Abstract Submitted
for the SHOCK17 Meeting of
The American Physical Society

Techniques for Collection and Analysis of Pop-Plot Data for Use in Parameterization of Reactive Flow Models RICHARD LEE, FORREST SVINGALA, Naval Surface Warfare Center, Indian Head EOD Tech. Division, ROBERT DORGAN, Air Force Research Laboratory, Munitions Directorate, DANA DATTELBAUM, Los Alamos National Laboratory, MICHAEL FURNISH, Sandia National Laboratories, GERRIT SUTHERLAND, Army Research Laboratory —
Reactive flow models have been used to design explosive trains and predict explosive response to various mechanical insults. Parametrization of these models can be determined using short-duration shock data from thin flyers for ignition behavior and sustained pulse Pop-plot data for growth to detonation behavior. The latter was measured in an explosive using 4 experimental configurations with different data collection techniques. The first two used gas-gun driven 1-D shock waves and either embedded particle velocity gauges, or photon Doppler velocimetry at the end of different sample thicknesses. The second two used explosive donors to produce either a 1-D or quasi-1-D shock wave in wedge or cylindrical acceptors, respectively. Break out of the detonation wave in wedge samples was observed by streak camera, while embedded time of arrival gauges were used for cylindrical samples. Run-distances were compared between all 4 cases using a consistent method involving the intersection of two linear fits through data prior to and after transition to detonation. All methods were found to provide consistent data, indicating that one or a combination of these methods are suitable for parameterizing a reactive flow model.

Richard Lee
Naval Surface Warfare Center, Indian Head EOD Tech. Division

Date submitted: 23 Feb 2017 Electronic form version 1.4