Quantifying Blast Exposure of Gun Crews

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Abstract:
The personnel that comprise the crews that operate shoulder-launched weapons (such as the Carl Gustav) and larger guns (such as the M777) are exposed to the blast at every firing whether in training or in the field. Applied Research Associates has undertaken the calculation of the blast wave distribution generated by the firing of such weapons to determine the blast loading on personnel. The calculations are high resolution, high-fidelity, three dimensional calculations using the government-owned Second order Hydrodynamic Automatic Mesh Refinement Code (SHAMRC). The results of the calculations provide the time history of all blast parameters throughout the region surrounding the weapon.

At least two calculations were made for each weapons system; one without personnel and at least one with personnel in various positions and orientations. The results of the calculations without personnel provide the incident or free field blast environment and are compared with experimental data taken at specific points within the field. The calculations with personnel provide the load distribution on the personnel and are available for correlation with medical outcome data.

This paper presents the setup and results of the calculations. These results are compared with point measurements of experimental data. Calculated blast parameter environments for the entire field of interest such as peak overpressure or peak overpressure impulse are shown.

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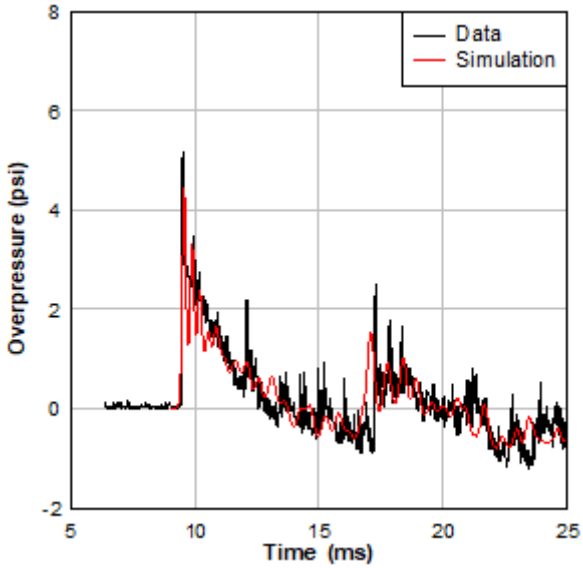

Figure 1: Comparison of simulated and experimental overpressure at a point around the M777 155 mm artillery system.

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