

Abstract Submitted
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Strength Characterization of Ductile Materials in Dynamic Tension from SHTB Data AVISHAY LINDENFELD, Rafael Advanced Defense Systems, YEHUDA PARTOM, Retired from Rafael — Using a Split Hopkinson Tension Bar (SHTB) to test ductile materials with high strain to failure (of the order of $\sim 50\%$), poses some challenges. 1) Interpretation of SHTB tests is not straight forward due to neck formation, which causes non-uniform stress and strain distributions along the specimen. 2) Neck location varies with specimen geometry and loading conditions, and it is not clear if this may influence the strain to failure. 3) To cause failure of a long specimen requires a long loading pulse, and this may be practically limited by the maximum striker's length possible for a given system. We address the latter problem by using a technique that practically doubles the duration of the loading pulse without changing the striker's length. We address problems 1 and 2 by using full numerical simulations (including the striker, the bars and the specimen) to predict the test results. In this way we are able to calibrate the strength model, taking into account necking, neck location and plastic heating.

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