SIMULATION OF HIGH OVERPRESSURE HOB AIRBLAST ENVIRONMENTS ON A LARGE SCALE

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It is now known that height-of-burst (HOB) detonations can create airblast environments which are more severe than surface burst environments at high overpressures (>100 psi), A double Mach stem structure develops during shock reflection form the ground at a range approximately equal to the HOB. This creates double peak static pressure waveforms with enhanced early-time impulses. Blast diffraction on above ground structures also contain multiple peaks with enhanced loads and impulses. There is an ongoing interest in simulating these HOB environments for military applications. High explosives (HE) charges can be used to simulate the nuclear surface burst case below about 100 psi for reasonable yields (100T or more), but it appears that it is impractical to elevate large HE charges for the HOB case. In this paper we propose a new method for naturally simulating such HOB environments on a large scale. A hemispherical HE charge could be sited near a sloping mountain which had been graded to form a large ramp at about 30 grade. When the spherical blast wave reflects from this ramp, a double Mach stem shock structure and environment is created similar to the HOB case. Validity of this concept is demonstrated by numerical simulations with a nonsteady 2-D hydrocode, FAST2D, which uses Flux Corrected Transport (FCT) techniques to maintain sharp discontinuities.