Abstract Submitted
for the SHOCK05 Meeting of
The American Physical Society

Development of a Mechanistic Burn Modeling of High-Explosives

YUICHIRO HAMATE, YASUYUKI HORIE[1], Los Alamos National Laboratory —

This paper describes a new computational framework for reactive burn modeling of solid explosives and proof-of-concept calculations. Our goal is to expand predictive capability through inclusion of various micro-mechanical burn processes. We propose a model which is complicated enough to represent underlying physics, but simple enough for engineering scale computations. Key components of the model include energy localization, the growth of hot spots, micro-mechanics in/around hot spots, and a phase-averaged mixture equation of state (EOS). The nucleation and growth of locally heated regions is treated by a statistical model based on an exponential size distribution. Proof-of-concept calculations are limited to shock loading, but show the capability of simulating Pop-plots, initial temperature effects, curved detonation waves in 2D, sandwich tests, and multi-dimensional effects, in a unified fashion based on micro-physics.

[1]At present, AFRL/MNME, Eglin AFB

Yuichiro Hamate
Los Alamos National Laboratory

Date submitted: 07 Apr 2005

Electronic form version 1.4