

Abstract Submitted
for the SHOCK11 Meeting of
The American Physical Society

Proton Radiography of Shape Charge Jets Penetrating Teflon and Explosive ERIC N. FERM, MICHAEL W. BURKETT, LARRY M. HULL, MARK MARR-LYON, WENDY V. MCNEIL, CHRIS L. MORRIS, PAUL M. RIGHTLEY, Los Alamos National Laboratory, LANSCE PROTON RADIOGRAPHY TEAM — We have used proton radiography at the Los Alamos Neutron Science Center to observe viper shaped charge jets penetrating inert and explosive materials. A viper jet was observed penetrating both Teflon and PBX 9501. Radiographs captured the penetration events at several times and are analyzed to determine the density of the materials imaged at each time. The interfaces and shock waves in the flow are clearly evident in the images. Multiple time images allow the determination of the velocities of the interfaces and shock waves. Comparisons are made in the Teflon case with estimates of penetration rates and densities using the quasi-steady approximation analysis used in many terminal ballistics models. The PBX 9501 clearly detonated from the impact of the shape charge jet tip traveling at 9.1 mm/s. The detonation wave is examined to see what support it obtains from the pursuing jet and the jet is examined to find the influence of the explosive products on penetration velocity. This experiment gives us experimental results of in-situ penetration process that can be used to verify common modeling techniques and fluid mechanic calculations of the penetration process.

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Date submitted: 18 Feb 2011

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