

Abstract Submitted
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Dynamic Punch Test AMOS GILAT, JEREMY SEIDT, The Ohio State University — A dynamic punch test is introduced. The test is conducted by placing a punching device between the incident and transmitter bars of a compression split Hopkinson bar apparatus. The punch has a rounded end that penetrates into the specimen which is a thin round plate clamped around the circumference. The force of the punch and the relative motion between the punch and the specimen holder are determined from the waves recorded on split Hopkinson bars. Digital image correlation technique is used to verify the displacements determined from the waves. Results are shown from tests on specimens made of 2024-T351 aluminum. The results can be used for the development and validation of continuum failure models for high strain rates applications. Many existing failure models relate stress triaxiality (ratio of the pressure and the von Mises stress) to equivalent failure strain, and some models have been modified to include the Lode parameter. The coefficients in the failure models are determined from experiments in which specimens are subjected to a combined state of stress. Such experiments are relatively easy to conduct in low (quasi-static) strain rate applications, but are very difficult to conduct at high strain rate.

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