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On the Role of Material Post-Necking Stress-Strain Curve in Simulation of Dynamic Impact NICOLA BONORA, ANDREW RUGGIERO, University of Cassino, JOEL HOUSE, PHILIP FLATER, AFRL, Eglin AFB, FL, USA, ROBERT DEANGELIS, University of Florida, Shalimar, FL, USA — Still today material modeling is a critical for a wider use of numerical simulation in impact phenomena. The impossibility to reproduce experimental tests has been explained with the need to incorporate other effects in the material formulation, such as damage. Bonora (2004) demonstrated, for smooth and notched bar geometries, that the capability to simulate the strain localization is mainly, if not exclusively, controlled by the provided material plastic flow curve while damage modeling contributes only in determining the material state at which failure occurs. Here, the importance of providing the correct material plastic flow curve in numerical modeling is demonstrated simulating the deformation process in Taylor impact test. The material under investigation is 99.9% half hardened Cu in as-received and annealed conditions. Material has been characterized under static and dynamic conditions and the post-necking response has been identified with as proposed by Ling (1996). Ductile damage has been modeled using the CDM based model proposed by Bonora (1997). An extensive parametric numerical investigation of dynamic tractions, at different strain rates on Hopkinson bar, and Taylor impact test has been performed providing material plastic flow curves differing only in the post-necking regime.

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