

Abstract Submitted
for the SHOCK07 Meeting of
The American Physical Society

Porting Initiation and Failure into Linked CHEETAH CLARK SOUERS, PETER VITELLO, Lawrence Livermore National Laboratory — Linked CHEETAH is a thermo-chemical code coupled to a 2-D hydrocode. Initially, a quadratic-pressure dependent kinetic rate was used, which worked well in modeling prompt detonation of explosives of large size, but does not work on other aspects of explosive behavior. The variable-pressure Tarantula reactive flow rate model was developed with JWL++ in order to also describe failure and initiation, and we have moved this model into Linked CHEETAH. The model works by turning on only above a pressure threshold, where a slow turn-on creates initiation. At a higher pressure, the rate suddenly leaps to a large value over a small pressure range. A slowly failing cylinder will see a rapidly declining rate, which pushes it quickly into failure. At a high pressure, the detonation rate is constant. A sequential validation procedure is used, which includes metal-confined cylinders, rate-sticks, corner-turning, initiation and threshold, gap tests and air gaps. The size (diameter) effect is central to the calibration. This work was performed under the auspices of the U.S. Department of Energy by the University of California Lawrence Livermore National Laboratory under contract No. W-7405-Eng-48.

Clark Souers
Lawrence Livermore National Laboratory

Date submitted: 25 Jan 2007

Electronic form version 1.4