



## Taking the Stab Out of Stabbings

**T**he safety of America's corrections officers is about to be augmented by efforts to keep British police officers safe while on duty.

*One of the major hazards encountered by every corrections officer in the United States is an attack by an inmate armed with a sharp-edged or pointed object. In England, where criminal use of handguns is not prevalent, it is the police officer who also faces assaults by individuals wielding knives, ice picks, and the like.*

Although the National Institute of Justice (NIJ) has led the way in establishing body armor standards relating to ballistics, for its work with stab-resistant body armor NIJ got a helping hand from the Police Scientific Development Branch (PSDB) of the Home Office in the United Kingdom.

According to Kirk Rice, program manager of weapons and protective systems at the National Institute of Standards and Technology's Office of Law Enforcement Standards, NIJ became involved with PSDB through an initiative of the U.S. Secret Service, which also has a keen interest in standards for stab-resistant vests.

"NIJ is leveraging the research that has already been done by the PSDB," Rice says. "The United Kingdom has a strong program in the stab area. That's because handguns are not much of a threat there, but knives are. We needed their expertise in the knife area so we decided to work with them and supplied them with some equipment and information in the earlier stages of the testing."

PSDB looked at the actual mechanics of stabbing, Rice says. Researchers developed an "instrumented" knife blade—that is, a knife blade that could measure the thrust and energy of a stab. In the first series of tests, 500 young, healthy male recruits tried out the blade, stabbing from a variety of directions and using a number of techniques: roundhouse, overhead, jab, and double- and single-handed stab. Using information from the instrumented blade, researchers could determine the kind of energy a human being was capable of delivering.

To their surprise, PSDB researchers found that the energies delivered were higher than expected. They

suspected the higher numbers could be due to the knife's large built-in handguard, which was incorporated into the knife for safety reasons.

PSDB then conducted a second series of tests and took into account that any number of factors can affect the act of stabbing someone. "With a gun, it doesn't really matter who shoots it," Rice says. "What's delivered is always the same. A knife is different . . . depending on the knife's design and a person's technique, strength, attitude, coordination, and body position."

By watching high-speed videotapes of the stabs and by examining data collected from the knife, PSDB found that, in the act of stabbing, each subject's hand slipped on the handle, toward the handguard.

"In the act of stabbing, the human hand will slip a bit," Rice says. "And as you bear down on the target, you have even more slippage. The handguard the PSDB employed allowed more energy to be delivered. But, in reality, a knife is not going to have such a large handguard."

Through the second series of tests the energy load applied to the handguard was measured and then discounted. The resulting "stab energy" number was calculated to be 43 joules.

According to Rice, one joule is roughly the equivalent of 1 foot-pound of energy (a 1-pound weight dropped from a height of 1 foot delivers 1 foot-pound of energy). PSDB, he says, determined that for the highest level of protection, a vest should be able to withstand 43 joules of energy, allowing no more than 7 millimeters, or about one-fourth inch, of penetration. PSDB also required a 50-percent overtest, in which the same vest was tested at 65 joules and allowed no more than 20 millimeters of penetration.

Rice says that in 1999, PSDB issued a stab-resistant standard for vests to be worn by its law enforcement officers. The agency defined two types of blades—both of which are professionally engineered and made of good quality steel, like a kitchen knife—as being representative of the typical threat on the streets of England. The NIJ

stab-resistant body armor project looked at the PSDB research and its standard and adopted the segments that represented the threat to American law enforcement and corrections officers.

The NIJ standard, which will be published this year under the title *NIJ Standard-0115.00: Stab Resistance of Personal Body Armor*, puts stab-resistant vests into two categories. What differentiates each category is the kind of threat it is designed to stop, Rice says, not the amount of energy it takes to deliver it.

One category of protection stops “engineered,” or high-quality blades, such as kitchen knives or those purchased at sporting goods stores or gun shows. This category represents the threat typically found on the street. The second category is specific to vests that stop the type of improvised weapons commonly found in correctional facilities, those of lower quality material that have been sharpened on concrete or some other type of rough surface.

Within each category are three levels of protection: the first level stops 23 joules of energy, the second stops 33 joules of energy, and the third stops 43 joules of energy.

For example, Rice says, a prison administrator might wear a vest designed to stop improvised weapons and

wear the 23-joule vest, while a corrections officer on a high-security unit would probably wear a 43-joule vest.

Although NIJ relied heavily on PSDB’s research, the new standard also has the input of the National Armor Advisory Board and the Law Enforcement and Corrections Technology Advisory Council, both of which are advisory groups to NIJ’s National Law Enforcement and Corrections Technology Center (NLECTC) system.

***To receive a copy of the upcoming standard, NIJ Standard-0115.00: Stab Resistance of Personal Body Armor, contact NLECTC-National, 800-248-2742. For more detailed information relating to the development of the NIJ standard, contact Kirk Rice at the National Institute of Standards and Technology, Office of Law Enforcement Standards, 301-975-2757.***



This article was reprinted from the Spring 2000 edition of *TechBeat*, the award-winning quarterly newsmagazine of the National Law Enforcement and Corrections Technology Center system, a program of the National Institute of Justice under Cooperative Agreement #96-MU-MU-K011, awarded by the U.S. Department of Justice.

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