

EDUCATION

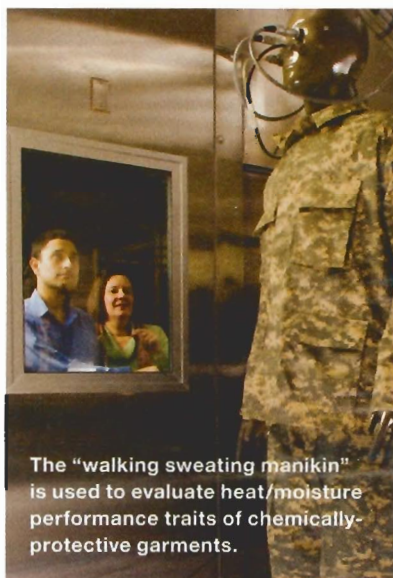
Philadelphia University Conducts Research For the Military on Safety & Protective. **By Kathlyn Swantko**

Lightweight Yet Battlefield Worthy

The strong level of spending for military textiles and apparel remains one of the few bright spots in a very difficult business environment. According to the Industrial Fabrics Association International's (IFAI) 2011 State of the Industry report, the military segment, which covers safety and protective products for troops, firefighters and law enforcement, "should continue to be the driving force through 2011, with 97,000 U.S. troops still deployed in Afghanistan."

The IFAI report states that expenditures on U.S. military textiles and clothing rank third behind the transportation and industrial segments. While this spending is expected to decrease by three percent in 2011, the level of spending in this area will remain substantial.

The Laboratory for Engineered Human Protection (LEHP), established at Philadelphia University in 2004, works with the U.S. Army Natick Soldier Center in support of researching and testing safety and protective textiles for the U.S. military. The mission of LEHP is to provide innovative textile product developments and protective garments that protect American servicemen and -women against all kinds of



The "walking sweating manikin" is used to evaluate heat/moisture performance traits of chemically-protective garments.

battlefield hazards. LEHP focuses on the constant need to provide lightweight garments that encapsulate the body and guard against harmful chemicals. The goal of LEHP's highly-specialized designs is to provide protection from chemical toxins in a lightweight garment that prevents the wearer from becoming overheated during the stress of battle.

"The co-critical objective is to design, develop and produce prototype chemically-protective garments with the required comfort, using the latest materials produced in collaboration with selected suppliers," explained Dr. Dave Brookstein, Executive Dean of University Research, School of Design & Engineering at Philadelphia University. "These garments, which are designed to address multiple battlefield missions and chemical toxin challenges, are evaluated and tested in close cooperation with the military services."

According to Brookstein, the LEHP program measures the properties of fabrics and garments,

which are then correlated with the perceived comfort of wearers. LEHP utilizes artificial intelligence (AI) data that has been generated through the University's Materials Evaluation Laboratory (MEL). This is a fully-equipped testing facility that is staffed by a group of experts and includes state-of-the-art equipment. MEL's capabilities include testing for potentially toxic chemicals, and offer a full array of apparel performance testing, and quality testing, as well as monitoring quality assurance and product integrity-compliance requirements.

Brookstein noted that the LEHP program has achieved a variety of successes over the past six years, including:

- Creation of six generations of chemically protective one- and two-piece garments with demonstrated comfort, barrier protection against agents, and contaminated doffing performance.
- Generation of multiple sets of tactile and biophysical comfort data for more than eighty fabrics, laminates, and membranes. This data was provided to LEHP's Garment and AI Teams, and to the US Army Natick Soldier Research, Development & Engineering Center (NSRDEC).
- Demonstration of the value of artificial intelligence and statistical means for projecting and assessing tactile comfort from laboratory-measured data.
- Creation of a rapid, stress-free means for evaluating biophysical comfort of fabrics by arm exposure in a Controlled Environment Chamber.
- Evaluation of heat/moisture performance characteristics of one- and two-piece chemically protective ensembles using a "walking sweating manikin".

Brookstein added, "The substantial and ongoing challenge for LEHP is to provide protection against chemical warfare agents without adding weight to the garment and the extent. LEHP's lightweight garment designs must prevent the wearer from becoming overheated during the stress of battle, resulting in an inability to carry out the mission."

For more information on the LEHP program, contact Dr. Dave Brookstein at brooksteind@PhilaU.edu or 215-951-2751. ●

Kathlyn Swantko, president of the FabricLink Network, created TheTechnicalCenter.com for industry networking and marketing of specialty textiles, and FabricLink.com for consumer education about everything fabric.

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