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Analysis of Computational Models of Shaped Charges for Jet Formation and Penetration[1] JONAH HAEFNER, JIM FERGUSON, Los Alamos National Laboratory — Shaped charges came into use during the Second World War demonstrating the immense penetration power of explosively formed projectiles and since has become a tool used by nearly every nation in the world. Penetration is critically dependent on how the metal liner is collapsed into a jet. The theory of jet formation has been studied in depth since the late 1940s, based on simple models that neglect the strength and compressibility of the metal liner. Although attempts have been made to improve these models, simplifying assumptions limit the understanding of how the material properties affect the jet formation. With a wide range of material and strength models available for simulation, a validation study was necessary to guide code users in choosing models for shaped charge simulations. Using PAGOSA, a finite-volume Eulerian hydrocode designed to model hypervelocity materials and strong shock waves developed by Los Alamos National Laboratory, and experimental data, we investigated the effects of various equations of state and material strength models on jet formation and penetration of a steel target. Comparing PAGOSA simulations against modern experimental data, we analyzed the strengths and weaknesses of available computational models. LA-UR-16-25639

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