

Abstract Submitted
for the SHOCK05 Meeting of
The American Physical Society

Experimental Study of Grit Particle Enhancement in Non-Shock Ignition of PBX 9501 PAUL PETERSON, RICHARD BROWNING, EDWARD ROEMER, MICHAEL OLDENBORG, DARLA THOMPSON, RACCI DELUCA, Los Alamos National Laboratory — The drop weight impact test is the most commonly used configuration for evaluating sensitivity of explosives to non-shock ignition. Although developed 60 years ago and widely used both as a material compression test and as a test bed for understanding the ignition process itself, little is known about the flow mechanisms or involvement of grit particles as sensitizing agents. In this paper we present the results of a series of experiments designed to study the flow mechanisms and events leading up to ignition. The experimental configuration used involves two pellet sizes, 3 and 5 mm in diameter, tested in three conditions, (1) with smooth steel anvils, (2) with standard flint sandpaper, and (3) with shed grit particles loaded between the steel anvils and the pellet faces. Diagnostics include optical micrographs, and scanning electron micrographs. Un-reacted samples show a variety of morphologies, including what appear to be quenched reaction sites, even at very low drop heights. Quasi-static crushing experiments were also done to quantify load-time histories.

Richard Browning
Los Alamos National Laboratory

Date submitted: 08 Apr 2005

Electronic form version 1.4