



US DEPARTMENT OF DEFENSE

BLAST INJURY RESEARCH PROGRAM COORDINATING OFFICE

Blast Exposure Research

Characterizing Exposures Associated with the Light Armored Vehicle (LAV)-Assault Gun (AG)

The LAV is equipped with an AG that fires 90 millimeter cartridges filled with propellant that is ignited to produce a controlled combustion that propels a projectile toward a target. The chemical composition of propellants affect combustion rates, intensity of blast emitted from the gun muzzle during firing, and injury risk. During a test conducted in April 2015, blast test devices (BTD) and noise microphones served as proxy sensors and collected data at two crew positions inside the LAV: commander and driver. This test characterized exposures associated with the twenty-eight firing conditions involving different types of ammunition, round conditioning temperatures and main gun elevations. US Army Public Health Center (USAPHC) evaluators analyzed the sensor data using the Blast Overpressure-Health Hazard Assessment (BOP-HHA) version 2.0 software. This software employs an algorithm based upon experimental data collected from more than 1,000 specimens exposed over 20 years of testing. This software includes a biomechanical model that analyzes the time-pressure data captured by the BTD to calculate the amount of "push" or mechanical work imparted by the blast pressure wave to the thorax and transmitted to the lung. The calculated work value is used to estimate the risk of lung injury and serves as a predictor of injury since air-containing organs are more susceptible to blast injury. BOP-HHA is the primary methodology used by USAPHC to assess injury risk from the non-auditory component of blast. The results of the analysis were used to develop standard operating procedures that will reduce injury risks to Service Members and operators firing the 90 millimeter LAV-AG.