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Numerical Modeling of Munroe Jets CHARLES MADER, Mader Consulting Co., MICHAEL GITTINGS, Science Applications International Corporation — Munroe jets are formed by the oblique interaction of detonation products from two explosive charges separated by an air gap. The jet consists of a high velocity jet of low density precursor gases and particles that travel faster than the primary jet which is a high pressure regular shock reflection. The Los Alamos PHERMEX Data Volumes [1] contain 40 radiographs taken by Douglas Venable in the 1960's of Munroe Jets generated by Composition B explosive charges separated by 5 to 80 mm of air. In several of the experiments the Munroe jets interacted with thin Tantalum foils and with aluminum plates. The PHERMEX experiments were modeled using the AMR Eulerian reactive hydrodynamic code, NOBEL [2,3], When the detonation arrives at the bottom of the gap, the detonation product s expand against the air and precursor gases travel at high velocity ahead of the detonation wave in the explosive. The expanding detonation products from the explosive collide and result in a high pressure regular shock reflection.. Interaction with a metal plate consists of first the interaction of the precursor gases and then the high pressure regular shock reflection arrives to further damage the metal plate.

[1] Los Alamos PHERMEX Data, Volumes I, II, and III, UC Press 1980.
[2] Numerical Modeling of Water Waves, Second Edition, Charles L. Mader, CRC Press 2004
[3] Numerical Modeling of Explosions and Propellants, Charles L. Mader, CRC Press 1998.

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