

Abstract Submitted
for the APR21 Meeting of
The American Physical Society

1D to 2D CYLEX Transformation to Save Time in JWL Parameterization REID GINOZA, Applied Research Associates — A Jones-Wilkins-Lee (JWL) equation of state (EOS) can be parameterized by simulating a cylinder expansion experiment (CYLEX) and selecting those parameters that lead to the closest match of the experimental velocity history data. This may be computationally expensive as it may take many simulations to find an acceptable parameter set. In this study, we investigate the possibility of using a hypothetical one-dimensional sphere expansion simulation as a substitute for the two-dimensional CYLEX simulation. The goal was to find a transform function that maps the velocity history of the sphere simulation to the velocity history of the CYLEX simulation. JWLs from several sources, some randomly generated, were used in both the one-dimensional sphere expansion and the two-dimensional CYLEX simulations. Three regression models were then constructed and evaluated: a three-term polynomial regression, a nine-term polynomial regression, and a multivariate adaptive regression spline model. These regression models resulted in close agreement between the CYLEX simulation velocity history and the transformed one-dimensional sphere expansion simulation velocity history.

Reid Ginoza
Applied Research Associates

Date submitted: 28 Dec 2020

Electronic form version 1.4