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Computational Investigation of In-Flight Temperature in Shaped Charge Jets and Explosively Formed Penetrators PETER SABLE, NATHANIEL HELMINIAK, Marquette University, ERIC HARSTAD, ARNE GULLERUD, JEROMY HOLLENSHEAD, EUGENE HERTEL, Sandia National Laboratories, SANDIA NATIONAL LABORATORIES COLLABORATION, MARQUETTE UNIVERSITY COLLABORATION — With the increasing use of hydrocodes in modeling and system design, experimental benchmarking of software has never been more important. While this has been a large area of focus since the inception of computational design, comparisons with temperature data are sparse due to experimental limitations. A novel temperature measurement technique, magnetic diffusion analysis, has enabled the acquisition of in-flight temperature measurements of hyper velocity projectiles. Using this, an AC-14 bare shaped charge and an LX-14 EFP, both with copper linings, were simulated using CTH to benchmark temperature against experimental results. Particular attention was given to the slug temperature profiles after separation, and the effect of varying equation-of-state and strength models. Simulations are in agreement with experimental, attaining better than 2% error between observed shaped charge temperatures. This varied notably depending on the strength model used. Similar observations were made simulating the EFP case, with a minimum 4% deviation. Jet structures compare well with radiographic images and are consistent with ALEGRA simulations previously conducted. Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

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