

Abstract Submitted  
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**Dynamic Response of a Carbon Fiber – Epoxy Composite** SCOTT ALEXANDER<sup>1</sup>, WILLIAM REINHART, Sandia National Laboratories — The dynamic response of carbon fiber reinforced epoxy composite materials was investigated under planar impact loading. The samples were unidirectional (all carbon fibers oriented in a single direction) with fiber fill volumes from 62 to 68%. Gun driven planar impact tests with impact velocities of 0.1-2.0 km/s were conducted allowing samples to be compressed up to about 15 GPa. Velocity interferometry was used to measure particle velocities from which the compressed state of the samples was determined. Wave speeds for shocks traveling along the carbon fibers are significantly higher than for those traveling transverse to the fibers or through the bulk epoxy. As a result, the dynamic material response is dependent on the relative shock - fiber orientation. Shocks traveling along the fiber direction exhibit both elastic and plastic characteristics over the stress range tested. Shocks traveling transverse to the fibers show only a single wave response similar to but slightly stiffer than the bulk response of the epoxy. Results will be presented detailing these findings which provide a basis for modeling this class of directional composite materials.

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