EVALUATION OF REFLECTIVE VEST OPTIONS

FINAL REPORT

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ABSTRACT

In 2010, the Institute for Police Research in conjunction with the Police Executive Research Forum conducted a study regarding the policies, experiences, and perspectives regarding the use of reflective vests by law enforcement officers in the United States. This study was prompted by a federal mandate that required officers to wear high visibility apparel in certain situations and the dearth of research material on the use of reflective vests and clothing by law enforcement officers.

The primary tool used for this study was a survey instrument developed by the authors, as well as a focus group and core committee comprised of active duty law enforcement officers from various agencies and ranks. The survey participants were street-level officers who would be expected to wear reflective vests. The survey was conducted in five agencies that were selected to represent a diversity of geographic locations, work environments, and force sizes. The survey was primarily distributed and collected by IPR directly from the officers at roll calls. All eligible officers in four of the departments were part of the sample. In one large department, a convenience sample was used.

The survey instrument contained questions specifically formulated to obtain information from officers about their need for visibility in certain tactical situations, the amount of reflective vests and safety gear training, the policy governing vest usage, and their experiences and perceptions arising from use of the reflective vests. Officers were also asked to provide feedback for improving reflective gear. The survey results were tabulated, and are summarized in the report.

The survey found significant consensus regarding the need for high visibility while directing traffic, assisting motorists, stabilizing an accident scene, taking down an accident scene, and conducting roadblocks. These situations generally are consistent with the regulatory requirements regarding the wearing of the vests. The survey also found that there was no consensus on the need for high visibility in other tactical situations, such as during routine patrol or while conducting traffic stops. The survey revealed a significant amount of disagreement regarding certain aspects of vest usage, which may reflect geographic and demographic differences between the departments. There was also evidence of some confusion regarding the scope of the federal requirement for reflective vests.

From this survey, several suggestions for policy guidance and training have been developed. Additionally, the report provides guidance for developing new safety gear, and a matrix of visibility needs in different tactical situations.

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EXECUTIVE SUMMARY

The Institute for Police Research (IPR) is a non-profit organization that focuses on researching law enforcement issues and proposing improvements for the law enforcement community. In 2007, a grant regarding the evaluation of reflective vests was awarded to IPR. The objectives of this study were to conduct field research pertaining to the use of reflective vests, document the law enforcement community's perspectives on the vests, develop policy and training recommendations based on the results of the study, and create a list of law enforcement visibility needs in various tactical situations.

The research project grew out of a new federal requirement that law enforcement officers wear reflective vests in certain situations, and the general dearth of research on the use of reflective vests by law enforcement officers. There are a significant number of law enforcement deaths arising from incidents where an officer is struck by a vehicle. While reflective vests are a useful tool for the law enforcement community when performing certain tasks on highways, law enforcement officers, unlike other highway workers, often require low visibility to safely perform their duties as well. Therefore, general rules and research regarding the use of reflective vests cannot be easily applied to law enforcement officers.

Nonetheless, there has been minimal study of the use of reflective vests by, and the visibility needs of, law enforcement officers. Therefore, IPR undertook this project to gain insight into the tactical situations where law enforcement officers need high visibility, as well as the officers' experiences and perspectives pertaining to reflective

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vests[1]. The primary tool of the research was a study that sought to elicit the perspectives and experiences of street-level law enforcement officers. This study revealed a number of interesting findings that should help advance the safety of law enforcement officers and the public.

The federal requirement that law enforcement officers wear reflective vests grew out of the SAFETEA-LU Transportation Bill of 2006, which included a small provision "requiring highway workers to wear high visibility garments" (Work Zone Safety Provisions). The Federal Highway Authority was charged with developing regulations to implement this provision. The FHWA did so in two steps. First, the FHWA issued regulations governing the use of reflective vests on Federal-aid highways, which required compliance no later than November 24, 2008 (23 CFR 634.2). Second, the FHWA extended the requirements by including them in the Manual on Uniform Traffic Control Devices (MUTCD), which governs the use of traffic control devices on virtually all public roadways (http://mutcd.fhwa.dot.gov/). The compliance with revisions to the MUTCD is required no later than December 31, 2011.

In the proposed regulations, FHWA stated that law enforcement officers, and other first responders, would be included in the mandate. The FHWA received a large number of comments from the law enforcement community, objecting to the mandate and explaining why law enforcement duties were distinct from other roadway duties. Nonetheless, the FHWA extended coverage of the regulations to law enforcement officers and other first responders on the basis that they were "workers" when performing their duties on the roadways. However, the FHWA partially addressed the

[1] The Institute for Police Research has created a website to share this information in an abbreviated format. For an abbreviated summary of research, results, and conclusions, visit http://www.iprveststudy.org for more information.

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concerns of the law enforcement community, revising the requirement so that law enforcement personnel were only required to wear the vests “when directing traffic, investigating crashes, handling lane closures, obstructed roadways, and disasters within the right-of-way of a Federal-aid highway” (23 CFR 634.2). This requirement was then extended to most public roadways under the MUTCD.

The regulations and the revised MUTCD also include requirements that high visibility apparel, generally reflective vests, meet certain visibility standards. These standards are set by the American National Standards Institute (ANSI). The primary standard for most highway workers is called the ANSI 107 standard. In response to the concerns of law enforcement, ANSI developed a separate standard for public safety employees: the ANSI 207-2006 standard for High Visibility Public Safety Vests. While it was initially unclear whether the ANSI 207 vests would satisfy the regulatory requirements, the FHWA in its December 16, 2009 revision to the MUCTD made clear that the ANSI 207 vest could be used as an option in place of the ANSI 107 vest. The regulations raised the question of how the reflective vest requirement would impact the safety of law enforcement personnel, which was the basis of this research study.

When IPR initiated the research study, a core committee was created for the duration of the project. The committee was comprised of law enforcement officials from around the country who were recruited to provide advice and feedback to IPR. In February 2009, the first meeting of the core committee took place and initial topics and issues for the study were discussed. It was determined that the best method for conducting the research was a survey of street-level law enforcement officers. The IPR retained a subcontractor, the Police Executive Research Forum (PERF) for the survey

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duration of the project. PERF is a national membership organization based in Washington, D.C. that conducts research on topics affecting the law enforcement community nationwide. PERF was tasked with assisting IPR in formulating the survey and study methodology, as well as and providing the statistical analysis of the survey results. The IPR also contracted with Liberty Institutional Review Board, an independent institutional review board, to review and approve any aspects of the study that involved human subjects.

In August 2009, a focus group meeting was held in Washington, D.C., and representatives from different law enforcement agencies around the U.S. attended to discuss the current issues regarding reflective vests. This meeting was also used as a "think tank" to develop questions and topics to include in the survey instrument. The thoughts, opinions, and perspectives of the focus group attendees were taken into consideration as IPR and PERF developed the first draft of the survey instrument.

After the draft was created, it was given to two different agencies through an online distribution process as the pilot phase of the project. The survey draft was also distributed to the focus group members for review and feedback. After the pilot distribution trial was complete and the focus group members had given their recommendations to IPR, changes were made to the survey questions as well as the survey distribution plan. Since the pilot phase produced dismal response rates with the online distribution method, the primary distribution phase would be conducted using a face-to-face method, which IPR felt would be more conducive to receiving higher response rates. It was decided that during the primary phase of the survey distribution

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that an IPR representative would attend the roll call meetings of the selected agencies to distribute and collect the surveys in person.

After the changes to the survey were applied and the results of the pilot phase led to the implementation of the new distribution strategy, these adjustments were discussed at the second core committee meeting in late September 2009. The core committee made suggestions for the survey questions and provided feedback on additional topics to include in the survey. The final survey contained 28 questions which fell into nine sections: Demographics, Agency Policy, Usage and Trends, Training, Care and Maintenance, Incidents, Situations and Traffic Stop Visibility, Reflective Vest Acquisition, and Next Generation of Reflective Gear.

The IPR determined that it was not feasible to conduct a statistically valid study of all law enforcement officers throughout the United States. Therefore, it was determined that the best alternative was to conduct an in-depth survey of officers at a limited number of agencies. The IPR sought agencies that provided geographical and demographical (size, agency type, etc.) diversity. The five agencies that were selected included a medium-sized urban police department on the west coast (Agency 1), a large state patrol division in the midwest (Agency 2), a medium-sized suburban police department in the northeast (Agency 3), a small rural/suburban police department in the southeast (Agency 4), and a large metropolitan police department in the southwest (Agency 5). The agencies selected provided a strong diversity in geographic, work setting, and size.

The IPR sought to survey street-level officers in each department who would be likely to encounter situations that would require the use of a reflective vest. Therefore,

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the subjects of the survey were officers in the rank of sergeant and below, who worked street-level patrol and other assignments that could require the use of a reflective vest, such as traffic and other specialty squads. The survey excluded individuals above the rank of sergeant, officers who did not work on the streets (such as corrections officers or those in administrative assignments), and officers who did not wear uniforms (such as detectives and undercover officers).

The distribution phase was conducted over the course of three months. The survey was generally distributed and collected by IPR personnel at roll calls, with the intent to survey all eligible officers in the agencies. The size of two agencies required a slight variance in the distribution method. Agency 3, as a large statewide agency, was the only agency who was offered the online distribution method. Additionally, since Agency 5 was a large agency with seven stations, a convenience sample was used. As the survey data was received, it was entered by an IPR representative into the PERF database. When the final agency's data was entered, PERF compiled the results and reported the data that was collected from the survey distribution. The results were reviewed not only by the PERF staff, but the IPR staff and core committee as well.

Through additional research, IPR was able to find out the current vests in use by the surveyed agencies as well as their current vest policies. In addition to the survey, the IPR reviewed the available literature and gathered information on reflective vests from various sources.

The research yielded a number of interesting conclusions. First, there was a general consensus among the officers surveyed regarding the situations in which high visibility was clearly desired. The survey contained questions that asked officers when

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they desired high visibility or low visibility, and these results were compared with the agencies' policies as well as the federal requirement. According the officers surveyed, a significant majority of the officers in all five agencies expressed a desire for high visibility when conducting roadblocks, directing traffic, assisting motorists (stabilizing scene), and assisting motorists (taking down accident scene). These situations are consistent with the federal requirement that vests be worn while directing traffic, during lane closures and obstructed roadways, and while investigating crashes. The areas where visibility needs varied significantly from agency to agency were routine patrol, traffic stops (approaching vehicles), and traffic stops (questioning the driver). It should be noted that officers are not required by federal regulations to wear the vest in the three latter situations.

In regards to agency policies, all of the agencies maintained policies that satisfied the federal requirements for wearing of reflective vests. According to the survey, more than 97% of the total officers surveyed knew that their agency maintained a written policy on reflective vests as well as when the vest should be worn. However, it is not clear whether the departments fully understand the scope of the federal requirements. For example, one policy required the use of reflective vests in the specific situations detailed in the regulations, but then added a requirement to wear the vests during any "activity" on the roadway. Therefore, while the expansive requirement for wearing reflective vests may be an intentional agency policy, there may also be a mistaken belief that the federal regulations require the use of the reflective vests for any activity on the roadways.

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Further, it appears that there may be some confusion regarding the requirement that reflective vests be worn when “investigating crashes.” The federal regulations would appear to limit this situation to circumstances of an actual crash investigation, which generally occurs after the accident scene has been stabilized. This interpretation is consistent with the officers’ desire for high visibility in such situations. However, the term “investigating crashes” is not inherently clear, and could cover a range of situations. The actual agencies’ policies used a number of different terms to address this particular situation.

One interesting finding was the disparity between the rural and urban departments regarding compliance with the reflective vest requirement, and when officers chose to wear the vest. The medium-sized urban department (Agency 1) had a higher non-compliance average pertaining to a variety of tactical situations on a highway while the small rural department (Agency 4) had a very high compliance average. This disparity may be linked to the communities and work environments of these agencies. In an urban environment with high violent crime rate and gang activity, the officers fear that wearing a high visibility vest would make them more of a target was greater than their fear of being struck by a motorist. However, in a small rural community with a lower violent crime rate and little to no gang activity, the officers may have a higher confidence and authority presence, making high visibility less of a perceived threat to them. These two agencies also displayed a significant contrast when officers were asked if they felt the decision to wear a vest should be at an officer’s discretion. The average response from the urban agency was agreement, while average response at the rural agency was disagreement.

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Other questions on the survey tried to further investigate the reasons that officers may not wear their reflective vests such as command presence, comfort, and convenience. When asked if the vest enhances their professional appearance, the average response from officers at 4 of the 5 agencies surveyed was disagreement or strongly disagreement. However, when asked what impact the vest has on their command presence, 50% or more of the officers surveyed at 4 of the 5 agencies said it had no impact. The contrast in the responses of these related questions may mean that most officers do not think they look professional in the vests, but that it does not necessarily impact their authority. It should be noted, however, that 43.6% of the officers surveyed at Agency 1 believe the vests have a negative impact on their command presence while Agency 4 had 51% of their officers say that it has a positive impact. Again, IPR finds that the drastic difference in work environments and personal relationships within the small community may be a factor into the officers' perspectives and use of the vests.

Comfort and convenience of use were not as significant of an issue as the IPR believed it would be. The average response at 4 of the 5 agencies was disagreement with the statement that the vests were uncomfortable to wear. Also, when asked if the vest was a hassle to "bother with," the average response at 4 of the 5 agencies was disagreement or strong disagreement.

We also asked the officers what improvements could be made to help them complete their required tasks while wearing the vests. More than 35% of officers at every agency (two of the agencies with over 50%) said they want a place on the vest for their police radio or microphone. This tool can be crucial when an officer needs to call

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for back up or respond to a call within seconds while wearing a vest. Between 38% and 50% of the officers at the agencies said they want improved access to their weapons and utility belts. Officers also expressed the desire to see a designated law enforcement only reflective color scheme (i.e., blue for police only) with officers at 4 of the 5 agencies weighing in over 50% in favor of this improvement.

Training and policy enforcement on vest use was another area that IPR felt could affect the officer's decision on when to wear the vest. The training at the agencies varied so greatly that the lack of consistency in how the officers were given the information is an area that IPR proposes further research. As for enforcement of the vest policies, the majority of officers reported they only receive a minor reprimand when not using their vests as required by their department's policies. The officers are informed about the policy on when to use the vests at least once and then enforcement of the use is minor from that point forward. This may also affect the officer's decision to wear the vest.

Since the reach of the regulations is currently being expanded, one immediate need for guidance to departments is on the scope of the regulations. It would be beneficial for some authoritative guidance for departments in implementing the regulations, particularly on issues such as when a reflective vest is required. Further, the development of a training module or sample training material for the use of reflective vests would likely be of great use to departments and officers. There may also be the need for further research into the potential for a law enforcement only color scheme, and into methods for increasing the visibility of the law enforcement identifier on the reflective vests.

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INTRODUCTION

The study “Evaluation of Reflective Vests” was funded by the U.S. Department of Justice/National Institute of Justice in September 2007. The study was initiated based on new requirements for visibility in and along Federal-aid highways that required law enforcement officers to wear reflective vests in certain situations.

Law enforcement occupations present a distinct challenge with respect to visibility. Unlike other occupations where high visibility can be considered an asset in helping to reduce struck-by hazards, the on-duty visibility requirements of a law enforcement officer can range from conspicuous as possible (e.g., in managing traffic, maintaining a highly visible public presence, etc.) to inconspicuous as possible (e.g., arrests, confrontations with known or suspected felons, border patrol, surveillance, etc.). Moreover, an officer may need to convert from low visibility to high visibility within seconds to ensure the safety of the public, fellow officers and suspects.

However, there has been little study of the use or appropriateness of reflective vests by law enforcement officers, and this project was initiated to fill this gap in knowledge. This research project sought to determine the need for officer visibility in tactical situations, help identify the range of visibility requirements, and to determine the perspective of law enforcement officers towards the reflective vests. Additional objectives to this project were to provide information that can help guide the

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development of new garments or gear and compile examples of policies and procedures governing the use of reflective vests by law enforcement officers.

Current Regulations

In 2006, Congress reauthorized the six-year transportation act, titled “The Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users” or SAFETEA-LU. That legislation contained a small clause requiring that all personnel working in and around Federal-aid highways wear reflective vests that were approved by the American National Standards Institute, or ANSI.

As a result of this legislation, the FHWA issued a notice of proposed rulemaking for regulations governing the use of high-visibility safety apparel for workers who are working within the right of way of Federal–aid highways (Federal Register Vol. 71, No. 78). Prior to the issuance of the proposed rule, the worker visibility rules historically applied to construction, utility, and maintenance workers. However, this notice proposed that the high visibility safety apparel rules apply to law enforcement officers and other first responders.

The FHWA received 175 comments on the implications of the proposed rule for law enforcement, most of which opposed the requirement that law enforcement officers wear the reflective vests. Many of the commenters objected to classifying law enforcement officers and other first responders as “workers” who were subject to the rule. While there was no indication from congress that it intended to broaden the class of workers covered by the worker visibility rules, the FHWA determined that law enforcement officers and other first responders were “workers” on the federal highway

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system and were therefore covered by the reflective vest requirement (Federal Register Vol. 71, No. 226).

However, the FHWA did address the substantive concerns of many in the law enforcement community when it issued the final regulations. In its final rule, the FHWA explained the concerns voiced by many of the commenters:

> Overarching comments from State and local police, national police organizations, and State DOTs indicated a strong need for recognizing the many roles that law enforcement personnel serve when working on highways. In particular, the commenters were concerned about law enforcement officers wearing high-visibility clothing while performing duties (such as routine traffic stops or searches and manhunts) that often place them in an adversarial or confrontational role, such as apprehending suspects, stolen vehicles, illicit drugs, or a vehicle occupant who turns out to be wanted for a serious felony and is armed and dangerous. As a result, many of these organizations commented that the rulemaking needed to allow more flexibility for law enforcement to determine, based on their own standard operating procedures, when it was appropriate to use high-visibility clothing. Their primary concern was that a highly-reflective garment would make them a better target if a gunfight develops, especially in nighttime conditions (Federal Register Vol. 71, No. 226).

The FHWA ultimately agreed that the role of police differs significantly from that of other persons whose duties require them to work in and around the highway. Therefore, the FHWA modified the definition of worker so that the high-visibility garment requirement would include law enforcement personnel only “when directing traffic, investigating crashes, handling lane closures, obstructed roadways, and disasters within the right-of-way of a Federal-aid highway” (23 CFR 634.2). The Final Rule was published November 24, 2006, and the states and other agencies were required to comply with its provisions no later than November 24, 2008.

While this rule applied only to workers working on the right of way of Federal-aid highways, FHWA indicated that it would consider expanding this rule to virtually all public roadways through the Manual on Uniform Traffic Control Devices for Streets and

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Highways or MUTCD. According to the Department of Transportation website, the manual "defines the standards used by road managers nationwide to install and maintain traffic control devices on all public streets, highways, bikeways, and private roads open to public traffic. [It] is published by the Federal Highway Administration FHWA under 23 Code of Federal Regulations (CFR), Part 655, Subpart F" (http://mutcd.fhwa.dot.gov/). The standards addressed in the MUTCD are drawn from other regulatory entities such as the American National Standards Institute (ANSI). This institute is a non-profit organization that creates guidelines to be used in evaluating products for conformity in safety and health throughout multiple U.S. industries.

Prior to the establishment of the vest requirement, ANSI had established standards for reflective vests that are generally used on the highways called the ANSI 107 standard. In response to the concerns of law enforcement regarding the standards for the reflective vests, ANSI published standards specifically addressing High Visibility Public Safety Vests – the ANSI/ISEA 207-2006 standard. These standards addressed tactical considerations for law enforcement, including badge and radio clips and access to equipment belt that the longer ANSI 107 vest precluded. It also included an optional "breakaway" feature for easy removal. As a result of these modifications, the minimum amount of fluorescent background material was lower for the ANSI 207 vest than for the ANSI 107 vest. Therefore, it was not clear whether the ANSI 207 vests satisfied the regulatory requirements for reflective vests.

The FHWA recently extended the reflective vest requirement for law enforcement to virtually all public rights of way, and clarified that the ANSI 207 vest could be used as an option to satisfy the visibility requirements. On December 16, 2009, the FHWA

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approved the revised 2009 MUTCD to require that all workers in a highway right-of-way or workzone, including law enforcement personnel, firefighters and emergency responders, wear high-visibility safety apparel (Federal Register Vol. 74, No. 240). The objective with this final ruling for the MUTCD was to revise the information, options, and standards related to traffic control devices and to "expedite traffic, promote uniformity, improve safety, and incorporate technology advances in traffic control device application" (Federal Register Vol. 74, No. 240). The FHWA also provided garments complying with ANSI/ISEA 207-2006 will be acceptable as an alternative to ANSI/ISEA 107-2004 for law enforcement and emergency responders. The revision is effective January 15, 2010 and compliance is required by December 31, 2011.

In June 2009, the FHWA issued a Final Rule excluding firefighters from the vest requirement after a University of Michigan Transportation Research Institute study found that the National Fire Protection Association standards for firefighter turnout equipment were equivalent in visibility to ANSI 107 and that compliance with the original rule could put the firefighter at an unnecessarily increased risk for injury (Federal Register Vol. 74, No. 113).

Literature Review

While the development of safety gear and technologies to protect law enforcement officers has become a significant field of research, there is little research either on the use of reflective vests by law enforcement officers, or on the cause of deaths due to officers being struck by vehicles. The term "struck by" pertains to an incident when an officer is hit by a vehicle while outside of their own vehicle. A review of

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these statistics indicates that law enforcement deaths due to struck by vehicles is a significant problem.

Reports from the Federal Bureau of Investigation (FBI) show that 682 officers where killed in the line of duty from 1989 to 1998 (LEOKA 1998). During the same time period, 636 police officers were accidentally killed in vehicle accidents. More recently, a 2008 FBI report indicated that 39 of 68 officers accidentally killed in the line of duty were a result of automobile accidents. Of those 39 officers, a total of 13 were struck outside of their vehicles: 12 officers were accidentally killed while directing traffic or assisting motorists, and 1 officer was killed while executing a traffic stop or roadblock. Thus, nearly 20% of officers who were accidentally killed in 2008 died from being struck by a car (LEOKA 2008). Between 1999 and 2008, a total of 123 officers were accidentally killed when struck by a vehicle (LEOKA 2008).

Another organization that tracks the deaths of law enforcement officers is the National Law Enforcement Officer Memorial Fund (NLEOMF). This non-profit organization has a mission to record and commemorate the fallen U.S. law enforcement officers as well as collect information that will help improve officer safety. The statistics collected regarding struck by deaths for officers through the NLEOMF is actually higher than the statistics reported through the FBI publications; however, the NLEOMF does not break down the fatalities by task and only indicates that the fatalities refer to officers "struck outside vehicle" (Research Bulletin 2008). The NLEOMF had the number of struck by fatalities for 2008 at 18 and the number for 2009 at 10 (Research Bulletin 2009).

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The State Associations of Chiefs of Police (SACOP) conducted a study in which they surveyed 698 state police associations of law enforcement executives regarding law enforcement injuries in 2002. In describing the rationale for the study, the authors stated that "… the law enforcement community has a financial incentive to investigate changes to uniforms, equipment, policy, and training that might decrease the instances of on-duty injuries" (Currier et al., 2003, p. 1). The authors suggest that, given the types of injuries and the conditions under which they occurred, improvements in uniform design, equipment, training, and agency policy could prevent injuries or mitigate their severity. Additionally, it was reported that more than half of all injuries happened between the hours of 6 p.m. and midnight, a time period in which visibility becomes more difficult.

There have been several documented attempts to reduce struck by hazards faced by drivers. NLEOMF has taken a proactive stance on educating the public on driving safety with its "Drive Safely" campaign (NLEOMF.org). This campaign includes tips for motorists, such as avoiding distractions while driving, slowing down and moving over when you see a public safety vehicle on the side of the road, and keeping to the posted speed limits.

One of the major concerns in keeping officers safe on the roads has been the visibility of the officer to passing motorists. In a collaborative effort between the National Safety Commission, the National Sheriffs' Association, and the Association of Police Organizations, the "Move Over, America" campaign was created. The "Move Over" campaign was aimed at educating the public about laws that required drivers to switch lanes or slow down to ensure the safety of officers on the road (Move Over America

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2007). Consistent with this initiative, at least 46 states have enacted “Move Over” laws to protect public safety officers. These and other campaigns attempt to increase awareness of the dangers faced by officers on and near the road.

Reflective Gear and Human Perception

While there is a deficiency in the amount of material regarding the use of reflective gear for law enforcement officers, there is a significant amount of research on reflective gear generally. Research on human perception (in motor vehicles) finds that drivers must first notice, and then identify, an object (in or near the roadway) in order to react to it (Beck[2] 2005, and Ashton 2007). Police uniforms are typically dark colored and even more difficult to see at night. The white shirt common among higher ranked officers does not add to their visibility in low light or nighttime conditions. Beck, citing research conducted in 1984, notes a driver at 30 miles per hour (mph) detects a subject in dark clothing at approximately 70 feet (giving the subject approximately 1.5 seconds to react). If the speed is 55 mph, the reaction time was under one second. Similar research by the University of Michigan Transportation Research Institute (as cited by Ashton 2007) concluded that in a simulated work zone, a driver detected a person in non-reflective clothing at 125 feet while they detected an individual in reflective clothing at 891 feet. However, a driver traveling at 35 mph required 159 feet to stop.

Prior research clearly demonstrates the effectiveness of reflective clothing in providing drivers more time to perceive an object and recognize that object as a person in order to react. Without the protection afforded workers wearing reflective gear, drivers have little, if any, time to identify the potential dangers ahead. In looking at the best

[2] www.ipmba.org/reviews/**The_Need_For_High_Visibility_Apparel**.pdf (accessed March 27th, 2009).

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practices for improving night work and traffic control, Cottrell (1999) stated that the best way to improve worker visibility in night work zones was to have workers use reflective vests, illuminated apparel, or white clothing with reflective marking. According to Cottrell, due to the frequently dark uniform colors, an officer conducting a traffic stop at night would, more than likely, not be seen in his or her dark uniform without the use of some reflective safety gear.

With regards to the color and placement of the reflective material, Sayer and Buonarosa (2008) published a study that outlined the difference between garment colors and scene complexity. The authors stated that:

> "Detection distances between fluorescent yellow-green and fluorescent red-orange garments were not significantly different, nor were there any significant two-way interactions involving garment color. Pedestrians were detected at longer distances in lower complexity scenes. Arm motion significantly increased detection distances for pedestrians wearing a Class 2 vest, but had little added benefit on detection distances for pedestrians wearing a Class 2 jacket" (p. 1).

Further, the results from a study conducted by Sayer and Mefford (2004) stated the "Configuration of the retroreflective trim, trim color, placement in the work zone, and driver age significantly affected pedestrian conspicuity. Intensity and the amount of retroreflective trim did not" (p. 1).

Reflective safety clothing clearly enhances visibility at night. The American Society for Testing and Material (ASTM) issued the *Standard Guide Properties of High Visibility Material Used to Improve Individual Safety* document (ASTM Designation F 923-00) that found that a luminous contrast is needed for nighttime visibility. In previous research by Arditi et al. (2003), reflective material was most effective when it was sufficiently bright to be seen at great lengths and could be seen in all directions. Further research conducted in Michigan (as cited in Ashton 2007) noted that this reflective

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material should be properly located on the user and should be made in such a way that the person who is seeing it can identify the user as a person and not a stationary object.

While the implications of such research indicates either tacitly or explicitly that wearing reflective equipment enhances officer safety, there may be some resistance to the use of reflective vests in normal day-to-day activities of law enforcement officers. LaTourrette et al. (2003) notes that officers are often the first to arrive on a scene and expected to render aid while maintaining order, often in ambiguous or time-dependent circumstances. In addition, “given their need for agility, flexibility, and speed, police officers cannot be burdened with excessive or restrictive gear” (p. 52). Further, law enforcement agencies and advocacy groups maintain that reflective vests make officers an easier target if a situation turns violent.

However, Beck (2005) argues that this conclusion is based on a misunderstanding of how reflective vests function. “Retroflective” material reflects light back towards the source. If an officer (or anyone) wearing a reflective vest walked under a streetlight, he or she would be illuminated as much as someone without the apparel. The light is reflected back towards the streetlight. In similar circumstances, the most obvious indicator of the person is the police officer’s badge. In addition, the fluorescent colors of reflective vests rely on daylight conditions, with high levels of ultra-violet light. At night, fluorescent material turns darker. Beck (2005) asserts that it would be easy for an officer to don a “tactical cover-up” in situations where low-visibility was desired or even required.

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Present Reflective Safety Clothing Issues

There are some issues with the vests themselves that deserve consideration when mandating the use of reflective safety gear. An investigation conducted by Hampson (1998) found that in some instances reflective vests made the officer feel hot causing discomfort. There is no literature explaining the changes made in vest construction since the Hampson investigation so it cannot be concluded that the same issues exist with today's reflective vests.

How long a reflective vest should be kept and maintained is an important but unknown issue, as well. A 2004 3M technical report entitled *Care Guidelines to Reduce Staining of 3MTM ScotchliteTM Reflective Material* stated concerns regarding staining that happens to reflective material when exposed to perspiration, salt water and other chlorine-containing compounds, strong acids or bases and compounds containing sulfur. The care guidelines in the report also note that extreme heat and humidity can have a negative effect on the reflective material.

Reflective vests are not the only safety equipment that can be used (or in some cases, not used) by law enforcement officers to make their presence known on the road. Reflective cones, flares, and light wands are also safety tools that officers use to promote high visibility in low lighting scenarios. Reflective cones are commonly used during scene stabilization; however, they do not always catch motorists' attention. In 2008, a Pennsylvania officer working outside of his vehicle to recreate and investigate the scene of a fatal crash set up a line of traffic cones to shield him from the right-of-way traffic and alert oncoming motorists of the lane closure. Even with the lane clearly blocked off, a motorist struck and killed him (Pearsall 2010). Many members of the law

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enforcement community make the argument that the problem is not with officer visibility or safety gear, but more often with the driver's attention.

Policies and Practices

Agency-specific policies, which differ from state to state and jurisdiction to jurisdiction, are vastly different concerning the use of a reflective vest or other related safety gear. Examples include the South Carolina Constables Office uniform policy, which states that "a reflective vest of mesh or other suitable material *may be* worn when working traffic assignments. The vest must have the words 'State Constable', with or without the word 'Police' on the back of the vest." Another policy example is the Madison (WI) Police Department policy which states that "officers are expected to wear their issued ANSI 2 reflective vest when directing traffic or otherwise on the scene of a crash for more than 15 minutes." Other policies are more rigorous. For example, the City of Canyon Texas includes within its job description for patrol officer that, "[W]hile on patrol, the individual will be required to always wear protective body armor for officer safety. When directing traffic, the individual will be required to wear a reflective traffic vest for officer safety, in compliance with agency policy."

Police tactics when conducting operations also play a significant part in officer safety. In most cases, an officer stops his or her vehicle such that he or she exits from the vehicle in close proximity to passing traffic and, then approaches the driver side of the stopped vehicle, thereby placing him or herself in a dangerous area. In contrast to this traditional method, some agencies have changed their tactics to reduce the risks to the officer by requiring him or her to approach the vehicle on the passenger side. This information was gathered from the website NJLawman.com in the topic area of police

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tactics. This website offers resources as well as discussion forums to invite the law enforcement community's feedback online.

Further, according to NJLawman.com, a website dedicated to the dissemination of law enforcement related tactics, an improved safety tactic based on New Jersey case law allows police officers to ask the driver of a lawfully stopped vehicle to step to the rear of the car, stating the officer needs no justification in most states (NJLawman.com). This tactic, known as the "step-out" tactic, places the officer at the rear of the vehicle instead of on the side, arguably a safer position for the officer. However, the "step-out" tactic is controversial with some departments.

In 2009, the IACP State and Provincial Police Directorates Police Planning Officer's listserv queried its membership regarding the "step-out" tactic. Of the 17 responding agencies, five allow the use of this tactic but have no written policy governing it, five do not recommend its use but have no written policy governing it, four prohibit its use and three just do not use the tactic (Ashton, 2007). There is no available literature explaining how the reflective vest would act in unison with the above mentioned tactic. While agencies' policies vary, there is some agreement that wearing reflective equipment does improve officer safety by increasing visibility.

Reflective Clothing Standards

Currently, there are two models of the American National Standards Institute reflective vests: the ANSI/ISEA 107-2004 and the ANSI 207-2006. The first model ANSI 107-1999 was implemented in 1999 following the success of a standard safety garment implementation for workers on roadways in Europe. Prior to the creation of the ANSI 107-1999, there were standards on reflective or high visibility clothing for workers on

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highways or roadways. The current standard, ANSI 107-2004, is categorized into three different classes based on the environments and hazards in which they are intended to be used. According to the Blauer *Reference Guide to Protective Clothing Systems for Public Safety*, “the standard defines three protective classes based on the amount of fluorescent background material and retro-reflective material used and various design and usage requirements” (2006).

Class I Garments were developed for use in situations where workers are located a significantly safe distance from direct traffic with vehicles traveling no faster than 25 miles per hour. The workers should also be able to focus fully on the traffic situations they are facing as part of their main duties. Workers who would wear Class I garments include parking lot attendants, shopping cart retrievers, and sidewalk maintenance workers. Class II Garments are made for workers who may work in environments with inclement weather, workers that may divert their attention from oncoming traffic, situations where traffic is traveling 25mph or faster, and jobs with risks that surpass the duties of the Class I workers (Blauer). This is the class that is recommended for road construction workers as well as law enforcement and emergency response personnel. Class III Garments are made for workers with a high task load that requires them to give their attention to other tasks rather than traffic. While the Class III vests exist, they are not allowed under the ANSI standard (Blauer).

In November of 2006, ANSI/ISEA published the ANSI/ISEA 207-2006 Standard for High-Visibility Public Safety Vests which establishes design, performance specifications and use criteria for highly visible vests that are used by law enforcement, emergency responders, fire officials, and Department of Transportation personnel. The

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ANSI 207 standard does not specify different levels of protection (Class 1, 2 or 3), like the ANSI 107 standard. A vest is either ANSI 207 certified or not. The primary distinction of ANSI 207 versus ANSI 107 lies in the amount of fluorescent background material. ANSI 207 requires a minimum of 450 in^2. This would fall between ANSI 107 Class 1 (217 in^2) and Class II (775 in^2) garments. The minimum amount of required retroreflective area (207 in^2) did not change from ANSI 107 and 207 (High Visibility Safety Apparel Doc. No. 153). ANSI 207 vests are now permitted as an option that law enforcement officers can use instead of the ANSI 107 Class II vest.

Several versions of the ANSI207 vests currently come equipped with features designed specifically for law enforcement officers, including 2-point and 5-point breakaway designs which allow the vest to break apart if it is grabbed in a resistance situation. Other features include microphone clips, shorter torso coverage for equipment belt access, and wording on the back of the vests that identify the law enforcement officer's agency such as "Sheriff" or "Police." While many manufacturers produce reflective vests, only certified vests will have a certification label that reads "ANSI/ISEA 107 Certified" or "ANSI/ISEA 207 Certified".

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METHODS

The research sought to determine the attitudes, experiences, and perspectives of law enforcement officers who would normally be expected to use reflective vests. The research focused on the tactical situations in which reflective vests were beneficial or not, on the perspectives of officers regarding the wearing of the vests, the policies and practices that dictated wearing the vests in the real world, as well as the potential areas for improving the policies or design of the reflective vests. The primary research tool was a survey of law enforcement officers. The survey was supplemented by input from a focus group, feedback from a core committee, and the gathering of documentation and information from the agencies studied. Because it was not feasible to conduct a valid study of all law enforcement officers in the United States, the survey covered officers in five law enforcement agencies.

Survey Instrument

The survey, Officer Safety: The Use of Reflective Vests and Other Related Safety Equipment, was developed jointly by the Police Executive Research Forum (PERF) and the Institute for Police Research (IPR). The survey was designed to evaluate the visibility needs of law enforcement personnel and examine policies and practices on the use of reflective vests and related safety gear.

The IPR recruited a small group of officers from different agencies across the U.S. to represent that law enforcement community and serve as a core committee for the project. The core committee would review and provide feedback during different stages of the project. IPR and the core committee met in early 2009 and discussed topics of concern in regards to the issue of reflective vests prior to the IPR hiring PERF

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as a subcontractor for the survey development. An outline of the major issues to be included in the survey was developed by PERF utilizing the latest literature on the topic. A focus group meeting was convened consisting of officers from 10 agencies who had knowledge of their policies and practices with regard to the use of reflective vests and other related safety gear. This is a survey development method that PERF has used in the past to great effect with previous survey instruments. The focus group participants were asked to discuss and comment on the main topics included in the proposed survey outline. Further, participants were asked to provide additional input on the key issues to be included in the survey and methods to encourage officer participation. Equipped with this information, PERF and IPR developed a draft of the survey.

After the survey was drafted, it was sent to representatives from nine law enforcement agencies who were asked to complete the survey and make margin notes concerning question form and content. We requested that they take note of any aspects of the survey form or content that were problematic, confusing, difficult, or unclear. Each person was then contacted via telephone to discuss the survey item by item. Respondents were queried on their understanding of the intent of each question in addition to the following survey components: the meaning of specific words and phrases in the questions, the types of information respondents need to answer the questions, the respondent's ability to match their answer to the response categories provided in the survey, and the types of cognitive strategies used by the respondent to retrieve the information. Particular attention was paid to whether survey items were perceived by the respondents as intended by PERF and IPR. PERF also collected information from respondents concerning the length of time taken to complete the

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survey. The feedback received through this cognitive interview process was used to refine the survey instrument.

Additionally, the survey was pilot-tested with two agencies. Results of the piloting process led to minor changes to the survey instrument, but significant adjustments to the distribution method. After evaluating the method of online distribution and the resulting response rates in the pilot testing of two medium-sized agencies, IPR concluded that a face-to-face distribution would be a more effective method than online distribution. Since participation was voluntary, the importance of a committed presence on IPR's behalf served as a motivating factor for choosing this as the primary form of survey distribution and collection.

Finally, the refined survey instrument was sent to the core committee for feedback. The survey instrument was modified to reflect the input of the core committee. As required for grant projects involving the use of human subjects, IPR contracted an IRB to review and evaluate the protection and safety of human subjects involved in this project. Liberty IRB from Deland, Florida was selected by IPR as the IRB to serve on this project. Prior to the completion of the survey development, Liberty IRB was consulted regarding the plan for selecting officers and agencies to participate, the officers' rights to refuse participation, their preservation of their anonymity and confidentiality, and the proper protocol for handling and securing collected data. Once finalized, the survey was reviewed by Liberty IRB. All issues raised by Liberty IRB were addressed and the final instrument was approved for dissemination.

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Defining the Study Population

The goal was to survey current street-level law enforcement officers who would potentially wear reflective vests during tactical situations. Therefore, the study population included sworn officers at the level of sergeant or below who were engaged in law enforcement activities that could potentially involve the use of reflective vests in a tactical law enforcement situation. The term "sworn officers" included deputy sheriffs, troopers, and state police officers, in addition to municipal law enforcement officers. Sworn officers did not include trainees who had not yet been sworn in. The population included sworn officers at the rank of officer, corporal, and sergeant (though certain departments may have had intermediate ranks, or may have used slightly different terminology for the ranks). The population included officers in street-level specialty units or assignments, such as traffic enforcement, gang, SWAT, community policing, motorcycles, canine, DWI enforcement, and bicycle. However, officers in these units were not sampled separately, and the survey was not intended to yield separate results for officers in these specialty units.

The population excluded employees who would not typically be expected to wear the reflective vests in tactical law enforcement situations. Therefore, the study population excluded non-sworn employees, and sworn employees above the rank of sergeant. The population also excluded sworn employees at the rank of sergeant and below who were in assignments where the officer would not normally be expected to encounter tactical situations that would warrant the use of a reflective vest. Thus, the population excluded sworn officers in primarily administrative assignments (such as training or administration), in assignments that are primarily within the confines of a building or its exterior (such as corrections or building security), and in assignments

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such as process server or license inspections. The population also excluded assignments where officers do not wear law enforcement uniforms (such as undercover officers and detectives).

The study design sought to ensure that the survey was distributed to the proper population. As discussed in greater detail below, the surveys were generally distributed through the employees' unit, whether at a unit roll-call or through internal unit delivery methods. Generally, excluded officers (such as undercover officers or corrections officers) are in units separate from included officers and would not have received a survey. Therefore, the study did not encompass units made up solely of employees who are excluded from the survey. In the event excluded officers completed the survey, a screening question in the survey (Survey Question 4) was used to ensure that these responses were excluded.

Selecting Law Enforcement Agencies for Sampling

In order to directly reach street-level officers, the study conducted surveys of officers at five law enforcement agencies. It was not feasible to conduct a statistically valid survey of all law enforcement officers in the United States. Therefore, the study sought to survey a cross section of agencies which would include a variety of agency sizes, and would reflect a diversity of demographic and geographic factors. Ultimately, the agencies surveyed were geographically diverse: including agencies in the Northeast, Southeast, Midwest, West Coast, and Southwest. The agencies also represented a range of sizes: from a small agency with approximately 47 total officers, to a large one with over 3,000 officers. The selected agencies also covered a variety of demographic areas: a large metropolitan department, a statewide highway patrol

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department, a medium-sized urban department, a medium-sized suburban department, and a small rural/suburban department (see Figure 1).

Figure 1. List of Agencies

Agency 1 – Medium Urban Police Department (West Coast)

Agency 2 – Large State Patrol (Midwest)

Agency 3 – Medium Suburban Police Department (Mid-Atlantic)

Agency 4 – Small Rural/Suburban Police Department (Southeast)

Agency 5 – Large Metropolitan Police Department (Southwest)

Survey Content and Format

The final survey instrument contained 28 questions of various open- and closed-ended formats in a series of nine topical areas: (1) Officer Demographics, (2) Agency Policy, (3) Usage and Trends, (4) Training, (5) Care and Maintenance, (6) Incidents, (7) Situations and Traffic Stop Visibility, (8) Reflective Vest Acquisition, and (9) Next Generation of Reflective Gear. A copy of the final survey instrument is included in Appendix A.

Data Collection

Officer participation in the survey was voluntary. Due to the sensitive content included in the survey, it was decided that the survey would be confidential and anonymous. Rigorous precautions were taken to protect the confidentiality of survey responses. The surveys were administered at roll call. All officers were provided with an abbreviated consent form. This 1-page consent form was approved by Liberty IRB as a substitute for the original 5-page consent form, which required a signature from the participant. This method was used because it allowed the survey participants to be

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completely anonymous. The participants did not provide any personally identifiable information, and the study design totally concealed the identity of the participants.

As an alternative, the participants had the option to receive the full 5-page informed consent form if they wished to have their identity linked with their survey data. The abbreviated consent form described the purpose of the research, the time required to participate, any risks that could be expected, confidentiality precautions, and expected benefits for participation. If the officers agreed to participate, they were to mark a field on the cover sheet of the survey indicating that they read the IPR informed consent form and agreed to participate.

IPR staff traveled to four of the five departments and gave prepared instructions, distributed the surveys, and collected the completed surveys. Most surveys were completed in hardcopy format during roll call and returned directly to the IPR survey administrator. However, since one of the agencies was statewide with several stations and divisions, IPR administered an online distribution of the survey to allow their officers to complete the survey. This process included an email of specific instructions with a hyperlink to a secure PDF file that allowed the officers to submit the data directly into the PERF database. As surveys from were received, IPR staff handled data entry responsibilities. Nearly all officers present at the roll calls agreed to complete the survey. Most non-response was due to the fact that officers were not present at the roll call.

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Overall, 579 surveys were received out of 741 disseminated, resulting in an overall response rate of 78.1%.

- Agency 1: 78 surveys disseminated/89 surveys completed (87.6% response rate)
- Agency 2: 232/359 (64.6%)
- Agency 3: 66/69 (95.7%)
- Agency 4: 28/28 (100%)
- Agency 5: 175/196[3] (89.3%)

Prototype Development

Within the original scope of work, the IPR made plans to work with manufacturers to develop a prototype based on the information obtained from the survey. While the prototype development goals were adjusted during the course of the project, the IPR knows the data collected from this study can still be used to assist vest manufacturers in their continuous efforts to better meet the needs of law enforcement officers.

[3] A sample of officers was selected from Agency 5 since it was not possible to simultaneously attend all roll call meetings.

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RESULTS

Demographics

As mentioned above, the survey was comprised of nine sections, the first of which was the Demographics section. This section contained five closed-ended questions designed to describe the survey respondents without the risk of identifying them[4] since this was a confidential and anonymous survey. Respondents were asked to indicate their current rank[5] (see Table 1). The vast majority of respondents irrespective of agency were at the Officer/Deputy/Trooper rank. The percentage of respondents who were sergeants ranged from 7.1% in Agency 4 to 19.7% in Agency 3. The percentage of corporals ranged from 0.4% in Agency 2 to 23.4% in Agency 5; two agencies do not have the rank of corporal or the equivalent.

Table 1. Current Rank of Respondent, by Agency

Rank	Agency 1	Agency 2	Agency 3	Agency 4	Agency 5
Officer/Deputy/Trooper	73.1% N=57	83.2% N=193	80.3% N=53	92.9% N=26	65.7% N=115
Corporal	16.7% N=13	0.4% N=1	0	0	23.4% N=41
Sergeant	10.3% N=8	16.4% N=38	19.7% N=13	7.1% N=2	10.9% N=19
# of cases	N=78	N=232	N=66	N=28	N=175

[4] One item on the survey asked respondents to indicate their number of years of law enforcement experience. With regard to this question, it was decided to include fewer response categories as a respondent might be identified when combining their response on this question with their rank (question 1) and gender (question 3) (e.g., female Captain with 12 years of experience).

[5] This item was included not only to describe the respondents, but also to make sure that all respondents were in-scope and eligible for the survey; the survey was intended only for respondents at the rank of Sergeant or below.

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Respondents were also asked to indicate the number of years of experience they have in the field of law enforcement (0-5 years, 6-10 years, or 11 or more years[6]). As shown in Table 2, respondents most frequently (a majority of respondents in Agencies 1 and 2, and a plurality of respondents in Agencies 3 and 5) indicated that they have 11 or more years of law enforcement experience, which indicates that they have considerable experience in the field. The lone exception was Agency 4, where most respondents (64.3%) indicated that they had 0-5 years of law enforcement experience. Irrespective of agency, the vast majority of respondents were male (see Table 3).

Table 2. Years of Law Enforcement Experience, by Agency

EXPERIENCE	Agency 1	Agency 2	Agency 3	Agency 4	Agency 5
0-5 years	12.8% N=10	19.0% N=44	28.8% N=19	64.3% N=18	36.6% N=64
6-10 years	6.4% N=5	25.9% N=60	24.2% N=16	17.9% N=5	18.3% N=32
11 or more years	80.8% N=63	55.2% N=128	47.0% N=31	17.9% N=5	45.1% N=79
# of Cases	N=78	N=232	N=66	N=28	N=175

Table 3. Gender, by Agency

GENDER	Agency 1	Agency 2	Agency 3	Agency 4	Agency 5
Female	3.8%	4.8%	6.1%	25.0%	13.8%
Male	96.2%	95.2%	93.9%	75.0%	86.2%
Missing	N=0	N=3	N=0	N=0	N=1
# of Cases	N=78	N=229	N=66	N=28	N=174

[6] Care was given when developing the survey to avoid identifying respondents through their responses. The categories utilized sufficiently describe the respondents without divulging their identity.

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Finally, respondents were asked to describe their current assignment[7] and the type of setting in which they work. All respondents included in this study were assigned to patrol/traffic at the time of survey administration. Table 4 shows that the agencies were selected from a range of geographical areas representing predominantly large sized urban areas (Agencies 1 and 5), small to medium-sized urban areas (Agencies 3 and 4), and rural areas (Agency 2). A smaller percentage of respondents from each of the five agencies, ranging from 1.7% (Agency 5) to 25.0% (Agency 4), indicated that they work in suburban areas.

Table 4. Years of Law Enforcement Experience, by Agency[8]

TYPE OF SETTING	Agency 1	Agency 2	Agency 3	Agency 4	Agency 5
Large-sized urban area	80.8%	21.1%	19.7%	7.1%	98.3%
Small to medium-sized urban area	15.4%	34.9%	77.3%	64.3%	0
Suburban area	3.8%	12.5%	6.1%	25.0%	1.7%
Rural area	0	66.4%	3.0%	7.1%	0
# of Cases	N=78	N=232	N=66	N=28	N=175

Agency Policy

The second section of the survey focused on agency policy as it pertains to the use of reflective vests. Respondents were first asked if their agency maintains a written policy

[7] The respondent's current assignment was utilized in the same manner as the information pertaining to rank: To describe the respondent and also to make sure they were in-scope as this survey was only intended for respondents assigned to patrol/traffic.

[8] Percentages do not sum to 100% because respondents could mark more than one response to describe the setting in which they work. Further, the number of cases (N in each cell) does not sum to the total number of respondents in each agency for this same reason. In this case, the total number of respondents is provided for reference since the information contained in the table is based upon the particular number of responses.

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regarding the use of reflective vests. The majority of respondents indicated that their agencies do maintain such a policy (see Table 5).

Table 5. Maintain Written Policy Regarding Reflective Vest Use, by Agency

MAINTAIN WRITTEN POLICY	Agency 1	Agency 2	Agency 3	Agency 4	Agency 5
Yes	100%	99.1%	93.8%	96.4%	98.2%
No[9]	0	0.9%	6.2%	3.6%	1.8%
# of Cases	N=78	N=232	N=65	N=28	N=171
Missing	N=0	N=0	N=1	N=0	N=4

Those respondents answering affirmatively were asked if their agency's written policy regarding the use of reflective vests dictated when this safety equipment should be worn. The vast majority of respondents across agencies answered affirmatively (see Table 6). Interestingly, however, several respondents within four of the five agencies were unaware of this information.

Table 6. Written Policy Dictates When Reflective Vest Should be Worn, by Agency

POLICY DICTATES WHEN WORN	Agency 1	Agency 2	Agency 3	Agency 4	Agency 5
Yes	97.0%	98.7%	98.3%	100%	95.2%
No	0	0	0	0	1.8%
Don't Know	3.0%	1.3%	1.7%	0	3.0%
# of Cases	N=66	N=224	N=58	N=24	N=168
Missing	N=12	N=6	N=3	N=3	N=0

[9] Those respondents responding negatively were asked to skip to the next section on Usage and Trends.

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Respondents indicating that their agencies' written policy stipulates when a reflective vest should be worn were then asked how often they comply with the policy during certain tactical situations for which their agency requires them to wear a vest (see Table 7). Respondents were presented with four tactical situations that might necessitate the use of a reflective vest[10]: DUI checkpoints on highways, traffic stops on highways, traffic direction on highways, and accident scene investigation/management on highways.

With regard to DUI checkpoints on highways, the majority[11] of respondents involved in such situations "always" utilize their reflective vests. However, in Agencies 1 and 5 a considerable number (13.2% and 19.3% respectively) of officers indicated that they "never" comply with the agency policy at DUI checkpoints on highways. Similar to the compliance at DUI checkpoints on highways, compliance was fairly high during traffic direction on highways and accident scene investigation/management on highways. In both cases, either a plurality or majority of respondents indicated that they "always" comply with agency policy, with a large percentage of respondents indicating that they "sometimes" comply. Compliance with the agencies' reflective vest policy was lower during traffic stops on highways with either a majority (Agencies 1, 2, and 3) or plurality (Agencies 4 and 5) of respondents indicating that they "never" comply with policy.

[10] Respondents were also provided with space to write in other tactical situations during which they might utilize reflective vests, although very few did so. When other tactical situations were identified, respondents most commonly indicated that they utilized reflective vests during school crossing duties and vehicle checks/checkpoints other than DUI.

[11] The lone exception was Agency 5 where a plurality, not a majority, of respondents indicated that they "always" use reflective vests at DUI checkpoints on highways.

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Table 7. Compliance with Agency Reflective Vest Policy Within Selected Tactical Situations, by Agency

TACTICAL SITUATION	How Often Do You Comply?	Agency 1	Agency 2	Agency 3	Agency 4	Agency 5
DUI Checkpoints on Highways	**Always**	68.4%	93.2%	91.3%	89.5%	49.4%
	Sometimes	13.2%	5.3%	6.5%	5.3%	21.7%
	Seldom	5.3%	1.0%	0	0	9.6%
	Never	13.2%	0.5%	2.2%	5.3%	19.3%
	# of Cases	N=38	N=207	N=46	N=19	N=83
	NA[12]	N=22	N=14	N=9	N=5	N=71
	Missing	N=4	N=0	N=2	N=0	N=6
Traffic Stops on Highways	**Always**	5.9%	14.6%	6.5%	25.0%	29.8%
	Sometimes	5.9%	6.6%	4.3%	12.5%	11.6%
	Seldom	3.9%	24.8%	13.0%	18.8%	13.2%
	Never	84.3%	54.0%	76.1%	43.8%	45.5%
	# of Cases	N=51	N=137	N=46	N=16	N=121
	NA	N=10	N=82	N=9	N=7	N=35
	Missing	N=3	N=2	N=2	N=1	N=4
Traffic Direction on Highways	**Always**	45.5%	63.3%	47.3%	91.7%	65.8%
	Sometimes	23.6%	32.1%	41.8%	8.3%	19.1%
	Seldom	9.1%	4.6%	7.3%	0	5.9%
	Never	21.8%	0	3.6%	0	9.2%
	# of Cases	N=55	N=218	N=55	N=24	N=152
	NA	N=5	N=1	N=1	N=0	N=5
	Missing	N=4	N=2	N=1	N=0	N=3
Accident Scene Investigation/ Management on Highways	**Always**	46.0%	59.1%	40.7%	83.3%	63.2%
	Sometimes	19.0%	35.0%	42.6%	16.7%	21.9%
	Seldom	15.9%	5.5%	13.0%	0	7.7%
	Never	19.0%	0.5%	3.7%	0	7.1%
	# of Cases	N=63	N=220	N=54	N=24	N=155
	NA	N=0	N=1	N=3	N=0	N=2
	Missing	N=1	N=0	N=0	N=0	N=3

Survey respondents were then asked what would happen for a failure to comply with agency policy in regards to wearing reflective vests (see Table 8). Most commonly, respondents indicated that the offending officer would receive a minor reprimand (e.g.,

[12] Some respondents indicated that compliance with the vest policy was "not applicable." This could have been due to the fact that the agency does not require them to wear vests during that type of tactical situation, or they may simply not be involved in those situations, whereby indicating a level of compliance would be not applicable.

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verbal or written reprimand, etc.). A segment of officers did not know the outcome, perhaps because none was specified in the policy. Still others indicated that there would be no reprimand for failure to comply. Very few respondents indicated that a major reprimand (e.g., suspension with or without pay, etc.) would be issued. Additionally, few respondents provided "other" outcomes. Most of those who did so indicated that a failure to comply could result in the denial of benefits/pay if injured or killed.

Table 8. Outcomes for Failing to Comply With Policy, by Agency

OUTCOMES	Agency 1	Agency 2	Agency 3	Agency 4	Agency 5
No reprimand	10.9%	8.1%	12.3%	8.3%	15.6%
Minor reprimand	46.9%	74.2%	63.2%	75.0%	56.3%
Major reprimand	1.6%	0.5%	0	8.3%	6.3%
DK – No outcome specified	31.3%	16.7%	15.8%	16.7%	15.6%
# of Cases	N=64	N=221	N=57	N=24	N=160
Missing	N=0	N=0	N=0	N=0	N=0

Usage and Trends

The third section of the survey included six questions on the use of reflective vests and other related safety gear. Respondents were first provided with a list of reflective safety equipment and asked to indicate which types of equipment they used, and for each response in the affirmative, how effective they gauged this equipment in increasing officer visibility (using a five-point Likert scale: 1=very ineffective; 2=somewhat ineffective; 3=neither ineffective nor effective; 4=somewhat effective; 5=very effective) (see Table 9).

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Regarding the use of reflective vests, the majority of officers in all five agencies reported using this equipment, ranging from 75.3% (Agency 1) to 100% (Agencies 2 and 4). On average, across agencies, the users of reflective vests rate them as "neither ineffective nor effective" (Mean=3.3 in Agency 1) to "somewhat effective" (Mean=3.9 in Agency 2). The majority of officers in each of the five agencies reported that they make use of flares. On the whole, flares were rated as slightly more effective than reflective vests. Use of personal strobe lights was not common among officers in each of the surveyed agencies, with no agency showing a majority of officers who used such devices. Those respondents who reported using personal strobe lights rated them as slightly more effective in general than either reflective vests or flares.

The use of directional light bars on police cruisers was common across a majority of agencies and the effectiveness of this equipment approximately mirrored the other reflective safety equipment. Reflective cones were used by all agencies, but they were most commonly used by respondents in Agencies 2, 4, and 5, while Agencies 1 and 3 reported less usage. Again, the effectiveness of reflective cones was similar to the ratings achieved by the other types of reflective safety equipment. With regard to use of other reflective safety equipment, some respondents reported using stop signs, flashlights/light wands, flags, LED turbo flares, and reflective jackets. These other types of equipment were deemed to be "neither ineffective nor effective" to "somewhat effective."

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Table 9. Types of safety equipment utilized and their effectiveness

	Agency 1	Agency 2	Agency 3	Agency 4	Agency 5
% use Reflective Vest	75.3%	100%	98.5%	100%	91.9%
Effectiveness of Reflective Vests	Mean = 3.3	Mean = 3.9	Mean = 3.6	Mean = 3.6	Mean = 3.8
# of Cases	N=77	N=232	N=66	N=28	N=172
Missing	N=1	N=0	N=0	N=0	N=3
% use Flares	97.4%	81.7%	100%	85.7%	97.7%
Effectiveness of Flares	Mean = 3.8	Mean = 3.8	Mean = 3.7	Mean = 3.4	Mean = 4.1
# of Cases	N=77	N=229	N=66	N=28	N=174
Missing	N=1	N=3	N=0	N=0	N=1
% use personal strobe lights	29.3%	35.5%	20.3%	25.9%	39.4%
Effectiveness of personal strobe lights	Mean = 4.0	Mean = 3.9	Mean = 4.2	Mean = 3.9	Mean = 3.8
# of Cases	N=75	N=217	N=64	N=27	N=170
Missing	N=3	N=15	N=2	N=1	N=5
% use directional light bar on cruiser	69.2%	99.1%	98.5%	64.3%	98.3%
Effectiveness of directional light bar	Mean = 3.9	Mean = 3.6	Mean = 3.8	Mean = 3.4	Mean = 3.9
# of Cases	N=78	N=232	N=66	N=28	N=174
Missing	N=0	N=0	N=0	N=0	N=1
% use reflective cones	40.3%	82.9%	39.7%	100%	88.9%
Effectiveness of reflective cones	Mean = 4.0	Mean = 3.6	Mean = 3.7	Mean = 3.4	Mean = 3.7
# of Cases	N=72	N=228	N=63	N=28	N=171
Missing	N=6	N=4	N=3	N=0	N=4
% use other equipment	27.8%	35.0%	0	50.0%	34.6%
Effectiveness of other equipment	Mean = 4.0	Mean = 3.8	N/A	Mean = 3.3	Mean = 3.9
# of Cases	N=18	N=60	N=13	N=6	N=26
Missing	N=60	N=172	N=53	N=22	N=149

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Respondents were then asked, during a typical week, how often they wore reflective vests while serving in an official capacity. As shown in Table 10, almost two-thirds of officers (64.9%) in Agency 1 "never" or "rarely" wore reflective vests. Conversely, respondents in Agency 4 generally indicated they use them the most frequently. Few respondents utilize their vests at least once per day.

Table 10. Frequency of reflective vest use while serving in an official capacity

FREQUENCY OF REFLECTIVE VEST USE	Agency 1	Agency 2	Agency 3	Agency 4	Agency 5
Never or rarely	64.9%	17.7%	42.4%	0	40.8%
1-3 times per month	24.7%	69.3%	50.0%	25.9%	36.8%
1-3 times per week	6.5%	12.1%	7.6%	66.7%	20.7%
Once per day	2.6%	0.4%	0	3.7%	1.1%
Several times per day	1.3%	0.4%	0	3.7%	0.6%
# of Cases	N=77	N=231	N=66	N=27	N=174
Missing	N=1	N=1	N=0	N=1	N=1

A list of statements about reflective vests was provided and respondents were asked to indicate their level of agreement with those statements (using a five-point Likert scale: 1=strongly disagree; 2=disagree; 3=neither disagree nor agree; 4=agree; 5=strongly agree). As shown in Table 11, the results indicate the following:

- Respondents generally do not believe that wearing a reflective vest enhances their professional appearance;
- Respondents across agencies generally were neutral with regard to the wearing of reflective vests impeding their access to weapons or utility belt;
- Respondents believe that wearing a reflective vest makes them a target in situations where they do not wish to be seen;
- Respondents indicated that comfort is not an issue when it comes to wearing a reflective vest;
- Respondents generally felt that it should be up to an officer's discretion to wear a reflective vest (or not);

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- Respondents generally felt that it was not much of a hassle to wear a reflective vest (although Agency 1 was more neutral);
- Respondents felt that they feel competent to set up a safe traffic pattern using reflective cones; and
- Respondents neither disagree nor agree that they have the proper safety equipment to safely conduct police business on highways with or without a reflective vest (that is, they felt neutrally).

Table 11. Perceptions of respondents on the use of reflective vests

PERCEPTIONS	Agency 1	Agency 2	Agency 3	Agency 4	Agency 5
Wearing a reflective vest enhances my professional appearance as an officer	Mean = 1.6	Mean = 2.5	Mean = 2.3	Mean = 3.2	Mean = 2.8
# of Cases	N=77	N=232	N=66	N=27	N=171
Missing	N=1	N=0	N=0	N=1	N=4
Wearing a reflective vest does not impede my access to my weapons and/or utility belt	Mean = 2.6	Mean = 3.3	Mean = 3.1	Mean = 3.7	Mean = 3.2
# of Cases	N=78	N=232	N=66	N=27	N=170
Missing	N=0	N=0	N=0	N=1	N=5
Wearing a reflective vest makes me a target in situations where I do not wish to be seen	Mean = 4.2	Mean = 3.7	Mean = 3.7	Mean = 3.7	Mean = 3.4
# of Cases	N=77	N=232	N=66	N=27	N=172
Missing	N=1	N=0	N=0	N=1	N=3
My reflective vest is uncomfortable to wear	Mean = 2.9	Mean = 2.3	Mean = 3.0	Mean = 2.5	Mean = 2.4
# of Cases	N=78	N=232	N=66	N=27	N=172
Missing	N=0	N=0	N=0	N=1	N=3

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Table 11. Perceptions of respondents on the use of reflective vests

PERCEPTIONS	Agency 1	Agency 2	Agency 3	Agency 4	Agency 5
The decision to wear a vest should be at an officer's discretion	Mean = 4.4	Mean = 3.3	Mean = 3.7	Mean = 2.9	Mean = 3.4
# of Cases	N=78	N=232	N=66	N=27	N=172
Missing	N=0	N=0	N=0	N=1	N=3
Wearing a reflective vest is too much of a hassle to bother with	Mean = 3.6	Mean = 2.4	Mean = 2.9	Mean = 1.9	Mean = 2.5
# of Cases	N=78	N=232	N=66	N=27	N=172
Missing	N=0	N=0	N=0	N=1	N=3
I feel very competent with regard to setting up a safe traffic pattern using reflective cones	Mean = 3.9	Mean = 3.8	Mean = 3.6	Mean = 3.8	Mean = 3.8
# of Cases	N=75	N=232	N=66	N=27	N=172
Missing	N=3	N=0	N=0	N=1	N=3
I feel that I have the proper equipment to safely conduct police business on highways with or without a reflective vest	Mean = 4.1	Mean = 3.6	Mean = 3.5	Mean = 3.4	Mean = 2.9
# of Cases	N=78	N=231	N=66	N=27	N=170
Missing	N=0	N=1	N=0	N=1	N=5

Respondents were then asked about the impact of reflective vest use on their command presence (see Table 12). With the exception of Agency 4, most respondents across agencies indicated that wearing a reflective vest had no impact on their command

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presence. However, the majority of respondents from Agency 4 indicated that wearing a reflective vest had a positive impact.

Table 12. The impact of reflective vests on command presence

IMPACT	Agency 1	Agency 2	Agency 3	Agency 4	Agency 5
Negative impact	43.6%	11.7%	19.7%	3.7%	13.4%
No impact	50.0%	64.9%	65.2%	44.4%	57.0%
Positive impact	6.4%	23.4%	15.2%	51.9%	29.7%
# of Cases	N=78	N=231	N=66	N=27	N=172
Missing	N=0	N=1	N=0	N=1	N=3

This section of the survey also asked respondents to utilize a five-point Likert scale (1=low importance; 2=moderately low; 3=neither high nor low importance; 4=moderately high importance; 5=high importance) to rate the importance of a series of factors with regard to the motivation they provide to wear a reflective vest. As shown in Table 13, avoiding injury/safety was the most important factor cited, with four of the five agencies assigning it a mean of 4.0 or greater. Maintaining access to worker's compensation was viewed as of moderately high importance by respondents in Agencies 4 and 5. Respondents from Agencies 4 and 5 rated the potential for civil/personal liability as a moderately high consideration. Finally, respondents from Agencies 2, 4, and 5 indicated that adherence to agency policy was of moderately high importance.

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Table 13. Motivations for wearing reflective vests

MOTIVATION	Agency 1	Agency 2	Agency 3	Agency 4	Agency 5
Avoiding injury/safety	Mean = 3.6	Mean = 4.3	Mean = 4.2	Mean = 4.5	Mean = 4.3
# of Cases	N=78	N=231	N=65	N=28	N=169
Missing	N=0	N=1	N=1	N=0	N=6
Maintaining access to worker's compensation	Mean = 2.6	Mean = 2.7	Mean = 2.7	Mean = 3.7	Mean = 3.9
# of Cases	N=78	N=231	N=66	N=28	N=169
Missing	N=0	N=1	N=0	N=0	N=6
Potential civil/personal liability	Mean = 2.9	Mean = 3.1	Mean = 2.9	Mean = 4.0	Mean = 3.7
# of Cases	N=78	N=231	N=66	N=28	N=170
Missing	N=0	N=1	N=0	N=0	N=5
Adherence to agency policy	Mean = 3.6	Mean = 3.7	Mean = 3.4	Mean = 4.4	Mean = 3.9
# of Cases	N=78	N=232	N=66	N=28	N=168
Missing	N=0	N=0	N=0	N=0	N=7

Finally, respondents were asked how satisfied they were with their vests for a variety of purposes (see Table 14). Respondents from four of the five agencies most commonly indicated that they were moderately satisfied with the effective visibility provided to officers wearing reflective vests to avoid accidents. Regardless of the purpose, respondents in Agency 1 were the least satisfied with their reflective vests; those from Agency 4 were the most satisfied with their reflective vests.

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Table 14. Satisfaction with reflective vests

SATISFACTION	Agency 1	Agency 2	Agency 3	Agency 4	Agency 5
Access to weapon	Mean = 2.5	Mean = 3.6	Mean = 3.2	Mean = 3.5	Mean = 3.2
# of Cases	N=78	N=232	N=66	N=28	N=171
Missing	N=0	N=0	N=0	N=0	N=4
Access to equipment	Mean = 2.5	Mean = 3.4	Mean = 2.9	Mean = 3.5	Mean = 3.2
# of Cases	N=78	N=232	N=66	N=28	N=172
Missing	N=0	N=0	N=0	N=0	N=3
Effective visibility to avoid accidents	Mean = 3.3	Mean = 4.0	Mean = 3.9	Mean = 4.2	Mean = 3.8
# of Cases	N=78	N=232	N=66	N=28	N=172
Missing	N=0	N=0	N=0	N=0	N=3
Ease of motion	Mean = 2.9	Mean = 3.8	Mean = 3.3	Mean = 3.7	Mean = 3.6
# of Cases	N=78	N=232	N=66	N=28	N=172
Missing	N=0	N=0	N=0	N=0	N=3
Identification of law enforcement status	Mean = 2.3	Mean = 3.4	Mean = 3.1	Mean = 4.0	Mean = 3.5
# of Cases	N=78	N=232	N=66	N=28	N=171
Missing	N=0	N=0	N=0	N=0	N=4
Ability to break away from attacker	Mean = 2.1	Mean = 3.0	Mean = 2.8	Mean = 3.4	Mean = 2.8
# of Cases	N=78	N=232	N=66	N=28	N=170
Missing	N=0	N=0	N=0	N=0	N=5
Mitigation of heat stress	Mean = 2.5	Mean = 3.3	Mean = 3.3	Mean = 3.4	Mean = 3.2
# of Cases	N=76	N=232	N=66	N=28	N=170
Missing	N=2	N=0	N=0	N=0	N=5

Training

The fourth section of the survey included questions pertaining to the training received by respondents regarding the use of reflective vests and other related safety equipment, as well as common high-risk situations where such equipment might be

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used, specifically where the training took place and how many hours of training were received.

Training on the use of reflective vests and other related safety gear, and situations where this equipment could be used, could take place during basic academy, in-service, at roll call, via the Internet, or through some other mechanism. With regard to the use of reflective vests, most respondents from the surveyed agencies indicated that they had received this type of training, but the percentage of respondents responding affirmatively ranged from 51.5% (Agency 3) to 85.7% (Agency 5). In some agencies this type of training was typically received in basic academy training (Agencies 2 and 5). Respondents in other agencies commonly received this training during in-service training (Agency 4). Still others indicated that they had received this type of training in roll call (Agencies 1 and 3). Very few respondents indicated that this type of training was provided via the Internet (see Table 15).

Table 15. Training Modality on the Use of Reflective Vests, by Agency[13]

MODALITY – USE OF REFLECTIVE VESTS	Agency 1	Agency 2	Agency 3	Agency 4	Agency 5
Basic Academy	1.3%	54.3%	12.3%	46.4%	79.9%
In-service	10.3%	15.1%	15.4%	60.7%	12.1%
Roll Call	56.4%	3.0%	30.8%	10.7%	14.9%
Internet	1.3%	2.6%	0	3.6%	1.1%
NA – training not provided	38.5%	37.5%	47.7%	21.4%	13.8%
# of Cases	N=78	N=232	N=65	N=28	N=174
Missing	N=0	N=0	N=1	N=0	N=1

Respondents were also queried about training that was received on the care and maintenance of reflective vests in the same setting discussed above. The percentage

[13] Percentages in this table do not sum to 100% because respondents could have marked more than one response.

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of respondents responding affirmatively regarding having received this type of training ranged from 13.6% (Agency 3) to 45.1% (Agency 5). This type of training was not typically provided to respondents, but when it was offered, it was most commonly given during basic academy training (Agencies 2 and 5), roll call (Agency 1), and/or in-service (Agency 4); only one respondent in one agency received this type of training on the Internet (see Table 16).

Table 16. Training Modality on the Care and Maintenance of Reflective Vests, by Agency[14]

MODALITY – CARE AND MAINTENANCE OF REFLECTIVE VESTS	Agency 1	Agency 2	Agency 3	Agency 4	Agency 5
Basic Academy	0	18.2%	3.1%	10.7%	43.6%
In-service	1.3%	2.6%	6.3%	21.4%	4.7%
Roll Call	24.4%	2.6%	6.3%	0	1.7%
Internet	0	0.4%	0	0	0
NA – training not provided	74.4%	77.1%	85.9%	71.4%	54.1%
# of Cases	N=78	N=231	N=64	N=28	N=172
Missing	N=0	N=1	N=2	N=0	N=3

In addition to training on the use and care/maintenance of reflective vests, the survey also included an item asking about training that was received on the use of other visibility equipment. The vast majority of respondents received this type of training. The percentage of respondents responding that this type of training was received (irrespective of the setting in which the training was received) ranged from 78.8% (Agency 3) to 93.1% (Agency 5). Most commonly, respondents received this type of

[14] Percentages in this table do not sum to 100% because respondents could have marked more than one response.

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training in the basic academy (Agencies 1, 2, and 5) and/or in-service (Agencies 1, 3, and 4). A large percentage of respondents in Agency 1 also indicated that they received this training in roll call. Very few respondents indicated that they received such training via the Internet (see Table 17).

Table 17. Training Modality on the Use of Other Visibility Equipment, by Agency[15]

MODALITY – USE OF OTHER VISIBILITY EQUIPMENT	Agency 1	Agency 2	Agency 3	Agency 4	Agency 5
Basic Academy	67.1%	86.2%	40.0%	42.3%	84.5%
In-service	55.3%	22.8%	47.7%	65.4%	16.7%
Roll Call	28.9%	0	13.8%	7.7%	7.5%
Internet	0	0	0	0	1.1%
NA – training not provided	7.9%	10.8%	21.5%	11.5%	6.3%
# of Cases	N=76	N=232	N=65	N=26	N=174
Missing	N=2	N=0	N=1	N=2	N=1

In addition to the training offered on the use and care of various types of visibility equipment, respondents were also asked about training that was received in situations that might require increased visibility. First, respondents were asked about training received on accident scene set up and stabilization. The vast majority of respondents received this type of training across the various agencies in the study, ranging from 84.8% (Agency 3) to 96.1% (Agency 2). Most of the training that was received occurred in basic academy training and/or in-service, with one agency indicating that a substantial percentage of respondents received this type of training in roll call. Few respondents received this training online (see Table 18).

[15] Percentages in this table do not sum to 100% because respondents could have marked more than one response.

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Table 18. Training Modality on Accident Scene Set up and Stabilization, by Agency[16]

MODALITY – ACCIDENT SCENE SET UP AND STABILIZATION	Agency 1	Agency 2	Agency 3	Agency 4	Agency 5
Basic Academy	61.5%	93.1%	46.2%	53.6%	83.8%
In-service	70.5%	35.8%	58.5%	71.4%	20.2%
Roll Call	24.4%	0.4%	12.3%	3.6%	9.2%
Internet	0	0.9%	0	0	0.6%
NA – training not provided	9.0%	3.9%	13.8%	10.7%	5.2%
# of Cases	N=78	N=232	N=65	N=28	N=173
Missing	N=0	N=0	N=1	N=0	N=2

Second, respondents were asked about training received on accident scene disassembly. The vast majority of respondents received this type of training across the various agencies in the study. The majority of respondents in all agencies indicated that they received this type of training ranging from 56.1% (Agency 3) to 86.6% (Agency 2). Most of the training that was received occurred in basic academy training and/or in-service, with one agency indicating that a substantial percentage of respondents received this type of training in roll call. Few respondents received this training online (see Table 19).

[16] Percentages in this table do not sum to 100% because respondents could have marked more than one response.

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Table 19. Training Modality Accident Scene Disassembly, by Agency[17]

MODALITY – ACCIDENT SCENE DISASSEMBLY	Agency 1	Agency 2	Agency 3	Agency 4	Agency 5
Basic Academy	51.9%	84.0%	28.6%	39.3%	71.3%
In-service	66.2%	25.1%	41.3%	57.1%	19.0%
Roll Call	19.5%	0	6.3%	0	4.6%
Internet	0	0.4%	0	0	0.6%
NA – training not provided	16.9%	13.0%	41.3%	25.0%	17.2%
# of Cases	N=77	N=231	N=63	N=28	N=174
Missing	N=1	N=1	N=3	N=0	N=1

Third, respondents were asked about training received on procedures for making stops along highways and roadways. Most respondents, irrespective of agency affiliation, indicated that they received this type of training, ranging from 87.9% (Agency 3) to 96.1% (Agency 2). Most of the training that was received on this topic occurred in basic academy training and/or in-service, with one agency indicating that a substantial percentage of respondents received this type of training in roll call. Few respondents received this training online (see Table 20).

[17] Percentages in this table do not sum to 100% because respondents could have marked more than one response.

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Table 20. Training Modality on Procedures for Making Stops Along Highways and Roadways, by Agency[18]

MODALITY – PROCEDURES FOR MAKING STOPS ALONG HIGHWAYS AND ROADWAYS	Agency 1	Agency 2	Agency 3	Agency 4	Agency 5
Basic Academy	82.1%	92.6%	66.2%	74.1%	82.6%
In-service	74.4%	53.7%	61.5%	77.8%	19.2%
Roll Call	39.7%	1.7%	21.5%	7.4%	9.3%
Internet	3.8%	1.3%	0	0	0.6%
NA – training not provided	11.5%	3.5%	10.8%	7.4%	7.0%
# of Cases	N=78	N=231	N=65	N=27	N=172
Missing	N=0	N=1	N=1	N=1	N=3

Very few respondents[19] indicated that they received training or information on reflective vests through mechanisms not mentioned previously (i.e., basic academy, in-service, roll call, or Internet). Those few who did respond affirmatively received field training, training in specialized schools, training in other occupations (e.g., volunteer fire fighter), and through personal observation of other officers. Whether it was received through the basic academy, in-service, roll call, Internet, or some other mechanism, and regardless of the topic, most training received within the past three years amounted to less than one hour[20].

[18] Percentages in this table do not sum to 100% because respondents could have marked more than one response.
[19] Only 22 respondents total across all five agencies responded affirmatively.
[20] Many of the respondents who indicated that they had not received any reflective vest training in the past three years indicated that they had previously received training on one or more of the topics covered in Question 14. This leads to the conclusion that they received training prior to the three year period covered in Question 16.

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Care and Maintenance

Next, respondents were asked a series of questions about the care and maintenance of their vests. The survey first elicited information as to whether or not the respondents' agencies inspected reflective vests after being issued to officers. The vast majority (from a low of 67.2% in Agency 2 to a high of 100% in Agency 3) of respondents reported that vests were *not* inspected. For those officers who *did* have their vests inspected, the frequency of these inspections is detailed in the Table 21. Respondents from Agency 1 typically indicated that vests are inspected, but the inspections are random and may or may not occur, while half of the respondents from Agency 5 indicated this as well. Agency 2 reported that their vests are inspected once per year. Respondents in Agency 4 were evenly split between multiple times per year and less frequently. As a whole, reflective vest inspections are not done frequently.

Table 21. Frequency of Vest inspections, by Agency

FREQUENCY OF VEST INSPECTIONS	Agency 1	Agency 2	Agency 3	Agency 4	Agency 5
Monthly or more frequently	28.6%	4.0%	0	0	8.3%
Multiple times per year, but less frequently than monthly	14.3%	14.7%	0	50.0%	25.0%
Once per year	0	57.3%	0	25.0%	8.3%
Every two years	0	0	0	0	8.3%
Vests are inspected, but inspections occur randomly and may or may not occur in a given year	57.1%	22.7%	0	25.0%	50.0%
Never	0	1.3%	0	0	0
# of Cases	N=7	N=75	N=0	N=4	N=12
Missing	N=3	N=1	N=0	N=0	N=4

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The survey then asked who conducts officers' vest inspections in their agency. The person(s) responsible for conducting these inspections varied by agency (see Table 22). The vast majority of respondents in Agencies 2 and 5 required that inspections be conducted by first line supervisors. Respondents in Agency 4 were split between the commander and either the first line supervisor or another position within the department. Agency 1 predominantly indicated that a position other than those listed was responsible for inspections. Other personnel listed consisted of CDC staff/quartermasters or the users themselves. No respondents in any agency indicated that either the Chief/Sheriff or risk management personnel conducted these inspections.

Table 22. Who Conducts Vest Inspections, by Agency

WHO CONDUCTS INSPECTIONS	Agency 1	Agency 2	Agency 3	Agency 4	Agency 5
First line supervisor	22.2%	97.3%	0	25.0%	80.0%
Commander	0	0	0	50.0%	6.7%
Chief/Sheriff	0	0	0	0	0
Risk Management	0	0	0	0	0
Other	77.8%	2.7%	0	25.0%	13.3%
# of Cases	N=9	N=74	N=0	N=4	N=15
Missing	N=69	N=158	N=66	N=24	N=160

Across all agencies, respondents overwhelmingly indicated that replacement reflective vests were available for those that were damaged or otherwise in need of replacement (from a low of 79.2% in Agency 1 to a high of 98.3% in Agency 2). Similarly, the vast majority of respondents indicated that their agencies pay for the replacement vests when needed.

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Incidents

Respondents were also asked if they have ever been struck or involved in a near-miss situation while working in an official capacity outside of their vehicles. The overwhelming majority of respondents across all agencies (ranging from 94.2% in Agency 5 to 95.5% or higher in all other agencies) reported that they had *not* been involved in such incidents. Those that had been struck were then asked to answer a series of questions about the nature of the incident. The results are shown in Table 23[21].

[21] The percentages should be interpreted with caution as a very small number of respondents indicated that they have been involved in a roadway- or street patrol-related incident in which they were struck.

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Table 23. Factors surrounding officers' involvement when struck by a vehicle, by Agency

FACTORS	Agency 1	Agency 2	Agency 3	Agency 4	Agency 5
Occurred even with the use of a reflective vest	66.7%	22.2%	33.3%	100%	10.0%
Occurred even with the use of other reflective gear	33.3%	44.4%	33.3%	0	10.0%
Involved a drunk or impaired driver	33.3%	11.1%	66.7%	0	40.0%
Occurred at night or during a low visibility situation	66.7%	44.4%	33.3%	0	50.0%
Occurred before other support arrived	33.3%	33.3%	33.3%	0	30.0%
Occurred on a major highway	0	66.7%	0	0	20.0%
Occurred on a local street or arterial	66.7%	44.4%	100%	0	50.0%
Resulted because the reflective vest made the officer a target	0	0	0	0	0
Required that the officer take medical leave	33.3%	22.2%	0	0	40.0%
# of Cases	N=3	N=9	N=3	N=1	N=10
Missing	N=0	N=0	N=0	N=0	N=0

Respondents were then asked if they had been involved in a near-miss in a roadway- or street patrol-related incident where they were nearly struck while working in an official capacity outside their vehicles. Over one-quarter of respondents in all agencies indicated that they had been involved in a near-miss situation, with a majority

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of respondents in Agency 2 having indicated that they had been involved in such situations (see Table 24). Across agencies, most respondents who have been involved in a near-miss incident did not report the event (see Table 25). Agency 3 was the only agency in which a majority of respondents did report such incidents. Reasons given for not reporting these incidents varied. Some indicated that nothing would have been done or there was no mechanism to report it. Others reported that if no injuries or damage were sustained, they felt no need to report the incident. Some respondents considered such incidents to be "part of the job," and thus deemed it unnecessary to report them. Others indicated they didn't know such incidents were to be reported, admitted the incident was their fault, or were unable to get the driver's information to do anything about it.

Table 24. Involved in a Near Miss Incident, by Agency

INVOLVED IN NEAR-MISS	Agency 1	Agency 2	Agency 3	Agency 4	Agency 5
Yes	35.1%	53.2%	30.8%	25.9%	37.0%
# of Cases	N=77	N=231	N=65	N=27	N=173
Missing	N=1	N=1	N=1	N=1	N=2

Table 25. Reported Near Miss Incident, by Agency

REPORTED NEAR-MISS	Agency 1	Agency 2	Agency 3	Agency 4	Agency 5
Yes	25.0%	41.3%	68.4%	42.9%	30.5%
# of Cases	N=24	N=121	N=19	N=7	N=59
Missing	N=3	N=2	N=1	N=0	N=5

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Situations and Traffic Stop Visibility

The seventh section of the survey contained two questions pertaining to situations that could involve the use of reflective equipment specifically and traffic stop visibility generally. The first survey item in this section asked respondents to rank six traffic situations from most hazardous (1) to least hazardous (6) (see Table 26). Respondents across agencies most commonly ranked a traffic stop where the officer approaches the vehicle as the most hazardous of the situations listed. Conversely, roadblocks and assisting motorists by taking down information at the accident scene were seen as least hazardous (see Table 26).

Table 26. Officer Perceptions of Traffic Hazards, by Agency

MOTIVATION	Agency 1	Agency 2	Agency 3	Agency 4	Agency 5
Roadblock	Mean = 4.5	Mean = 3.9	Mean = 4.4	Mean = 4.5	Mean = 4.5
Directing Traffic	Mean = 3.0	Mean = 3.1	Mean = 3.1	Mean = 2.7	Mean = 3.5
Traffic stop (approaching vehicle)	Mean = 2.4	Mean = 2.8	Mean = 2.9	Mean = 2.4	Mean = 2.7
Traffic stop (questioning driver)	Mean = 3.1	Mean = 3.2	Mean = 3.2	Mean = 2.7	Mean = 3.3
Assisting motorists (stabilizing scene)	Mean = 3.6	Mean = 3.7	Mean = 3.3	Mean = 3.9	Mean = 3.3
Assisting motorists (taking down accident scene)	Mean = 4.4	Mean = 4.5	Mean = 4.2	Mean = 4.8	Mean = 3.8
# of Cases	N=62	N=190	N=62	N=18	N=126
Missing	N=16	N=42	N=4	N=10	N=49

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Respondents were then given a list of tactical situations and asked to indicate the level of visibility (high, low, or other) sought based on their experience. Among agencies, respondents were most likely to prefer high visibility when staffing a roadblock, directing traffic, questioning drivers on a traffic stop, and assisting motorists (both in stabilizing the scene and taking down the accident scene) (see Table 27).

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Table 27. Level of Visibility by Experience

TACTICAL SITUATION	Level of Visibility	Agency 1	Agency 2	Agency 3	Agency 4	Agency 5
Routine Patrol	**Low**	51.9%	68.0%	51.5%	39.3%	45.0%
	High	46.8%	31.6%	42.4%	57.1%	53.8%
	Other	1.3%	0.4%	6.1%	3.6%	1.2%
	NA	N=77	N=231	N=66	N=28	N=169
	Missing	N=1	N=1	N=0	N=0	N=6
Roadblock	**Low**	18.4%	12.6%	7.8%	10.7%	9.5%
	High	78.9%	87.0%	92.2%	89.3%	86.4%
	Other	2.6%	0.4%	0	0	4.1%
	NA	N=76	N=230	N=64	N=28	N=169
	Missing	N=2	N=2	N=2	N=0	N=6
Directing Traffic	**Low**	10.5%	0.4%	7.6%	0	4.1%
	High	89.5%	99.6%	92.4%	100%	95.9%
	Other	0	0	0	0	0
	NA	N=76	N=230	N=66	N=28	N=170
	Missing	N=2	N=2	N=0	N=0	N=5
Traffic Stop (approaching vehicle)	**Low**	43.4%	63.6%	51.5%	39.3%	37.3%
	High	53.9%	34.2%	45.5%	53.6%	61.5%
	Other	2.6%	2.2%	3.0%	7.1%	1.2%
	NA	N=76	N=231	N=66	N=28	N=169
	Missing	N=2	N=1	N=0	N=0	N=6
Traffic Stop (questioning driver)	**Low**	38.2%	55.4%	37.9%	14.3%	30.8%
	High	60.5%	42.0%	60.6%	75.0%	68.0%
	Other	1.3%	2.6%	1.5%	10.7%	1.2%
	NA	N=76	N=231	N=66	N=28	N=169
	Missing	N=2	N=1	N=0	N=0	N=6
Assisting Motorists (stabilizing scene)	**Low**	17.1%	10.0%	13.6%	7.1%	11.9%
	High	82.9%	89.5%	83.3%	92.9%	88.1%
	Other	0	0.4%	3.0%	0	0
	NA	N=76	N=229	N=66	N=28	N=168
	Missing	N=2	N=3	N=0	N=0	N=7
Assisting Motorists (taking down accident scene)	**Low**	15.8%	10.0%	12.1%	7.1%	13.7%
	High	84.2%	89.1%	84.8%	92.9%	85.7%
	Other	0	0.9%	3.0%	0	0.6%
	NA	N=76	N=230	N=66	N=28	N=168
	Missing	N=2	N=2	N=0	N=0	N=7

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Reflective Vest Acquisition

The next section of the survey contained three questions that examined the acquisition of reflective vests. Respondents were first asked if their agency currently issues reflective vests or if it is up to individual officers to purchase their own reflective vests. As shown in Table 28, the vast majority of respondents from four of the five agencies surveyed indicated that the agency purchases virtually all of reflective vests for each individual officer. Only Agency 1 assigns the bulk of their vests to squads or vehicles.

The survey then asked if respondents were aware of the Federal requirement that law enforcement officers working in and around Federal-aid highways wear approved reflective vests in certain circumstances. The majority of respondents in Agencies 1, 2, and 3 were aware of these requirements, with a high of 75.4% of the respondents from Agency 2 being aware of them. However, almost two-thirds of the respondents in Agencies 4 and 5 were unaware of this requirement (64.3% and 64.1% respectively).

Respondents were then asked to indicate the type of reflective vests that are utilized by their agencies: ANSI-107-2004, ANSI-207-2006, or another type. Only one agency (Agency 5) indicated that a majority of vests used are ANSI-107-2004. All other agencies reported that the majority of vests used are ANSI-207-2006, from 77.3% in Agency 3 to 83.2% in Agency 2. Other types of vests were not commonly utilized but, when used, they were most commonly identified as a reversible jacket with reflective strips; other respondents marked this option because they did not know which vest they had.

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Table 28. Who Purchases Reflective Vests for Officers, by Agency

ACQUISITION SOURCE	Agency 1	Agency 2	Agency 3	Agency 4	Agency 5
My agency purchases reflective vests for each individual officer	39.5%	99.6%	100%	100%	97.1%
My agency purchases reflective vests for use by officers, but the vests are assigned to a squad or police vehicle	60.5%	0.4%	0	0	0.6%
Officers are required to purchase their own reflective vests	0	0	0	0	1.2%
Officers are not required to do so, but purchase their own reflective vests if desired	0	0	0	0	0
N/A – officers in my agency do not utilize reflective vests	0	0	0	0	1.2%
# of Cases	N=76	N=231	N=66	N=28	N=172
Missing	N=2	N=1	N=0	N=0	N=3

Next Generation of Reflective Gear

The final section of the survey asked respondents to provide input on future developments in reflective equipment. Specifically, respondents were asked three questions about their preferences and perceptions of next-generation reflective

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equipment. Respondents were provided with a list of features and were asked which ones they would like to see added to the next generation of reflective vests. The results are displayed in Table 29. Some of the options across agencies that were deemed to be the most attractive included: the desire to see a designated law enforcement only reflective color scheme (i.e., blue for police only); an integral spot on the reflective vest to affix the badge and/or police radio microphone; and improved access to weapons and the utility belt.

Table 29. Features of Next Generation Vests Desired by Officers, by Agency

FEATURE	Agency 1	Agency 2	Agency 3	Agency 4	Agency 5
Integral spot on vest to affix badge and/or police radio microphone	35.9%	52.2%	45.5%	50.0%	38.9%
Improved access to weapons and utility belt	38.5%	43.1%	43.9%	46.4%	49.7%
Improved comfort	20.5%	32.3%	24.2%	28.6%	38.9%
Improved reflectability	10.3%	26.3%	19.7%	42.9%	41.1%
Improved breakaway components	26.9%	37.1%	39.4%	39.3%	39.4%
Improved durability	16.7%	24.1%	10.6%	25.0%	30.9%
Improved fit	34.6%	29.7%	43.9%	46.4%	44.0%
Reflective color reserved for law enforcement use	33.3%	56.9%	57.6%	53.6%	53.7%
Fire resistant material	16.7%	25.0%	30.3%	32.1%	37.7%
Other	15.4%	6.9%	6.1%	3.6%	2.9%
# of Cases	N=78	N=232	N=66	N=28	N=175
Missing	N=0	N=0	N=0	N=0	N=0

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Respondents were then provided with a list of reflective equipment and asked to indicate which ones they thought held the greatest promise for future improvements in technology related to officer safety while working on roadways (see Table 30). While there was no clear agreement among respondents, reflective vests, flares, and reflective cones appeared to be the three categories of equipment that officers generally believed held the most promise for future improvements.

Table 30. Types of Reflective Equipment and their Promise for Future Improvement, by Agency

TYPE OF REFLECTIVE EQUIPMENT	Agency 1	Agency 2	Agency 3	Agency 4	Agency 5
Reflective vests	30.8%	35.3%	40.9%	75.0%	48.6%
Reflective traffic gloves	12.8%	22.0%	33.3%	46.4%	19.4%
Flares	41.0%	26.7%	33.3%	35.7%	53.7%
Reflective materials built into uniform	11.5%	18.5%	42.4%	39.3%	24.6%
Safety lighting built into uniform	10.3%	9.5%	13.6%	17.9%	13.1%
Warning signage	21.8%	25.0%	27.3%	14.3%	23.4%
Wands or lighting equipment with additional reflective material	23.1%	30.2%	30.3%	35.7%	28.0%
Reflective cones or other portable devices	39.7%	39.2%	39.4%	42.9%	45.1%
Other	5.1%	2.6%	0	0	3.4%
# of Cases	N=78	N=232	N=66	N=28	N=175
Missing	N=0	N=0	N=0	N=0	N=0

Finally, the survey concluded with a question asking respondents to provide any additional input on reflective equipment that has not yet been developed, or is under-

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developed, that could improve officer safety. Many officers commented on the suggested improvements being the drivers' and their attentiveness to their surroundings while others made comments about the safety gear itself.

Some of the more interesting suggestions/comments regarding safety garment and apparel improvements included:

- "Battery operated flares."
- "… incorporate technology in vehicles that would indicate there are emergency vehicles ahead once a vehicle came within some distance to the scene…send a signal out from the emergency unit's lights when activated[.]"
- "LED flare system."
- "Led lighting built into officer vests (bullet proof vests worn on outside of clothing) or traffic vests that an officer could activate/de-activate."
- "Portable deployable signs for accident scenes that advise drivers on lane usage and speed."
- "Portable devices with lights such as ground flashers made out of more durable material. Plastic scratches and wears quickly and motorists sometimes run over them anyway."
- "Training for drivers. Most people, especially unlicensed drivers, are clueless on how to react to flares, directional lights, etc."

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CONCLUSIONS

Visibility in Tactical Situations

The desires of the officers surveyed for high visibility appears to correlate to the respective dangers of high versus low visibility. Since there is some benefit to increased visibility in virtually all situations involving vehicular traffic, the primary determinant of whether visibility is desired appears to be the danger posed by high visibility. For law enforcement officers, the danger from high visibility arises primarily from the potential of a violent encounter, and the fact that high visibility will make the officer easier to target in such an encounter.

The survey responses on desired visibility generally can be divided into two categories. First, the officers surveyed generally agreed that high visibility was desired in the following situations: directing traffic, roadblocks, and when assisting motorists by stabilizing the scene and taking down the accident scene. Second, there was no consensus that high visibility was desired, and low visibility was often preferred, when conducting routine patrol, or during traffic stops.

This dichotomy regarding the need for visibility is consistent with the danger resulting from the dual nature of police work: one role potentially confrontational, and the other largely non-confrontational. As the International Association of Chiefs of Police explained in their comments regarding the proposed regulations, law enforcement officers have two roles with regard to pedestrians and motorists (Sweeney 2006). First, officers perform duties which may result in a violent confrontation with individual members of the public. This potential for confrontation is particularly dangerous when officers are working alone in the field. The primary examples of these duties are traffic

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stops and routine police patrols. Such duties can result in confrontations, most dangerously when a suspect is armed and seeks to target an officer. When an officer is a potential target, it is reasonable to expect that the officer would not desire to be highly visible. The survey responses were consistent with this expectation, as there was no consensus that high visibility was desired during routine patrol or traffic stops.

The concerns regarding high visibility and violent encounters are borne out by the record of officer deaths in such encounters. For example, between 1999 and 2008, 29 officers were feloniously killed while approaching an offender at a traffic stop, and 65 officers were feloniously killed during traffic stops or pursuits in situations where visibility may have been a factor (LEOKA 2008). The dangers of routine patrol are highlighted by the fact that between 1999 and 2008, 196 officers were feloniously killed responding to disturbance calls and in arrest situations, and additional 106 officers were killed in ambush situations, during this same period (LEOKA 2008).

Second, officers also perform duties that are either non-confrontational or are performed with a group of officers. Directing traffic is a duty that is generally non-confrontational, as is assisting motorists at an accident scene (after the scene has been stabilized.) When performing these duties, the likelihood of a confrontation is fairly low and therefore the danger posed by high visibility is lessened. Similarly, manning roadblocks or DUI checkpoints is a duty that is generally performed with a group of officers. In such situations, the likelihood of a confrontation, and the danger posed by a confrontation, is diminished by the number of officers present. Here, the danger posed by high visibility is lessened. Again, the statistics bear out the perception that the risk of a violent encounter is lower in these situations -- of the 101 officers feloniously killed

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during traffic stops and pursuits between 1999 and 2008, only one officer was feloniously killed while conducting a roadblock (LEOKA 2008). The survey responses from officers reflected this lowered danger from high visibility, as there was an overwhelming consensus that high visibility was desired at roadblocks, while directing traffic, or taking down accident scene information.

It is difficult to extrapolate these results to other situations involving law enforcement. To the extent generalizations can be made regarding the need for high visibility, since the risk of confrontation is the norm in police work, it is probably more beneficial to define those situations in which the risk of confrontation is minimized. In addition, whether a particular tactical situation involves a danger of confrontation is dependent upon the particular circumstances. Activities that can seem innocuous can present significant dangers. These dangers may vary based on the particular individuals involved, the culture of the area, and the specific circumstances of the encounter. Thus, the extent of the danger of confrontations in particular situations is best determined by the individual officer, or by his department.

Law Enforcement Perspectives on Reflective Vests

As a result of this study, IPR concluded that the opinions and perspectives regarding reflective vests vary greatly within the law enforcement community depending on several factors. Agency demographics, the work environment, model of vest used by the agency including design features of vest, and the range and frequency of tactical situations are some of the factors that impact an officer's opinion on the use of reflective vests. There were instances when officers varied in their opinions regarding different

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aspects of the vest such as ease in donning and doffing, comfort and the impact on command presence.

Officers' opinions on vest usage appear to be largely influenced by the settings in which they worked. For example, the medium-size urban agency often felt negatively towards the vest when it came to compliance, effectiveness, appearance, and features. Less than 50% of those officers complied with their agency's policy and the federal mandate when it came to wearing the vest during traffic direction and accident scene investigation. An alarming companion to this discovery is the fact that about 20% of the officers surveyed from this agency state they never wear their vests during these two standard tasks. The remaining agencies reported a great majority of "always" and "sometimes" wearing their vests when performing the mandated tasks. In particular contrast to the urban agency, the small agency (Agency 4) reported that 91% and 83% of their officers always complied when directing traffic and investigating an accident scene, respectively. We also found that none of the officers at the small agency responded that they seldom or never wore their vests during these two tasks, as is required by their agency's policy and the federal mandate.

Thus, it appears that the work setting had a direct impact on the officers' decision whether or not to wear the vest. Officers in the urban setting may want to keep themselves less visible in the event they become endangered by gang activity or violence directed at them. The small agency may have a better authority relationship with their community resulting in less conflict between police and citizens, which gives them more confidence to use their vests for visibility purposes. When asked if they felt the decision to wear a vest should be at an officer's discretion, the average response at

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the urban agency was agreement while the average response at the rural agency was disagreement. This dichotomy again may be affected by the environment in which the officers of these agencies work and their perception of danger faced in their jurisdictions.

In regards to officers' attitudes towards the effectiveness of reflective vests and safety gear, the opinions varied in certain areas, but were consistent in others. For example, when the officers were asked if they agreed or disagreed with the statement, "I feel that I have the proper equipment to safely conduct police business on highways with or without a reflective vest," the average response from the medium urban agency was agreement while the large metropolitan officers indicated disagreement. The average response from the medium suburban, state patrol, and small agency were neither in agreement or disagreement. Since each agency is equipped with different safety gear, but all were equipped with reflective vests, it is difficult to evaluate these opinions without also knowing the emphasis that each type of safety gear tool receives during training. Officers may feel that certain safety gear is more effective or preferred over reflective vests because they better understand its purpose, when it should be used, and how it should be used.

The officers were surveyed about their use of reflective vests and other safety gear, and how they would rate the effectiveness of the equipment. While 75.3% of the medium urban agency used their reflective vests, two other agencies showed that 91.9% and 98.5% of officers used the vests. The remaining two agencies reported that 100% of the officers surveyed use their reflective vests. While the responses for usage were significant, the average attitude towards the effectiveness of the vest was

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consistent throughout all five agencies; all agencies fell into the inconclusive attitude of "neither ineffective nor effective." As an average of the responses, this result could mean that the opinions ranged from officers feeling that vests were very ineffective or very effective, which may be a more feasible assumption judging from the attitudes expressed in the other areas of the officers' perspectives on reflective vests.

When it comes to an officer's appearance, an image that represents authority and order for the purposes of public safety and protection (command presence) is the desirable. The initial attitude from the law enforcement community at large when the reflective vest mandate was first implemented was that officers would be grouped with construction workers, crossing guards, and other highway workers. They were concerned that their image of authority and order would be skewed if they wore the same vests that were mandated to all highway workers. A question specifically targeting the officers' perceptions of vest use found that the average response from surveyed officers at 4 out of the 5 agencies was disagreement or strong disagreement with the following statement: "Wearing a reflective vest enhances my professional appearance as an officer." It seems that the officers are acknowledging wearing the vest does impact the image that they strive to maintain, but their responses on command presence displayed a different case.

In another question, the officers were asked what type of impact the vest had on their command presence. In contrast with the above responses, 50% or more of the officers surveyed at 4 out of the 5 agencies felt that it had no impact on their command presence. However, 43.6% of the officers surveyed from the medium urban agency felt the vest had a negative impact, while only 6.4% that believed it had a positive impact.

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The small agency differed greatly with 51.9% of the surveyed officers stating that the vest made a positive impact on their command presence. Two other agencies, including the state patrol with 23.4%, and the large metropolitan reported with 29.7% felt that the vest had a positive impact on their authoritative image as well.

Through additional research, we discovered that the two agencies that expressed the highest percentage of officers who believed the vest had a positive impact on their command presence (small rural and large metropolitan) actually have their authority titles (i.e. the word “POLICE”) written on the front and back of their reflective vests. While it is possible that this additional detail may not only affect the way the officers feel about their appearance when wearing the vest, it may help them maintain their authority by differentiating them from other workers on highways.

The model of the reflective vests can make a significant difference in the perspectives of law enforcement officers since older models often do not have the same updated accessibility, design, or breakaway features as the newer models. The agencies and their models of vests are as follows:

- Agency 1 (Medium, Urban, West Coast) – 207-2006
- Agency 2 (State Patrol, Midwest) – ANSI107-2004
- Agency 3 (Medium, Suburban, Mid-Atlantic) – ANSI107-2004 and ANSI207-2006
- Agency 4 (Small, Rural, Southeast) – ANSI207-2006
- Agency 5 (Large, Metropolitan, Southwest) – ANSI107-1999

In some cases, when the police officers are pleased with their vest design because it gives them access to their belt, they do not realize that their vest may be non-compliant

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with the minimum visibility requirement. Vest designs that remove the excess material or even provide snaps to keep it out of the way of their utility belt and weapon access can put those officers responsible for upholding the law in jeopardy of breaking the law as it currently exists. Comfort and ease in putting the vest on are not as much of an issue to the officers as the impediment to their necessary tools and weapons in the event of a physical threat or communicating with their fellow officers in a time-sensitive, emergent situation. The average response of officers surveyed at 4 out of 5 agencies disagreement with the statement that the vest is uncomfortable to wear.

When asked if the reflective vest was too much of a hassle to bother with, again the average responses of officers surveyed at 4 out of 5 agencies were disagreement or strong disagreement. It appears that most officers do not have a problem with the comfort of the vests and do not mind taking the few extra seconds to put the vest on. From this finding we can attribute that the remaining problems of vest design can be directed back to the vest meeting the minimum visibility requirements which impedes access to their belt and the lack of requiring the optional features like microphone clip or the use of agency identification ("POLICE" title on vest). Additionally, the range of tactical situations that the officers face and the visibility desired in those situations can impact their perspectives about using the vests.

Improvements for Next Generation of Garments and Gear

The push for new developments and improvements to law enforcement safety is an issue that is frequently evaluated. From the results of this study, there has been insight gained into the needs as well as the preferences of patrol officers who use reflective vests and other safety gear in their daily lives. Some points of consideration

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include components that give officers a place to affix their radios/microphones, better access to their weapons and utility belt safety equipment such as batons, handcuffs and flashlights, as well as the desire for a specific color of reflective or fluorescent material that distinguishes law enforcement from other highway workers.

Regarding a feature that allows them to affix their badge or microphone to the vest, the number of officers from the surveyed agencies in favor of having this as a standard feature ranged from 35.9% to 52.2%. When asked about improved access to weapons and utility belt, the numbers ranged from 38.5% to 49.7%. In addition, those seeking improved fit ranged from 29.7% to 46.4%. Finally, in 4 out of the 5 agencies 50% or more of the officers surveyed expressed a desire for a designated law enforcement only reflective color scheme (i.e., blue for police only) for law enforcement in the next generation of reflective vests.

Law enforcement officers are constantly exposed to emergencies and unexpected encounters, even when working in relatively stable situations such as directing traffic. The reflective vests must accommodate these changes in the role of the officers. In particular, the need to easily communicate by radio, whether to monitor calls for assistance or to place a call for assistance is vital to officers at any scene. Therefore, any vest design must place a priority on allowing officers access to their radio microphone. Additionally, an officer's access to their weapons and their utility belt is always essential. A vest design which does not allow this access is deemed to be more of a safety hazard than a device for enhancing the officer's survivability. While the ANSI 207 vest standards were designed to provide access to provide access to the

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microphone and utility belt, a significant number of the officers surveyed indicated that improved access was desired. Therefore, there is clearly room for improvement.

One particular area for improvement is in the sizing and fit of the vests. In addition to affecting comfort, the sizing and fit also affect officers' access to their utility belt and weapons. Interestingly, in two of the departments surveyed, an identical percentage of officers sought both improved access to their utility belt and improved fit. The 207 vests are shorter than the 107 vests, which should allow the vests to end above the utility belt, thereby providing the officers with easy access to the utility belt. However, if a 207 vest is too large for a particular officer, the vest will be too long and will block access to the utility belt. Therefore, attention must be paid to ensure that officers are provided vests with the appropriate length for their individual build. In instances where vests are assigned by patrol car, rather than to each officer, vests may need to be designed so that the length can be adjusted by each officer.

One of the clearest areas for improvement is in the color and appearance of the vests. In four out of five agencies, a majority of the officers felt that having a designated reflective color scheme reserved for law enforcement would be beneficial. As Sayer and Buonarosa (2008) note, there are different color schemes that produce roughly the same detection distance. Therefore, it may be possible to designate a color scheme that is unique to law enforcement. Similarly, some officers felt that the vests diminished their presence as an authority figure. One reason may be that it was not apparent that they were law enforcement officers while wearing the vests. Certain vests have the term "police", or some other law enforcement identifier such as "sheriff" or "trooper" in large letters on both the front and back of the vests. Other vests have only a space for

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a badge, or have the law enforcement identifier in small letters or in letters that are not visible at night. Ensuring that the law enforcement identifier is in letters that are large enough to be seen from a distance during both the day and the night would be a significant improvement.

In addition, an effective breakaway feature is critical should an officer find himself involved in a physical altercation with a suspect while wearing a vest. While the current ANSI 207 vests often include a breakaway feature, the officers surveyed indicating a desire for an improved breakaway feature ranged from 26.9% to 39.4%. Therefore, the current breakaway features are either inadequate, or vests with these features are not distributed to a significant number of officers.

Reflective Vest Policy and Procedures

The study was conducted at five agencies of different sizes, geographic locations, and jurisdictions. Survey participants were asked if they knew whether or not their agency maintained a written policy on the use of reflective vests and whether that policy dictated when the vest should be used. All five agencies had a written policy that was consistent with the federal requirements. The following excerpts were taken from the agencies' written policies:

Agency 1: "All Department Personnel shall wear a reflective vest while on any roadway while conducting the following duties:

- Directing Traffic
- Investigating traffic collisions
- Handling lane closures or obstructed roadways
- Assisting with a disaster
- Any police activity that place department employees within the right-of-way traffic

EXCEPTIONS: While conducting a traffic stop or when a situation arises which may compromise the safety of the employee or the public."

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Agency 2: "State Patrol issued high visibility clothing shall be worn:

- While involved in vehicle check stops and limited special purpose checkpoints
- While directing traffic
- Carrier Enforcement officers will be required to carry those items necessary to respond to emergency medical situations or emergency traffic conditions" (2 reflective vests were on the list of required items).

Agency 3: "Officers shall wear reflective vests at all times when engaged in traffic direction in the roadway or while conducting any other activity in the roadway."

Agency 4: "Officers will utilize their reflectorized traffic vests when directing traffic or investigating a crash at the scene."

Agency 5: "The employees will wear the reflective vests during the hours of darkness and while:

- Directing traffic whether performing on-duty or off-duty job responsibilities
- Working accidents on major streets, freeways, tollways or any roadway where heavy traffic is present or likely to be present."

In the agencies' policies there is no statement that indicates that traffic stops require the use of reflective vest. However, the percentage of officers at each agency that believed they were never compliant when they chose not to wear their vests during stops ranged from 45.5% to 84.3%. It is possible that the officers were confused by the overlying mandate which requires all workers on highways instead of focusing on the more narrow guidelines that pertained to law enforcement and furthermore, their agency specifically.

Another aspect of the policies' and federal mandate's language that IPR noticed might be confusing to officers was the distinction and transition from stabilizing an accident scene to investigating an accident scene. Patrol officers often serve as first responders to highway traffic accidents and their first duty in this role is to stabilize the scene. The actions they perform can be dangerous since they must pay attention to what is happening at the scene as well as the drivers on the road. 23 CFR part 634

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states that law enforcement personnel are required to wear reflective vests “when directing traffic, investigating crashes, handling lane closures, obstructed roadways, and disasters within the right-of-way of a Federal-aid highway.” However, there appears to be confusion regarding when the officer is considered to be investigating crashes. The responses to from officers from each agency surveyed when asked if they comply during the tasks of investigating an accident scene or direction traffic on a highway fell heavily into the Always compliant and Sometimes compliant categories. At the medium urban agency 19% of their officers reported that they never wear their vest when involved in Accident Scene Investigation or Management on Highways. This could be attributed to a misunderstanding of what the terms “Accident Scene Investigation” entails or it may be representative of desire to be unseen in their work environment regardless if they are working an accident scene. Overall, further clarification of the mandate as well as the agency policy may be necessary so officers can be clear on when to put wear their vest when in the role of a first responder.

Policy and Practice Comparison: Current Federal Requirements

The research and survey revealed that the practice and perceptions of the officers and departments were generally consistent with the regulations, however, there were a couple of areas where there was confusion. The current regulations require the wearing of reflective vests in five particular situations: “when directing traffic, investigating crashes, handling lane closures, obstructed roadways, and disasters within the right-of-way of a Federal-aid highway”. With respect to directing traffic, the officers surveyed overwhelmingly perceived the need for high visibility, and the vast majority always or sometimes wore their vests. With respect to obstructed roadways or lane

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closures, the officers surveyed overwhelmingly perceived the need for vests during road blocks. Similarly, the vast majority of officers surveyed always wore their vests during DUI checkpoints on highways. Thus, the current practices and the perceptions of the officers surveyed appeared to be consistent with the requirements to wear vests when directing traffic, and when handling lane closures and obstructed roadways. Handling disasters occurred too infrequently to be surveyed effectively.

However, there appeared to be confusion regarding the requirement that officers wear the reflective vest while investigating crashes, and with the general coverage of the regulations. The regulations require the wearing of reflective vests when officers are "investigating crashes." The term "investigating crashes" is not further defined in the regulations. However, the term is used in conjunction with other terms (i.e directing traffic, conducting roadblocks) that are all normally used when the scene is static and officers are not acting as first responders. Therefore, it appears that the intent of the regulations was that the term "investigating crashes" applies to the actual accident investigation, which occurs after the scene has been stabilized, and not to the officers working at crash scenes in their first responder role.

This interpretation is consistent with the perceptions of the officers. The officers surveyed overwhelmingly felt that high visibility was needed when assisting motorists by stabilizing the scene and taking down or dismantling the accident scene. By comparison, there was no consensus that high visibility was beneficial during traffic stops or during other first responder activities. Nonetheless, the agency policies varied in their terminology regarding wearing the vests at crash scenes and there appears to be a lack of consistency in its application.

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Additionally, there appears to be some confusion regarding whether the regulations generally require the use of vests for all actions on the highway. The regulations themselves clearly have no such requirement. However, departments, and particularly officers, may not be aware of the specific language of the regulations. For example, as noted above. Some of the departments surveyed included this requirement in their policies.

Further Research and Guidance

The confusion regarding the coverage of the regulatory requirements and the definition of "crash investigation" points to a need for further education of departments and officers. It may be advisable for the NIJ, or some other authoritative source, to develop guidance for departments in implementing the regulations, particularly since the scope of the regulations is currently being expanded.

Further, training regarding the requirements of the regulations, and the use of the reflective vests, is very inconsistent. Therefore the development of a training module or sample training material for the use of reflective vests would likely be of great use to departments and officers.

Finally, since there is a desire for a unique law enforcement color scheme, there may also be the need for further research into the potential color schemes, the variety of ways they may be incorporated into the design, as well as their visibility and utility. Similarly, research into methods for increasing the visibility of the law enforcement identifier on the reflective vests may help inform the next version of vest design.

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Appendix A – Survey Instrument

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INFORMED CONSENT STATEMENT FOR OFFICER SAFETY SURVEY

Please read this consent agreement carefully before you decide to participate in the study.

The purpose of this research project is to evaluate visibility needs of law enforcement personnel and examine policies and practices on use of reflective vests and related safety gear. The outcomes will be used to improve policy on use of reflective gear. This project is funded by the US Department of Justice (DOJ), by the Institute for Police Research (IPR).

Description of the research and human subject involvement: You will be asked to provide information and data related to law enforcement responses along Federal-aid Highways and other roadways. The information will be requested in a survey format, including information on your Department, experiences with vests and reflective gear, and types of emergency response situations that can occur in relation to highways or other roadways. Once collected, the data will be analyzed to discuss the range of situations, visibility needs, challenges encountered, and how policies support or impede effective response. The survey is also likely to ask for recommendations on improvements in policy, gear and other visibility needs.

Time required: This survey should take 20 minutes or less to complete.

Risks: You may need to provide information on the extent to which Department Policy is being breached. For example, vests may be required, but are not used during certain situations, such as when a vest impedes access to a firearm or during an undercover investigation.

Confidentiality: This survey collects NO private, identifiable information. It is a completely confidential and anonymous survey. All responses will be held in the strictest of confidence. No individual responses will ever be reported. Results will be shared in the aggregate, or sum, so no one individual can be identified. Your agency has asked you to complete this survey, but we have no way to identify you and your responses will not be made available to your agency.

Benefits: Although you may not receive direct benefit from your participation, you and your Department are expected to ultimately benefit from policies and reflective gear that better match situations faced by law enforcement officers related to the work environments that require professional judgment on visibility, in particular work along or near highways and other roadways.

Voluntary Participation and Withdrawal: Your participation is voluntary. You may choose not to participate in the survey or to stop your participation at any time. You may also decline to answer any questions that you are uncomfortable answering.

Payment: You will receive no payment for your participation.

Additional questions: If you have questions about this project or if you have a research-related problem, you may contact any of the following researchers on the project:

Aaron Nisenson, Institute for Police Research
1549 Ringling Blvd.
Sarasota, FL 34236-6772
(941) 487-2560 ext. 105, after hours (202) 441- 5334
info@IPRveststudy.org

If you have questions about your rights in the study, please contact Liberty IRB at (386) 740-9278. If you wish to read a full copy of the informed consent form, please visit www.IPRveststudy.com.

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The United States Department of Justice is seeking your assistance in matters related to your safety. New regulations issued by the Federal Highway Administration now require the use of reflective vests for law enforcement officials. While some concessions are being made, the voice of law enforcement is urgently needed to gather fundamental information related to visibility, officer discretion, and protection. This survey is sponsored by National Institute of Justice, working cooperatively with the Institute for Police Research.

This survey will result in a report that will be available in Fall 2010 through the National Institute of Justice, as well as the Institute for Police Research website: http://www.IPRveststudy.org.

✶ *Please check this box to indicate that you have read the IPR informed consent form and agree to participate in this survey:* ☐ ✶

INSTRUCTIONS:

- If you have any questions regarding the survey, please call or e-mail Aaron Nisenson from the Institute for Police Research at (941) 487-2560 ext. 105, after hours (202) 441-5334, or info@IPRveststudy.org.
- Please use either blue or black ink and print as neatly as possibly using only CAPITAL letters.
- There are three ways to respond to this survey. If at all possible, we prefer that you use the Internet method as it promotes accuracy and reduces our data entry time. If completing the survey online, please make sure to enter your ID NUMBER, which is located at the top right of this page. Without the ID NUMBER, you will not be able to complete the survey online.
  - An electronic version of this questionnaire is located on the Internet at: http://survey.policeforum.org/iprveststudy.pdf
  - Fax the completed survey to the Institute for Police Research at (941) 487-2570.
  - Mail the completed survey to: Aaron Nisenson
Institute for Police Research
1549 Ringling Blvd, 6th Floor
Sarasota, FL 34236-6772
- This is a CONFIDENTIAL and ANONYMOUS survey.
  - Confidential: All responses will be held in the strictest confidence. No individual responses will ever be reported. Results will be reported in the aggregate, or sum, so no one individual can be identified.
  - Anonymous: We will not ask you to identify yourself anywhere on this survey. Please do not put any identifying marks (badge number, name, etc.) anywhere on this document. Please note that a series of ID NUMBERS have been assigned to your agency. These ID numbers have not been assigned to any specific person and there is no way to identify any respondents from the ID NUMBER.
- While it is important to receive surveys that are as complete as possible, respondents should feel free to decline to answer any questions that they are uncomfortable answering.
- This survey should take you approximately 15-20 minutes to complete.
- This survey is funded by the Department of Justice, National Institute of Justice.

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Demographics

1. **What is your current rank?**
   - ☐ Officer/Deputy/Trooper
   - ☐ Corporal
   - ☐ Sergeant
   - ☐ Lieutenant or above
   - ☐ Other (please describe):

2. **How many years of experience do you have in the field of law enforcement?**
   - ☐ 0-5 years
   - ☐ 6-10 years
   - ☐ 11 or more years

3. **Are you...**
   - ☐ ...Female
   - ☐ ...Male

4. **Please mark the response that best describes your current assignment.**
   - ☐ Patrol/traffic
   - ☐ Office/desk duty
   - ☐ Investigations/Detective
   - ☐ Special assignments (e.g., narcotics, gang enforcement, etc.)
   - ☐ Other (please describe):

5. **In which type of setting do you work? Please mark all that apply.**
   - ☐ Large sized urban area
   - ☐ Small to medium sized urban area
   - ☐ Suburban area
   - ☐ Rural area

Agency Policy

6. **Does your agency maintain a written policy regarding the use of reflective vests?**
   - ☐ Yes
   - ☐ No (SKIP to Question 8)

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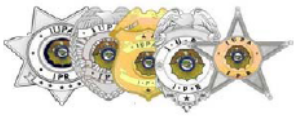

Officer Safety: The Use of Reflective Vests and Other Related Safety Equipment

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7. Does your agency's written policy regarding the use of reflective vests dictate when this safety equipment should be worn?

☐ Yes ⇨ **If YES, how often do you comply with agency policy during the following tactical situations for which your agency requires that you wear a reflective vest? Please mark "NA" for Not Applicable if your agency does not require you to wear a vest in a particular tactical situation.**

☐ No

☐ Don't know

Tactical Situation	How often do you comply with agency policy?
DUI checkpoints on highways	⇨ ☐ Always ☐ Sometimes ☐ Seldom ☐ Never ☐ NA
Traffic stops on highways	⇨ ☐ Always ☐ Sometimes ☐ Seldom ☐ Never ☐ NA
Traffic direction on highways	⇨ ☐ Always ☐ Sometimes ☐ Seldom ☐ Never ☐ NA
Accident scene investigation/management on highways	⇨ ☐ Always ☐ Sometimes ☐ Seldom ☐ Never ☐ NA
Other (please specify):	⇨ ☐ Always ☐ Sometimes ☐ Seldom ☐ Never ☐ NA

⇨ **If YES, what are the outcomes of failing to comply with agency policy in regards to wearing reflective vests? Please mark all that apply.**

☐ No reprimand

☐ Minor reprimand (e.g., verbal or written reprimand, etc.)

☐ Major reprimand (e.g., suspension with or without pay, etc.)

☐ DK - No outcome specified

☐ Other (please specify):

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Usage and Trends

8. **Please indicate the types of equipment that you have used and your assessment of their effectiveness in providing officer safety?**

	Do you use this type of reflective safety equipment?		If YES, how effective* is this equipment at increasing officer visibility?
Reflective vest	☐ Yes	☐ No	⇨
Flares	☐ Yes	☐ No	⇨
Personal strobe lights	☐ Yes	☐ No	⇨
Directional light bar on cruiser	☐ Yes	☐ No	⇨
Reflective cones	☐ Yes	☐ No	⇨
Other (please specify):	☐ Yes	☐ No	⇨

*Please rate the effectiveness using the following scale:
1=Very ineffective
2=Somewhat ineffective
3=Neither ineffective nor effective
4=Somewhat effective
5=Very effective

9. **During a typical week, how often do you wear a reflective vest while serving in an official capacity?**
   - ☐ Never or rarely
   - ☐ 1-3 times per month
   - ☐ 1-3 times per week
   - ☐ Once per day
   - ☐ Several times per day

10. **Rate the extent to which you agree or disagree with the following statements pertaining to the use of reflective vests using the following scale: 1=Strongly disagree, 2=Disagree, 3=Neither disagree nor agree, 4=Agree, 5=Strongly agree.**
    - ☐ Wearing a reflective vest enhances my professional appearance as an officer.
    - ☐ Wearing a reflective vest does not impede my access to my weapons and/or utility belt.
    - ☐ Wearing a reflective vest makes me a target in situations where I do not wish to be seen.
    - ☐ My reflective vest is uncomfortable to wear.
    - ☐ The decision to wear a vest should be at an officer's discretion.
    - ☐ Wearing a reflective vest is too much of a hassle to bother with.
    - ☐ I feel very competent with regard to setting up a safe traffic pattern using reflective cones.
    - ☐ I feel that I have the proper equipment to safely conduct police business on highways with or without a reflective vest.

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11. What impact does wearing a reflective vest have on your command presence?

- ☐ Negative impact
- ☐ No impact
- ☐ Positive impact

If you would like to provide additional comments concerning the impact of a reflective vest on your command presence, please do so in the space below.

12. Rate the importance of the following factors with regard to the motivation they provide you to wear a reflective vest. Please use the following scale: 1=Low importance, 2=Moderately low, 3-Neither high nor low importance, 4=Moderately high, 5=High importance.

- ☐ Avoiding injury/safety
- ☐ Maintaining access to worker's compensation
- ☐ Potential civil/personal liability
- ☐ Adherence to agency policy

13. How satisfied are you with your reflective vest for the following purposes? Please use the following scale: 1=Very unsatisfied, 2=Moderately unsatisfied, 3-Neither unsatisfied nor satisfied, 4=Moderately satisfied, 5=Very satisfied.

- ☐ Access to weapon
- ☐ Access to equipment
- ☐ Effective visibility to avoid accidents
- ☐ Ease of motion
- ☐ Identification of law enforcement status
- ☐ Ability to break away from attacker
- ☐ Mitigation of heat stress

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Training

14. Please indicate the types of training you have received and where you received this training. Please mark all that apply.

	Basic Academy	In-service	Roll Call	Internet	NA - this training is not provided
Use of reflective vests	☐	☐	☐	☐	☐
Care and maintenance of reflective vests	☐	☐	☐	☐	☐
Use of other visibility equipment (e.g., flares)	☐	☐	☐	☐	☐
Accident scene set up and stabilization	☐	☐	☐	☐	☐
Accident scene disassembly	☐	☐	☐	☐	☐
Procedures for making stops along highways and roadways	☐	☐	☐	☐	☐

15. Are there other mechanisms not mentioned in Question 14 through which you have received training or information on reflective vests?

☐ Yes ⇨ **If YES, please describe the type of training and where it was received:**

☐ No

16. How many total hours of training have you received regarding the use of a reflective vest in the past three years?

☐ Less than one hour

☐ 1-2 hours

☐ 3-4 hours

☐ 5 or more hours

☐ NA - No reflective vest training has been provided

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Care and Maintenance

17. Does your agency inspect the reflective vests after they have been issued?

- ☐ Yes ⇨ **If YES, how frequently are reflective vests inspected?**
  - ☐ Monthly or more frequently
  - ☐ Multiple times per year, but less frequently than monthly
  - ☐ Once per year
  - ☐ Every two years
  - ☐ Vests are inspected, but inspections occur randomly and may or may not occur in a given year
  - ☐ Never
- ☐ No (SKIP to Question 19)

18. Who most frequently conducts the reflective vest inspections within your agency?

- ☐ Firstline supervisor
- ☐ Commander
- ☐ Chief/Sheriff
- ☐ Risk management
- ☐ Other (please specify):

19. If your reflective vest is deemed to be either damaged or otherwise in need of replacement, is a replacement reflective vest available?

- ☐ Yes ⇨ **If YES, who will pay for the replacement reflective vest?**
  - ☐ Agency
  - ☐ Officer
- ☐ No

Incidents

20. Have you been involved in a roadway- or street patrol-related incident in which you were struck while working in an official capacity outside of your vehicle?

- ☐ Yes ⇨ **If YES, please mark all that apply:**
  - ☐ The incident occurred even with the use of a reflective vest
  - ☐ The incident occurred even with the use of other reflective gear (e.g., flares, cones, etc.)
  - ☐ The incident involved a drunk or impaired driver
  - ☐ The incident occurred at night or during a low visibility situation
  - ☐ The incident occurred before other support arrived
  - ☐ The incident occurred on a major highway
  - ☐ The incident occurred on a local street or arterial
  - ☐ The incident resulted because the reflective vest made the officer a target
  - ☐ The incident required that I take medical leave

    If so, how long were you on medical leave?
- ☐ No

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21. Have you been involved in a *near miss* in a roadway- or street patrol-related incident in which you were *nearly* struck while working in an official capacity outside of your vehicle?

☐ Yes ⇨ If YES, was it reported?
☐ No
☐ Yes
☐ No ⇨ If NO, why not?

Situations and Traffic Stop Visibility

22. Rank the following items in order of hazard, from most hazardous (1) to least hazardous (6):

☐ Roadblock
☐ Directing traffic
☐ Traffic stop (approaching vehicle)
☐ Traffic stop (questioning driver)
☐ Assisting motorists (stabilizing scene)
☐ Assisting motorists (taking down accident scene)

23. For the following tactical situations, indicate the level of visibility sought based on your experience. If you mark "other," please describe your response in the space provided below.

☐ Low ☐ High ☐ Other*.....Routine patrol
☐ Low ☐ High ☐ Other*.....Roadblock
☐ Low ☐ High ☐ Other*.....Directing traffic
☐ Low ☐ High ☐ Other*.....Traffic stop (approaching vehicle)
☐ Low ☐ High ☐ Other*.....Traffic stop (questioning driver)
☐ Low ☐ High ☐ Other*.....Assisting motorists (stabilizing scene)
☐ Low ☐ High ☐ Other*.....Assisting motorists (taking down accident scene)

*If you marked "Other" above, please describe your response here:

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Reflective Vest Acquisition

24. Does your agency currently issue reflective vests OR is it up to the individual officer to purchase his/her own reflective vest?

- ☐ My agency purchases reflective vests for each individual officer
- ☐ My agency purchases reflective vests for use by officers, but the vests are assigned to a squad or police vehicle
- ☐ Officers are required to purchase their own reflective vests
- ☐ Officers are not required to do so, but purchase their own reflective vests if desired
- ☐ NA - officers in my agency do not utilize reflective vests

25. Are you aware of the Federal requirement that law enforcement officers working in and around federal-aid highways wear approved reflective vests in certain circumstances?

- ☐ Yes
- ☐ No

26. What type of vest is utilized by your agency? (The type is often indicated on a label inside the vest.) Please mark all that apply.

- ☐ ANSI-107-2004
- ☐ ANSI-207-2006

ANSI-107-2004 ⇨

ANSI-207-2006 ⇨

- ☐ Other (please describe):

Next Generation of Reflective Gear

27. Which of the following features would you like to see added to the next generation of reflective vests? Please mark all that apply.

- ☐ Integral spot on vest to affix badge and/or police radio microphone
- ☐ Improved access to weapons and utility belt
- ☐ Improved comfort (e.g., breathability, cooler, etc.)
- ☐ Improved reflectability (i.e., brighter reflective properties)
- ☐ Improved breakaway components
- ☐ Improved durability
- ☐ Improved fit (i.e., additional sizes more closely aligned to body size and shape)
- ☐ Reflective color reserved for law enforcement use (i.e., blue for police only, etc.)
- ☐ Fire resistant material
- ☐ Other (please specify):

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28. **Which of the following types of reflective equipment holds the greatest promise for future improvements in technology related to officer safety while working on roadways? Please mark all that apply.**

- ☐ Reflective vests
- ☐ Reflective traffic gloves
- ☐ Flares
- ☐ Reflective materials built into the uniform
- ☐ Safety lighting built into the uniform
- ☐ Warning signage
- ☐ Wands or lighting equipment with additional reflective material
- ☐ Reflective cones or other portable devices
- ☐ Other (please specify):

⇨ **If you checked ANY of the types of equipment above, please briefly tell us how you feel these types of equipment could be improved.**

29. **Are there any types of reflective equipment that have not yet been developed, or are under-developed, that could improve officer safety? If so, please describe this equipment and under which circumstances this equipment could enhance the safety of officers.**

Thank you VERY much for assisting us with this important survey regarding officer safety. If you have any questions or comments about this survey, the project, or the Institute for Police Research, please contact Aaron Nisenson at (941) 487-2560 ext. 105, after hours (202) 441- 5334, or info@IPRveststudy.org.

If you are interested in learning more about this study, please visit http://www.IPRveststudy.org.

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Appendix B – Visibility Matrix

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Visibility Matrix

Type of Duty	Risk of Confrontation	Number of Officers	Risk Due to Visibility	Officer Desire for High Visibility
Assisting Motorists (stabilizing scene or taking down scene)	Low	Low or High	Low	High Visibility
Directing Traffic	Low	Low or High	Low	High Visibility
DUI Check points	Medium	High	Low	High Visibility
Roadblocks	Medium	High	Low	High Visibility
Routine Patrol	High	Low	High	Low Visibility
Traffic Stops	High	Low	High	Low Visibility

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