

Abstract Submitted  
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**Observation of sub-detonative responses in confined high density HMX-based PBXs** ANDREW CUMMING, ANDREW WOOD, PAUL STEWARD, PHILIP OTTLEY, PETER GOULD, IAN LEWTAS, QinetiQ — This paper describes experiments and modelling aimed at understanding the behaviour of highly loaded (90%-95%) pressed HMX-based PBXs, when subjected to shock compression and ignition by means of distinct mechanical and thermal insults under confinement. In order to separate the role of the stimuli, a test has been designed where a metal impactor is propelled at test samples using a well characterised propellant over a range of velocities to produce various levels of mechanical damage. The impactor is then heated using a characterised pyrotechnic composition which ignites the mechanically damaged explosive. Tubes have been designed to examine the effect of confinement at burst pressures of 218.5MPa and 120MPa. The high confinement tubes employ polycarbonate windows and the low confinement tubes are manufactured from polycarbonate blocks to allow the reaction of the energetic material to be captured using high-speed video. Tests carried out using these tubes have given a good insight into the processes occurring. Modelling runs have predicted an oscillating compressive wave in the explosive and considerable damage at either end of the explosive column. The latter leads to potential deconsolidation once the donor charge has burnt out allowing increased burning and violence.

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