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Analysis of Xrage and Flag High Explosive Burn Models with PBX 9404 Cylinder Tests DANIELLE HARRIER, JULIANNA FESSENDEN, SCOTT RAMSEY, Los Alamos National Laboratory — High explosives are energetic materials that release their chemical energy in a short interval of time. They are able to generate extreme heat and pressure by a shock driven chemical decomposition reaction, which makes them valuable tools that must be understood. This study investigated the accuracy and performance of two Los Alamos National Laboratory hydrodynamic codes, which are used to determine the behavior of explosives within a variety of systems: xRAGE which utilizes an Eulerian mesh, and FLAG with utilizes a Lagrangian mesh. Various programmed and reactive burn models within both codes were tested, using a copper cylinder expansion test. The test was based off of a recent experimental setup which contained the plastic bonded explosive PBX 9404. Detonation velocity versus time curves for this explosive were obtained from the experimental velocity data collected using Photon Doppler Velocimetry (PDV). The modeled results from each of the burn models tested were then compared to one another and to the experimental results using the Jones-Wilkins-Lee (JWL) equation of state parameters that were determined and adjusted from the experimental tests. This study is important to validate the accuracy of our high explosive burn models and the calibrated EOS parameters, which are important for many research topics in physical sciences.

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