

Society of Engineering Science 51st Annual Technical Meeting

1–3 October 2014

Purdue University, West Lafayette, Indiana, USA

Selection of loading profiles in kolsky bar experiments

Liao, Hangjie, liao23@purdue.edu; Chen, Weinong, Purdue University, United States

ABSTRACT

During a Kolsky bar experiment, stress equilibrium and strain rate constancy conditions need to be satisfied to directly obtain rate-sensitive material properties. Stress equilibrium indicates the stress distribution along specimen thickness is uniform. Constant strain rate means the strain rate is relatively constant during most of the loading duration. Satisfaction of these two critical conditions depends on the bars/sample impedance ratio and the sample loading condition. In this analytical and experimental study, bilinear incident pulses with various shapes are generated with different bars/sample impedance ratios. The effects of loading pulse profile and bar/sample impedance ratio on the time to achieve stress equilibrium and strain rate constancy will be presented and discussed.