

Abstract Submitted
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2169 Steel Waveform Experiments M.D. FURNISH, C.S. ALEXANDER, W.D. REINHART, J.L. BROWN, Sandia National Laboratories — In support of efforts to develop multiscale models of materials, we performed eight gas gun impact experiments on 2169 steel (21% Cr, 6% Ni, 9% Mn). These experiments provided shock, reshock and release velocimetry data, with initial shock stresses ranging from 10 to 50 GPa (particle velocities from 0.25 to 1.05 km/s). Both windowed and free-surface measurements were used, with samples 1 to 5 mm thick. The study focused on dynamic strength determination via the release/reshock paths. Reshock tests with explosively welded impactors produced clean results. The free-surface samples, which were steps on a single piece of steel, showed lower wavespeeds for thin (1 mm) samples than for thicker (2 or 4 mm) samples. A configuration used for the last three shots allowed release information to be determined from these free surface samples as well. The sample strength appears to increase with stress from ~ 1 GPa to ~ 3 GPa over this range, consistent with other recent work but about 40% above the Steinberg model. Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

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