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A New Technique for Monitoring Inhomogeneous Deformation during Flyer Plate Impact JAMES WALKER, DONALD GROSCH, SIDNEY CHOCRON, KATHRYN DANNEMANN, RORY BIGGER, THOMAS MOORE, TRENTON KIRCHDOERFER, Southwest Res Inst — A new and unique experimental configuration was developed and demonstrated to measure the inhomogeneous deformation of heterogeneous materials during flyer plate impact tests. Flyer plate experiments were performed on a granite material with a small scale structure; strain rates ranged from 10^5 to 10^7 s^{-1}. A cross section of an impacted target was monitored and photographed during, and immediately following, passage of the shock wave through the material. Eight to sixteen images were taken during passage of the shock wave. This was accomplished using an ultra-high speed Imacon camera with very short exposure times; for example, in one experiment the exposure time was 5 nanoseconds with a framing rate of 5 million frames per second. Continuous wave lasers were used as the illumination source. Edge and notch filters were used to lessen the intensity of the impact flash in the image. The photographic data was analyzed using a digital image correlation (DIC) system. These experiments examined deformation on a cut plane within the target.

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