

OCCUPATIONAL BLAST EXPOSURE DURING MILITARY AND LAW ENFORCEMENT TRAINING

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Occupational overpressure (OP) exposures were previously characterized and reported for mortar crew members (81 and 120 mm), artillery crew (105 mm Howitzer), and explosive breaching personnel. This work will be reviewed and new data from exposure to 50 caliber sniper rifle (2 classes), M3 Carl Gustav recoilless rifle, and instructor grenade range exposure will be presented. OP data was collected using blast gauges (Gen6; Black Box Biometrics, Rochester, NY) attached to operators and in fixed static positions; where possible industry standard pencil probes were also used to collect data for comparative purposes. Operator OP exposure (95% confidence interval) on the left (non-dominant) shoulder firing the 50 Cal rifle was 4.8 -5.3 psi for the first class and 6.13 - 7.51 psi for the second class. OP for the Gustav gunner firing the training round was 4.1 ± 0.9 psi (mean \pm SD). Acoustic data was also collected on the grenade range using a Larson Davis LxT sound meter with 1/4" mic (max 178dB for a frequency range of 4Hz-20 KHz) which meets the U.S. MIL-STD-1474E guidelines to record acoustic/noise exposure. Recorded measures using both the acoustic meter and calculated from pencil probe data indicate that mid-range exposure was 155 ± 3.0 dB for each detonation. Laboratory (blast tube) and field data which focuses on the effect of sensor orientation (incident vs reflective) to the overpressure source magnitude will also be presented to illustrate the magnitude of reporting errors (100%) if sensor orientation and the blast environment are unknown (e.g. internal detonation, location of walls, type of charge, etc). These data characterize repetitive low level overpressure exposures commonly experienced by U.S. military and law enforcement personnel from a variety of training environments. This presentation will also emphasize essential factors that must be considered when measuring overpressure exposure which are critical for investigating the effects of occupational overpressure exposure from blast.

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