EXPLOSIVE EQUIVALENCY RESULTS FOR CASED MUNITIONS

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Defense Threat Reduction Agency performs a wide variety of testing that involves under-documented standard explosives or new explosives. Understanding weapons effects, including airblast, damage and cratering, from these explosives is essential to the DTRA's testing mission. Two specific areas that have been under investigation by DTRA are aluminized explosives and fieldable bomb fills.

Aluminized explosives are used in many military cased weapons. The effects of the case confinement, of oxygen deprivation, and of dust or water vapor entrained in a fireball have been poorly documented. DTRA has performed over 30 tests in the past 5 years with diagnostic and test instrumentation designed to obtain specific information for modifying and improving existing equations-of-state for existing and new cased aluminized explosives.

Another objective of the work performed at DTRA is to support the development of new and simulant explosives. DTRA's testing program often requires that penetrating warheads are air or gun delivered to a target. To measure the penetration path accurately, inert warheads are sometimes used in these tests. Then, to measure the explosive effects of these same warheads, the inert material must be removed from the bomb case without moving the bomb, and a fieldable explosive fill placed in the bomb case. Since standard bomb-fills are typically castable explosives, which are extremely difficult to field in remote test sites, appropriate fieldable emulsion simulants for the explosives of interest are required. DTRA has developed two such simulants, QM100RA and QM100RAT. Understanding how well these explosives simulate the airblast and target damage of the standard bomb is essential.

In earlier papers[1,2], several of the tests performed by DTRA to characterized aluminized explosives have been discussed. This paper will summarize the previously reported airblast equivalencies and expand the discussion to include new data from cratering experiments using five different explosives.