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Dynamic Ductility Measurements of Shocked Metals using Time Sequence Radiography[1] R.G. GARZA, J.D. MOLITORIS, H.G. ANDRESKI, J.D. BATTEUX, L.M. LAUDERBACH, G.H. CAMPBELL, J.S. STOLKEN, R.L. KRUEGER, Lawrence Livermore National Laboratory, ENERGETIC MATERIALS CENTER / CHEMICAL SCIENCES DIVISION TEAM, MATERIALS SCIENCE AND TECHNOLOGY DIVISION TEAM — Using time sequence radiography we have measured ductility, fracture, and failure of various metals under dynamic shock loading. The metals being examined were in intimate contact with a high-explosive charge that was detonated to produce the transmitted shock. Using high-resolution radiography we obtained a set of images in time sequence detailing how the metal sample responds. Complete data sets to failure were measured for stainless steel and tantalum. As the experiments were designed for single-pass radiography, there are no interference effects. As the samples were shocked directly toward the detectors, fragment mitigation had to be 100% successful. The experimental technique will be presented as well as results on tantalum, stainless steel, and possibly other materials.

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