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Development of a Near Field Air Blast Measurement Device NICHOLAS FALCONE, NICHOLAS OWENS, VASANT JOSHI, NSWC IHEODTD — Measurement of air blast pressures is a critical component in understanding the fundamental nature and characteristics of a detonation event. Blast measurements in the near-field are tough to characterize because of difficulty in collecting these data. Previous attempts to acquire data using a hydraulic system assumed a lossless transfer, which led to errors. A new device has been developed for collecting and surviving blast measurements at close distances to explosive events. This method uses indirect measurements through a gauge in a material train that allows transmitting shock to a protected piezoelectric sensor, which is cost effective, has sharp rise time, and is generally robust enough to withstand shock loading, unlike most commercial blast measurement sensors that cannot survive the extreme environment found in close proximity to a detonation or the post detonation fireball. To alleviate the damage to sensor, high strength steel rod takes the full force of the blast, which may incur some damage, but the waves travel, attenuated as they reach piezoelectric blast pressure sensor immersed in an incompressible fluid. Thus the limitation of the device is dictated by the strength of steel and not the piezoelectric sensor. This paper focuses on the details of device construction, calibration procedure, calibration curves, correlation of the device characteristics to actual blast measurements and observed deviations.

Nicholas Falcone
NSWC IHEODTD

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