

Abstract Submitted
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High strain rate behavior of pure metals at elevated temperature GABRIEL TESTA, NICOLA BONORA, ANDREW RUGGIERO, University of Cassino and Southern Lazio, GIANLUCA IANNITTI, Techdyn Engineering, GENTILE DOMENICO, University of Cassino and Southern Lazio — In many applications and technology processes, such as stamping, forging, hot working etc., metals and alloys are subjected to elevated temperature and high strain rate deformation process. Characterization tests, such as quasistatic and dynamic tension or compression test, and validation tests, such as Taylor impact and DTE - dynamic tensile extrusion -, provide the experimental base of data for constitutive model validation and material parameters identification. Testing material at high strain rate and temperature requires dedicated equipment. In this work, both tensile Hopkinson bar and light gas gun were modified in order to allow material testing under sample controlled temperature conditions. Dynamic tension tests and Taylor impact tests, at different temperatures, on high purity copper (99.98%), tungsten (99.95%) and 316L stainless steel were performed. The accuracy of several constitutive models (Johnson and Cook, Zerilli-Armstrong, etc.) in predicting the observed material response was verified by means of extensive finite element analysis (FEA).

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