

Abstract Submitted
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Shock wave mitigation using Newtonian and non-Newtonian fluids XINGTIAN TAO, BRENDAN COLVERT, VERONICA ELIASSON, Univ of Southern California — The effectiveness of a wall of liquid as a blast mitigation device is examined using a shock tube and a custom-designed and -built shock test chamber. High-speed schlieren photography and high-frequency pressure sensors allow measurement during the relevant shock interaction time periods of the liquid-gas interface. The characteristic quantities that reflect these effects include reflected-to-incident shock strength ratio, transmitted-to-incident shock strength ratio, transmitted and reflected impulse, and peak pressure reduction. In particular, the effects of viscous properties of the fluid are considered when using non-Newtonian dilatant and pseudoplastic fluids. Experiments have been performed with both Newtonian and non-Newtonian fluids. The impact of a shock waves on Non-newtonian fluids is compared to that of Newtonian fluids. Experiments show that non-Newtonian fluids have very strong reflection properties, acting like solid walls under the impact of a shock wave. Further work is to be performed to compare quantitatively the properties of Newtonian vs. non-Newtonian fluids.

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