Minimizing Blast Overpressure Exposure: Enabling Lethality by Reinforcing Safety and Recommitting to Standards

by CPT Leah Foodman

On Dec. 11, 2023, the U.S. Army Training and Doctrine Command's Ranges Proponent Office issued guidance for "Managing Brain Health Risk from Blast Overpressure." The memorandum, crafted for installation range managers, is intended to "provide guidance for minimizing exposure from blast overpressure until information can be added to Army Regulation 385-63, ***Range Safety***." The Department of Defense has current standards that aim to limit blast overpressure exposure in order to prevent "lung injury, eardrum rupture [... and other] potential health impacts," yet, there is sparse information — and thus, limited data driven guidelines — pertaining to blast overpressure and brain health.

The U.S. Army Engineer School (USAES) recently conducted research related to overpressure exposure and neurotrauma for personnel executing breaching operations. Their findings begin to bridge the aforementioned knowledge gap of the impact of over-pressurization exposure impacts on the brain. Despite USAES' research emphasis on breaching operations, the implications of its results are largely applicable to the Armor community. Most notably, USAES concluded that overpressure exposure results in negative long term health consequences, but also imminently compromises lethality. Per the USAES study, "Soldiers [who are exposed to blast overpressure] will be slower to react and unable to identify sounds and directions from enemy threats [during and after breaching operations]; this is a reduction in overall combat capability and efficiency." As the large-scale combat operations fight looms and preparations intensify, Armor leaders at all echelons must recommit to standards adherence and risk mitigation for blast overpressure injuries.

Leaders must reinforce double hearing protection for all Soldiers. "Double hearing protection" refers to both external and internal protective mechanisms used conjunctively; for example, traditional issued in-the-ear protection coupled with a combat vehicle crewman (CVC) helmet worn with a buttoned chinstrap. Without a secured chinstrap, the external ear protection offered by the CVC is ineffective—and the helmet is unlikely to remain in place in the event of an accident. Department of the Army Pamphlet 385-63, ***Range Safety***, Table 8-20, "Exposure Limits to Hazardous Impulse Noise for Tank Main Gun for Selected Cartridges" lists the number of rounds that a tank crew member may fire from his/her respective position on the vehicle with both single and double hearing protection. In this study informing the data in Table 8-20, single hearing protection refers to "approved earplugs, earmuffs, CVC helmet, or headset," while double protection requires earplugs *and* one of the latter three devices.

Per Table 8-20, an exposed (out of the hatch) vehicle commander firing M829A3 cartridges from the 120mm Abrams Main Gun may safely fire 26 rounds over a 24-hour period with single hearing protection, but up to 256 rounds with double hearing protection. The driver and gunner may fire 104 and 417 rounds respectively with single hearing protection, but up to 1,000 rounds per day with double protection. While a buttoned CVC chinstrap is far from fashionable, when paired with approved earplugs, it can be truly lifesaving: preserving hearing and minimizing blast overpressure exposure thereby enables optimal situational awareness and reaction times both acutely and over long periods. Leaders must set the conditions now (in training) to prevent residual injury and ensure clear dissemination of the standard and its rationale. This will ensure that Armor formations enter conflicts ready to win.

The Range Proponent Office's memorandum said it best: "This interim guidance is not meant to restrict commanders from conducting mission essential heavy weapons training [but to] raise blast overpressure (BOP) risk awareness as DoD continues to better define the relationship between BOP exposure… and potential health effects." Commanders and leaders across the Army must leverage their authority and best judgment to implement training plans that balance two critical objectives: preparing for war and safeguarding the warfighter.

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Acronym Quick-Scan

BOP – blast overpressure
CVC – combat vehicle crewman
DoD – Department of Defense
USAES – U.S. Army Engineer School