



US DEPARTMENT OF DEFENSE

# BLAST INJURY RESEARCH PROGRAM COORDINATING OFFICE

## Blast Exposure Analysis

### Assessed Injury Risk from Blast Exposures Transmitted to Gunner/Assistant Gunner

The Blast Overpressure-Health Hazard Assessment (BOP-HHA) version 2.0 software analyzed data collected during tests conducted at Aberdeen Test Center (ATC) in June 2016. This quantitative risk assessment, performed by the Army Public Health Center, characterized blast exposures produced by combustion of the propellant when rounds were fired by the M3E1 Multi-Role Anti-Armor/Anti-Personnel Weapon System (MAAWS) and yielded hazard severity and probability estimates for the gunner and assistant gunner firing under ten conditions involving different types of ammunition, round conditioning temperatures, and firing postures. Results of both BOP and impulse noise tests were used to determine the maximum number of rounds that gun crewmembers could fire without incurring significant injury risk for this new weapon system. Test results were used to establish standard operating procedures that will reduce injury risks to Service Members/operators firing the M3A1 MAAWS. The M3A1 MAAWS is being developed to become the next generation Carl Gustaf M4—a lighter weight, more tactically versatile replacement for the system currently being used. BOP-HHA software was developed by the US Army Medical Research and Materiel Command (USAMRMC) to characterize occupational exposures sustained by personnel firing weapons or detonating explosive devices. A variant of the INJURY software developed by JAYCOR Corporation (now L-3 Corporation), BOP-HHA uses an algorithm based upon experimental data collected from over 1,000 exposed specimens over a period of over 20 years and includes a biomechanical model of the thorax that estimates the amount of “push” or mechanical work imparted to the thorax by a blast pressure wave. The calculated work value is used to estimate the risk of lung injury expressed as risk coordinates (hazard severity and probability) as described in Army Regulation 40-10. BOP-HHA is the primary methodology used by Army Public Health Center to assess injury risk from the non-auditory component of blast.

