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The Spike Dynamics Source Model for Ejecta in the FLAG Code[1] ALAN HARRISON, Los Alamos National Laboratory — The Lagrangian hydrocode FLAG employs a subgrid model to represent the ejection of particulate mass ("ejecta") from a shocked metal surface. The ejection process is modeled as a Richtmyer-Meshkov instability (RMI) of the liquid metal surface, in which the metal spikes that form break up to become ejecta. The FLAG model includes (1) a description of RMI spike and bubble growth rates and (2) the Self-Similar Velocity Distribution (SSVD) model of the velocity field We report here on the improvement of this model by incorporating (3) a spike breakup treatment based on the Taylor Analogy Breakup (TAB) model, and (4) a new model for the inflow of metal into the base of the spikes. This combination reconciles the evolving shape of the spikes (elongation and thinning) with the inflow, and with the corresponding properties of the bubbles. Since the model describes the motion of each fluid element into and along the spike, and subsequent fragmentation of the spike into ejecta, it predicts not only mass ejection rate but also the sizes and velocities of the particles launched in this process. We describe the new self-consistent model and its implementation in FLAG. We present representative verification and validation calculations.

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