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Modeling Unit Cell interactions for the Microstructure of a Heterogeneous Explosive: Detonation Diffraction Past an Inert Sphere[1] D. SCOTT STEWART, JOHN B. BDZIL[2], University of Illinois, Urbana, IL — We describe an approach being used to model multi-phase blast explosive, that is mostly condensed explosive by volume with inert embedded particles. The asymptotic theory of detonation shock dynamics is used to describe the detonation shock propagation in the explosive. The shock motion rule in the explosive requires that the shock move at a normal speed that depends on the shock curvature. The angle that the shock makes with the particle boundary is also prescribed. We describe theory that can be used to predict the behavior of a collection of such detonation shock/particle interactions in the larger aggregate. A typical unit cell problem of a detonation shock diffraction over a sphere is analyzed by analytical and numerical means and the properties of an ensemble of such unit cell problems is discussed with implications for the macroscopic limiting behavior of the heterogeneous explosive.

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