

Army Researchers Continue Physical Demands Study

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Marilyn Sharp, the Physical Demands Study's principal investigator from U.S. Army Research Institute of Environmental Medicine, looks on as a Soldier begins one of the validation tests of the study.

NATICK, Mass. -- Researchers, from the U.S. Army Research Institute of Environmental Medicine, or USARIEM, traveled to Fort Carson, Colorado, three times this year as they continue to collect data for the Physical Demands Study. USARIEM is working with the U.S. Army Training and Doctrine Command as part of the comprehensive Soldier 2020 initiative. The purpose of the Physical Demands Study, or PDS, is to provide valid, reliable and accurate predictive tests to select Soldiers for accession into physically-demanding occupations.

USARIEM's role in this initiative is to examine the physical performance requirement of the specified combat arms occupations and to develop predictive physical tests that will apply uniformly to every Soldier being recruited for these military occupational specialties, or MOSs, regardless of gender, age or ethnicity. "The Army's scientific approach for evaluating and validating MOS-specific standards aids leadership in selecting the best-qualified Soldiers for each job within the Army profession," said Jack Myers, a planner in the Training and Doctrine Command's, or TRADOC's, G-3/5/7 section. "This will ensure force capability and readiness."

Over the past two years, USARIEM researchers have traveled thousands of miles, conducted several stages of testing, and spoken with hundreds of Soldiers at all levels. "First, the physically demanding tasks for each combat arms MOS were defined by branch commandants and command sergeants major," Myers said. "We then vetted this through commanders and CSMs [command sergeant majors] from the operational force. The tasks were approved by [TRADOC] and then reviewed by SMA-hosted [sergeant major of the Army-hosted] board of directors."

Subject matter experts, within each branch, identified 31 physically demanding occupational

requirements necessary to be successful in combat MOSs. Once the tasks were identified and verified, TRADOC conducted the first phase of testing to verify tasks, conditions and standards across the operational force. The 31 tasks were validated by having more than 500 Soldiers from eight brigades - heavy and light units - throughout five installations perform the tasks. While the task validation events were conducted by TRADOC, USARIEM researchers were able to observe the Soldiers in action.

"During each verification, we learned a lot about the tasks while making measurements related to task standards, such as weight lifted, number of repetitions, and distances walked," said Marilyn Sharp, the study's principal investigator from USARIEM.

The first action taken by USARIEM, for the PDS, was to conduct focus group interviews with junior and senior enlisted Soldiers to obtain feedback on the accuracy and completeness of the tasks identified for their respective MOSs. By and large, Soldiers in the focus groups confirmed that the tasks, conditions and standards were appropriate.

USARIEM then observed and measured small groups of male and female Soldiers performing each of the 31 critical tasks in a controlled laboratory environment. This enabled researchers to take measurements to examine the physiological demands of each task. Measurements included heart rate, respiration, oxygen consumption, perceived exertion and time to completion for each individual Soldier. "We then observed these same tasks in a more controlled lab experiment, with Soldiers performing tasks to standard in combat gear," Sharp said. "This allowed us to compare measurements like heart rate, oxygen consumption, and the Soldier's perception of how hard they were working."

Sharp said that these measurements were very controlled and that all participants had to complete the task the same way. Researchers then compared physiological requirements of tasks, skill, equipment, perception of difficulty and importance to MOS. "We categorized each task by the type of movement needed - lift, carry, pull, et cetera, - and the physical demands, the muscle strength, power, muscular endurance and aerobic endurance, and then ranked the tasks by difficulty level," Sharp said. "The tasks with the highest physical demands were selected as representative of that MOS. "We reported the critical tasks selected to each schoolhouse and got their concurrence that these would serve as the basis from which we would build the predictive models."

The tasks with the highest physical demands were then simplified into task simulation tests. These simulations captured the physically-demanding aspects, but they removed the highly-skilled portions of the tasks.

The first trip to Fort Carson was used to determine the reliability of the task simulations. Soldiers performed the tasks four times over a two-week period to identify learning effects and to ensure that a Soldier scored similarly over the course of each test. If the test was not reliable or a similar score was not obtained from test to test, the simulation was unsuitable. Once the reliability of the task simulations was established, a suite of predictive tests was selected by subject matter experts.

The predictive tests are physical-fitness-type tests. The same Soldiers performed the task simulations and the predictor tests to develop a test battery to predict performance on the task simulations. This aspect of testing is called the test validation phase and involved field artillery, armor and infantry task simulations.

Two more field studies will be conducted during the summer on Fort Stewart and Fort Riley. This will complete the data collection for the predictive test validation phase. The data will be analyzed, and recommended courses of action will be presented to TRADOC.

"It's very deliberate and it's very scientifically based," said Gen. David G. Perkins, TRADOC commanding general, of the study. "One (advantage) of it is it's giving us really concrete data that's quantifiable and measurable. It's really giving us insight even beyond what it originally was chartered for."

Perkins lauded USARIEM's work on the study. "It's invaluable, really, because for one thing, they're extremely responsive," Perkins said. "The fact that you can do it all in house ... we're much more innovative. We can adapt more quickly to rising insights. You really can innovate and adapt much quicker."

Sharp said that developing valid, reliable and accurate predictive tests to be used to select Soldiers to serve in the physically demanding occupations is essentially what these past couple years have been all about for her and her team. While the study still has a few more months to go before being wrapped up and all the data are analyzed, Sharp is excited about the results.

"We want a battery of four to seven predictive tests that will give us a good idea if a Soldier has the potential to be successful in that MOS when they are called upon to perform the physically demanding tasks expected of them," Sharp said. "We are looking for tests that could be used early in a recruit's career and be safe and cost-effective.

"They must also use little equipment, require little training and experience, and most importantly, be representative of the most physically-demanding aspect of a military occupation. The goal is to help find the right Soldier for the right job."

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