EFFECT OF BLAST CONFINEMENT ON PERSONNEL VULNERABILITY

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ABSTRACT

While there exist experimental data related to personnel vulnerability subjected to blast threats in free field scenarios, the increased potential for injury related to the interaction of blast waves with reflecting surfaces such as walls and obstacles has not received significant attention to date. The investigation of the potential for blast injury in complex blast environments is of utmost importance, given the increased occurrence of the detonation of Improvised Explosive Devices (IEDs) in urban areas and other "confined" areas, where the blast propagation cannot be characterized as an ideal Friedlander wave.

Numerical investigations of the effect of rigid reflecting walls and corners on personnel injury probabilities have been carried out in the past, in which simulated pressure field information was combined with empirical blast injury correlations. These investigations highlighted the increased blast threat and resulting injury potential for individuals located near walls and corners, in various explosive configurations and layouts.

The purpose of the current study is to experimentally quantify the effect of confinement on personnel facing blast. The tests, carried out at DRDC Suffield and making use of instrumented Hybrid III mannequins and Blast Test Devices (BTD), have clearly demonstrated the increased blast threat and corresponding injury potential as predicted from head acceleration and chest overpressure, with increased confinement level, going from free-field to wall, corner and finally corridor configurations.