

Effective Strategies for Motorcycle Stops



U.S. Department of Transportation
**National Highway Traffic Safety
Administration**

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Table of Contents

I. Executive Summary	1
II. Introduction	3
III. Methodology	5
IV. Understanding the Problem	6
V. Strategies for Safe Motorcycle Traffic Stops	8
A. Planning the Stop and Stopping the Vehicle	8
B. Approaching the Motorcyclist and Managing the Interaction	12
C. Conducting Activities After the Stop	14
VI. Strategies for Reducing the Likelihood of High-Speed Pursuits	15
A. Predicting the Likelihood That a Motorcyclist Will Flee	15
B. Planning the Stop and Stopping the Vehicle	16
C. Approaching the Vehicle and Managing the Interaction	17
VII. Promising Practices in Effective Motorcycle Traffic Stop Training	18
A. Potential Modules/Topics	18
B. Critical Success Factors	23
C. Medium or Mix of Media	24
D. Potential Challenges to Consider During Planning and Implementation	25
VIII. Other Recommendations	26
IX. Acknowledgments	27
X. References	30

I. Executive Summary

The National Highway Traffic Safety Administration has identified the need to provide the law enforcement community with guidance regarding the safe conduct of motorcycle traffic stops. This document describes promising practices for safely and effectively conducting traffic stops of motorcyclists, effective officer safety strategies and techniques, as well as strategies and techniques for reducing high-speed pursuits involving motorcycles. These techniques are not purported to eliminate high-speed pursuits, but are intended to help reduce the likelihood that a pursuit will result from a motorcycle traffic stop, and to maximize the safety of all involved. Promising practices for training law enforcement officers in the safe conduct of motorcycle traffic stops are also provided.

This guidance document is designed for law enforcement executives, planners and policy makers, curriculum designers, trainers, supervisory staff, and law enforcement officers at all levels of experience who are responsible for conducting traffic stops in the course of their duties. The primary intent of this document is to assist law enforcement officers in safely conducting motorcycle traffic stops and issuing citations when violations are observed. The suggestions offered are intended to raise awareness of various risks associated with motorcycle traffic stops, as well as to identify strategies and techniques that can help law enforcement officers manage, mitigate, or avoid these risks. The recommendations contained herein are not formulaic and are not intended to supersede or replace the use of discretion and professional judgment of the law enforcement officer or individual agency policy.

The development of this document was supported by a three-phase research study. A systematic review of the existing academic and professional literature was completed, and requests for information were posted on relevant listservs. Next, a comprehensive review was conducted at the State level. This review included interviews with identified experts, including law enforcement officers, and reviews of relevant Web sites. Finally, the information gathered was presented to a panel of subject matter experts. The members of this panel were asked to validate and rank the importance of these findings and to identify any gaps in the information gathered.

Law enforcement officers are advised to observe and analyze a variety of behaviors and characteristics of motorcycles and motorcyclists before signaling their intent to initiate a

stop. Variables to consider when planning safe and effective stops include the nature of the violation observed; geographic features of the location, presence of NHTSA impaired riding cues, and the availability of backup. When initiating a stop, law enforcement officers are advised to select a safe and appropriate site when possible. Desirable characteristics of sites for conducting stops include: (1) a site removed from the flow of traffic; (2) an area that provides good visibility for the law enforcement officer and for passing motorists; (3) adequate space to allow proper positioning of the patrol vehicle and sufficient distance from the motorcyclist; (4) an area that allows the law enforcement officer and the motorcyclist to get a safe distance from the road; (5) a level, solid surface; and (6) an area with sufficient lighting when needed for nighttime stops.

Law enforcement officers are well aware of the importance of maintaining situational awareness, and this is critical when approaching the motorcyclist and managing the interaction during the traffic stop. Law enforcement officers are also advised to be aware of communication challenges specific to motorcyclists. Motorcyclists may have difficulty hearing the law enforcement officer's instructions due to their helmets, the aftereffects of "road noise," or because they are using earplugs or listening devices. Strategies for managing the special challenges of traffic stops involving groups of motorcyclists and for managing towing and impoundment of motorcycles are also discussed.

Guidance for training law enforcement officers in the safe conduct of motorcycle traffic stops includes recommendations to utilize a mix of classroom and field training, role-playing using realistic scenarios, and in-service training such as roll-call DVDs. Some of the recommended topics or modules include understanding rider orientation and behaviors, gathering motorcycle and rider information before the stop, and identification of impaired riders.

Critical success factors for motorcycle traffic stop training are also identified. These factors are:

- (1) providing a practical basis for the training;
- (2) ensuring the credibility of the trainer and the training material;
- (3) incorporating realistic scenarios and role-playing;

- (4) focusing on safety;
- (5) emphasizing the law enforcement officer's judgment and common sense;
- (6) stressing methods of effective communication;
- (7) obtaining agency and leadership commitment;
- (8) incorporating training aids and job aids;
- (9) demonstrating alignment with the job description and mission; and
- (10) including and addressing local issues and local situations.

II. Introduction

Motorcycles are becoming a greater concern for U.S. law enforcement agencies. The number of motorcycles on U.S. roads has increased, as has the size, horsepower, and speed of these motorcycles. As the number of motorcycles increases, there is a perception among many in the law enforcement community that motorcycle riders may be less likely to stop upon request. Similarly, there is a perception that motorcycles are also more likely to become engaged in high-speed pursuits than passenger vehicles. Motorcycle traffic stops are a challenging situation for law enforcement officers and an increasing concern for law enforcement.

The National Highway Traffic Safety Administration has identified the need to provide the law enforcement community with guidance regarding the safe conduct of motorcycle traffic stops, as well as strategies and techniques for reducing the likelihood that a high-speed pursuit will occur during the conduct of a motorcycle traffic stop. This guidance document is designed for law enforcement executives, planners and policy makers, curriculum designers, trainers, supervisory staff, and law enforcement officers of all levels of experience who are responsible for conducting motorcycle traffic stops in the course of their duties.

This document identifies promising practices for safely and effectively conducting traffic stops of motorcycles, officer safety strategies and techniques for motorcycle traffic stops, and strategies and techniques for reducing high-speed pursuits involving motorcycles. While these techniques do not purport to eliminate high-speed pursuits, they are intended to minimize the likelihood that a motorcyclist will flee, and to

provide strategies to maximize the safety of all involved should the motorcyclist attempt to flee. This document also identifies and discusses risks and recommends strategies and techniques to avoid or mitigate those risks; the intent is to assist law enforcement officers in safely conducting motorcycle traffic stops and issuing citations when a violation is observed. Finally, this document provides promising practices for training law enforcement officers in the safe conduct of motorcycle traffic stops.

III. Methodology

The research that supported the development of this guidance document was conducted in a series of three progressive phases, with each stage building on the preceding phases:

- First, a literature review was conducted to locate existing print-based information related to motorcycle traffic stops. Twenty-two academic databases on a wide range of subject areas were searched. Requests for information were posted to 7 listservs to seek relevant material. In addition, the NHTSA regional offices and three subject matter experts were consulted to gather additional information. All identified information was reviewed and summarized in a final literature review.
- Next, a 50-State review was undertaken to collect relevant information from law enforcement officers and others working on motorcycle traffic stops. Feedback and insight were gathered from around the country, and several States' Web sites were reviewed for additional information. A series of 10 case studies was developed to highlight current issues related to motorcycle traffic stops.
- Finally, findings from the literature review and the case studies were combined to create a comprehensive overview of existing tactical and training applications. A panel consisting of a diverse set of law enforcement experts was formed to review this information and to identify gaps in the findings. Panelists helped to rank and categorize findings, which included identifying materials that should or should not be included in the final guide.

The collective results from all three phases of research were used to inform the content of this guide.

IV. Understanding the Problem

NHTSA has developed this guidance document at a time when the number of motorcycles on U.S. roads is increasing, motorcycles are becoming more powerful, and the average age of riders is decreasing. Additionally, motorcycle crash rates far outpace those of passenger vehicles (NHTSA, 2010). Together, these changes are creating increasingly challenging situations for law enforcement officers seeking to engage in safe motorcycle traffic stops. This section provides an overview of current statistics related to motorcycles in the United States and emphasizes why it is important to focus on conducting safe motorcycle traffic stops.

Motorcycling is becoming more popular in the United States. In 2008, there were almost 8 million motorcycles registered in the United States, representing about 5 percent of all personal vehicles, and the number continues to grow (Federal Highway Administration, 2009). While the number of motorcycles on the roads overall is increasing, the highest increase is in the number of registered supersport motorcycles (Goodwin, Thomas, Hall, & Tucker, 2011). These motorcycles are built on a racing frame and can reach speeds of nearly 190 mph.

As the number and type of motorcycles on the roads is changing, the demographic of motorcycle riders is also changing. The average age of motorcycle riders is decreasing (Motorcycle Industry Council, 2009), with younger riders (those under 30) being especially likely to own supersport motorcycles (Governors Highway Safety Association, 2007). This may be indicative of a trend toward less experienced motorcyclists riding more powerful motorcycles. Another significant change relates to the gender of riders: 1 in 10 riders is now female (Motorcycle Industry Council, 2009).

Motorcycle riders, as a group, engage in several high-risk behaviors. Many report engaging in behaviors such as speeding (Mannering & Grodsky, 1995; Jamson, Chorlton, & Conner, 2005), and many riders are not properly licensed (NHTSA, 2009b). Motorcycle riders involved in fatal crashes are also more likely to have consumed alcohol (NHTSA, 2009b). Additionally, only 67 percent of riders wear helmets (Pickrell & Ye, 2009).

Relative to other motorists, motorcyclists are at a higher risk for crashes and fatalities. According to NHTSA, motorcyclists were about 37 times more likely than passenger car occupants to die in motor vehicle traffic crashes and 9 times more likely to be injured (NCSA, 2009). Riders of supersport motorcycles have driver death rates four times higher than those of cruiser/standard motorcycle riders, putting them at even greater risk (Teoh & Campbell, 2010).

These high crash and fatality rates may be at least partly related to the high-risk behaviors identified earlier. Compared with a passenger car driver in a fatal crash, a motorcycle rider in fatal crashes is more likely to have been speeding at the time of the crash (35% versus 23%), riding with an invalid license (25% versus 12%), have a previous license suspension or revocation (18% versus 13%), have a high blood alcohol concentration (BAC) (29% versus 23%), and have a previous conviction for driving while intoxicated (DWI) (4% versus 3%) (NHTSA, 2009b). A recent survey of riders found that about a fifth reported having ridden within two hours of consuming alcohol in the past two years (McCartt, Blonar, Teoh, & Strouse, 2010).

These statistics indicate that traffic safety issues related to motorcycles are becoming more commonplace. Therefore, to assist the law enforcement community in addressing these challenges, the focus of the remainder of this document is to provide strategies and techniques for approaching motorcycle traffic stops and best practices for training law enforcement officers in the conduct of these stops.

V. Strategies for Safe Motorcycle Traffic Stops

Safety is the primary consideration for any law enforcement officer conducting a motorcycle traffic stop. This section provides guidance about how to safely conduct a traffic stop of a motorcyclist. It is important to note that the strategies and techniques recommended here are not intended as a substitute for the discretion and best judgment of the law enforcement officer. The circumstances surrounding each motorcycle traffic stop are unique and therefore cannot be adequately addressed with prescriptive procedures. Rather, these recommendations are intended to assist law enforcement officers by raising awareness of a variety of risks associated with motorcycle traffic stops, as well as strategies and techniques to use in managing those risks. These recommendations are not formulaic and should be adapted to fit the unique circumstances of each traffic stop.

For the purposes of this guidance, a motorcycle traffic stop is divided into three phases:

- Planning the stop and stopping the vehicle;
- Approaching the motorcyclist and managing the interaction; and
- Conducting activities that occur after the stop.

Strategies and recommendations are provided for each phase of the stop.

A. Planning the Stop and Stopping the Vehicle

The first major decision point that the law enforcement officer faces is whether to initiate a traffic stop. As with all traffic violations, the law enforcement officer must have a valid reason to conduct the stop. Helmet or equipment violations, such as wearing a helmet that does not meet State requirements, may be a reason to conduct a stop of a motorcycle.

Once a violation has been observed and the law enforcement officer makes a decision to conduct the stop, many law enforcement officers quickly observe and analyze a variety of behaviors or characteristics of the motorcyclist and motorcycle before signaling their intent to the rider. Closely observing and evaluating the rider's operational behaviors can provide important clues regarding the rider's skill and experience, and may help the law enforcement officer to predict the motorcyclist's likely behavior during the stop. For example, skilled riders often display more head and eye movement as they constantly scan and evaluate the flow of traffic.

Because of the possibility that the motorcyclist may attempt to elude the law enforcement officer, taking the time to gather information about the motorcycle and the rider prior to initiating the traffic stop is critically important. Taking note of identifying

information about the motorcycle, as well as the rider's equipment and apparel, may prove useful in identifying both the rider and the motorcycle at a later time if necessary. Factors to consider include the following:

- *Nature of the violation.* The type of violation observed may be predictive of the behavior and reactions of the motorcyclist during the traffic stop. For example, motorcyclists who are observed riding very aggressively may present more management challenges during the traffic stop. A motorcyclist traveling at 10 mph over the speed limit may not provide the same type of challenges as a motorcyclist traveling at 40 mph over the speed limit. The seriousness of the violation and the potential consequences of that violation may also be predictive of the motorcyclist's behavior during the traffic stop. Stops made because of suspicion that the driver is impaired should be considered higher risk.
- *Geographic location.* The geographic area in which the traffic stop will occur is an important factor to consider. At times the law enforcement officer may elect not to conduct the stop because of the geographic location. Hills, curves, and narrow shoulders are all locations that are less desirable for traffic stops of all vehicle types. As the motorcycle rider is especially exposed to passing traffic, these locations are even more dangerous for conducting a stop of a motorcyclist. The decision to forgo a traffic stop because of geography is made at the law enforcement officer's discretion and typically involves a balance between the seriousness of the offense and the potential risk to the law enforcement officer, the motorcyclist, and other motorists or pedestrians. Conversely, should the law enforcement officer choose to make the stop, the geography of the area is an important element in planning the stop. Additional information about selecting a safe location for a motorcycle traffic stop is discussed on page 10.
- *Presence of NHTSA impaired-riding cues (weaving, swerving, wide-radius turns, etc.).* As with other drivers, the NHTSA driving cues are important indicators of possible impaired riding among motorcycle riders. However, these cues to potential impairment may be displayed somewhat differently by motorcycle riders because of the characteristics of two-wheeled vehicles. Once a motorcycle reaches a certain speed, the vehicle is stabilized. Therefore, the weaving and swerving that is frequently observed among impaired drivers may be observed only at slower speeds among motorcyclists—for example, immediately before and after the motorcyclist stops for a traffic light or stop sign. However, motorcycle riders may need to swerve to avoid potholes, etc., so swerving may not always be a sign of impairment. NHTSA has developed a document detailing DWI detection cues for motorcyclists (NHTSA, 2007). These include drifting

during a turn or curve, trouble with dismount, trouble with balance at a stop, turning problems, being inattentive to surroundings, inappropriate or unusual behavior, and weaving. Those cues that have been determined to be the most powerful indicators of impaired motorcycle riding are discussed in more detail on page 20 of this guide, and also in the NHTSA publication, "The Detection of DWI Motorcyclists," available at www.nhtsa.gov/people/injury/pedbimot/motorcycle/610DWIMotorcyWeb/pages/index.htm.

- *Make, model, license plate number, and color of the motorcycle, and description of the rider's equipment and gear.* Taking note of any identifying or distinctive characteristics of the motorcycle or motorcyclist can be useful at a later point, particularly if the motorcyclist does attempt to elude the law enforcement officer.
- *The availability of backup.* Motorcyclists may be more likely to attempt to flee than drivers of passenger cars. If it appears that backup may be necessary (based on factors such as the nature of the observed violation, the motorcyclist's driving behaviors, or the presence of a group of motorcyclists), the law enforcement officer should make backup arrangements in advance. In many jurisdictions, backup will be miles away or not available at all.

Selection of a safe and appropriate site is an important aspect of initiating a motorcycle traffic stop. Factors to be considered in selecting a location include the following:

- *A site removed from the flow of traffic.* Passing traffic is one of the greatest threats to the law enforcement officer during any traffic stop, and the risks associated with passing traffic are greater for a motorcyclist than for occupants of a passenger car because the motorcycle does not offer the rider the protection provided by a passenger vehicle. This risk can be reduced by selecting locations such as exit ramps, side streets, private driveways, and empty parking lots, if available. If the motorcyclist stops on or near the roadway, the law enforcement officer should direct him or her to move as far away from traffic as possible.
- *An area that provides good visibility for the law enforcement officer and for passing motorists.* Sites that allow the officer to easily see and be seen help to reduce the risk of being struck by passing vehicles. Sites where vision is obscured by the crest of a hill or a turn in the roadway should be avoided when possible. This not only reduces the actual risk to the officer and the motorcyclist, but it may improve the interaction between the law enforcement officer and the motorcyclist as well. Motorcyclists may feel particularly vulnerable during a

traffic stop due to their physical exposure; carefully selecting a location for the stop can reduce anxiety and may improve the interaction.

- *A level, solid surface, free of gravel, dirt, and loose or broken pavement.* The inherent instability of two-wheeled motorcycles makes them more vulnerable to the destabilizing effect of uneven road surfaces. (Surface characteristics are not as critical for three-wheeled motorcycles; consequently they can be treated more like traditional passenger vehicles.) If the law enforcement officer initiating the stop is not sensitive to the surface road characteristics, he or she may inadvertently increase the likelihood of a high-speed pursuit, as the motorcyclist may determine that there is less risk associated with fleeing than with pulling to the side of the road where the surface is unsafe.
- *Adequate space to allow proper positioning of the law enforcement officer's patrol vehicle a sufficient distance from the motorcyclist.* Proper positioning of the patrol vehicle is always important, but it may be even more so with the traffic stop of a motorcycle rider. In the traffic stop of a typical passenger vehicle, the automobile itself provides a measure of protection to the occupant(s). Because a motorcycle does not offer the same degree of protection, any protection that can be offered by the patrol vehicle is especially important. Another important difference between a traffic stop of a passenger vehicle and of a motorcycle is that the passenger vehicle provides a barrier between the law enforcement officer and the motorist that is not present in a motorcycle traffic stop. In motorcycle traffic stops, the law enforcement officer should maintain sufficient distance to ensure safety.
- *At night, an area that is well lit.* Generally an area that is well lit provides greater visibility and increased safety for both the law enforcement officer and the motorcyclist. In some circumstances, however, the law enforcement officer may wish to take advantage of the opportunity to control available lighting, using the patrol vehicle and spotlights as the only light source. The law enforcement officer can also use this lighting to make it more difficult for a potentially violent perpetrator to see the approaching law enforcement officer.
- *An area that allows the law enforcement officer and motorcyclist to get a safe distance off the road.* If possible, avoid areas with guardrails or other barriers that might prevent the motorcyclist or the law enforcement officer from removing themselves safely from passing traffic, if needed.

B. Approaching the Motorcyclist and Managing the Interaction

Once the law enforcement officer has initiated the stop, additional strategies can assist in approaching the vehicle and managing the interaction:

- *Maintaining situational awareness.* Law enforcement officers are well aware of the importance of maintaining situational awareness and how this contributes to the law enforcement officer's safety. Many of the elements of maintaining situational awareness during a motorcycle traffic stop are similar to situational awareness in traffic stops of a passenger vehicle or other law enforcement scenarios. For example, the law enforcement officer must maintain 360-degree awareness of the environment and be able to clearly see and be constantly aware of the location of the driver's hands. In any traffic stop, passing traffic is one of the greatest threats to the law enforcement officer, so the officer must remain aware of the flow of nearby traffic.

Other components of situational awareness are unique to traffic stops involving motorcyclists. A few examples include maintaining awareness of the numerous storage areas on a motorcycle where the motorcyclist may store his or her license and registration. These locations include tool pouches and tank bags. Law enforcement officers should be aware that such locations (e.g., tool pouches left unbuckled) might allow ready access to a weapon. The law enforcement officer should closely observe all aspects of the motorcyclist's behavior for clues to determine whether a rider's attempts to access these areas pose a threat.

- *Understanding the special communication and other challenges of motorcyclists.* Law enforcement officers note that it is important to ensure that the motorcyclist is able to hear the law enforcement officer's instructions before assuming that the motorcyclist is simply ignoring those instructions. Motorcycle helmets and the aftereffects of "road noise" may make it more difficult for the rider to hear the law enforcement officer's instructions. In addition, motorcyclists may be using earplugs or listening to music using headphones. Some law enforcement officers recommend "miming" instructions to the motorcyclist to improve communication. For example, rather than verbally instructing the motorcycle rider to move away from passing traffic, the law enforcement officer should point in the direction the motorcyclist should move. Other challenges that riders may face relate to discomfort from equipment (e.g., riding gear) or the need to maintain balance on the motorcycle.

In addition, there are numerous factors for law enforcement officers to consider when devising an approach for a motorcycle traffic stop. These are offered not as recommendations, but rather as issues to be aware of when stopping a motorcyclist:

- *Approaching the motorcycle appropriately.* Once the motorcyclist has stopped, there is no clear agreement among law enforcement professionals regarding the best way to approach the motorcyclist. Some law enforcement officers recommend approaching the motorcycle from the right, and others recommend approaching from the left. Making the approach from the right side generally offers the advantage of being farther from passing traffic. Some law enforcement officers believe that it is also safer in the event that the motorcyclist attempts to fire upon the law enforcement officer. However, approaching from the right may mean that the law enforcement officer must walk on uneven terrain or low ground, such as a ditch, and may give the officer less room to maneuver and to maintain a safe distance from the motorcyclist. Some law enforcement officers prefer an approach from the left. While a left approach often places the officer closer to traffic, it may be more familiar for the motorcyclist and may also provide the officer with greater maneuverability. Regardless of the approach used, law enforcement officers agree that the officer should make his or her intentions clear to the motorcyclist.
- *Instructing the motorcyclist to remove his or her helmet.* In some instances, the law enforcement officer may choose to direct the motorcyclist to remove his or her helmet. This may be necessary to allow the law enforcement officer to identify the motorcycle rider, and it will also help the motorcyclist to better hear the law enforcement officer's questions and instructions. However, it is important to recognize that removing the helmet may add to the risks for the motorcyclist, as the helmet is an important piece of safety equipment. In addition, some law enforcement officers suggest that when the helmet is removed, it can be used as a weapon.
- *Dismounting the motorcycle.* Increasingly, motor officers are being trained to dismount on the side away from traffic and other hazards (typically on the right side). This is sometimes referred to as the "safe side" or high side. In some jurisdictions, law enforcement officers are also being trained to instruct motorcycle riders to dismount on this side. However, there is no clear agreement on this topic. Not all riders will know how to dismount on the safe side, and it is possible that a rider who is unfamiliar with this maneuver will risk injury.

- *Dealing with groups.* Groups of motorcyclists present particular challenges to the law enforcement officer. Frequently when a law enforcement officer initiates a traffic stop of a motorcyclist who is part of a group, the other members of the group will stop as well. In such cases, some riders may stop in front of the patrol vehicle while others may stop behind, making it very difficult for the law enforcement officer to maintain situational awareness. In addition, this may create a pedestrian hazard that the officer is responsible for managing. Some law enforcement officers recommend that it may be more important to call for backup in advance of initiating a traffic stop of a group of motorcyclists, or one motorcyclist who is part of a group, to reduce such hazards.

C. Conducting Activities After the Stop

In some instances, it may be appropriate for the law enforcement officer to impound the motorcycle after the stop is completed. This is an important element of the safe completion of the stop, because motorcyclists can become agitated and even aggressive when they realize that their motorcycles will be towed and impounded. The motorcyclist may be concerned that the motorcycle will be damaged during the towing process.

When arranging for the tow of a motorcycle, officers should consider the following:

- Properly towing a motorcycle requires specific expertise, and tow truck operators must use appropriate equipment and processes to prevent damage and liability.
- Whenever possible, tow providers should use flatbed trucks with special motorcycle dollies and towing straps, such as bar harnesses designed specifically for motorcycles.
- Sling-type tow trucks should be used only as a last resort and only by a tow operator with extensive experience in towing motorcycles. Motorcycles are easily damaged by a sling tow if the tow operator has limited experience or insufficient training in towing motorcycles specifically.
- Reassuring the motorcyclist that every effort will be taken to handle the motorcycle with care may allay fears and reduce the possible agitation of the rider.

VI. Strategies for Reducing the Likelihood of High-Speed Pursuits

This section provides guidance and recommendations regarding strategies and techniques for reducing the likelihood that a motorcyclist will flee during the conduct of a motorcycle traffic stop. These methods are not expected to eliminate high-speed pursuits; rather, the objective is to reduce the number of high-speed pursuits by providing the law enforcement community with tools and techniques that may discourage some motorcyclists who might otherwise be inclined to flee. Most opportunities to reduce the likelihood that the motorcyclist will flee will take place before the law enforcement officer signals the intent to conduct the traffic stop.

It is important to remember that some motorcyclists are especially motivated to flee. This may be due to involvement in illegal activities, knowledge of an active warrant for the rider's arrest, awareness that the rider lacks a valid driver's license, or because the motorcycle is stolen.

Some in the law enforcement community hypothesize that many motorcyclists are inherently risk takers, and actively seek these interactions with law enforcement. Furthermore, because of a history of successfully eluding law enforcement officers, a number of motorcyclists have grown confident that they can evade law enforcement.

A. Predicting the Likelihood That a Motorcyclist Will Flee

In order to reduce the incidence of high-speed pursuits, it may be helpful to identify behaviors or characteristics of the motorcyclist that may indicate an increased likelihood to attempt to flee. The following may be predictive of an attempt to elude police.

While riding, the motorcyclist:

- Demonstrates a high level of aggressiveness in the way he or she rides;
- Displays severe illegal behavior, or has an extensive history of driving violations (if known);
- Disregards the law enforcement officer's signals to stop;
- Is driving while impaired due to drug or alcohol use;
- Scans the area, seemingly looking for an opportunity to escape; or
- Looks back at the law enforcement officer, seeming to try to "size the law enforcement officer up."

Once stopped, the motorcyclist:

- Keeps his or her hands on the handle bars;
- Does not shut off the motorcycle's engine at the law enforcement officer's request;

- Keeps one foot on the motorcycle versus both feet on the ground; or
- Downshifts to a lower gear (to prepare the motorcycle for riding).

B. Planning the Stop and Stopping the Vehicle

If a rider seems likely to flee, the following techniques may be helpful while planning to stop the vehicle:

- *Follow the motorcyclist without lights or sirens (or using rear lights only) to collect information before announcing presence.* Some law enforcement officers report that most motorcyclists who will attempt to flee do so at the point when the law enforcement officer and the motorcyclist first make eye contact. To reduce the risk of fleeing, it is recommended that the law enforcement officer follow the motorcyclist with the lights and siren off for a sufficient time to gather information before initiating the stop, or that the officer use rear lights only when that option is available. Many surrounding motorists will respond by slowing down, changing lanes when possible, and/or increasing their following distances, thus allowing for more reaction time. This creates a “cushion of space” and reduces the risks to the motorcyclist, the law enforcement officer, and other motorists by effectively allowing the law enforcement officer to create a safer environment for conducting the stop while the motorcyclist remains unaware of the law enforcement officer’s intent.
- *Call in information via radio.* By waiting to signal the motorcyclist of his or her intention, the law enforcement officer also has the opportunity to call in pertinent information via radio. This information may include the license plate number, color, make, and model of the motorcycle, and pertinent characteristics of the motorcycle or the motorcyclist’s gear or apparel.
- *Initiate the stop only when close to the target motorcyclist.* By signaling the stop when proximate to the motorcyclist, the law enforcement officer forces the motorcyclist into a “reactionary mode” and reduces his or her opportunity to plan to flee and to identify potential escape routes.
- *Arrange to have multiple law enforcement officers available and, when possible, have law enforcement officers in front of the motorcyclist as well.* The law enforcement officer can increase the probability of a successful stop by arranging for backup before initiating the stop. However, backup may not be available in all cases.
- *Use the patrol vehicle’s public address system to instruct the motorcyclist to pull to the side of the road, turn off the engine, or take other appropriate action before approaching*

the motorcycle. This allows the law enforcement officer to instruct the motorcyclist to pull to a safe place along the roadway or to move to an area where the law enforcement officer can clearly see the motorcyclist before exiting the patrol vehicle.

C. Approaching the Vehicle and Managing the Interaction

Once the stop has been initiated and the motorcycle has pulled over, these additional techniques may further help to reduce the possibility of a pursuit:

- *Asking the motorcyclist to put the kickstand down and to use it to stabilize the motorcycle.* By asking the motorcyclist to keep the kickstand down and to rest the motorcycle on the stand, the law enforcement officer increases the number of steps and the amount of time required for the motorcyclist to get away.
- *Controlling access to the keys to the motorcycle (if applicable).* For motorcycles that have keys, some law enforcement officers elect to give the motorcyclist specific directions about what to do with the keys. Some law enforcement officers direct the motorcyclist to remove the keys and to place them in his or her pocket. Other law enforcement officers may elect to take custody of the keys for the duration of the stop—for example, placing the keys on the law enforcement officer's clipboard. It is important to note that having the law enforcement officer take possession of the keys may elicit a strong response from the motorcyclist. If it is necessary to take possession of the keys, it is also helpful to assure the motorcyclist that the keys will be returned when the traffic stop is complete.

VII. Promising Practices in Effective Motorcycle Traffic Stop Training

As motorcycle traffic stops pose increasing challenges for law enforcement officers, training on this topic becomes more important. Training is typically done on the job. Most law enforcement organizations have not had the resources to develop and implement specific training on this topic. However, some law enforcement officers receive additional training related to motorcycle helmets and equipment in jurisdictions where there is a focus on enforcing related laws. Of particular note: Motorcycle officers are often more prepared to conduct a stop of a motorcyclist. Their personal motorcycle riding, training, and experience provide them with specific insights related to stopping a fellow motorcyclist. However, all officers need to understand how to successfully conduct a motorcycle stop.

A few organizations have begun to research, develop, and implement programs specifically designed to train law enforcement officers in the issues and techniques specific to stopping motorcycle riders. These programs are designed to teach law enforcement officers the skills needed to increase safety for all while conducting motorcycle traffic stops. The programs are based on input from dozens of law enforcement professionals and organizations with extensive experience in motorcycling issues.

Information drawn from these existing programs was evaluated by the expert panel. The following prospective training topics and lessons learned were identified and are suggested for use by other agencies and organizations considering implementing training on this topic.

A. Potential Modules/Topics

The topics below have been identified as the most important topics for training law enforcement officers in conducting stops of motorcyclists.

1. *Understanding motorcycle-specific regulations.* Not all law enforcement officers are familiar with motorcycle-specific regulations. These law enforcement officers may be reluctant to conduct motorcycle stops because they lack sufficient familiarity or experience with these laws. Training on these regulations could increase the success of a law enforcement officer recognizing and acting upon a violation. Laws vary by State and jurisdiction. Law enforcement officers should become familiar with motorcycle-specific regulations in their jurisdictions, including the following:
 - o *Helmet laws.* Helmet use may be required for all riders or only for a specific set of riders (usually under age 18), and specific types of helmets may be required or prohibited.

- *Equipment laws.* Motorcycles may be required to be equipped with, or prohibited from having, various types of accessories. For example, there may be minimum standards for tire thickness, limits on exhaust noise, or a maximum height for handlebars.
 - *Licensing laws.* All States have statutes specific to the operation of motorcycles and require special licenses or endorsements to operate a motorcycle on the highway. Law enforcement officers should be up to date on State and local statutes and ordinances governing motorcycle operation.
2. *Becoming aware of rider orientation.* Many law enforcement officers have not had the experience of riding a motorcycle themselves. Therefore, these law enforcement officers may be less aware of factors that can prevent clear communication with the rider once he or she is stopped. Law enforcement officers should consider the following:
- The rider's helmet may impact a rider's ability to hear clearly.
 - The riding gear can create discomfort for the rider, and the rider may need to adjust the gear for ventilation and/or more comfort.
 - The rider may feel vulnerable alongside a busy highway.

When law enforcement officers are not aware of these factors, they may mistake common behaviors or movements by the rider for potential threats.

3. *Comprehending motorcyclists' behaviors during traffic stops.* Law enforcement officers unfamiliar with riding motorcycles or stopping motorcyclists may not readily understand or expect the behaviors the rider will demonstrate during a stop. Law enforcement officers should anticipate the following:
- Riders may need to reach into one or more compartments for license and registration documents and/or even dismount the motorcycle to retrieve the documents. However, these locations can also be used to store weapons, so officers need to remain alert to properly assess rider intentions.
 - Some riders may have difficulty hearing if their helmets remain on. This can be impacted by the configuration of the helmet or ambient noise.
4. *Considering suggested methods for approaching and stopping motorcyclists.* Various aspects that are unique to stopping motorcycles should be emphasized:
- *Effective use of patrol vehicle lights.* Activate the rear lights of the patrol vehicle first to signal trailing motorists of an impending action and to create a "cushion of space." Not all patrol vehicles will have this capability, but this strategy can provide other motorists with advance notice that the law enforcement officer intends to take action. Many motorists will respond by

- slowing down and increasing their following distances, allowing for more reaction time. This response reduces the risks to the motorcyclist, the law enforcement officer, and other motorists by allowing the law enforcement officer to create a safer environment for conducting the stop before alerting the motorcyclist of the law enforcement officer's plan to conduct a stop.
- *Appropriate side to approach the rider.* There is no clear agreement regarding the best way to approach the motorcyclist. For example, approaching from the non-traffic side of the motorcycle reduces the risk to the law enforcement officer of being struck by a vehicle. However, it may surprise the rider (creating a negative reaction) or position the law enforcement officer in a less desirable location (e.g., a ditch or a gutter at the edge of the road). Local jurisdictions may elect to train law enforcement officers to use one approach over the other based on local preferences.
5. *Identifying impaired riders.* Law enforcement officers should become familiar with behaviors that are indicators of impaired motorcycle riding. The following cues, taken from NHTSA's "The Detection of DWI Motorcyclists" (2007), are *excellent* cues that have been found to predict impaired motorcycle operation at least 50 percent of the time:
- *Drifting during a turn or curve.* The motorcycle appears to drift outside the lane, or into another lane, through a curve or while turning a corner.
 - *Trouble with dismount.* The motorcyclist exhibits problems turning off the engine and locating or deploying the kickstand, balancing his or her weight on one foot while swinging the other foot over the seat to dismount, or deciding upon a safe place to stop the bike.
 - *Trouble with balance at a stop.* The motorcyclist is observed shifting his or her weight from side to side or from one foot to another to maintain balance at a stop.
 - *Turning problems.* Research has identified four types of turning problems that are excellent indicators of motorcycle rider impairment:
 - *Unsteady during a turn or curve.* Impaired motorcyclists may have difficulty maintaining balance at slow speeds during a turn. The law enforcement officer may observe the front wheel or handlebars wobbling as an impaired motorcycle rider negotiates a turn.
 - *Late braking during a turn.* Most motorcyclists apply the brakes prior to or when entering a turn. An impaired motorcyclist is more likely to misjudge the speed or distance to the turn, necessitating the use of the brakes as he or she negotiates the turn.
 - *Improper lean angle during a turn.* Impaired motorcyclists may attempt to sit upright while negotiating a turn rather than leaning into the turn.

- *Erratic movements during a turn.* The motorcyclist may demonstrate inconsistent actions and sudden corrections while negotiating a turn.
- *Inattentive to surroundings.* When in traffic, most motorcyclists will periodically scan the area around their motorcycles. An impaired motorcyclist may exhibit reduced vigilance. An impaired motorcyclist may also fail to notice that a traffic light has changed from red to green.
- *Inappropriate or unusual behavior.* There are a number of unusual or inappropriate behaviors that may serve as cues that a motorcyclist may be impaired. This includes behaviors such as holding an object in one hand or under an arm while operating the motorcycle, dropping an object from a moving motorcycle, and arguing with other motorists (or other disorderly behavior).
- *Weaving.* Weaving is a well-known indicator of impaired driving with typical passenger vehicles and an even more powerful predictor of impaired motorcycle operation. However, weaving tends to occur only at lower speeds with motorcycles, because two-wheeled vehicles become stabilized at higher speeds. When weaving, the motorcyclist uses excessive movement within a lane or across lane lines. This does not include movements necessary to avoid road hazards such as potholes.

The remaining cues have been found to be *good* indicators of impaired motorcycle operation. These cues have been found to predict impaired motorcycle operation 30 to 50 percent of the time:

- *Erratic movements while going straight.* The motorcyclist makes erratic movements or sudden corrections while attempting to ride in a straight line.
- *Operating without lights at night.* The motorcyclist operates the motorcycle without the lights on when it is dark.
- *Recklessness.* The motorcyclist operates the motorcycle recklessly or rides too fast for conditions.
- *Following too closely.* The motorcyclist follows another vehicle at an unsafe distance.
- *Running a stoplight or stop sign.* The motorcyclist exhibits impaired vigilance or impaired judgment by not stopping at red light or stop sign.
- *Evasion.* The motorcyclist attempts to evade the law enforcement officer during an enforcement stop.
- *Wrong way.* The motorcyclist drives the wrong way in traffic, including going the wrong way on a one-way street and crossing a center divider line to ride into opposing traffic.

The NHTSA publication, "The Detection of DWI Motorcyclists," is a good reference on this topic and is available at www.nhtsa.gov/people/injury/pedbimot/motorcycle/610DWIMotorcyWeb/pages/index.htm.

It is also important to recognize that some common and safe riding behaviors can be perceived as impaired riding. Law enforcement officers should become skilled at recognizing and understanding that:

- Riders often weave to avoid bumps and road hazards; and
 - Riders often sway due to various riding dynamics such as acceleration, deceleration, and wind.
6. *Gathering motorcycle and rider information before a stop.* It is helpful for law enforcement officers to learn about motorcycle makes/models and riding equipment. This will allow them to easily identify the motorcycle and rider and convey this detailed information to dispatch, which can assist with arrangements for backup procedures if necessary.
 7. *Responding to a threat from a motorcyclist.* Some law enforcement officers may benefit from training regarding the threats that a motorcyclist may pose to a law enforcement officer. For example:
 - Weapons may be within easy reach of the rider on the motorcycle.
 - A motorcyclist may attempt to flee as the law enforcement officer transitions from the patrol vehicle to the rider.
 8. *Managing group riding and motorcycle clubs/gangs.* Law enforcement officers may be unfamiliar with the additional challenges of managing a stop involving a group of riders. For example:
 - Managing multiple stopped riders is more difficult than managing one stopped rider.
 - One or more riders in a group may have weapons.
 - Law enforcement officers can benefit from training on any known outlaw motorcycle groups, their hierarchies, and the meaning of related symbols. Such information may be specific to each local jurisdiction.
 9. *Communicating with motorcyclists at a safe distance.* To improve safety, law enforcement officers should be trained on the distances necessary to ensure effective communication without placing the law enforcement officer in harm's way.
 10. *Understanding motorcycle dynamics.* To select better stopping locations and to better understand riders' actions while stopped, law enforcement officers may benefit from

training regarding the unique characteristics of motorcycles compared with other highway vehicles. For example:

- Motorcycles need to be balanced when stopped, either with a kickstand or by the rider.
- Motorcycles need a stable surface for a safer stop, so slopes and areas with loose materials (gravel and sand) should be avoided.
- Most motorcycles do not have a reverse gear.

11. *Handling motorcycle impoundment and towing.* Should a tow be necessary, law enforcement officers need to be familiar with towing practices that ensure that the motorcycle is handled in a manner that will protect it from damage. The law enforcement officer should communicate these actions and precautions with the rider to reduce rider anxiety. Law enforcement officers also would benefit from learning the following:

- Separating a motorcycle rider from his or her motorcycle can create a volatile situation, as riders are often concerned about their motorcycles' safety and proper handling.
- A motorcycle should be put in a sling tow only as a last resort, and the towing company should be instructed to send a flatbed or trailer if at all possible. If a flatbed (rollback) or trailer is not used, then the tow operator needs to be highly experienced and trained on how to tow motorcycles using a sling. It may be helpful to tell the rider what type of tow vehicle will be used.
- It is recommended to advise the tow company in advance of its arrival on scene that the tow is for a motorcycle.

12. *Identifying noncompliant helmets as appropriate.* Law enforcement officers are often unfamiliar with identifying helmets that do not meet the State's safety regulations. This is especially important in States with universal helmet laws. The NHTSA publication, "How to Identify Unsafe Motorcycle Helmets," is a good reference on this topic and is available at www.nhtsa.gov/people/injury/pedbimot/motorcycle/UnsafeHelmetID/.

B. Critical Success Factors

The following topics are considered to be the most important factors in creating a successful training program on motorcycle traffic stops.

1. *Provide a practical basis for the training.* Law enforcement officers benefit from programs that emphasize the application of knowledge and how it fits within training already received.

2. *Ensure credibility of training.* The training should stress real-world situations and be delivered by law enforcement officers with a depth of experience in stopping motorcycle riders.
3. *Incorporate scenarios with realism and role-playing.* Role-playing brings the training content into action and makes the information easier to retain.
4. *Focus on safety.* The training should stress that every action taken is designed to maximize the safety of the law enforcement officer, the motorcycle rider, and the public.
5. *Emphasize the law enforcement officer's judgment and common sense.* The training should include how law enforcement officer judgment and situational awareness are used when formulating and executing a safe stop of a motorcycle rider.
6. *Stress methods of effective communication with motorcyclists.* The program should underscore the importance of communicating with the motorcyclist. This process can be unique to the dynamics of stopping a motorcycle and the concerns of the rider.
7. *Obtain commitment of the agency/leadership.* The training will be more effective with assurances that the program has the full support of the agency's leadership.
8. *Incorporate training aids and job aids.* To reinforce key points, it can be beneficial to distribute items such as laminated cards to serve as refreshers and to aid law enforcement officers in making motorcycle stops. NHTSA has distributed such aids on a variety of topics (noncompliant helmets, impaired riding, etc.).
9. *Demonstrate alignment with job description and mission.* The training should be positioned as a set of tools to assist the law enforcement officer with his or her daily duties.
10. *Include and address local issues and local situations.* Addressing local issues and situations makes the training more relevant.

C. Medium or Mix of Media

The following are considered to be the most effective means to deliver a successful training program on the safe conduct of motorcycle traffic stops:

1. *Mix of classroom and field training.* Law enforcement officers benefit from instruction that incorporates classroom, videos, and field training to provide a deeper, more practical understanding of the dynamics of stopping a motorcycle rider.
2. *Role-playing.* Role-playing is a promising training practice. Law enforcement officers who have had the opportunity to role-play a realistic scenario may be more likely to retain what they have learned and to apply the new skills on the job.

3. *In-service training such as roll-call DVDs.* Roll-call DVDs are seen as an effective way to deliver refresher and in-service training.

It is important to provide customized examples that are as specific to the local jurisdiction as possible.

D. Potential Challenges to Consider During Planning and Implementation

Planning for training will require consideration of a number of factors to help in ensuring the most successful outcome possible. Planners should bear in mind that external and operational factors can impact the quality of training delivery. Some issues to consider include the following:

1. *Financial considerations.* Delivering training can be resource intensive. Leveraging existing training opportunities and consolidating training efforts is one method to ensure that resources are used effectively.
2. *Agency leadership and commitment.* Demonstrated commitment at the highest levels of the organization helps to ensure that the content of the training is actually implemented on the job. Because training is resource intensive, support from leadership helps to ensure that the necessary resources are made available.
3. *Time constraints.* Training time is limited. In recognition of time constraints, it is important that training be designed to make maximum use of the time available.
4. *Logistics.* Ensure that the materials, equipment, instructors, and facilities to properly train on this topic are available. Coordination with other agencies to share the impact of training is an effective strategy, especially in small agencies. Current training programs might be leveraged to help offset these matters.
5. *Develop an understanding of the need for training.* By stressing the importance of protecting the safety of the law enforcement officer, the rider, and the public, safe motorcycle traffic stops will be more relevant to agencies and to law enforcement officers. Motor officers often have a significantly expanded knowledge of this topic compared with other law enforcement officers and could be helpful in expanding this understanding to all other law enforcement officers.

Training programs that emphasize safety for all, explore the unique characteristics of stopping a motorcycle, integrate memorable and visual training techniques, and have the full support of leadership have the best opportunities to succeed in increasing safety on our nation's highways.

VIII. Other Recommendations

The following additional recommendations are offered for agencies and organizations seeking to go beyond training of law enforcement officers:

1. *Development and delivery of community outreach and education programs for the motorcycle riding public.* These programs would provide information regarding regulations, safety, and the “etiquette” of motorcycle traffic stops and could also improve relationships between the law enforcement community and motorcyclists.
2. *Local information sharing.* Law enforcement agencies may benefit from sharing information at the local level using techniques such as electronic citations capability, electronically linking agency records. These strategies would allow for sharing information about motorcyclists with a history engaging in high-speed pursuits and evading law enforcement officers during motorcycle traffic stops.

IX. Acknowledgments

This guide was developed by NHTSA with the advice and assistance of dozens of transportation safety experts representing numerous organizations. NHTSA is grateful for their input and pleased to acknowledge their contributions.

NHTSA's research contractor conducted interviews with a diverse set of organizations and agencies to learn more about current promising practices related to motorcycle stops. These telephone interviews served as an informational foundation for the project. One or more individuals from each of the following organizations participated.

- Anaheim (CA) Police Department
- Anne Arundel County (MD) Police
- Arkansas State Police Highway Patrol
- Atlanta (GA) Police Department
- Austin (TX) Police Department
- Broward County (FL) Sheriff's Office
- California Highway Patrol
- Calvert County (MD) Sheriff's Department
- Connecticut Office of Legislative Research
- Edmond (OK) Police Department
- Federal Law Enforcement Training Center (GA)
- Florida Department of Law Enforcement
- Florida Highway Patrol
- Georgia Department of Driver Services
- Georgia Governor's Office of Highway Safety
- Georgia State Patrol
- Horry County (SC) Police
- Illinois State Police
- Institute of Police Technology and Management (FL)
- International Association of Police Chiefs (VA)
- Kansas Highway Patrol
- Leon County (FL) Sheriff's Office
- Maryland Motor Vehicle Administration
- Maryland State Police
- Michigan State Police
- Missouri State Highway Patrol
- Myrtle Beach City (SC) Police
- Nebraska Office of Highway Safety
- New Jersey State Police
- New York City Police

- New York State Police
- North Carolina Governor's Highway Safety Program
- North Carolina State Highway Patrol
- North Carolina State Police
- North Miami Beach (FL) Police Department
- Northwestern University (IL)
- Oakland County (MI) Sheriff's Department
- Oklahoma Highway Patrol
- Orange County (CA) Traffic Officers Association
- Orange County (FL) Sheriff's Office
- Oregon DOT/Oregon State University
- Pennsylvania State Patrol
- Seminole County (FL) Sheriff's Office
- South Carolina Highway Patrol
- Tallahassee (FL) Police Department
- Tennessee Highway Patrol
- Texas Department of Public Safety
- Texas Transportation Institute, Center for Transportation Safety, Texas A&M
- U.S. Park Police (DC)
- Vermont Criminal Justice Training Council
- Virginia Department of Motor Vehicles
- Virginia Highway Safety Office
- Virginia State Police
- Washington State Patrol
- Wisconsin Department of Transportation
- Wisconsin State Patrol

Once these initial interviews were completed, a panel reviewed the results to help define and narrow the content of the guide. The following people served as panel members.

- Lieutenant Tina Arcaro, New Jersey State Police
- Bill Bullard, Law Enforcement Driver Trainer, Firearms Instructor, Oklahoma Law Enforcement Basic Training Academy
- Pat Hahn, Information Officer, Minnesota Department of Public Safety
- Leonard Jacob, University of North Florida
- Daniel Kells, Lead Motorcycle Instructor, Tempe Police Department
- Major Daniel W. Lonsdorf, Director, Bureau of Transportation Safety Wisconsin State Patrol
- Joanne E. Michaels, Director, National Traffic Law Center National District Attorneys Association

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MOTORCYCLE TRAFFIC STOP SAFETY

PLANNING THE STOP

- Follow the rider without lights or sirens at first to observe and take note of vehicle and rider description.
- If available, consider using the patrol vehicle's rear lights to alert other motorists.
- Identify a safe stopping area:
 - A level, solid surface
 - Away from the flow of traffic
 - Highly visible to passing motorists
 - Enough space to allow proper positioning of the patrol vehicle
 - At night, an area that is well lit
- Maintain situational awareness during all phases of the stop.

MAKING THE STOP

- Initiate the stop only when close to the rider.
- When possible, arrange to have multiple law enforcement officers available.
- Use the patrol vehicle's public address system to instruct the rider to pull to the side of the road, turn off the engine, and take any other appropriate actions.

APPROACHING THE VEHICLE AND MANAGING THE INTERACTION

- In addition to roof lights, consider using the patrol vehicle's spotlight.
- Determine the appropriate side from which to approach the rider.
- Ask the rider to engage the kickstand.
- Instruct the rider to remove his/her helmet.
- Ask the rider to dismount (if applicable).
- Control access to the motorcycle's keys (if applicable).

KEEP IN MIND

- Riders may be wearing ear protection and may not hear your siren.
- Riders may not see your vehicle's lights if their side mirrors are out of position or vibrating.

IDENTIFYING IMPAIRED RIDERS

NHTSA has identified several indicators that can help you detect when a motorcycle rider is impaired.

Excellent Indicators

Predict impairment at least 50% of the time

- Turning problems
 - Drifting
 - Unsteady
 - Delayed braking
 - Improper lean angle
 - Erratic movements
- Inattentive to surroundings
- Weaving
- Trouble with dismount
- Trouble with balance at a stop
- Inappropriate or unusual behavior

KEEP IN MIND

- Riders often weave to avoid bumps and road hazards.
- Swaying may be the result of slowing, accelerating, or wind.

Good Indicators

Predict impairment at least 30-50% of the time

- Erratic movements while riding straight
- Operating without lights at night
- Recklessness
- Following too closely
- Running a stoplight or stop sign
- Evasion



LOCAL LAWS AND REGULATIONS

Use this space to record State/local motorcycle laws and regulations such as helmet laws, pipe restrictions, passenger limits, registration requirements and plate mounting, headlight use regulations, safety gear requirements, tire tread depth requirements, etc.



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