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Experimental and Computational Study of Water Blast Mitigation Associated with Different Water Configurations[1] ANDREW ZAKRAJSEK, ERIC MIKLASZEWSKI, STEVEN SON, Purdue University — An explosion yielding a shock wave is just one of the many threats the US faces. This threat can cause damage to equipment, structures, and cause significant risk to personnel. These threats define an immediate importance for understanding blast mitigation techniques via readily available mitigants. Specific blast mitigation techniques using water are being studied. Four fundamentally different water configurations are being considered. The fundamental mitigation mechanisms such as momentum transfer, large impedance differences, and evaporation are being explored. Laboratory testing using an explosively driven shock tube and a pressurized air shock tube are used for configurations including: solid water barriers, water sprays, water sheets, and individual droplets of water. Trends observed will be explained based on simulations coupled with known droplet breakup phenomena and analysis. We will report on experimental results and analysis, in addition to discussing the various blast mechanisms associated with each testing configuration.

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