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Low-level blasts possible TBI link

FORT LEONARD WOOD, Mo – Fort Leonard Wood's Urban Mobility Breacher Course is teaming up with researchers to prevent traumatic brain injuries from occupational blast exposures.

"The Urban Mobility Breacher Course was an ideal fit for our field research program," said Capt. Matthew LoPresti, Walter Reed Army Institute of Research Center for Military Psychiatry and Neuroscience research psychologist.

The Urban Mobility Breacher Course is designed to teach leaders in the Army four breaching techniques -- mechanical breaching, thermal breaching, explosive breaching and ballistic breaching.

"We are aware that large improvised explosive device blasts can give you a TBI. What researchers are trying to find out now is if repetitive exposure to low-level blasts, like breaching charges, can accumulate into a TBI," said Sgt. 1st Class Brandon Reid, Urban Mobility Breacher Course noncommissioned officer-in-charge.

LoPresti visited Fort Leonard Wood last year during one of the course's two-week training schedules. He said it provided him with unique data on occupational blast exposures.

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"We presented some preliminary results at an international Neuroscience meeting in Washington, D.C., this past fall and recently had an article accepted for publication in Frontiers in Neurology. Those works present a snapshot of some of the individual measures we collected, but we are currently working towards a comprehensive report that ties all of our data together," LoPresti said.

"While we did find some correlation between blast exposure and subtle elevations in blood biomarkers of brain injury, all of our findings to date are below clinical significance. In short, the breachers we have tested are not getting hurt from their regular training activities, but the long-term consequences of repeated exposure to the relatively low-level blast used in breacher training -- and other military training exercises -- are still unclear," he added.

Some of Fort Leonard Wood's Soldiers are still participating in the second phase of the study.

"We invite participants to come to Bethesda for up to five days where they get in-depth testing of cognitive and neurophysiological functioning, including extensive neuroimaging. This phase of the study is still underway," LoPresti said.

Reid was one of the instructors tested during the field study. He also spent a few days in Bethesda, Maryland.

Reid said standing near a breaching blast feels like "a blunt force hitting you."

"As instructors, we have to be there for every single blast. I will tell you at the end of heavy demolition day, after several heavy concrete shots, we can physically feel the difference in ourselves. We are wore out," he added.

As an explosion goes off, it sends out blast overpressure. Overpressure is pressure that is more-than-normal atmospheric pressure caused by an explosion's shock wave.

"We want to stay under 4 pounds-per-square-inch. Hearing damage starts to happen at about 3.4 PSI. Ear protection negates the PSI, making the standard 4-PSI," Reid said.

"The formula for over pressure tells us where we can stand," Reid said.

Some of the study's findings have prompted the Urban Mobility Breacher Course to have some of its doctrine changed.

"On the heavy concrete charge, the tactics, techniques and procedures say we can stand behind a breacher's blanket at 27 feet. So, that is what we have been doing. But, during the study, the sensors told us that we were absorbing anywhere from 9 to 13 PSI per person," Reid said. "To be in our threshold, we found that we needed to be 40 feet back. We sent this information up to doctrine so they can make the change to 40 feet while shielded."

The formula works for every charge except the concrete charge because of the way the blocks are positioned.

Reid said the study also helped bust a common misconception about the way Soldiers stack-up to tactically enter a structure after breached with a charge. He said most people think the first person in the line absorbs the most pressure.

"The first person is usually behind a breaching shield, which splits the blast wave. The incidental pressure reconvenes on the rest of the stack, So, usually the fourth or fifth person gets the majority of the blast's over pressure," Reid said.

LoPresti said that in addition to the Urban Mobility Breacher Course cadre, the 35th Engineer Battalion leadership was very helpful to his research team.

"We make it a priority not to interfere with training while conducting our study, but we have a relatively large footprint and ask the instructors and students to take the time to participate in daily data collections. We could not have accomplished this without the full support of the team at Fort Leonard Wood," LoPresti said.

He said well-matched control subjects have been challenging to find because his team wants to compare breacher participants with individuals who have some operational experience, but minimal exposure to blast.

"If any of the readers of this article are interested in being a participant, they are welcome to contact me and we can discuss if they meet our screening criteria," LoPresti said.

LoPresti may be reached at matthew.l.lopresti.mil@mail.mil or 301.319.9765.

The occupational blast exposure study is being conducted by the Walter Reed Army Institute of Research and the Naval Medical Research Center in collaboration with the National Institutes of Health.

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For more information, contact the Fort Leonard Wood Public Affairs Office at 573.563.4145.
Encl. (1) Photo
Photo Cutline: Soldiers from Company A, 35th Engineer Battalion, 1st Engineer Brigade, spent a portion of their Advanced Individual Training learning to build and use different kinds of breaching charges Feb. 5.

About Fort Leonard Wood

Fort Leonard Wood is a thriving and prosperous installation that has evolved from a small basic training post 70 years ago to a premier Army Center of Excellence that trains about 80,000 military and civilians each year.

Home to the Maneuver Support Center of Excellence, Fort Leonard Wood now trains and educates service members and develops doctrine and capabilities for the Training and Doctrine Command's U.S. Army Chemical, Biological, Radiological, and Nuclear School, U.S. Army Engineer School, and U.S. Army Military Police School, three gender integrated Initial Military Training brigades, and the Army's largest Noncommissioned Officers Academy.

Over the past several years, Fort Leonard Wood has received numerous additional responsibilities to include supporting the 4th Maneuver Enhancement Brigade, a large Forces Command unit that is responsible for all deployable capabilities at Fort Leonard Wood. A colonel-commanded Marine Corps Detachment and an Air Force Detachment, which are both the largest on any Army installation, are located on Fort Leonard Wood; a large Navy Seabee Detachment and elements of the Coast Guard train here as well.
