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Effects of metal/air barriers on sympathetic detonation mitigation SHAWN STRICKLAND, ROBERT REEVES, CLIFTON MORTENSON, DENNIS BAUM, BOB NAFZINGER, KEVIN HOOD, Lawrence Livermore Natl Lab — The initiation of an explosive by the inadvertent or indirect transfer of a shock from a nearby explosive is known as sympathetic detonation and has significant implications to the safe handling and storage of explosives. In this study, the limits of sympathetic detonation mitigation by using metal/air/metal layered barriers to separate detonating explosives are explored. In the presented experiments, steel substrates containing the channel and barrier geometries were 3-D printed. The channels were filled with an HMX-based, cast-curable explosive. In these designs the steel barrier walls had material thicknesses varying from 0.35 to 1.2mm with air gaps from 0.7 to 1.8 mm wide. In sweeping through these parameters, we will look for to onset of sympathetic detonation of an HMX-based high explosive in channels separated by metal/air/metal barriers. The experiment utilizes piezo timing pins and high-speed imaging to track the detonation front and determine if sympathetic detonation occurs between channels. This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344. LLNL-ABS-768320

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