

Abstract Submitted
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Characterization of Viscoelastic Materials for Low-Magnitude Blast Mitigation SUSAN BARTYCZAK, WILLIS MOCK, Naval Surface Warfare Center Dahlgren Division — Recent preliminary research indicates that exposure to low amplitude blast waves, such as from IED detonation or multiple firings of a weapon, causes damage to brain tissue resulting in Traumatic Brain Injury (TBI) and Post Traumatic Stress Disorder (PTSD). Current combat helmets are not sufficiently protecting warfighters from this danger and the effects are debilitating, costly, and long-lasting. The objective of this research is to evaluate the blast mitigating behavior of current helmet materials and new materials designed for blast mitigation using a test fixture recently developed at the Naval Surface Warfare Center Dahlgren Division for use with an existing gas gun. A 40-mm-bore gas gun is used as a shock tube to generate blast waves (ranging from 5 to 30 psi) in a test fixture mounted at the gun muzzle. A fast opening valve is used to release helium gas from a breech which forms into a blast wave and impacts instrumented targets in the test fixture. Blast attenuation of selected materials is determined through the measurement of pressure and accelerometer data in front of and behind the target. Materials evaluated in this research include 6061-T6 aluminum, polyurea 1000, Styrofoam, and Sorbothane (durometer 50, shore 00). The experimental technique, calibration and checkout procedures, and results will be presented.

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