, a multiphase continuum model is used to predict flow structures arising from compaction wave interactions, using empirical relations valid for all volume fractions. The results of a parametric study examining the effects of wave strength, initial solid volume fraction, and particle diameter on the wave profiles are examined, for both planar piston impact and spherical particle dispersal simulations. The relative contributions of compression, compaction and drag to the gas and solid energetics are analyzed to assess the likelihood of combustion initiation.

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