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resistive coefficient can be anticipated on the basis of the static piezoresistive coefficient and the change in the resistance due to the increase in temperature following shock compression. Calculation of the temperature in lithium following shock compression compared to the melting point as a function of pressure shows melting should occur at approximately 72 kilobars. Impact experiments with thin lithium gages deposited on glass showed large increases in resistance (interpreted as melting) at dynamic pressures of about 50 kilobars.

* Work supported by Air Force Weapons Lab., Kirtland Air Force Base, Albuquerque, N. M.

AE 3. An Ultra-High Velocity Flying Plate Technique. A.R. MCMILLAN, F.H. SHIPMAN, W.M. ISBELL, V.G. GREGSON, Gen. Motors Tech Center.--A method of producing flyer plates at velocities in excess of those obtainable through multistage light gas gun acceleration is presented. The technique consists of launching a high impedance impactor against the low impedance side of a low impedance-high impedance laminate. Through multiple shock reverberations, the high impedance material is accelerated. Experiments have been performed in which aluminum flyers have been accelerated to 10.3 mm/μsec and copper flyers to 8.6 mm/μsec. The upper bound of the velocity is the free surface velocity of the plexiglas intermediate which has been observed to be 15.8 mm/μsec. Flyer impacts were observed to be flat to ± 5 nsec. An experiment with an aluminum flyer plate impacting an aluminum specimen has shown a measured shock velocity that agrees with data gathered through other techniques indicating plate integrity and applicability to hugoniot measurements.

AE 4. High Amplitude, Short Duration Shock Waves for Attenuation Studies.* W.M. ISBELL, D.R. CHRISTMAN, T.E. MICHAELS, General Motors Tech. Center.--Shock wave attenuation studies were conducted using two gas gun techniques which overcame previous problems of launching thin, unsupported impactors at high velocities. (1) The roles of the target and impactor were reversed and a projectile containing quartz-instrumented specimens of different thicknesses was launched against a mylar membrane at the end of the launch tube. (2) A high impedance impactor was launched against a low impedance flyer spaced 5 to 10 mm from the surface of a specimen. Due to the difference in impedances, the flyer crossed the gap at a higher velocity than the projectile and arrived at the specimen surface stress-free and unsupported. Attenuation data was obtained from each technique. Planar impact of thin membranes at velocities >14mm/μsec was achieved with the second technique, creating shock pulses >2000 kbars in amplitude and <30 nsec in duration.

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AE 5. X-Ray Diagnostic for Dynamic Diffraction Experiments.* A. C. Mitchell, Q. Johnson, and L. Evans, Lawrence Radiation Laboratory, Livermore.--For the first time x-ray diffraction has been observed from a material while that material was under shock-wave compression.[1] The shift of the (200) diffraction line of LiF was monitored by using a multi-channel scintillation detector. For the x-ray diagnostics, an inexpensive, expendable array of small plastic fluor scintillation detector were developed. A rectangular shaped fluor is attached to a glass fiber optic light pipe by an injection molding technique. The detector used in this experiment were approximately 1 degree wide in 20 for the geometry used.

[1] Q. Johnson, A. Mitchell, R. N. Keeler, and L. Evans, Phys. Rev. Letters, in press (1970).

* Work performed under the auspices of the U.S. Atomic Energy Commission.

AE 6. Flux Compression using Gas Gun. M.J. VRABEL, J. BLACKBURN, and P.S. BRODY, Harry Diamond Labs.--A magnetic field of at least .7 megagauss was obtained using a .5 kilogram projectile to compress a seed field of 30,000 gauss. The projectile moved the base of a triangular copper strap toward the apex. The triangular sides were supported by an aluminum block. The apex angle was 130°. Initially the base was 8.9 cm and the altitude 2 cm. The strap width was 5 cm. The velocity of the projectile at impact was .93 mm/μsec. The projectile was an aluminum cup, 10.16 cm in diameter with a .635 cm thick face. The seed field was injected directly using an 18 kJ capacitor bank. The field was measured during the closure time of 40 μsec using a dB/dt probe. The maximum field as measured was probably simultaneous with probe destruction. Photographs of the event were taken every 2.3 μsec.

AE 7. A Method for Study of Dynamic Tensile Failure in Liquids.* D. C. Erlich, Stanford Res. Inst.--A helium gas gun has been used to impact a lucite flyer plate upon a target containing two cells separated by a thin Mylar diaphragm parallel to the plane of impact. The first cell was filled with the liquid under study (glycerol), and the second with a liquid of lower shock impedance (octane). Piezoresistive ytterbium foil gages recorded stress histories of the event at several Lagrangian positions in the target. When the rarefaction waves from the back of the flyer and from the glycerol-octane interface met, the glycerol underwent tension at a tensile stress rate of $\sim 5 \times 10^6$ kbar/sec. Upon tensile failure, a failure signal was sent out from the failure plane which was perceived as an increase in compression by the gage behind the glycerol-octane interface. The magnitude and slope of this failure signal yields information concerning the failure mode and the dynamic tensile strength of the liquid, whose failure characteristics cannot be studied through recovery work.

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