

Q&A

Supplement 1: Status Report to the Attorney General on Body Armor Safety Initiative Testing and Activities

WHAT IS THE BODY ARMOR SAFETY INITIATIVE AND HOW DOES IT BENEFIT LAW ENFORCEMENT AGENCIES?

On November 17, 2003, Attorney General John Ashcroft announced the Department of Justice's Body Armor Safety Initiative (BAI) in response to concerns raised by the law enforcement community regarding the effectiveness of their armor. He directed the National Institute of Justice (NIJ) to initiate an examination of Zylon[®]-based bullet resistant armor, to analyze upgrade kits provided by manufacturers to retrofit Zylon[®]-based bullet-resistant armors, and to review the existing process by which bullet-resistant armor is certified to determine if the process needs modification. The testing and research conducted by the NIJ will provide objective information to help agencies determine whether they should replace their existing Zylon[®]-based body armor and whether upgrade kits offered by the manufacturer will ensure the performance of used armor throughout the warranty period. The review and modification of the existing armor compliance testing program will help to ensure the long-term performance of armor while balancing safety, performance, and budgetary concerns. NIJ's ongoing research into the causes and mechanisms of armor degradation will assist in developing methodologies for evaluating used armor and eventually lead to the development of nondestructive test procedures.

HAS THE CAUSE OF THE FOREST HILLS (PA) VEST FAILURE BEEN DETERMINED?

NIJ has performed a statistic-based series of ballistic tests on artificially-aged armors in an effort to determine the cause of the Forest Hills, Pennsylvania, incident in which a unit of NIJ-compliant body armor failed to prevent penetration from a bullet it was designed to defeat. These armors were artificially weakened to match the condition of the rear panel of the Forest Hills officer's armor. No penetrations occurred during this testing, so NIJ cannot draw any definitive conclusions at this time regarding the cause of the failure.

Through tests and research conducted to-date, several factors have been identified that may have contributed to the failure:

- The front panel of the officer's armor—not available for analysis because it was needed as evidence for the criminal prosecution—may have been significantly weaker than the rear panel. Thus, the aged armors may not have been accurately representative of the panel that failed.
- NIJ relied on tensile strength as an indicator of ballistic strength—other mechanical properties might also influence ballistic strength.

- Bullets might be more likely to penetrate regions of mechanical damage caused by folding, flexing, abrasion, etc.
- The moisture content in the interior of the officer's panel at the time of the incident is unknown. The presence of moisture in an armor panel can influence ballistic resistance.

DO THE UPGRADE KITS OFFERED WITH CERTAIN MODELS OF ZYLON®-BASED BODY ARMOR ENSURE THE ARMOR'S PERFORMANCE THROUGHOUT THE WARRANTY PERIOD?

Through its research, NIJ has found that the upgrade kits, tested in conjunction with used Level IIIA armor, experienced bullet penetrations. Excessive backface signatures (BFS) were recorded for all three of the primary threat levels (Levels IIA, II, and IIIA) during this testing. The excessive BFS measurements, along with the bullet penetrations experienced in the Level IIIA armor, would be considered unacceptable if the armor were new and tested in accordance with the NIJ Standard.

WHAT DOES THE MANUFACTURER'S WARRANTY COVER?

Users of body armor should contact the manufacturer or manufacturer's representative to determine exactly what is covered under the warranty. Some manufacturers only warrant their body armor for workmanship and material defects. Others warrant them to perform as stated on the label against designated projectiles. Many only warrant their products to the original user/purchaser. There are also often terms and conditions associated with the warranty that must be accepted for the warranty to be honored. Body armor purchasers should be aware that these variations exist and should talk to the manufacturer or manufacturer's representative to fully understand the details of the warranty.

NOW THAT THE DEPARTMENT OF JUSTICE HAS PROVIDED FINDINGS ON THE EVALUATION OF UPGRADE KITS, WHAT SHOULD LAW ENFORCEMENT AGENCIES AND OFFICERS DO IF THEY ARE CONCERNED WITH THE PERFORMANCE OF THEIR UPGRADE KIT AND ARMOR?

The Department of Justice recommends that law enforcement officers who are concerned about the performance of their upgrade kit and armor contact the manufacturer to find out what replacement options may be available to them. Until that is determined, officers should continue to use the upgrade kit in conjunction with their armor. An officer who is not wearing armor is 14 times more likely to suffer fatal injury than an officer who is.

WE HAVE HEARD THAT ARMOR PERFORMANCE MAY DEGRADE AS A RESULT OF EXPOSURE TO HEAT, MOISTURE, LIGHT, AND WEAR AND TEAR. HOW DOES ONE KNOW IF THE ARMOR'S PERFORMANCE MAY HAVE DEGRADED AND MAY NO LONGER PROVIDE ADEQUATE PROTECTION?

At this time, there are no definitive nondestructive test methods identified that can conclusively determine if a particular armor has been damaged to the point that it no longer provides an adequate level of ballistic resistance. Through NIJ's research effort, the development of a nondestructive test procedure for ballistic armor is anticipated. Armors that are known to have been exposed to excessive amounts of heat, light, moisture, and wear and tear should be carefully examined. If there are any obvious visual defects (e.g., the permanent cover on the ballistic insert has been breached, raw ballistic material is visibly exposed, evidence of significant "set wrinkles" in the panel), the armor should be taken out of service and replaced.

Users should contact the manufacturer with any concerns regarding the performance of their armor.

HOW SHOULD I CARE FOR MY BODY ARMOR TO ENSURE THAT IT CONTINUES TO PERFORM THROUGHOUT ITS WARRANTY PERIOD?

Follow the manufacturer's care instructions provided with your armor. The instructions can be found on labels located on the external surface of each ballistic panel. The carrier should also have a label that contains care instructions. Failure to follow these instructions may damage the ballistic performance capabilities of the armor. If you cannot locate the care instructions for your armor, you should immediately contact the manufacturer to request the instructions.

Agencies should educate officers on the proper care and maintenance procedures for their armor, per the manufacturer's instructions, and armor should never be stored for any period of time in an area where environmental conditions (temperature, light, humidity) are not reasonably controlled (i.e., normal ambient room temperature/humidity conditions), such as in automobiles or automobile trunks. Armor should not be exposed to any cleaning agents or methods not specifically recommended by the manufacturer, as noted on the armor panel label. The *Selection and Application Guide to Personal Body Armor* contains general guidelines on how to properly care for armor. This document can be downloaded from <http://www.justnet.org>.

WHAT IS THE DEPARTMENT OF JUSTICE DOING TO ADDRESS THE ISSUES RELATED TO THE PERFORMANCE OF USED BODY ARMOR?

NIJ is conducting extensive research to determine the causes and mechanisms of body armor degradation. NIJ hopes to develop an artificial aging protocol that will enable body armor manufacturers to accurately predict the service life of a given armor model. It is also anticipated that this research will eventually lead to the development of a nondestructive test method to determine the efficacy of a given unit of armor. Currently, the only method available to accomplish this is destructive ballistic testing.

IS USED ARMOR'S ABILITY TO PREVENT EXCESSIVE BACKFACE SIGNATURE AS IMPORTANT AS ITS ABILITY TO PREVENT BULLET PENETRATION?

NIJ recognized the importance of armor's ability to prevent bullet penetration as well as reduce blunt trauma to an acceptable level. Prior research has determined the acceptable limits for blunt trauma, and the NIJ standard does not allow more than 44 mm of deformation for an armor model to be NIJ-compliant. Used body armor should provide the same level of assurance.

WHEN WILL THE DEPARTMENT OF JUSTICE COMPLETE ITS TESTING OF ZYLON®-BASED BODY ARMOR AND PROVIDE THE PUBLIC SAFETY COMMUNITY WITH THE DEFINITIVE ANSWERS ON THE PERFORMANCE OF ZYLON®-BASED BODY ARMOR?

We anticipate the completion of the broad-based Zylon® testing initiative in Spring 2005. This testing will indicate whether Zylon®-based body armors degrade, the general extent of the degradation, and what factors may be causing the degradation.

DO OTHER BALLISTIC-RESISTANT MATERIALS DEGRADE, TO WHAT EXTENT DO THEY DEGRADE, AND WHAT IS BEING DONE TO ENSURE THAT BODY ARMOR MADE OF THESE MATERIALS ARE PROTECTED FROM DEGRADATION?

Yes, most other ballistic resistant materials are known to degrade in ballistic performance due to one reason or another. However, the current directive is to evaluate Zylon®-based body armor. Findings concerning the degradation of performance of Zylon®-based body armor may shed light on issues pertaining to other ballistic materials.

Armor manufacturers are responsible for understanding the vulnerabilities of the materials used in their designs and to consider these during the design process so that adequate safety margins are built in to the armor so that it performs acceptably over its entire ballistic-resistance warranty period. NIJ is also investing in research that may lead to the introduction of test methods and performance standards that will require body armor to successfully withstand a series of "exposure" tests during which many of the known vulnerabilities of ballistic materials will be exploited.

WHAT IS THE DEPARTMENT OF JUSTICE DOING TO MODIFY THE EXISTING BODY ARMOR STANDARD AND COMPLIANCE TESTING PROGRAM TO ENSURE THE PERFORMANCE OF USED BODY ARMOR?

The Department of Justice is considering input provided by the Body Armor Summit participants and other key stakeholders as well as from research and testing conducted to-date as it reviews the Standard and Compliance Testing Program. Research is being conducted that is aimed at developing an artificial aging protocol that will enable body

armor manufacturers to accurately predict the service life of a given armor model. It is also hoped that this research will eventually lead to the development of a nondestructive test method to determine the efficacy of a given unit of armor. NIJ anticipates issuing recommended modifications within the next two months.

WHERE CAN I FIND ADDITIONAL INFORMATION ABOUT THE BODY ARMOR SAFETY INITIATIVE OR INFORMATION TO HELP ME IN PURCHASING BODY ARMOR?

There are several resources available to you. Additional information about the Body Armor Safety Initiative can be found at the U.S. Department of Justice, Office of Justice Programs, Bulletproof Vest Partnership/Body Armor Safety Initiative website (<https://vests.ojp.gov/index.jsp>). Also available on this site is information on the Bulletproof Vest Partnership (BVP) Program. BVP pays up to 50 percent of the cost of vests purchased by jurisdictions with approved applications.

Additional information to help you in purchasing body armor, such as the “Selection and Application Guide to Personal Body Armor,” can be found at www.justnet.org. This website provides testing and evaluation information through the Body Armor Database. This database provides a comprehensive listing of all models that have been tested by NLECTC and found to comply with NIJ Standard-0101.03, *Ballistic Resistance of Police Body Armor*, NIJ Standard-0101.04, *Ballistic Resistance of Personal Body Armor*, and NIJ Standard-0115.00, *Stab Resistance of Personal Body Armor*.