

DYNAMIC PUNCH TEST IN THE SHPB APPARATUS FOR CALIBRATION OF A SHEAR FAILURE MODEL

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Abstract

We are conducting punch tests in the split Hopkinson pressure bar (SHPB) apparatus to investigate shear failure of several materials: aluminum, tungsten alloys and stainless steel. The tested specimen is a thin disc which is placed between punch and anvil adapters. The strain gauge signal measured on the transmitted bar shows a sudden fall which is related to the failure properties of the material. We are using 2D Numerical simulations of the entire SHPB set-up to calibrate our failure model. The calibration procedure is carried-out in two stages: first, we calibrate a strength model according to stress-strain curves we obtain from standard analysis of tests with cylindrical specimens. Then, using the calibrated strength model, we calibrate our two parameter shear failure model to fit the fall time of the transmitted signal in the punch tests. We achieve good comparison between experimental results and simulations.

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