

Structural integrity under extreme loads

Topic: High fidelity models of blast loading

TITLE: Numerical models of explosives

RESEARCH BACKGROUND:

General-purpose numerical platforms lack of detailed models for describing the detonation dynamics of explosives. That is, explosive charges are usually modeled as homogeneous bodies, even though real explosive devices are strongly inhomogeneous and made of several components. This thesis aims to simulate, using a continuum mechanics approach, the detonation dynamic of real devices containing explosives.

RESEARCH ACTIVITIES:

1. Literature research on state-of-the-art models for describing the detonation dynamics
2. Investigation of the most promising identified models in a CFD environment (*blastFoam*)
3. Calibration of numerical models using experimental data
4. Numerical simulations of blast-loaded plates and validation against experiments

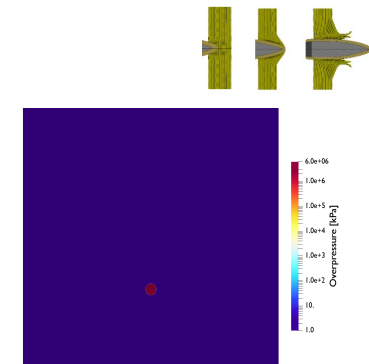
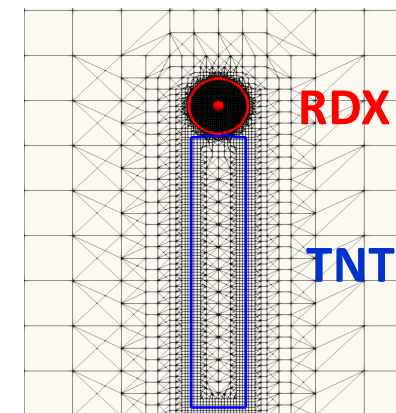
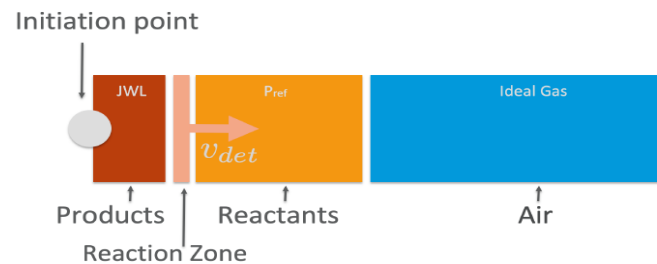
METHODOLOGY: Numerical - Analytical

DURATION: 6-9 months

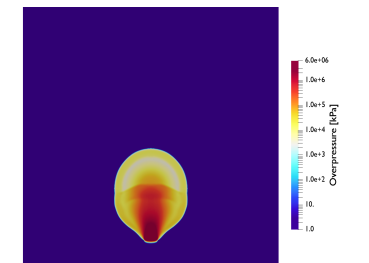
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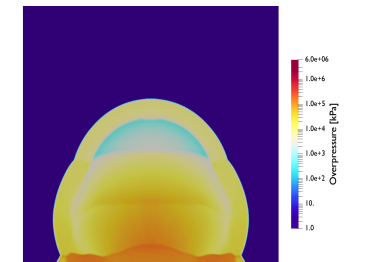
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t = 0.005 ms



t = 0.05 ms



t = 0.15 ms