TABULAR EXPLOSIVE SOURCE MODELS USED IN BLASTX

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ABSTRACT

BlastX is an engineering-level, fast-running code that provides the airblast environment for explosions outside or inside structures. Most codes of this type base the free-air shock environment on empirical TNT spherical or hemispherical peak pressure and impulse curves and scale this data to other explosive compositions using "equivalency" factors. At best, equivalency factors vary with scaled range and differ between peak pressure and impulse. BlastX applies "tabular explosive source" models for a wide variety of military and fertilizer-based expedient explosive compositions. These models include spheres (and hemispheres), cylindrical charges of various length/diameter (L/D) ratios either center or end detonated, and several 3-D models that simulate truck bombs. The models provide detailed pressure, particle velocity, and density waveforms that are needed to compute reflected blast environments. Further, these models capture important details of close-in airblast loadings much better than those based on empirical TNT curves and reproduce the directionality of cylindrical charges and truck bombs. This paper describes the process of development and validation of tabular explosive source models that includes hydrocode calculations and comparisons with pressure measurements.