

Trapping of Plastic Waves by Adiabatic Deformation

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Abstract: Adiabatic heating due to conversion of plastic work into thermal energy substantially changes the boundary value problem of plastic wave propagation. The thermal coupling in plastic wave propagation causing the wave trapping is the main subject of this contribution. Two cases have been analyzed, that is the adiabatic wave trapping of plastic waves in tension and also in shear. The case of shear is relatively new and recently studied by this author. Theory, experiments and numerical analyses of the Critical Impact Velocity (CIV) in shear due to adiabatic wave trapping is discussed in details. A review of recent studies on CIV in tension and shear is given. The CIV in tension and shear can be viewed as new material constants characterizing the impact resistance for metals and alloys.

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