Law Enforcement Stops & Safety Subcommittee

Staff Study 2004

INTERNATIONAL ASSOCIATION OF CHIEFS OF POLICE

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FOREWARD

Traffic stops are integral to law enforcement, but can be one of the most dangerous facets of police work. Statistics compiled by the Federal Bureau of Investigation show that the third leading cause of death for on-duty police officers is being struck by a vehicle, accounting for nearly 10 percent of officer fatalities annually. FBI data also indicates officer deaths resulting from such incidents have increased steadily since 1991.

A series of fatal crashes involving police vehicles brought needed attention to the issue of officer safety during traffic stops. In these crashes, police vehicles parked on the shoulder of high-speed roadways were struck from the rear and resulted in vehicle fires. Since 1989, there have been 12 documented fatal crashes in which the fuel tank ruptured and fires resulted.

In 2003, the International Association of Chiefs of Police Highway Safety Committee established the Law Enforcement Stops and Safety Subcommittee (LESS) to work with the National Highway Traffic Safety Administration to improve officer safety during traffic stops. LESS is made up of 26 safety experts from government, vehicle manufacturers, safety advocacy groups, and law enforcement.

Previous work to study the crash issue focused primarily on the vehicle and vehicle safety equipment. LESS was charged with studying the issues from a broader perspective and with determining best practices to avoid crashes during traffic stops and other road side contacts.

This document reports the Subcommittee's work to date. It outlines research and recommendations compiled by three LESS Work Groups: Vehicle, Highway Environment and Design, and Policy and Procedure.

This report is not intended to be all encompassing; rather, it represents a position from which further work on this issue may develop. The recommendations and best practices identified within the following pages are methods law enforcement stakeholders can employ to improve highway safety for police officers. However, additional issues may also have a significant impact on officer safety. For example, public education is not specifically addressed in this report, but in many instances the safety of officers working roadside rests, literally, in the hands of motorists.

Further work is needed to study additional methods available to enhance officer safety in various traffic situations. Significant safety improvements require a major, coordinated effort by law enforcement organizations, vehicle manufacturers, safety advocacy groups and other stakeholders. It is hoped this report will bring increased attention to the ongoing necessity to examine police practices in an ever-changing environment.

EXECUTIVE SUMMARY

This 2004 Staff Study Report documents the work to date of the Law Enforcement Stops and Safety Subcommittee. It includes technology, practices, and research related to improving officer safety and preventing police vehicle crashes. Recommendations are included at the end of each section of the report as benchmarks against which to measure future successes to improve the safety of police vehicles, highway environment and design, and traffic stop practices.

Police Vehicle

The Law Enforcement Stops and Safety Subcommittee continues the efforts of the Blue Ribbon Panel to partner with automobile and equipment manufacturers in designing well-equipped, safe police vehicles. One significant outcome has been Ford Motor Company's commitment to conduct crash tests at 75 miles per hour to better simulate actual police vehicle highway crashes. Routine vehicle inspections by fleet and supervisory personnel are recommended to ensure proper equipment installation, trunk packing, and maintenance of vehicles.

Preliminary work with new lightbar, take-down light, and directional arrow prototypes developed by the Florida Highway Patrol has demonstrated increased vehicle visibility. The prototypes were designed based on research in human perception and reaction and use Light Emitting Diode (LED) technology to manipulate color, output, and flash rate. The prototype lightbar for a moving vehicle flashes randomly, alternating red and blue segments across the lightbar at a rate of 90 flashes per minute. In a parked vehicle it flashes a solid color. A photocell instructs the vehicle to flash red in the daytime and blue at night. Initial research shows the prototypes increase daytime and night visibility, better inform motorists of vehicle movement, decrease shadows, and better conceal officers during stops.

In addition, new low frequency sirens in the 125 to 300 Hz range have been evaluated. During tests, the prototype sirens could be heard 25 percent further away than the standard 700 to 1500 Hz sirens. Additional testing will help determine the circumstance in which lower frequency sirens and different siren patterns are perceived more effectively by motorists.

Several studies reported the safety benefits of light color vehicles and retroflective vehicle markings. The Arizona Department of Public Safety and the Pennsylvania State Police adopted highly contrasting, retroflective vehicle markings, including rear bumper chevrons, to increase vehicle conspicuity.

Although still early in development, Intelligent Transportation Systems (ITS) have the potential to reduce traffic crashes. The National Highway Traffic Safety Administration estimates that 49 percent of rear-end crashes can be avoided with technology like on-highway electronic message boards and "smart" cars with built in crash warning and avoidance systems.

Highway Design and Environment

The Law Enforcement Stops and Safety Subcommittee identified several improvements in highway design and environment that can improve safety for police officers. Guidelines recommend 12-foot travel lanes and highway shoulders. Research shows crash rates increase when lane and shoulder widths are reduced and commercial vehicles are disproportionately affected. Any decisions to reduce lane widths or eliminate shoulders should be carefully discussed among stakeholders.

Conventional and innovative pavement markings and reflective clothing are important safety features to alert and direct drivers. Rumble strips have been shown to effectively reduce drift-off road crashes by 18 to 72 percent on high-speed, controlled access rural roads. Reflective clothing can dramatically improve motorists' response time. Research by Cornell University shows that pedestrians wearing reflective clothing can be seen by motorists at a distance of 500 feet compared to 55 feet for pedestrians wearing blue or black.

Twenty-eight states have instituted "move-over" laws. The goal of such legislation is to mandate necessary precautionary measures to ensure the safety of emergency personnel and vehicles. While laws vary in terms of provisions and penalties, they specify that traffic must slow down and move over to an adjacent traffic lane.

Many changes in highway design occur without the input of law enforcement. The Integrated Management Process prescribed by the Transportation Research Board promotes broad input to address highway safety concerns. The process is flexible and allows individual states and jurisdictions to customize it according to their political culture and resource constraints.

Policy and Procedure

Identifying traffic stop "best practices" is difficult because no two traffic stops are the same. The California Highway Patrol analyzed traffic stop policies from 25 police agencies across the country. While common themes appear, it is evident that applied research has not dictated any precise combination. Differences exist in police vehicle placement and orientation, use of emergency lights, suspect vehicle approach, and in-vehicle citation writing.

Computer crash simulations performed by Ford Motor Company and the New York Sate Police identified an optimal vehicle configuration to protect pedestrian officers. The configuration requires 15 feet between the police and violator vehicles, positioning both vehicles parallel to the road, off-setting the police vehicle 50 percent of its width to the left of the violator's, and turning its wheels to the right for a right-shoulder stop.

The New York State Police simulations also identify a maneuver for reducing officers' risk while seated inside the vehicle during a stop. The "fall back" maneuver involves the officer increasing the distance to 40 feet between vehicles and laterally as far away from traffic as possible after the initial approach and interview phase. To re-approach the driver and complete the stop, the vehicle is returned to the basic configuration.

The Ford Motor Company used computer simulations to identify a "safe zone" for pedestrian officer. Recommended for any extended time outside the vehicle, the "safe zone" extends six feet from the police vehicle's front passenger door.

The basic vehicle configuration will not protect an officer in every situation. Rigorous training, retraining, and supervision are crucial to ensuring officer safety. Officers must be taught to balance the threats posed by stopped motorists and the risks faced by an officer turned pedestrian.

The Law Enforcement Stops and Safety Subcommittee is instrumental in forming a coalition of government, industrial, and civic partners for the exchange of ideas and solutions for safe stops. The importance of a coordinated and integrated approach can not be overstated. A continued commitment to address increasingly complex safety problems for law enforcement officers at traffic stops is needed. Support at all levels is required for increased funding to sustain an ambitious research agenda.

Effective traffic enforcement is enhanced by police vehicles that are equipped to prevent crashes and designed to withstand collisions, highway designs that contribute to officer safety, and policies and procedures that provide clear guidance for on-scene risk management by officers. Improving officer safety during roadside contacts is a challenging, but achievable task.

Police Vehicle

INTRODUCTION

Police vehicle performance requirements differ from consumer vehicle models. Police officers spend 10 times mores time in their vehicles, are 1,000 times more likely to be parked at the side of the highway, and are four times more likely to be involved in a crash than ordinary citizens.[1] Moreover, a police vehicle is used in circumstances where high-energy crashes are likely to occur, for example as a blocker vehicle during traffic stops. Therefore, they are more likely than their civilian counterparts to experience the full impact of collisions.[2]

A series of fatal crashes involving the Crown Victoria Police Interceptor (CVPI) resulted in fires from punctured or ruptured fuel tanks and caused law enforcement to question the vehicle's safety. Initial inquiries focused on the vehicles and the equipment installed in them after purchase. Reviewers found that the vehicles met all applicable Federal safety standards; however the standards did not reflect the full range of performance expectations for police vehicles.

In 2002, Ford Motor Company and the Arizona Attorney General's Office appointed the Blue Ribbon Panel to complete a comprehensive review of factors associated with police vehicle crashes. Results showed that crashes were clustered near highway entrance and exit ramps, that the more serious crashes were caused by impaired drivers, and forty-seven percent were caused by drivers losing control and striking stationary police vehicles. Twenty-one percent of the crashes were high-impact (more than 50 miles per hour), rear-end crashes on roadway shoulders.[3]

One vehicle manufacturer, the Ford Motor Company, responded by developing three safety enhancements intended to decrease post-collision fires. First, special shields in front of the fuel tank on key suspension components are now standard on the CVPI. Second, Ford introduced an optional bin for the floor of the trunk, called the Trunk Pack™, which laterally aligns police equipment to reduce the risk of fuel tanks punctures. Ford also provided a trunk equipment packing guide to optimize the benefits of the Trunk Pack™. Third, an active fire suppressant system with a manual engagement feature will be available on the 2005 CVPI. This system is innovative in its use of special chemicals to neutralize gasoline and reduce the chance of an extinguished fire relighting.

The LESS Subcommittee continues the work of the Blue Ribbon Panel to involve law enforcement, vehicle and equipment manufacturers, government, and other interested parties in identifying and evaluating safety improvement for police vehicles.

FACTS BEARING ON THE PROBLEM

Safety improvements in police vehicles are, in part, dependent on the production protocols of auto manufacturers and aftermarket equipment vendors. The Ford CVPI has approximately 85 percent of the U.S. police vehicle market,[4] and over 300,000 units still in operation.[5] Although the market for police vehicles appears large, only 100,000 units are sold per year, an amount well below auto manufacturers' typical product lines that must sell 200,000 to 250,000 units per year to remain profitable.[6]

Manufacturers produce vehicles from a base platform whose life cycle is intended to last several years. Design changes require a long lead time and often result in increased costs passed on to the consumer. Although law enforcement agencies are regular, stable sources of income for manufacturers, they represent a small fraction of the automobile market. With more police models being produced, including the increasing popularity of sport utility vehicles, the cost per vehicle for design changes, even safety modifications, increases exponentially.

Base platforms are similar to consumer models, but police vehicles are modified by the manufacturer to increase acceleration, top speed, drive train durability, heavy duty suspension, stabilizer bar, brake capacity and longevity, and charging system output. However, no uniform definition exits for vehicles sold as "police packages" or "police interceptors." Each company determines its own design features, thus making it difficult to effect industry wide changes.

Beyond initial vehicle specifications, there are few guidelines for the manufacturers or installers of aftermarket equipment for police vehicles. Improperly designed and mounted equipment can become projectiles in crash situations and increase the risk of injury to vehicle occupants. Safety equipment such as occupant restraints and air bags can malfunction or deploy improperly due to inferior equipment installations.

RESEARCH RESULTS

This chapter reports the work of the Vehicle Group to study vehicle equipment related to preventing crashes including emergency lights, vehicle color and markings, sirens, mounted equipment, and Intelligent Transportation Systems.

Vehicle Lighting Improvements

After reviewing research related to human perception and reaction, the Florida Highway Patrol developed and tested a prototype lightbar, takedown light, and directional arrow.[7] The prototypes were designed using newer Light Emitting Diode (LED) technology.[8] LED technology allows for the manipulation of key lighting factors affecting visibility and conspicuity. These include color, intensity, and flash rate. The following summarizes research related to the development of the prototypes.

Color. In the dark, humans are more sensitive to blue light than to red, while in daylight, the opposite is true. For instance, in daylight, humans require twice as much energy from a blue source to perceive it to be as bright as a red source.[9] At night, we require only one-third the intensity of a blue light to match the perceived brightness of a red light. Our sensitivity to different colored lighting also depends on ambient light levels. For example, because most vehicle lighting at night is red, a blue light tends to stand out from this background. An exception to this rule would be during poor viewing conditions (i.e., fog, smoke, and haze). Under these conditions, red light is preferred because it scatters less, travels farther, and retains greater intensity at a distance than blue light.[10]

Another phenomenon of color perception is known as Blue Advancing-Red Receding. Studies have shown that, especially under darkened conditions, the human eye perceives a stationary lamp emitting a higher frequency, shorter wavelength of light (violet or blue) to be moving towards the observer, while a lamp producing a lower frequency, longer wavelength (red) will appear to be moving away from the observer.[11] This can affect a motorist's ability to ascertain the distance and state of motion of a police vehicle, particularly during low ambient light conditions.[12]

Intensity. Generally, brighter lights produce greater conspicuity. However, ambient light plays a key role in conspicuity because a lamp that appears bright in the dark may not be visible during daylight hours. The duration of "on" time also affects perception. According to the Society of Automotive Engineers, halogen lights, with one-twentieth the peak intensity of strobe lights, appear as bright as strobe lights because they are "on" 100 times longer than strobe lights.[13]

Flash Rate. Several studies have shown that lamps with faster flashes command greater attention than slower flashing lamps.[14] While there is some disagreement about the ideal flash rate for emergency vehicle lights, the Society of Automotive Engineers recommends that flash rates be between 1 to 2 Hz (60 to 120 flashes per minute).[15] While faster flash rates have shown to produce a greater sense of urgency, they can also cause more distraction and greater eye discomfort to motorists.[16]

Description of Florida Highway Patrol Prototypes

Moving police vehicles require a different lighting configuration than a stopped vehicle. The Florida Highway Patrol (FHP) lightbar prototype for a moving vehicle used a high number of moderate flashes (90 per minute) extending across the entire bar. This moderate rate was chosen because previous studies have been inconclusive as to the ideal flash rate. The lightbar was programmed to randomly alternate red and blue segments creating flashes of red, blue, and sometimes white light. While parked, a solid flashing pattern was employed and a photocell instructed the vehicle as to which color to display (red in daylight and blue at night). An override switch was installed to allow officers to use red lights during poor viewing conditions. The prototype also included a transmission sensor to select a light pattern depending on whether the vehicle was parked or in motion.

The take-down prototype, was also created with LED lights. Instead of the usual halogen point-source lights in the front of the lightbar, the entire front of the lightbar was activated (red and blue segments illuminated simultaneously). This created an intense light stronger than lightbars using traditional halogen spot lamps.

Finally, the FHP moved the directional arrow from the lightbar to the rear window to avoid possible interference with the effectiveness of the lightbar. The prototype employed a rectangular strip of LEDs surrounding the window's perimeter to create a "taller" display. These strips created a "U" shape with the open end facing the intended direction.

Evaluation of Florida Highway Patrol Prototypes

Three manufacturers each submitted lightbars built to FHP's prototype specifications: Code 3, Whelen Engineering, and Federal Signal. In side-by-side evaluations, observers subjectively rated each of the three prototypes as being "better" than the lightbar currently used by FHP. Evaluators were particularly impressed with the brightness of the test units' red lights during daylight viewing. The reconfigured take-down lights were perceived as virtually eliminating shadows and providing better concealment for officers approaching a violator's vehicle. Finally, the remodeled and repositioned directional arrow, while better than current models, did not convey its "move over" message clearly enough.

Initial results have been promising. A large-scale field evaluation is needed to determine the effectiveness of the prototypes in reducing rear-end high-speed crashes. Below are the results of the 14 observation tests conducted by the FHP.

Florida Highway Patrol Emergency Lighting Research and Prototype Evaluation March 2004

*Tests	N	Unit A	Unit B	Unit C	Unit D
One (day)	14	5.0	7.9	5.8	7.4
Two (day)	14	5.0	8.4	6.1	7.6
Three (day)	14	5.0	6.4	7.1	5.9
Four (day)	15	5.0	7.5	6.3	6.5
Five (siren)	14	XX	XX	XX	XX
Six, part 2 only	13	5.0	5.6	4.5	5.2
Seven (night)	14	5.0	8.7	7.0	8.6
Eight (night)	14	5.0	8.1	7.3	9.1
Nine (night)	14	5.0	6.9	7.6	7.3
Ten (night)	14	5.0	7.6	7.1	7.7
Eleven (take down)	14	5.0	6.4	6.3	8.6
Twelve (take down)	14	5.0	7.6	7.2	7.9
Thirteen (night blind – 1)	14	5.0	7.1	7.1	7.1
Fourteen (night blind – 2)	14	5.0	7.7	6.8	7.1
Average		5.0	7.4	6.6	7.4

*See the Florida Highway Patrol Emergency Lighting Research and Prototype Evaluation for detailed test descriptions.

Vehicle Siren Improvement

FHP also investigated whether vehicle sirens could be enhanced to make police vehicles more obvious. Psychological research has shown that visual and auditory cues work synergistically together to reduce reaction times.[17] Therefore, improving sirens may increase police vehicle conspicuity and imbue drivers with an increased sense of urgency.

The properties of low frequency sounds suggest one area that could be exploited with a new siren. Because low frequency sounds can more readily bend around objects, they can travel further, and are better able to penetrate solid objects like cars with closed windows. Also, the human ear is not able to perceive from which direction low frequency sounds originate. Because they are perceived equally from all directions, low frequency sirens may be particularly effective at intersections.

Whelen, Federal Signal, and Code 3 each produced prototypes for FHP. The manufacturers expressed concern that the public's familiarity with the pitch and pattern of current sirens would make any change detrimental. Consequently, the prototypes maintained the current frequency range while adding a lower frequency supplement. It became clear that it was not possible to produce frequencies below 100 Hz within the space and power limitations of current police vehicles. The resultant systems produced sounds in the usual 700 to 1500 Hz range with a low-frequency supplement in the 125 to 300 Hz range.

In subjective ratings, the prototype sirens could be heard from 23-27 percent further away than the high frequency siren. Results are promising and further testing of the low frequency siren prototypes is warranted. Additional testing could determine if lower frequency sirens and different siren patterns like the European high-low style pattern are perceived more effectively. New siren configurations must be tested with OSHA standards.

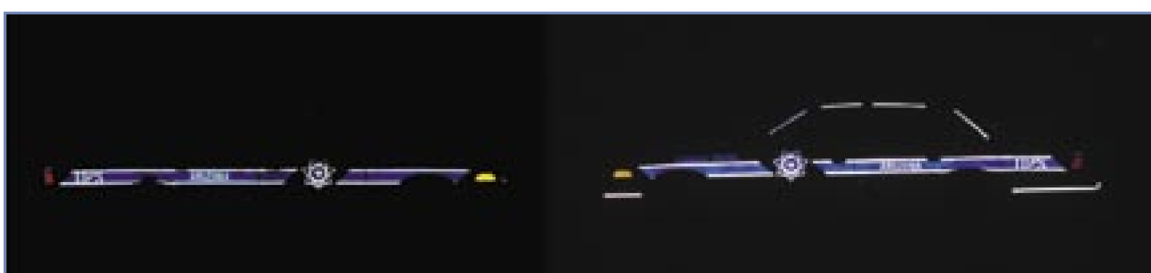
Vehicle Color and Markings

The color and markings of a police vehicle provide important cues a motorist can use to detect and identify the vehicle. The same aspects affecting visibility and conspicuity of lightbars also apply to the police vehicle's color and graphics package.

Several highway studies indicate that cream, yellow, and white objects are the most visible.[18,19] Similarly, insurance studies have shown that fewer automobile crashes involve yellow or white cars.[20] Also, a review of 32 rear-end crashes involving stopped police vehicles found that the majority of struck vehicles were black.[21] An observational study conducted by the Ohio State Highway Patrol in 2003 led the organization to change its primary vehicle color from dark gray to white to make it more conspicuous at night.

The Arizona Department of Public Safety was one of the first agencies in the country to adopt European concepts for vehicle color and markings. Retroflective chevrons with high-color contrast were applied to the back bumper and vehicle roofs were outlined in retroflective material to improve conspicuity during daytime and night. Pictures of the Arizona adaptation are shown below. For the rear-end pictures, the new graphics are on the left. For the side view, the new graphic is on the right.

The Pennsylvania State Police also tested vehicle graphics and determined that a red and yellow chevron that looks much like a construction barricade works best because it is most easily understood by the public. As of now, no statistical data is available to demonstrate the effectiveness of these improved graphics.



Mounted Equipment

Mounted vehicle equipment can be hazardous for occupants of police vehicles. As vehicle design has progressed it has become increasingly difficult to find acceptable structure to mount equipment. Radar antennas, display units, video cameras, emergency lights mounted in the interior, and computers displaced by air bag deployment can become projectiles in the event of a crash. Federal Motor Vehicle Safety Standard 201, Occupant Protection in Interior Impact requires that surfaces that can be struck by the head during a collision absorb certain forces to reduce the chance of injury.[22] However, there are no standards that specify the threshold for equipment to remain mounted. In the absence of any industry standard, the Florida Highway Patrol adopted a policy to require equipment to remain in place during a crash force of 30g (thirty times its own weight).

One of the keys to reducing these crash injuries to officers is to determine via consistent supervisory inspections what officers actually are transporting in their vehicles, as well as the manner in which they are carrying it.

Intelligent Transportation Systems

Intelligent Transportation Systems (ITS) have the potential for greatly reducing traffic crashes, including those involving stopped vehicles. For instance, through the use of video cameras to monitor traffic and on-highway electronic message boards, drivers can be informed quickly about crash scenes ahead. Informed drivers can prepare for the slowed traffic they will encounter and be on the look for emergency vehicles. Using technology to make cars "smarter" is another way ITS can reduce crashes. With computers becoming both more powerful and smaller, their use in vehicles continues to increase. In the near future, cars may have crash warning and avoidance systems built into them that detect moving and stationary objects surrounding the vehicle. For example, if a driver is in danger of rear ending or side swiping another car, driver warnings are given. "Smart" technology can interact with the vehicle's cruise control to help drivers avoid crashes. The National Highway Traffic Safety Administration estimates that 49 percent of rear-end crashes can be avoided with these systems.[23]

CONCLUSIONS

Effective traffic enforcement is enhanced by police vehicles that are equipped to prevent crashes and designed to withstand collisions. Cooperative efforts among law enforcement and vehicle and equipment manufacturers will ensure that safety improvements are both adequate and cost-effective.

RECOMMENDATIONS

The following recommendations are submitted by the Vehicle Work Group of the Law Enforcement Stops and Safety Subcommittee to the Highway Safety Committee of the International Association of Chiefs of Police.

1. ***Conduct additional research on vehicle lighting systems.***

   Additional studies are needed to (a) understand the role that color, output, and flash rates have on rear-end police vehicle crashes, (b) establish the effectiveness of new lightbar configurations developed by the Florida Highway Patrol, and (c) identify other vehicle lighting features that may enhance visibility (e.g., flickering versus steady lights with different "on" and "off" ratios).

2. ***Conduct additional research on vehicle color and markings.***

   Additional studies are needed to establish the effectiveness of vehicle color and markings such as rear bumper chevrons, in reducing rear-end police vehicle crashes.

3. ***Conduct additional research on vehicle siren systems.***

   Additional testing is needed to determine if lower frequency sirens and different siren patterns are more effective than current siren systems in warning approaching motorists.

4. ***Establish suitable mounting points for stronger installation of in-car equipment.***

   Additional research is needed to establish optimal placement and threshold requirements for equipment to remain mounted in the event of a crash. Manufacturers should provide appropriate brackets and installation guidelines.

5. ***Request that automobile and aftermarket equipment manufacturers conduct crash tests that simulate police officers' work environments.***

   The 75-mile per hour, rear-impact, vehicle-to-vehicle CVPI testing recommended by the Blue Ribbon Panel should extend to all police vehicles and vehicle manufacturers. These tests better simulate actual police vehicle crashes and provide engineers and researchers with improved data to evaluate the effectiveness of safety equipment.

6. ***Encourage safety inspections by fleet and supervisory personnel.***

   Inspections should ensure that (a) vehicles are in proper working condition, (b) equipment is safely installed, and (c) equipment is properly carried by line personnel. The Florida Highway Patrol has developed an inspection form that is available on the CVPI website.

Endnotes

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HIGHWAY ENVIRONMENT AND DESIGN

INTRODUCTION

Since 1998, crashes involving police vehicles have brought increased attention to the issue of officer safety during traffic stops. The Blue Ribbon Panel, convened by law enforcement and the Ford Motor Company to address the issue, reviewed 152 crash records to identify factors associated with rear-end crashes. Seventy-eight of the crashes reviewed occurred on roadway shoulders, including 32 that occurred on high-speed highways.[1] Accordingly, the discussion of high-speed rear-end crashes must include consideration of the highway environment as well as the vehicle.

Highway environment includes factors such as the widths of travel lanes and roadway shoulders, enforcement platforms, crash reporting sites, entrance and exit ramps, median barriers, pavement marking and enhancements, signage, exceptions to accepted roadway design standards and officer visibility. These factors can contribute to or detract from a safe working environment for a police officer. Further, highway surroundings continue to evolve. Traffic volume and speed limits have increased, while lane and shoulder widths have decreased. Grass medians have been replaced with center barrier walls and the vehicle mix now includes triple trailers and sport utility vehicles. What was once considered acceptable practices by the enforcement officer may now be out dated, presenting an unacceptable level of risk that must be evaluated and improved.

FACTS BEARING ON THE PROBLEM

Traffic in high-density population areas has increased, taxing the capacity of freeway systems. To address this issue quickly and economically, traffic engineers often choose to convert roadway shoulders into traffic lanes or to reduce shoulder widths to expedite the movement of traffic. The results of these decisions are mixed. While additional lanes allow traffic to continue moving, crashes now cause longer backups. No shoulders and reduced shoulder width delay emergency vehicles and prevent crashed vehicles from being moved out of traffic, delaying traffic flow further.

In addition, converting roadway shoulders poses a safety risk to law enforcement officers and compromises their ability to conduct enforcement activities. The risk increases on high-speed freeways where a crash may have catastrophic results. In areas where shoulders have been reduced in width, traffic enforcement is limited due to the absence of a safe area to observe traffic and stop violators. Traffic enforcement is virtually non-existent in areas where shoulders do not exist because of the danger of rear-end crashes.

Changes to the highway environment and design often are completed without input from law enforcement stakeholders. In many states, highway safety responsibilities are divided among multiple government agencies (e.g., Department of Transportation, motor vehicle administration, state-level law enforcement, and emergency services) and lack a comprehensive strategic approach. Many safety improvement initiatives focus only on strategies that the particular agency is responsible for implementing and do not effectively address the entire safety problem.[2]

RESEARCH RESULTS

The Highway Design and Environment Work Group was charged with studying the engineering requirements for roadway design and proposing "best practices" related to officer safety. This chapter reports on the work of the Group to review federal guidelines and operation manuals and to gather relevant research related to travel lanes and shoulder widths, rumble strips, pavement markings, officer visibility, move-over laws, and the highway design exemption process. The Transportation Research Board's Integrated Safety Management Process is described.

Travel Lanes

Guidelines for roadway travel lanes recommend 12-foot travel lanes. However, the use of 11-foot lanes is acceptable in highly developed urban areas. Ten-foot lanes are adequate on low-speed roadways and nine-foot lanes are suitable on low-speed, low-volume rural roads.[3] While the National Cooperative Highway Research Program advises transportation officials to reduce travel lane width to 11-feet as the first consideration to increase capacity, some research has shown that reductions in lane widths can increase traffic crashes.[4] Further, a number of studies have demonstrated the negative effects that narrow travel lanes have on commercial motor vehicles.[5,6]

A review of previous research by the Illinois Department of Transportation found a correlation between lane/shoulder width and crash reduction. Using a crash predictive model, researchers noted that a two-foot increase in lane width was associated with a 23 percent reduction in related crashes. Similarly, a two-foot increase in shoulder width yielded a 16 percent reduction (for paved shoulders) in traffic-related crashes.[7] Additional research showed that narrow (less than 12-feet) two-lane two-way roads with many curves cannot be navigated by large trucks even when they are obeying posted speed limits.[8] Large-truck crash rates are significantly higher on multilane highways with narrow lane widths. Tractor-trailer crash rates were 584 per 100 million vehicle miles traveled on 10-foot lanes versus 203 per 100 million vehicle miles traveled on 12-foot lanes.[9]

Shoulders

Federal Highway Administration Guidelines indicate that vehicles stopped on the shoulder should clear travel lanes by at least one foot and, preferably, by two feet. Ten feet is considered the normal shoulder width along high-speed roadways. Heavily traveled, high-speed highways and highways carrying large numbers of trucks should have shoulders at least 10 feet wide and preferably 12 feet wide. Widths greater than 10 feet, however, may encourage unauthorized use of the shoulder as a travel lane.[10]

A shoulder should be wide enough for a vehicle to be driven completely out of the traffic lane. Narrow shoulders are better than none at all. For example, when a vehicle making an emergency stop can pull over onto a narrow shoulder such that it occupies one to four feet of the travel lane, the remaining travel lane can be used by passing vehicles.[11]

There are definite advantages to well-designed and properly maintained shoulders on high-volume roadways and freeways.

- Space is provided separate from travel lanes for vehicles to stop due to mechanical difficulties, flat tires, or other emergencies.
- Space is provided for motorists to stop occasionally to consult road maps or for other non-emergency reasons.
- Space is provided to allow for evasive maneuvers, resulting in a reduction of crashes or crash severity.
- Space is provided for pedestrian and bicycle use, for bus stops, for occasional encroachment of vehicles, for mail delivery vehicles, and for traffic detours during construction.
- Highway capacity is improved because uniform speed is encouraged.[12]

When converting highway shoulders to traffic lanes, reducing the left shoulder should be considered before reducing the right shoulder. Research and observations by enforcement personnel indicate that the right shoulder is the preferred refuge area and emergency response is easier to provide if the right shoulder is maintained.[13]

The National Cooperative Highway Research Program provides two guidelines for converting shoulders to travel lanes.

1) Field observations indicate that operational impacts of reduced shoulder or lane widths are most notable in the transition area. It is recommended that the transition area be located on a tangent, preferably in an area where there are no crossing structures, retaining walls, or other roadside appurtenances.

2) Emergency turnouts and crossovers should be provided along altered sections. It is recommended that enforcement and emergency response personnel be involved in determining locations. These turnouts should be large enough to accommodate a tractor-trailer unit and at least one piece of emergency equipment. The location of crossovers should be considered in conjunction with incident management plans. [14]

Additional advantages and disadvantages to consider when eliminating highway shoulders are described below.[15] Further, because conversion of highway shoulders and breakdown lanes to travel lanes is not consistent with federal design criteria, approval is required when conversions occur on federally-funded highways (see Design Exemption Process later in this chapter).

Increases in roadway capacity by converting highway shoulders are achieved with some increase in crash rates.[16] The design of such lanes must clearly take into consideration the safety aspects of the particular freeway section. As noted in the American Associations of State Highway and Transportation Officials *1997 Highway Safety Design and Operations Guide:*

- Where shoulders are converted to travel lanes, removing the left shoulder is prefer able.
- Systems for rapid incident detection and response should be considered for sections with substandard lanes and shoulder widths. (This includes removing disabled vehicles from the shoulders before the peak period when the shoulder becomes a travel lane.)
- If both shoulders are removed, mitigating measures should include advisory and regulatory signing, constructing frequent emergency pullouts, active overhead and side-mounted changeable message signs, continuous lighting, truck lane use restrictions, dedicated service patrols.
- For sections greater than 1.5 kilometers where inadequate shoulders are provided, emergency pullouts should be considered where feasible.[17]

Shoulder Conversion Analysis
American Association of State Highway and Transportation Officials

Left Shoulder		Right Shoulder		Both Shoulders	
Advantage	**Disadvantage**	**Advantage**	**Disadvantage**	**Advantage**	**Disadvantage**
• Infrequently used for emergency enforcement • Inexpensive to convert • Commercial trucks often restricted from left lane traffic	• Requires re-striping • Some median treatments cause sight distance problems	• Easily implemented	• Preferred area for emergency stops and enforcement • Sight distance changes at merge and diverge areas of ramps	• Not recommended • Use only in extreme cases	• Requires re-striping • Safety concerns (no refuge) • Enforcement is difficult • Increases incident response times • Maintenance more difficult and expensive

Rumble Strips

Rumble strips are one measure with the potential to reduce high-speed, rear-end roadside crashes.[18] Rumble strips are crosswise grooves in the road shoulder. States have developed various design dimensions, but generally the grooves are one-half inch deep, spaced seven inches apart, and cut in groups of four or five. Vehicles passing over rumble strips produce a sudden rumbling sound that causes the vehicle to vibrate, thereby alerting inattentive or drowsy drivers of encroachment onto the shoulder. Rumble strips are used primarily on expressways and freeways, although some states install them on two-lane rural roads with a high number of single vehicle crashes.

Several studies have confirmed the safety benefits and cost effectiveness of rumble strips on high-speed, controlled access roads. For instance, researchers on the Pennsylvania Turnpike found Sonic Nap Alert Pattern (SNAP) rumble strips reduced the number of drift-off-road crashes by 65 percent.[19] Similarly, researchers reported that milled rumble strips were responsible for a 65 percent reduction in drift-off-road crashes on rural interstates and parkways in New York.[20] Virginia researchers demonstrated the effectiveness of milled versus rolled rumble strips finding milled strips were three times louder and produced vibrations 12 times greater than rolled strips.[21] Research generally attributes rumble strips with reducing drift-off-road crashes by 18 to 72 percent on high-speed, controlled-access rural roads.[22]

Pavement Markings

Several engineering options provide improved shoulder delineation, including chevrons, signs, guardrails, and conventional and innovative pavement markings. These options can be used alone or in conjunction with other regulatory and warning devices to regulate the flow of traffic and to prevent encroachment onto the shoulder. Recent technology has produced pavement markings that create the optical illusion of acceleration even at a constant speed, increasing attention to the driving environment.

Research on the effectiveness of conventional and innovative pavement markings is mixed with some studies demonstrating effectiveness, while others show little effect. For example, results show that during nighttime hours, chevrons can effectively move traveling vehicles away from the centerline. Further results are achieved when raised pavement markers are used. In contrast, post-mounted delineators moved the traveling vehicle toward the centerline. Research also has shown that the proper design and installation of retroreflective raised pavement markers can be an effective means of traffic control, especially during nighttime hours. Retroreflective or internally-illuminated, raised pavement markers can be used to replace markings that alert motorists or direct them to specific roadway lane usage.[23]

Design Exception Process

The *US Code of Federal Regulations, Title 23, part 625 (23 CFR 625)* details the Federal Highway Administration's (FHWA) requirements for the design, construction, and maintenance of highways. Despite the flexibility that exists in the regulations with respect to major road design features, there are situations in which the application of even the minimum criteria would result in an unacceptably high costs or major impacts on the adjacent environment. [24] For such instances, when it is appropriate, the design exception process allows for the use of criteria lower than those specified as minimum acceptable values the in the *AASHTO Green Book*.[25]

If a highway project is not part of the National Highway System (NHS), states do not need FHWA approval for design exceptions. States can request exemption from FHWA oversight under the Intermodal Surface Transportation and Efficiency Act of 1991 (ISTEA). For projects on NHS routes, the FHWA requires that all exceptions from requirements be justified and documented in some manner. Formal FHWA approval is needed for 13 specific controlling criteria outlined below.[26]

Design Criteria Exemptions Requiring Formal Approval Federal Highway Administration		
Design Speed	Lane Width	Shoulder Width
Bridge Width	Structural Capacity	Horizontal Alignment
Vertical Alignment	Grade	Stopping Sight Distance
Cross Slope	Super-elevation	Horizontal Clearance
Vertical Clearance		

Officer Visibility

Prompt identification of an officer performing his or her duties on the highway is critical. The sooner a motorist identifies the officer, the more time he or she has to react and take appropriate action. Conspicuity, as addressed by the *American National Standard for High-Visibility Safety Apparel* (ANSI/ISEA 107-1999), is enhanced by high contrast between clothing and the ambient background against which it is seen.[27] The Standard provides performance criteria for the materials to be used in high-visibility apparel, specifies minimum areas, and recommends placement of the materials. Garments that meet the Standard provide visibility in all light conditions, day or night.

Class One garments have the least amount of fluorescent and reflective trim and are recommended for parking lot attendants and sidewalk workers. Class Two material is designed for more complex weather conditions, for occupations that divert the motorist's attention away from traffic, and for traffic speeds between 25 miles per hour and 50 miles per hour. Class Three is the most visible material and is designed for workers that require visibility through the full range of body motions and traffic speeds exceeding 50 miles per hour. Law enforcement officers are encouraged to wear Class Two or Class Three garments during roadside contacts.

A number of research projects have been conducted on high visibility reflective apparel for traffic safety workers. Cornell University researchers note that the amount of time a motorist traveling 60 miles per hour needs to recognize a pedestrian and stop is approximately 260 feet. Pedestrians wearing blue or black will be seen at 55 feet, red at 80 feet, yellow at 120 feet, white at 180 feet, and reflectors at 500 feet.[28] Generally, research supports the use of contrasting fluorescent red-orange or green-yellow vests with two-inch striping of the other color (e.g., green-yellow vests with red-orange stripes).[29] Embossed silver emblems can be used to provide additional contrasts.

Consideration must be given to visibility or conspicuity of the incident and incident location. Equipment is available to signal motorists of the presence of law enforcement and emergency vehicles occupying a lane of traffic or shoulder. Lighting is one strategy and is addressed by another chapter in this report. Low-cost measures, like traffic cones, are appropriate as a temporary measure to protect the officer and incident for brief periods. Extended closure of a lane of traffic or shoulder on a high-volume, high-speed highway should follow the incident management plan adopted by the law enforcement agency.

Move-over Laws

Legislative action is one remedy states pursue to address safety for law enforcement officers and other emergency personnel working in the roadway environment. The goal of such action is to mandate appropriate and necessary precautionary measures for motorists approaching a highway incident involving stationary emergency vehicles and personnel. Typically, move-over laws specify that traffic must slow down and be prepared to stop in the presence of emergency vehicles and personnel and that motorists move over into an adjacent lane, if available. Twenty-eight states have enacted versions of a "move-over law." While the laws vary in terms of provisions and penalties, the underlying impetus is to enforce safety in such circumstances as a matter of law, not as a matter of courtesy.

The U.S. Department of Transportation and FHWA have approved provisions of a model move-over law through the National Committee on Uniform Traffic Laws and Ordinances. The 2003 Manual on Uniform Traffic Control Devices states, in part:

> An essential part of fire, rescue, spill clean-up, and enforcement activities is the proper control of road users through the traffic incident management area in order to protect responders while providing safe traffic flow. These operations might need corroborating legislative authority for the implementation and enforcement of appropriate road user regulations, parking controls, and speed zoning. It is desirable for these statutes to provide sufficient flexibility in the authority for, and implementation of, temporary traffic control to respond to the needs of changing conditions found in traffic incident management areas.[30]

Key Move-over Law Provisions Federal Highway Administration
Identifying an emergency scene, including emergency personnel, vehicles and equipment.
Authorizing emergency workers to control the scene and requiring that motorists obey their directives and refrain from interfering with the scene.
Designating that it is the driver's responsibility to slow down to a speed that is both appropriate to the scene and necessary to avoid a crash, and that it is the driver's responsibility to be prepared to stop, if needed.
Requiring that drivers, when approaching an emergency scene and/or stopped emergency vehicles, move over to occupy an adjacent lane removed from the scene, if such lane is available.
Providing for graduated penalties, ranging from $500 to $10,000.
Providing for double the normal fines for speeding and other traffic infractions.
Allowing the state to mandate driver education and provide safety education initiatives relative to the move-over law.

<u>Integrated Safety Management Process</u>

Traffic on high-speed highways poses significant safety concerns to both public and private entities. The Transportation Research Board's Integrated Safety Management Process (NCHRP Report 501), promotes broad input to address highway safety concerns.

State organizations carry out a number of independent safety initiatives that individually help to reduce injuries and fatalities on highways. Although highway safety responsibilities are divided among multiple agencies (DOT, motor vehicle administrators, state police, emergency service, etc.), most states do not have a comprehensive strategic approach. Many initiatives focus only on strategies that the particular agency is responsible for implementing and do not effectively address the entire safety problem. A coordinated, comprehensive management approach to integrating engineering, education, enforcement, and emergency service efforts is needed to more effectively address major crash problems and achieve a greater reduction of overall injuries and deaths.[31]

The following six steps "for advancing from crash data to integrated action plans" are recommended:

- Review highway safety information;
- Establish emphasis area goals;
- Develop objectives, strategies, and preliminary action plans to address the emphasis areas;
- Determine the appropriate combination of strategies for identified emphasis areas;
- Develop detailed actions plans; and
- Implement the action plans and evaluate performance.

In addition, the Transportation Research Board provides a detailed description of the roles and functions forming the organizational structure of such an integrated approach. The process is sufficiently flexible to allow individual states and jurisdictions to customize the process according to their political and organizational culture, resource constraints, and safety needs.[32]

CONCLUSIONS

The environment in which police officers fulfill their duties must safely accommodate enforcement activity. Such activity includes apprehending violators, rendering assistance to motorists, and responding to crashes and other traffic safety emergencies. An integrated approach to roadway planning, engineering, design, and construction will ensure these activities are taken into account. An environment safe for officers also promotes the consistent flow of traffic, facilitates the work of emergency responders, and serves the best overall interests of highway and traffic safety.

RECOMMENDATIONS

The following recommendations are submitted by the Highway Environment and Design Work Group to the Law Enforcement Stops and Safety Subcommittee to the Highway Safety Committee of the International Association of Chiefs of Police.

1. ***Encourage jurisdictions to adopt an integrated management approach to highway transportation and safety.***

   It is paramount that law enforcement agencies become active partners with other stakeholders in highway environment and design issues. Consideration should be given to funding incentives for jurisdictions adopting and sustaining an integrated management approach.

2. ***Encourage jurisdictions to adopt and enforce "move-over" laws.***

   Twenty two states have not passed move-over legislation to protect pedestrian officers and motorists approaching roadside incidents.

3. ***Support continued research on the role of highway design and environmental factors in police vehicle crashes.***

   Additional applied research studies are needed to better understand the relationship between highway design and environment factors and rear-end crashes involving stopped police vehicles.

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INTRODUCTION

Traffic-related activities can be life threatening events for police officers. Pedestrian officers struck by errant vehicles is the third leading cause of death for police officers, accounting for nearly 10 percent of officer fatalities annually.[1] Traffic stop policies can be the difference between life and death for officers on the road.

Identifying traffic stop "best practices" is difficult because no two traffic stops are exactly the same. Factors such as highway design, weather, lighting, traffic congestion, violation severity and violator behavior can each influence the outcome of a traffic stop. Agency policy must balance the threats posed by stopped motorists and the risks faced by an officer turned pedestrian on public roadways.

While risk assessment and incident management can reduce the likelihood of officer injury or death, no policy can, or should, dictate an officer's every action during a stop. Policy can provide general direction to the officer, but proper training and supervision are necessary to reinforce officers' decision-making during traffic stops.

FACTS BEARING ON THE PROBLEM

Limited research is available to guide the development of traffic stop policy. Crash simulation software holds promise as a way to gather data on practices such as police vehicle position and officer-vehicle approach. Visualizing traffic stop scenarios may provide policy options to minimize officer risk.

Accurate information concerning vehicle and officer placement during traffic stops is essential to evaluating their effectiveness in reducing risks. Currently, only limited data is reported by the National Highway Traffic Safety Administration's Fatality Analysis Reporting System and the Federal Bureau of Investigation's annual Law Enforcement Officers Killed and Assaulted report concerning officer deaths in traffic incidents. Detailed information about roadside locations; vehicle, highway, and officer characteristics; and the precise circumstances of reported deaths, injuries, "near misses," and property damage are currently not available. A uniform method for coding and reporting such data would facilitate interagency comparisons and provide the necessary information to support "best practices" research.

RESEARCH RESULTS

The Policy and Procedure Work Group was charged with studying collision prevention strategies and proposing the best procedures and practices for conducting safe traffic stops and other roadside contacts. This chapter reports the Group's work to identify current practices and to assess their potential to reduce the number and severity of high speed crashes involving police vehicles.

<u>Policy and Procedure Research</u>

In June 2002, the Arizona Attorney General and the Ford Motor Company assembled a Blue Ribbon Panel to review and recommend improvements to police practices employed in traffic patrol situations. To gather basic information, the panel asked the Arizona Department of Public Safety to survey law enforcement agencies and identify traffic patrol practices. Responses from 129 agencies, including 86 police departments, 30 state-level patrol/police agencies, and 13 sheriff offices were analyzed. The results indicated that practices varied widely and that differences could not be explained by type of agency alone.

Researchers found that 73.6 percent of responding agencies park their vehicles off-set left of violators' vehicles, 70.5 percent park to the rear of violators' vehicles, and 63.6 percent approach stopped vehicles on the driver side. One in five respondents (20.2 percent) reported that they angle their vehicles and nearly half (45.7 percent) turn their wheels to the left when stopped on the right shoulder. Sixty percent of respondents did not mention a minimum parking distance from a violator's vehicle. Of the agencies that mentioned a distance, responses ranged from five to 21 feet or more.[2]

POLICE PRACTICE SURVEY, 2003 Arizona Department of Public Safety
73.6% park vehicles offset left
70.5% park to the rear of the violator vehicle
45.7% turn vehicle wheels left when stopped on the right shoulder
20.2% angle police vehicle
76.7% leave both top lights and rear flashers on during the stop
63.6% approach a violator vehicle on the driver's side
58.1% issue citation while seated in the police vehicle
96.1% require driver to in violator's vehicle while officer issues citation
82.2% park police vehicle to the rear of a crash scene
65.9% use only the Ford Crown Victoria Police Interceptor for patrol purposes
86.8% mark police vehicles with reflective decals on both sides
62.8% mark police vehicles with reflective decals on the rear
92.2% equip police vehicles with top mount emergency lighting
51.2% carry at least 14 items in the trunk compartment
51.2% use the factory installed top-mount bracket to secure a spare tire
84.5% do not have special procedures for packing the vehicle trunk
45.0% mount shotguns parallel to the roof behind the officer
73.7% mount MDC/lap top computers in the center console or passenger area
37.2% mount video cameras on the windshield or ceiling
66.7% install combination metal/Plexiglas prisoner barriers in police vehicles
28.7% use prisoner restraint seats

In 2003, the California Highway Patrol completed an in-depth analysis of selected agencies' policies.[3] Freeway enforcement stop policies from 15 local police departments, five sheriff offices and five state-level agencies were analyzed to determine commonalities and differences (see Appendix A of this report). The analysis revealed discrepancies between official policy and actual practices, thus, underscoring the importance of LESS Subcommittee efforts to develop "best practices" based on research.

State-level Policies

Generally, state-level agencies stress the importance of finding a safe location to make an enforcement stop. The recommended location is influenced by environmental conditions such as terrain, traffic volume/congestion, visibility/sight distances, available protection, weather, road characteristics, and violation severity. All state-level agencies recommend stopping the police vehicle a minimum of 10 feet behind the stopped vehicle and having the violator(s) stay inside their vehicle. Officers are encouraged to avoid standing between vehicles. The role of a second officer, if any is described, is to serve as a safety backup.

While common themes appear in the state-level policies, it is apparent that applied research has not dictated their precise combination. Major differences in state policies exist in the following areas:

1. Vehicle placement and orientation (in-line versus angled), including factors such as vehicle separation distance (10 to 15 feet in California and North Carolina and 22 to 25 feet in Ohio), setting of the parking brake (recommended in Arizona, California and Ohio), alignment of the steering wheel (sharply left in California and North Carolina), and vehicle offset (left or right and by varied amounts across states);

2. Use of emergency lights (strongly discouraged in California, but mandated in Ohio, New York, and North Carolina);

3. Suspect vehicle approach (right-side approaches strongly encouraged in California, both approaches allowed in Ohio and North Carolina, and left-side approaches suggested in New York); and

4. In-vehicle citation writing (prohibited in California, strongly discouraged in Florida, and left to officer discretion in Ohio, New York, and North Carolina).

Police Departments and Sheriff Offices Policies

A similar review of traffic stop polices for police departments and sheriff offices also reveals common practices regarding stop location (safest available location), vehicle placement (rear of the stopped vehicle, up to 30 feet behind), and lighting (the configuration of emergency lights generally allowed). In most agencies, officers have wide latitude in performing traffic stops.

Computer Simulation Research

Determining an optimal police vehicle configuration for traffic stops is a complicated and challenging process because the police vehicle must serve two different, yet equally essential, functions: 1) to protect an officer from being struck by nearby traffic, and 2) to provide effective cover for an officer in the event of an assault by the stopped motorist. Crash simulation software allows police agencies to safely test and evaluate policy decisions.

What is computer simulation?

Computer simulation involves modeling the essential features of a real or proposed situation and then predicting the likely outcome by conducting experiments on the computer-generated model. In the case of police vehicle positioning, the model is based on the laws of physics and mathematical equations representative of the dynamics involved in motor vehicle collisions. Test results can be output as graphs, spreadsheets, diagrams, or animations. Police agencies can use computer simulation to predict the effectiveness of a particular traffic stop scenario and then use limited real-life testing to validate the computer-generated results.

The accuracy of a computer simulation depends primarily on the complexity of the model and the accuracy of the input data. Most of the sophisticated software available today has been tested and validated through studies by professional organizations such as the Society of Automotive Engineers. Presently, there are only two published studies involving the use of computer simulation to evaluate police vehicle configurations during traffic stops. The first study was performed by engineers at Ford Motor Company. The second was conducted by the New York State Police. The Arizona Department of Public Safety has also completed significant work with computer simulations.

Ford Motor Company Study

The Ford Motor Company study[4] demonstrated how the position of the police vehicle greatly influences the dynamics of a collision. The study examined the relationships among officer safety and variables such as police vehicle overlap, police vehicle angle, police vehicle steering angle, and police vehicle distance from the suspect vehicle. It also examined the effect of factors such as striking vehicle angle, striking vehicle weight, striking vehicle overlap, and striking vehicle velocity. Several factors, called assumptions, were held constant across all simulations.

The Ford study determined that attempting to protect officers approaching either side of the suspect vehicle compromised the protection afforded by a configuration tailored to a single-side approach. Because 63.6 percent of agencies responding to the Arizona Police Practices Survey indicated that they used left-side approaches,[5] the Ford study focused on identifying a police vehicle configuration to provide maximum protection for a left-side officer approach. The configuration most likely to prevent a pedestrian officer from being struck requires 15 feet between the police

SIMULATION ASSUMPTIONS
Suspect Vehicle
• wheels are parallel to direction of travel
• ignition switch is off (steering locked)
• left side at least one vehicle width from closest traffic lane
Striking Vehicle
• weight limited to passenger cars and light trucks
• 75 mph maximum
• no steering input during crash
Police Vehicle
• rear-wheel drive
• gear is in park
• no steering input during crash
Pedestrian Officer
• positioned 32 inches from suspect vehicle door

vehicle and violator's vehicle, parking both vehicles parallel to the roadway, off-setting the police vehicle 80 percent of its width to the left of the violator's, and turning its wheels to the right. The results were validated with an actual crash test.

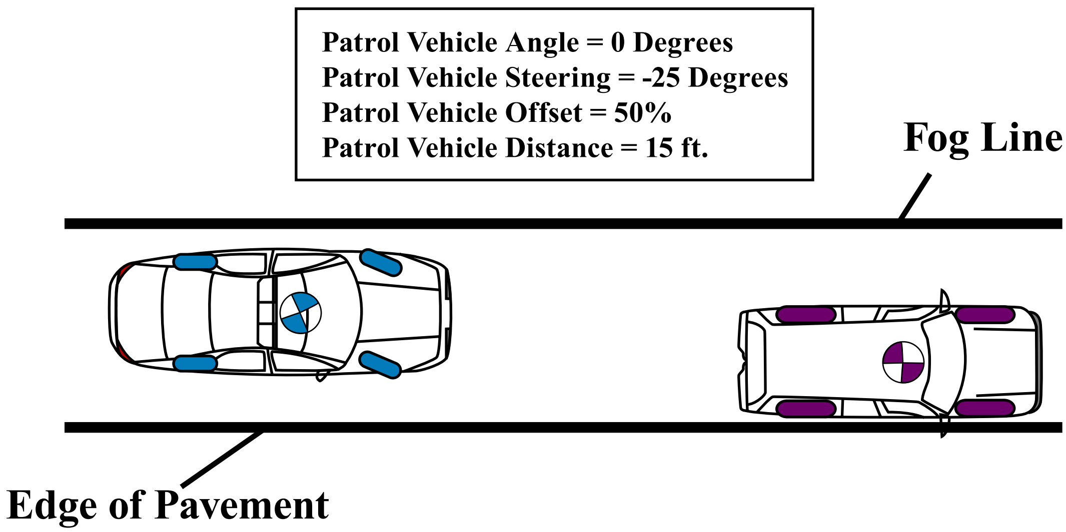
The Ford study also identified a "safe zone" for pedestrian officers on right shoulder stops. Recommended for any extended time outside the vehicle, the "safe zone" extends six feet from the police vehicle's front passenger door.

New York State Police Study

The New York State Police study [6] also examined police vehicle positioning as it relates to pedestrian officer safety during traffic stops. While many of the initial assumptions and definitions used in the Ford study were maintained, a number of significant changes were made.

The first significant difference between the studies involved environmental factors such as weather and barriers adjacent to the scene of the traffic stop. The Ford study assumed that the test pavement was dry and that there were no physical barriers, such as guide rails or curbs adjacent to the scene. The New York State Police study examined the affects of both inclement weather and adjacent barriers on police vehicle positioning. Other differences between the studies involved the assumed width of a highway shoulder, the distance the pedestrian officer was assumed to stand away from the suspect vehicle, and the right-side officer approach.

New York State Police Recommended Configuration

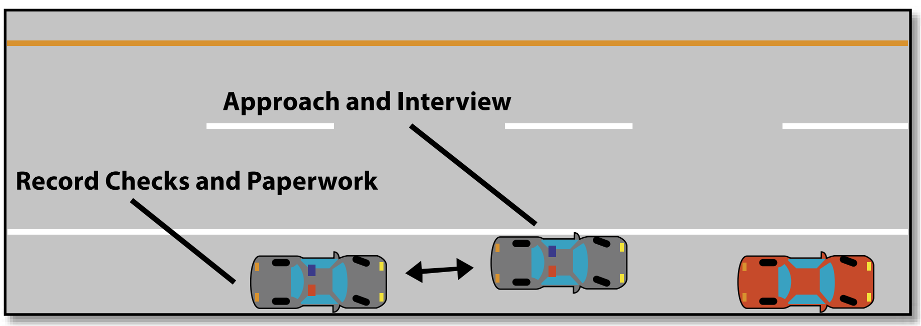


However, the most significant difference between the studies was how each assessed the relative effectiveness of police vehicle configurations. The Ford study evaluated police vehicle configurations based on their ability to prevent the pedestrian officer from being struck by a vehicle at the scene. The New York State Police study also examined instances where the pedestrian officer was struck by a vehicle and the impact velocity of the vehicle striking the officer. The impact speed was then compared with pedestrian injury data collected by the National Highway Traffic Safety Administration and the positioning of the police vehicle was evaluated based on a projected mortality rate for each police vehicle configuration tested.

Based on the mortality rates in more than 2,000 computer simulations, the New York State Police identified an optimal vehicle configuration to protect officers, shown above, very similar to the Ford recommended configuration. The angle of the police vehicle wheels steer the vehicle away from the pedestrian officer while the spacing of one car length allows enough distance for the police vehicle to track away from the pedestrian officer. The left offset and overlap between the police vehicle and the stopped vehicle provides coverage for the pedestrian officer from oncoming traffic. Orienting the police vehicle parallel to the roadway presents the smallest target for an errant vehicle yet still protects the officer.

The New York State Police study also identified police vehicle maneuvers for reducing an officer's risk while sitting inside the vehicle during a traffic stop. One such maneuver, known as "fall back," involves the officer altering the position of the police vehicle depending on whether he/she is inside or outside of the vehicle. During the initial approach and interview phase of the traffic stop, officers position their vehicle in the aforementioned configuration. Upon returning to the vehicle to complete record checks and paperwork, the officer increases the distance between the vehicles to 40 feet and laterally as far away as from the adjacent traffic lane as possible. Once the officer is ready to re-approach the driver to complete the stop, he/she repositions the vehicle to the standard configuration. While more research is needed to confirm the validity of this procedure, it appears to be a promising approach to increase officer safety.

"Fall Back" Maneuver



<u>Incorporating Traffic Stop Policies and Procedures into Training</u>

Training traditionally has focused on protecting the officer from the dangers posed by the violator. Vehicle approach methods, control of occupant(s), and use-of-force options are standard components of police academy curricula across the country. In fact, from 1993-2002, 48 percent of law enforcement officer line-of-duty fatalities are caused by felonious assaults. However, FBI data also indicates that officer deaths as a result of being struck by an errant vehicle have been rising steadily since 1991.[7] Training related to the pedestrian officer that incorporates traffic stop methods based on science and traffic incident data is at least as likely to reduce the number of deaths and injuries as assault training. Computer simulations have demonstrated that the proper positioning of the police vehicle may strategically shield the officer. Likewise, the position of the pedestrian officer with respect to the stopped vehicle can also significantly limit danger to the officer from traffic and vehicle debris, should a crash occur.[8,9]

Because each traffic stop is unique, officers must be trained to recognize the various factors and peculiarities involved in each stop. Training curricula should review factors such as: incidents of varying types (DUI stops, large-vehicle stops, two-officer squads); the environment (weather, congestion, roadway characteristics, shoulder width, speed limits); location; and time of day. Officers should be trained to balance the various risks posed by both the violator and the roadside environment in order to determine appropriate actions.

Training for new recruits is routine at police academies, but continuous training of more experienced officers may be overlooked. Officers struck by errant vehicles average 10 years of law enforcement experience and 500 traffic stops per year.[10] In-service training can help stave off complacency associated with familiar and routine tasks, and keep safety foremost. From a training standpoint, the New York State Police study advocates a multi-level approach that begins with a standard, in-line method for new recruits followed by more advanced training on situation-specific approaches for experienced officers between their second and fifth years of service. Refresher courses are recommended between officers' fifth and tenth years of service.

In addition to rigorous and continuous training on traffic stop procedures, steps must be taken to ensure that agency policies and practices are actually being followed by officers. The hazards inherent in performing a traffic stop need not be escalated by poor technique. Supervisors play a critical role in achieving officer safety by constantly reinforcing the safety message.

CONCLUSIONS

Traffic stop policies vary widely with respect to vehicle placement and orientation, use of emergency lights, and suspect vehicle approach. Officers are commonly instructed to conduct traffic stops as far away from traffic as possible, such as rest stops, service drives, private driveways or parking lots. When conditions prevent this, contact with stopped vehicles should occur as far onto the right shoulder of the road or highway as possible, farthest away from the fastest moving traffic, avoiding stops in the median and in any lane of traffic.[11,12]

Each traffic stop is unique and no single police vehicle orientation can provide uniform protection for a pedestrian officer. Further, agency policy cannot substitute for officer discretion in the conduct of a traffic stop. However, computer simulation studies by the Ford Motor Company[13] and the New York State Police[14] did identify optimal vehicle configurations to protect a pedestrian officer. The New York State Police study also identified police vehicle maneuvers for reducing officer risk while sitting inside the police vehicle during a traffic stop.

Rigorous training, retraining, and supervision are crucial to ensuring officer safety. After law enforcement agencies teach officers the fundamental procedures relative to location selection, vehicle placement and orientation, and officer position and violator approach, officers should be taught to identify and balance the various risks posed by the violator and the roadside environment. The combination of a standard vehicle configuration and ability to evaluate specific/unique circumstance will equip the officer with an improved ability to negotiate his or her way to safety during traffic stops.

RECOMMENDATIONS

The following recommendations are submitted by the Policy and Procedure Work Group of the Law Enforcement Stops and Safety Subcommittee to the Highway Safety Committee of the International Association of Chiefs of Police.

1. ***Encourage jurisdictions to adopt traffic stop policies and procedures.***

   Traffic stop policies and procedures should clearly direct the movement of officers and establish criteria for:
   - site selection;
   - distance between police and violator vehicles;
   - parking brake activation;
   - alignment of front wheels;
   - vehicle positioning;
   - fall-back maneuvers;
   - officer approach;
   - ticket writing procedures;
   - secondary police vehicles;
   - conducting field sobriety tests;
   - making arrests;
   - use of early warning equipment; and
   - merging stopped vehicles into traffic flow.

2. ***Encourage jurisdictions to adopt traffic stop training curricula.***

   Training curricula for new recruits should reflect the results of research conducted by the New York State Police and the Ford Motor Company on vehicle position: space the vehicles about 15 feet (one car length) apart; overlap the stopped vehicle 50 percent, parallel to the road; turn the steering wheel right (for a right-shoulder stop). In-service and remedial training curricula should teach officers to modify this basic vehicle configuration based on perceived risks posed by violators and passing traffic.

3. ***Encourage jurisdictions to include computer simulations as training tools.***

   Computer simulations provide an opportunity for officers to observe the advantages of changing their personal tactics for traffic stops.

4. ***Emphasize the critical role that supervisors play in officer safety.***

   Supervisory responsibilities should include identifying and correcting poor traffic stop techniques according to agency policy and conducting on-the-job training through roll-calls and critical incident debriefing.

5. ***Develop public information campaigns related to safe traffic stops.***

   Public education campaigns should provide motorists with information on moving to an adjacent travel lane in the presence of emergency vehicles and personnel and proper safety precautions when exiting and re-entering the flow of traffic, including what to do when pulled over by a police officer.

6. ***Conduct additional research using crash simulation software.***

   (a) Conduct simulations that evaluate the effects of lower speeds, curbs, and sloping sidewalks on crash outcomes.

   (b) Conduct simulations where police vehicle placement is significant, e.g., crash scenes, lane closures, and traffic control activities.

   (c) Conduct simulations that reflect local circu stances to validate current agency policy.

7. ***Develop agency-level performance measures related to traffic stop safety.***

   These measures would enable agencies to track changes over time and permit comparisons across agencies. The performance measures could be constructed based on the number of roadside crashes (categorized as urban or rural, on freeway or surface streets) and their outcomes (fatal, injury, or property crashes), either per the number of roadside contacts (both traffic enforcement and motorist assists) or the number of miles driven (excluding travel for non-police services).

8. Encourage jurisdictions to regularly submit data for inclusion in the FBI's annual Law Enforcement Officers Killed and Assaulted report.

More complete reporting from law enforcement agencies would improve the quality of information available to the research community.

9. Improve the crash data pertaining to officer-involved vehicle crashes with a) special data collection efforts in the form of sponsored research and demonstration projects, and b) enhancements to current FBI and NHTSA databases, including the collection of more detailed crash data, such as:

- Incident outcomes – death, injury, or near miss;
- Incident locations – urban or rural; work zone or accident scene; shoulder, intersection, or traffic lane;
- Incident times – categorized by light conditions (day or night);
- Incident circumstances – enforcement stop, motorist assist, DUI checkpoint;
- Roadside characteristics – rumble strips, near entrance/exit ramp, crossover;
- Vehicle orientation – angled or straight, wheels angled or straight, parking brake on or off;
- Officer's activity – approaching violator, getting violator information, returning to police vehicle;
- Officer's positioning – right side, left side, between vehicles; and
- Officer's years of service.

10. Promote further evaluation of police polices and practices that effect positive outcomes.

Continue to review "best practices" and evaluate their effectiveness in improving crash outcomes involving officers.

Endnotes

[1] Federal Bureau of Investigation. (2003). Law enforcement officers killed and assaulted, 2002. Washington, D. C. Retrieved from http://www.fbi.gov/ucr/ucr.htm.

[2] Arizona Department of Public Safety Research and Planning. (2003). Police practices survey: Final report. Retrieved from http://www.dps.state.az.us/operations/policepractices.asp.

[3] California Highway Patrol. (2004). Safe traffic stops: A vision for improved police officer roadway safety. Unpublished manuscript.

[4] Chen, R., Geraghty, B., Nichols, G., & Ridenour, J., Jr. (2003). Police vehicle orientation during traffics stops: Protecting pedestrian officers from adjacent traffic. (SAE Technical Paper Series No. 2003-01-0886).

[5] Arizona Department of Public Safety Research and Planning

[6] Hunt, J. (2003). Safe stops: An analysis of collisions, practices, and patrol vehicle positioning during traffic stops. New York State Police.

[7] Federal Bureau of Investigation.

[8] Chen, Geraghty, Nichols, & Ridenour Jr.

[9] Hunt.

[10] Ford Motor Company. (2003). Crown Victoria Police Interceptor presentation: Making a safe car safer. Retrieved from http://www.cvpi.com/pdfs/PoliceOfficerSafetyActionPlan.pdf

[11] Arizona Department of Public Safety Research and Planning.

[12] California Highway Patrol.

[13] Chen, Geraghty, Nichols, & Ridenour Jr.

[14] Hunt.

APPENDIX A

Table A

Summary of Policies for Highway Patrols and State Police Agencies

	CALIFORNIA HIGHWAY PATROL (HPM 70.6 CHAP. 3, 13; HPG 70.14 CHAP. 5)	FLORIDA HIGHWAY PATROL (POLICY 17.22)	OHIO STATE HIGHWAY PATROL (41.2.01/41.2.02/41.3.01/41.3.03/41.3.08/61.1.06/ 61.1.07/61.1.08)41.3.03/41.3.08/61.1.06/ 61.1.07/61.1.08)41.3.03/41.3.08/61.1.06/ 61.1.07/61.1.08)	NEW YORK STATE POLICE (FIELD MANUAL – ARTICLES 30, 42A; REVISIONS CURRENTLY UNDER CONSIDERATION)	NORTH CAROLINA STATE HIGHWAY PATROL (TRAINING MATERIAL)
1) WHERE TO STOP:	Safe location; as far off roadway as possible; right shoulder strongly encouraged; off freeway if possible; "safe" locations (adequate sight distance, shoulder width, etc.); avoid restricted shoulders and heavy congestion; don't impact traffic flow.	Trooper discretion considering violation severity, weather, occupant characteristics, road characteristics.	Safe location for officer and violator.	If possible, location that allows maximum visibility of patrol car and emergency lighting; with as few escape routes as possible; where there is sufficient room off the roadway for both patrol car and stopped vehicle; at night, area that is well lighted. Avoid hazardous areas (curves, hill crests, and intersections).	Location should consider traffic congestion, visibility, pedestrians, road conditions, terrain, and escape routes. Officers encouraged to "be patient" when selecting a stop location to ensure safety.
2) VEHICLE PLACEMENT:	To rear of violator unless unusual circumstances; 10-15 ft separation (10 ft desired min.); "slight" offset left; steering wheel max left; parking brake recommended.	Shall be to rear.	Should be 22-25 feet behind; offset 1.5-2 feet to left when possible; front wheels straight ahead; set emergency brake.	If possible, park patrol car about 12 ft. behind stopped vehicle and approximately 3 ft. to the left. Recommend parking off the roadway to avoid obstructing the flow of traffic.	Should park 10-15 feet in back of violator. Patrol vehicle may be offset 3 feet to the left or right, depending on environmental conditions. Front wheels should be turned sharply to the left.
3) LIGHTING:	After stop, flashing lights strongly discouraged.	Trooper shall consider circumstances when deciding to leave emergency lights on.	Emergency lights should be used at all times; trunk lid lights come on automatically when trunk is open.	Keep emergency lights on except wig-wag. Illuminate the stopped vehicle with headlights, spotlight and takedown lights whenever necessary.	Leave emergency lights on. During night time stops, officers should use all available equipment to illuminate the suspect vehicle.
4) OFFICER APPROACH AND ORIENTATION:	Right side (i.e., off traffic) strongly encouraged, especially strongly on freeways; should consider circling patrol car on approach; after initial contact move to A pillar or square up at door. If left approach, make initial contact at trailing edge of door, move to A pillar.		Both are included in training material; advantages of right side approach are emphasized.	Stand behind the driver's doorpost area (implied left side approach). Do not walk between vehicles.	Both included in training material with advantages and disadvantages. Special suggestions for motorcycles, big rigs, and multiple occupants. Sidestep approach; never beyond rearmost passenger.

Table A

Summary of Policies for Highway Patrols and State Police Agencies

	CALIFORNIA HIGHWAY PATROL (HPM 70.6 CHAP. 3, 13; HPG 70.14 CHAP. 5)	FLORIDA HIGHWAY PATROL (POLICY 17.22)	OHIO STATE HIGHWAY PATROL (41.2.01/41.2.02/ 41.3.01/41.3.03/ 41.3.08/61.1.06/ 61.1.07/61.1.08)41.3 .03/41.3.08/61.1.06/ 61.1.07/61.1.08)41.3 .03/41.3.08/61.1.06/ 61.1.07/61.1.08)	NEW YORK STATE POLICE (FIELD MANUAL – ARTICLES 30, 42A; REVISIONS CURRENTLY UNDER CONSIDERATION)	NORTH CAROLINA STATE HIGHWAY PATROL (TRAINING MATERIAL)
5) OFFICER/ MOTORIST INTERACTION:	Motorist in own vehicle; officer at passenger window; never stand between vehicles.	May permit individuals in patrol car; never in motorist's car.		Driver and passengers to stay in their vehicle.	Do not stand between vehicles. May permit individuals in patrol car but recommend against.
6) OFFICER PAPERWORK:	Officer prohibited from being in vehicle while writing citation unless for safety reason.	Should not be in vehicle except in extreme weather.	Officer discretion.	Officer discretion. Motorist not permitted to sit in patrol car while a ticket is being issued.	Officer discretion (benefits and drawbacks listed) for driver and passenger side of patrol vehicle.
7) DUI CHECKS:	In front of violator's vehicle suggested but officer discretion often results in testing on the off-traffic side of vehicles.		Encourages sobriety testing in view of camera and selecting location based on officer safety considerations; prohibits testing between vehicles.	"Give standardized field sobriety tests outdoors, in an area suitable for standing or walking. At night, select a safe location with good visibility."	Don't stand with back towards traffic or stand directly between vehicles.
8) TWO OFFICER UNITS:	For two officer units: both are encouraged to make the approach but typically 1 officer will remain outside patrol car and behind headlights.			2nd member may either approach the violator or remain in the patrol car. Usually 2nd member is positioned on passenger side of violator vehicle.	2nd officer's focus is safety.

Table B

Summary of Policies for Police Departments and Sheriff Offices

	DAYTON POLICE DEPARTMENT (General Order 3.02-02)	CITY OF MANSFIELD, DIVISION OF POLICE (Division Directive 13.016)	NEWPORT NEWS POLICE DEPARTMENT (Operations Manual)	SPRINGFIELD POLICE DEPARTMENT (General Order, Directive 01-055)	LICKING COUNTY SHERIFF'S OFFICE (Directive 61.1.7-61.1.8)	CRIMINAL JUSTICE INSTITUTE'S MODEL FOR SHERIFFS OFFICES
1) WHERE TO STOP:	Officer safety is most important element of traffic stops. Conditions of roadway, the urgency to stop violator (DUI), and existing volume of traffic may impact stop procedures.	Choose stop location that affords maximum protection from sudden assault and protection from other traffic on the roadway.	Locate safest available location to stop the vehicle.	Location chosen carefully and provide ample space and sufficient light. Avoid stops in congested areas, over/ under-passes, and intersections	Location of stop should be chosen to avoid hill-tops, curves and intersections. A stop area should provide some cover.	Officer should be familiar with area, and anticipate appropriate location to stop the violator (consideration of space, lighting should be given; avoid stops on hills, intersections, private driveways, etc.)
2) VEHICLE PLACEMENT:	Position patrol vehicle approx. 20' behind the violator's vehicle. During daylight patrol vehicle should be positioned at slight angle with left front offset 2' to the left of the violator's vehicle and the right rear is near the curb; during night stops the patrol vehicle should be positioned directly behind and offset approx. 3' to the left of the violator's vehicle.		Maintain a "reasonable distance" between the vehicle and the patrol vehicle. When possible, position the patrol vehicle behind and slightly to the left of the stopped vehicle.	Position patrol vehicle behind the violator's vehicle and offset 2 or 3' to the left.	Park patrol vehicle 20' to 30' from the stopped motorist and at a 20 to 30 degree angle with front tires turned sharply towards the roadway (left).	Position patrol vehicle approx. one-half to one car length behind the violator's vehicle. Patrol vehicle should be positioned to offer officer some protection from oncoming traffic. Position should be 2' outside and to the left of the violator's vehicle.

Table B

Summary of Policies for Police Departments and Sheriff Offices

	DAYTON POLICE DEPARTMENT (General Order 3.02-02)	CITY OF MANSFIELD, DIVISION OF POLICE (Division Directive 13.016)	NEWPORT NEWS POLICE DEPARTMENT (Operations Manual)	SPRINGFIELD POLICE DEPARTMENT (General Order, Directive 01-055)	LICKING COUNTY SHERIFF'S OFFICE (Directive 61.1.7-61.1.8)	CRIMINAL JUSTICE INSTITUTE'S MODEL FOR SHERIFFS OFFICES
3) LIGHTING:	Emergency lights will be used when assisting motorists stopped in hazardous locations and when patrol vehicle is stopped on roadway. Floodlights/takedown lights may be used during a traffic stop to obtain better illumination of an area or to provide additional lighting at traffic scene. When patrol vehicle parked along roadway at night, should consider using hazard warning lights.	For felony vehicle stops, adjust headlights/spotlights to focus on violator's vehicle interior.	Direct the unit's auxiliary lights (spotlight, take down lights, alley lights) as applicable.	Spotlight and/or high beam headlights may be used to illuminate the interior of the violator's vehicle. Utilize care when using these lights so that other drivers are not blinded by these lights.	Red, blue and hazard lights remain on during stops. Use rear alternating red/blue flashers and hazard lights when checking abandoned vehicles, minor parking violations, low traffic subdivisions and township roads. Spotlight or takedown lights should only be used as protection of officer when hazardous conditions exist.	At night after stop, head lights should be on low beam for safety of oncoming traffic; use emergency bar lights and flasher lights.

Table B

Summary of Policies for Police Departments and Sheriff Offices

	DAYTON POLICE DEPARTMENT (General Order 3.02-02)	CITY OF MANSFIELD, DIVISION OF POLICE (Division Directive 13.016)	NEWPORT NEWS POLICE DEPARTMENT (Operations Manual)	SPRINGFIELD POLICE DEPARTMENT (General Order, Directive 01-055)	LICKING COUNTY SHERIFF'S OFFICE (Directive 61.1.7-61.1.8)	CRIMINAL JUSTICE INSTITUTE'S MODEL FOR SHERIFFS OFFICES
4) OFFICER APPROACH AND ORIENTATION:	Approach rear of violator's vehicle, stopping at a point to the rear of the trailing edge of the front door if occupants are only in the front seat; right side approach is acceptable option when passing traffic is so close to constitute danger to the officer. For high risk stops, can order occupants back to officer.			Officer normally approaches the violator's vehicle from the driver's side. Officers may at their discretion approach the violator's vehicle from the passenger's side for safety reasons.	Observe violator's vehicle and occupants for about 30 seconds before exiting the patrol vehicle. Deputy should stand as close to the vehicle as possible and to the rear of the driver's door.	The officer should approach from the rear of violator's vehicle, looking into the rear seat area, and stop at a point to the rear of the trailing edge of the left front door.
5) OFFICER/ MOTORIST INTERACTION:			Request that all occupants remain in the vehicle unless directed to do otherwise.	Generally request that driver and/or passenger(s) remain in the violator's vehicle. While speaking with violator, officer should stand as close as possible to vehicle and to the rear of driver.	Deputy should stand as close to the vehicle as possible and to the rear of the driver's door.	
6) OFFICER PAPERWORK:	A violator is not permitted to stand by patrol vehicle while citation is being completed. Officer completes forms for enforcement action away from violator when violator is allowed to remain in his/her vehicle.			Officers will not permit the violator to enter the patrol vehicle while the officer completes necessary paperwork, unless a custodial arrest is being made.	When deputy returns to patrol vehicle, it is suggested that he or she places his/her clipboard on the steering when completing paperwork, so that he or she can continue to observe the vehicle and its occupants.	

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7) DUI CHECKS:	Select an area of level ground, free of debris, to administer the tests.			No standing with back towards traffic or standing directly between vehicles.		
8) TWO OFFICER UNITS:						Passenger officer should be responsible for all radio communication, writing notes and messages relayed from communication center. During traffic stop passenger officer should exit from vehicle and act as observer and cover for officer. At no time should two officers approach violator together.

INTERNATIONAL ASSOCIATION OF CHIEFS OF POLICE

RESOLUTION

Adopted at the 110th Annual Conference
Philadelphia, Pennsylvania
October 24, 2003

Aggressive Traffic Enforcement for Law Enforcement Officer Survival

Submitted by the Highway Safety Committee
AHS009.a03

WHEREAS, public safety is the highest priority of the U.S. Department of Transportation, Transport Canada, and law enforcement agencies; and

WHEREAS, alcohol-related and speed-related fatalities for all persons continue to be a concern; and

WHEREAS, the deaths of law enforcement officers in crashes caused by impaired drivers and involving speed have increased significantly; now, therefore, be it

RESOLVED, that law enforcement executives ensure their agencies adopt and employ traffic enforcement policies that emphasize strict enforcement in these areas, not only for public safety, but also for police officer survival.

International Association Of Chiefs Of Police

RESOLUTION

Adopted at the 110th Annual Conference
Philadelphia, Pennsylvania
October 24, 2003

Construction of Highways/Roadways that Consider the Safety of Law Enforcement Officers and Other Emergency Responders

Submitted by the Highway Safety Committee
AHS005.a03

WHEREAS, traffic enforcement is necessary to ensure the safe and efficient movement of people, vehicles, and goods along the streets, roadways and highways of the United States and Canada; and

WHEREAS, commercial vehicle inspection and enforcement are necessary to ensure the safe and efficient movement of goods along the streets, roadways and highways of the United States and Canada, as well as the protection of the surface transportation infrastructure; and

WHEREAS, traffic crashes and other highway incidents require response and investigation by law enforcement officers and other emergency responders; and

WHEREAS, streets, roadways and highways have not been engineered for the safety of law enforcement officers and other emergency responders while they are conducting crash investigations, commercial vehicle inspection and enforcement, traffic enforcement; or responding to other highway incidents; and

WHEREAS, law enforcement officers are exposed to significant dangers during traffic and commercial vehicle enforcement activities, during commercial vehicle inspections, during crash investigations, and during other highway incidents; now, therefore, be it

RESOLVED, that the Federal Highway Administration (FHWA), Transport Canada, the Federal Motor Carrier Safety Administration (FMCSA), and the National Highway Traffic Safety Administration (NHTSA) include the aforementioned factors and consider, as well, pullover/safety lanes and observation and enforcement platforms when they create standards for the construction of streets, roadways and highways; and be it

FURTHER RESOLVED, that the safety of law enforcement officers and other emergency responders while they are performing their responsibilities on streets, roadways and highways become an integral part of, and a major priority during, the strategic planning process, as well as the comprehensive safety strategies of the FHWA, Transport Canada, FMCSA and NHTSA; and be it

FURTHER RESOLVED, that this priority be relayed to the American Association of State Highway Transportation Officials (AASHTO), the American Association of Motor Vehicle Administrators (AAMVA), the Governors' Highway Safety Association (GHSA), the Commercial Vehicle Safety Alliance (CVSA), and other related organizations.

RESOLUTION

Adopted at the 110th Annual Conference
Philadelphia, Pennsylvania
October 24, 2003

Increasing Data Collection on Law Enforcement Officers Killed in the Line of Duty in Motor Vehicle Crashes

Submitted by the Highway Safety Committee
AHS006.a03

WHEREAS, the Federal Bureau of Investigation (FBI) collects data on law enforcement officers killed in the line of duty; and

WHEREAS, a significant number of law enforcement officers are killed each year during motor vehicle crashes; and

WHEREAS, the data collected on these types of deaths is insufficient for a comprehensive analysis and subsequent review of policies and procedures; now, therefore, be it

RESOLVED, that the FBI, after collaboration with the IACP's Highway Safety Committee and the National Highway Traffic Safety Administration (NHTSA), collect additional data concerning the deaths of law enforcement officers involved in roadside traffic and commercial vehicle enforcement, commercial vehicle inspections, and other highway incidents; and be it

FURTHER RESOLVED, that the collected data be analyzed by NHTSA or its contractee; and be it

FURTHER RESOLVED, that the data analysis be provided to the IACP's Highway Safety Committee for consideration in revising the *Manual of Police Traffic Services Policies and Procedures*, the *Highway Safety Desk Book*, and the *Traffic Safety Strategies for Law Enforcement Executives*.

INTERNATIONAL ASSOCIATION OF CHIEFS OF POLICE

RESOLUTION

Adopted at the 110th Annual Conference
Philadelphia, Pennsylvania
October 24, 2003

Manufacturers of Equipment/Accessories Cooperating in Safety Studies, Evaluations, and Information Dissemination

Submitted by the Highway Safety Committee
AHS007.a03

WHEREAS, law enforcement agencies rely upon motor vehicles as a primary means to manage traffic, to enforce traffic laws, to respond to calls for service, and to protect incident scenes; and

WHEREAS, each law enforcement jurisdiction reflects its ownership and equips its vehicles using varying schemes; and

WHEREAS, law enforcement officers rely upon the safety of their issued equipment, as well as upon the use of designated emergency vehicles, to fulfill professionally their sworn responsibilities; and

WHEREAS, officer safety and the safety of the motoring public are dependent upon the identification and proper equipping of emergency vehicles; and

WHEREAS, "the manufacturers of equipment/accessories used to enhance the safety and visibility of law enforcement and other emergency vehicles" (hereinafter referred to simply as "the manufacturers") have the expertise, equipment, and research facilities to conduct safety testing, studies and evaluations of their own product(s), both alone and in conjunction with other products and with law enforcement vehicles; and

WHEREAS, the manufacturers have an ethical responsibility to ensure the mounting, installation and/or storage of their equipment/accessories do not compromise the safety components or the electrical systems integral to law enforcement vehicles; now, therefore, be it

RESOLVED, that the manufacturers be called upon to conduct safety testing, studies and evaluations of their product(s), both alone and in conjunction with other products; and be it

FURTHER RESOLVED, that testing of law enforcement vehicles include crash testing at speeds up to, and including, 75 miles per hour; and be it

FURTHER RESOLVED, that the manufacturers work in conjunction with the producers of law enforcement vehicles to ensure the safety components integral to the vehicles are not compromised; and be it

FURTHER RESOLVED, that the manufacturers provide to fleet managers, law enforcement executives/agencies, and the IACP information and/or templates concerning the safe mounting, installation and/or storage of their equipment/accessories in or on law enforcement vehicles; and be it

FURTHER RESOLVED, that if the mounting, installation and/or storage of equipment/accessories could compromise the safety features of law enforcement vehicles, this information also shall be provided to fleet managers, law enforcement agencies/executives, and the IACP; and be it

FURTHER RESOLVED, that the manufacturers be called upon to cooperate with the IACP's Highway Safety Committee and the National Highway Traffic Safety Administration (NHTSA) in any study(ies) relevant to the establishment of standards, guidelines and/or best practices addressing subject areas such as, but not limited to, emergency vehicle lighting, reflectivity and reflective markings, basic equipment mounting, equipment storage and the emergency vehicle's overall basic safety features.

FURTHER RESOLVED, that the IACP, in conjunction with the National Highway Traffic Safety Administration (NHTSA), shall cause the formation of a national study panel to propose the adoption of national standards addressing emergency vehicle lighting, reflectivity, basic equipment mounting, equipment storage, and the emergency vehicle's overall basic safety features, including crash resistance.