

Abstract Submitted
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Incremental Stress-Strain Response of Polymers Using Instrumented Reverse Taylor Impact Experiments LOUIS FERRANTI, JR., NARESH THADHANI, Georgia Institute of Technology — Instrumented reverse Taylor impact experiments were conducted on pure epoxy and epoxy-cast Al+Fe₂O₃ composites to determine the incremental stress-strain response under dynamic loading. High-speed camera images were used to measure transient (axial and areal) deformations and velocity interferometry was used to record complex elastic and plastic wave propagation behavior. For polymeric materials, elastic strains are generally not negligible compared to plastic strains and the rigid-plastic material behavior assumed in typical Taylor tests for metallic materials cannot be applied. Hence, in this work, a one-dimensional elastic-plastic wave propagation analysis developed by Hutchings* to account for the appreciable elastic strains that can develop before the material yields, was used. The calculations obtain stress-strain behavior for each polymer composition and permit the characterization of internal elastic and plastic wave propagation response. These results are used to compare relative strengths between each composition and ascertain the influence particle reinforcement has on material properties.

**J. Mech. Phys. Solids (1979)*

Louis Ferranti, Jr.
Georgia Institute of Technology

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