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Modeling and analysis of high-explosive driven perturbed plate experiments at Los Alamos JAMES COOLEY, RUSSELL OLSON, DAVID ORO, Los Alamos National Laboratory — Measurement and modeling of fluid instabilities has been an important part of numerical simulation verification and validation efforts from the beginning of computational fluid dynamics. The use of these same instabilities to assess the accuracy and validity of models for material strength began at least by the middle of the 1970s [1]. These techniques have been improved upon over many decades, for example recent work in Russia [2]. These techniques have proven useful in challenging various different models for material response. We have performed several experiments at the Los Alamos pRad facility for perturbation growth in both Tantalum and Depleted Uranium. These results provide excellent data images over several microseconds of growth. In this paper, we will present efforts to use these experiments to validate our numerical code and constitutive models. We will detail a systematic study of various constitutive models for the metals and evaluate the rigidity of the constraint that these experiments provide to the modeling community. We will spend some time examining the assumptions in the constitutive models and assessing the relative uncertainties of each major assumption. LA-UR 13-21276

[1] J. F. Barnes, P. J. Blewett, R. G. McQueen, K. A. Meyer, and D. Venable, "Taylor Instabilities in Solids," *Journal of Applied Physics*, 45(2):6, 1974
[2] V. A. Raevsky, "Influence of dynamic material properties on perturbation growth in solids," Technical Report, All-Russion Research Institute of Experimental Physics, VNIIEF, 2009

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