Abstract Submitted
for the SHOCK09 Meeting of
The American Physical Society

Design of a Sample Recovery Assembly for Magnetic Ramp-Wave Loading[1] S. CHANTRENNE, Consultant, J.L. WISE, J.R. ASAY, M.E. KIPP, C.A. HALL, Sandia National Laboratories — Characterization of material behavior under dynamic loading requires studies at strain rates ranging from quasi-static to the limiting values of shock compression. For completeness, these studies involve complementary time-resolved data, which define the mechanical constitutive properties, and microstructural data, which reveal physical mechanisms underlying the observed mechanical response. Well-preserved specimens must be recovered for microstructural investigations. Magnetically generated ramp waves produce strain rates lower than those associated with shock waves, but recovery methods have been lacking for this type of loading. We adapted existing shock recovery techniques for application to magnetic ramp loading using 2-D and 3-D ALEGRA MHD code calculations to optimize the recovery design for mitigation of undesired late-time processing of the sample due to edge effects and secondary stress waves. To assess the validity of our simulations, measurements of sample deformation were compared to wavecode predictions.

[1]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.

S. Chantrenne
Sandia National Laboratories

Date submitted: 26 Feb 2009 Electronic form version 1.4