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Pseudo-Reaction Zone model calibration for Programmed Burn calculations CARLOS CHIQUETE, CHAD D. MEYER, JAMES J. QUIRK, Los Alamos National Laboratory, MARK SHORT, Los Alamos Nationary Laboratory — The Programmed Burn (PB) engineering methodology for efficiently calculating detonation timing and energy delivery within high explosive (HE) engineering geometries separates the calculation of these two core components. Modern PB approaches utilize Detonation Shock Dynamics (DSD) to provide accurate time-of-arrival information throughout a given geometry, via an experimentally calibrated propagation law relating the surface normal velocity to its local curvature. The Pseudo-Reaction Zone (PRZ) methodology is then used to release the explosive energy in a finite span following the prescribed arrival of the DSD propagated front through a reactive, hydrodynamic calculation. The PRZ energy release rate must be coupled to the local burn velocity set by the DSD surface evolution. In order to synchronize the energy release to the attendant timing calculation, detonation velocity and front shapes resulting from reactive burn simulations utilizing the PRZ rate law and parameters will be fitted to analogues generated via the applied DSD propagation law, thus yielding the PRZ model calibration for the HE.

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