

Abstract Submitted  
for the SHOCK15 Meeting of  
The American Physical Society

**Modelling of shear band interaction in 1D torsion** YEHUDA PARTOM, Retired, EREZ HANINA, RAFAEL — When two shear bands are being formed at a close distance from each other, they interact, and further development of one of them may be quenched down. As a result, there should be a minimum distance between shear bands. In the literature there are at least three analytical models for this minimum distance, but generally, prediction of these models do not agree with each other or with test results. Recently we developed a 1D numerical scheme to predict the formation of shear bands in a torsion test of a thin walled pipe. We validated our code by reproducing results from the pioneering experiments of Marchant and Duffy, and then used it to investigate the mechanics of shear localization and shear band formation. We describe our shear band code in a separate publication, and here we use it as a tool to investigate the interaction between two neighbouring shear bands during the process of their formation. We trigger the formation of the shear bands by specifying two perturbations on the initial strength. We vary the perturbations in terms of their amplitude and/or their width. Usually, the stronger perturbation triggers a faster developing shear band, which prevails and quenches the development of the other shear band. We change the distance between the perturbations and find that up to a certain distance one of the shear bands becomes fully developed, and the other stays only partially developed. Beyond this distance the two shear bands are both fully developed.

Yehuda Partom  
Retired

Date submitted: 01 Jan 2015

Electronic form version 1.4