"Share The Road" – Motorist Awareness of Motorcyclists

A Guidance Document

January 2017

I. Congressional Mandate

The Fixing America's Surface Transportation Act (FAST Act), Public Law 114-94, directed the Secretary (Department of Transportation, DOT) to develop and provide to the States model language for use in traffic safety education courses, driver's manuals, and other driver's training materials instructing the drivers of motor vehicles on the importance of sharing the roads safely with motorcyclists. Most states apply for and receive discretionary funding from the department to use to develop and implement programs aimed at motorists to increase awareness of motorcyclist safety. With its origins as an actual message slogan, the phrase "Share the Road" (STR) has evolved to signify and encompass all motorist awareness messaging and educational outreach initiatives.

This is not the first time the DOT through the National Highway Traffic Safety Administration (NHTSA) has been tasked with assessing model language for motorist awareness messages regarding motorcycle safety. In 2006, The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), Public Law 109-59, directed the DOT to develop the model language. In that effort, NHTSA reviewed Share the Road language being used at the time by 21 state licensing, highway safety, and motorcycle safety agencies and a variety of national organizations with a vested interest in motorcycle safety. These materials included operator licensing manuals, public service announcements, brochures, pamphlets, posters, and Internet Web sites. The agency identified the common themes and language from these materials that serve to convey the importance of sharing the road safely with motorcyclists.

Instead of repeating the process undertaken during the mandate within SAFETEA-LU, NHTSA has instead opted to review the research behind many of the common multi-vehicle motorcycle crash factors, the applied research behind social behavior change methods, and the processes NHTSA hopes to have states adopt, within the constraints of federal grant funding guidelines.

To disseminate the model Share the Road language to governmental agencies and safety organizations, NHTSA will work with the Governor's Highway Safety Association, National Association of State Motorcycle Safety Administrators, the American Association of Motor Vehicle Administrators, American Motorcyclist Association, and the Motorcycle Riders Foundation. As directed in the FAST Act, this document will serve as a conveyance to State motorcycle, safety, and licensing officials the importance of including these messages in their education courses, licensing materials, driver's manuals and educational campaigns aimed at drivers.

II. History

i. Share the Road Messaging

In the 2006 scan of the states regarding STR messaging, NHTSA found several common themes, particularly as they related to content in the state's licensing materials and driver's manuals. Some of these common themes include, but were not limited to:

- Share the road with Motorcyclists. Motorcycles are vehicles with the same rights and privileges as any vehicle on the roadway.
- Allow the motorcyclist a full lane width. Although it may seem as though there is enough room in the traffic lane for an automobile and a motorcycle, remember the motorcycle needs the room to maneuver safely. Do not share the lane.
- Approximately one-half of all motorcycle crashes involve another motor vehicle. Nearly 40 percent were caused by the other vehicle turning left in front of the motorcyclist.
- Motorcycles are small and may be difficult to see. Motorcycles have a much smaller profile than vehicles, which can make it more difficult to judge the speed and distance of an approaching motorcycle.
- Always signal your intentions before changing lanes or merging with traffic. This allows the motorcyclist to anticipate traffic flow and find a safe lane position.
- Remember that motorcyclists are often hidden in a vehicle's blind spot or missed in a quick look due to their smaller size. Always make a visual check for motorcycles by checking mirrors and blind spots before entering or leaving a lane of traffic and at intersections.
- Don't be fooled by a flashing turn signal on a motorcycle – motorcycle signals usually are not self-cancelling and riders sometimes forget to turn them off. Wait to be sure the motorcycle is going to turn before you proceed.
- Remember that road conditions which are minor annoyances to you pose major hazards to motorcyclists. Motorcyclists may change speed or adjust their position within a lane suddenly in reaction to road and traffic conditions such as potholes, gravel, wet or slippery surfaces, pavement seams, railroad crossings, and grooved pavement.
- Allow more following distance, three or four seconds, following a motorcycle so the motorcyclist has enough time to maneuver or stop in an emergency. In dry conditions motorcycles can stop more quickly than a car.

Little has changed in the proceeding 10 years, as states continue to utilize similar messages identified by the 2006 scan. NHTSA again conducted a cursory search of existing STR messages in 2016, finding similar or identical themes and messages being utilized by the states.

ii. 23 USC 2010 and 23 USC 405(f) grant funding

The interest in identifying best practices for STR messaging has its roots in grant funding available to the states. NHTSA has a vested concern in ensuring that states are well-equipped to best utilize limited grant funding for motorcyclist safety initiatives. The Section 2010 Motorcyclist Safety Grants program was authorized under SAFETEA-LU (2005-2009). Disbursements were administered by NHTSA and projects

were managed by the State Highway Safety Offices (SHSOs). A state was eligible for a grant if it satisfied criteria contained within at least two of the following six programmatic categories:

- Motorcycle rider training courses
- Motorcycle awareness program
- Reduction of fatalities and crashes involving motorcycles
- Impaired driving program for motorcyclists
- Reduction of fatalities and accidents involving impaired motorcyclists
- Use of fees for motorcycle training and safety programs

Eligible states received a minimum allocation of $100,000, but not more that 25% of their overall Section 402 grant program allocation. SAFETEA-LU authorized the Section 2010 program at $6 million each year for FY 2006 - FY 2008 and at $7 million for FY 2009. Under the newer federal transportation authorizations (MAP-21 and FAST Act), the Section 2010 program was incorporated and renamed under the National Priority Safety Program as the 405(f) grant program. The eligibility requirements remained unchanged, the minimum allocation was removed, and overall grant program funding was reduced to $4 million per fiscal year. Few states supplement their motorist awareness initiatives with other grant funds (i.e. Section 402 funding), though some supplement with state motorcycle registration funds.

iii. Data on fatal multi-vehicle crashes involving motorcyclists

NHTSA has limited access to non-fatal crash injury data, as this data is maintained by each state with varying definitions for injury levels. Consequently, the frequency of multi-vehicle personal injury crashes involving motorcycles on a national level is somewhat of an unknown. In NHTSA's 2007 report titled, "Recent Trends in Fatal Motorcycle Crashes" (HS 810837), among all fatal motorcycle crashes between 2001-2005, nearly 55 percent of the crashes were multivehicle crashes. Other notable characteristics include:

- An overwhelming majority (more than 85%) of the motorcycle riders killed in two-vehicle crashes were crashes involving passenger vehicles.
- Of the front-to-side crashes involving motorcycles and passenger vehicles, where one vehicle collided with the other at right angles, in 78 percent of the crashes the role of the motorcycle was recorded as the striking vehicle[1].
- In 55 percent of the head-on two-vehicle crashes involving motorcycles and passenger vehicles, the role of the motorcycle was recorded as the striking vehicle.
- In 68 percent of the rear-end crashes involving motorcycles and passenger vehicles, the role of the motorcycle was recorded as the striking vehicle.
- For the passenger vehicle drivers involved in two-vehicle motorcycle crashes, 35 percent of the driver-related factor was failure to yield right-of-way compared to only 4 percent for motorcycle operators.
- More than 90 percent of the two-vehicle motorcycle crashes involving passenger vehicles occurred on non-interstate roadways (in both urban and rural areas).

[1] It should be noted that "striking vehicle" neither indicates nor absolves fault.

- Of the two-vehicle motorcycle crashes involving passenger vehicles, nearly 6 out of 10 occurred on urban roadways.
- More than 70 percent of these crashes occurred from May to October, which corresponds to the peak motorcycle riding season.

States are encouraged to analyze their specific state crash databases to ascertain more detailed crash factors that can be linked to and highlighted in motorist awareness education and outreach opportunities. Motorcyclist fatalities involved in multi-vehicle crashes are also usually low in number in comparison to other motorists. Consequently, states should analyze both fatal and non-fatal injury multi-vehicle motorcycle crashes to improve trend analysis of crash factors.

NHTSA is currently developing highly-specific segmented messages that directly correspond to specific crash factors for states to utilize in their own motorist awareness efforts. It is NHTSA's position that this unique segmented approach will better identify the specific desired behaviors for motorists.

III. Message vs Execution

NHTSA acknowledges that federal legislation has neither mandated nor yielded much guidance in the way of execution strategies. NHTSA's reports and research have not provided the needed granularity in terms of strategic guidance when it comes to low-budget outreach and media campaigns. While this document is not intended to fulfill that need, the information below represents some of the more significant issues facing low-budget campaign practitioners.

Message penetration

It might be easy to confuse internet or social media penetration with message penetration, when in fact there are distinct differences. Internet penetration refers to the number of internet users in a given geographic location. It is sometimes referred to as the Internet Divide, and can be useful in determining the level of investment in digital advertisements. However, specific to motorcycle safety and highway safety in general, low internet penetration zip codes can coincide with high proportions of high-risk drivers. A similar consideration occurs with social media penetration, as younger audiences are tending to eschew Facebook as a dominant social media platform.

Message penetration should be viewed as a completely different metric in determining the effectiveness of a multi-pronged motorist awareness education and outreach program. In the simplest terms, it measures how often a particular target has seen a particular motorcycle safety message within a given time frame and geographic location. For example, a state chooses to focus on intersection safety as the message, and the zip-code specific executions include digital media, driver school outreach, DMV branch outreach, DMV registration mailer outreach, law enforcement leave-behinds, and automobile dealership leave-behinds. The message penetration metrics would be able to identify estimates of how many opportunities licensed drivers within the specified zip codes would have had to see a message about intersection safety. The costs of assistance in identifying these metrics should be built-in to the overall cost of the campaign.

Message spillage

Regardless of one's precision in marketing scope, the targeting of a motorist awareness campaign is undoubtedly going to have some form of "spillage," that is, money wasted in reaching out to people with no interest in motorcycle safety. There are, however, strategic planning efforts that can minimize spillage. NHTSA recognizes that states have limited funds for motorist awareness marketing campaigns, and even if a state did, it could be unwise to unilaterally invest all of it in digital marketing. The relatively low cost of procuring digital media advertisements cannot be overlooked in terms of reaching a large diffuse population. However, when comparing an overall budget of $25k versus $2.5 million, the former requires a much more surgical approach. States are encouraged to evaluate overall digital media budgets and compare different strategies. A small budget can minimize spillage by choosing to advertise in zip codes that are over-represented in multi-vehicle motorcycle related crash locations. One might even aggregate the home addresses of at-fault drivers in multi-vehicle motorcycle crashes to identify hot spot locations for at-risk drivers.

Media and Message Mix

Media mix is the combination of communication channels one uses to meet its marketing objectives. Typically these include newspapers, radio, television, billboards, websites, email, direct mail, and social media. Budgetary considerations will ultimately play a deciding role in terms of the diversity of the mix, but generally speaking, low-budget initiatives like motorist awareness campaigns will rely heavily on paid digital and social media channels, as well as low-cost outreach via direct mail and email.

Message mix is an often-overlooked strategy that can have significant impacts among high-risk authoritarian-averse audiences. As referenced in the Message Type section above, there are numerous ways to persuasively convey a particular message. Whereas evidence suggest that an authoritarian-averse audiences will not respond well to messages that begin with "Don't" or "Do", these audiences might be more responsive to information-based or risk-reward-oriented communications instead[2]. Sometimes a particular communication channel will dictate the type of message for that particular execution[3]. Developing multiple messages that address a particular objective should be included in the strategic development phase of any multi-pronged motorist awareness education and outreach campaign.

Financial Considerations

NHTSA fully acknowledges the financial limitations among states in terms of addressing multi-vehicle motorcycle related collisions. As indicated above, the Section 405(f) grant program has diminished to just over $4 million per year. With over 45 states qualifying for funding, state apportionments are prohibitively small.

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[2] Lewis, Ioni M. and Watson, Barry C. and White, Katherine Marie (2009) Response efficacy : the key to minimizing rejection and maximizing acceptance of emotion-based anti-speeding messages. Accident Analysis & Prevention. (In Press)

[3] Geber, S., et al., Tailoring in risk communication by linking risk profiles and communication preferences: The case of speeding of young car drivers. Accid. Anal. Prev. (2015)

NHTSA encourages states to develop dynamic investment strategies that are appropriate for small-budget media campaigns. The strategies that are employed for larger budget programs like Occupant Protection and Impaired Driving Prevention are not necessarily the same that would be used for motorcycle safety. NHTSA encourages states to employ creative low-cost digital and social media strategies that are combined with multi-faceted earned media and outreach components.

IV. Problem Identification

NHTSA encourages those states in the midst of a motorist awareness initiative development process to accurately define the problem to the level of precision that allows for the maximization of available resources.

NHTSA has limited access to state-level motorcycle crash injury data, specifically as it pertains to dominant crash factors. NHTSA is encouraging states to aggregate fatal and non-fatal multi-vehicle motorcycle-involved crashes over a multi-year timeframe to ascertain a baseline of crash factor trends. Some of the common crash factors that show up on nationally representative data research include:

> In the multiple vehicle accidents, the driver of the other vehicle violated the motorcycle right-of-way and caused the accident in two-thirds of those accidents[4].
>
> These Right-Of-Way violations (ROWV) occur when a vehicle pulls out of a side road onto a main carriageway without giving way to an approaching motorcycle. In these accidents there appeared to be a marked problem with other road users seeing the motorcyclists. In many observation-failure cases of this type, the motorcycle was so close to the junction that there appeared to be no explanation as to why they had not seen it, even when looking in that direction. This is commonly referred to as a 'Looked but Failed to See' (LBFTS) error.[5]
>
> Intersections are the most likely place for the motorcycle accident, with the other vehicle violating the motorcycle right-of-way, and often violating traffic controls.[6]
>
> The most frequent accident configuration is the motorcycle proceeding straight then the automobile makes a left turn in front of the oncoming motorcycle.[7]
>
> The view of the motorcycle or the other vehicle involved in the accident is limited by glare or obstructed by other vehicles in almost half of the multiple vehicle accidents.[8]

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[4] Hurt, H. H., Ouellet, J. V., & Thom, D. R. (1981). Motorcycle accident cause factors and identification of countermeasures Volume I: Technical Report. *Traffic Safety Center, University of Southern California, Contract No. DOT HS-5-01160*.

[5] Crundall, D., Clarke, D., Ward, P., & Bartle, C. (2008). Car Drivers' Skills and Attitudes to Motorcycle Safety. *London: Department for Transport*.

[6] Hurt et al. 1981

[7] Hurt et al. 1981

[8] Hurt et al. 1981

The right kind of data analysis and problem identification strategy allows the data to tell where or when the practitioner should allocate resources.

V. Countermeasure Selection

NHTSA has previously developed Share the Road materials and provided them to states via the TrafficSafetyMarketing.gov website. In an effort to be data-driven, based off of existing known crash factors related to multi-vehicle crashes involving motorcycles, NHTSA is developing new issue-specific products for use by the state highway safety offices and motor vehicle administrations in their future motorist awareness initiatives:

Blind Spots

Because of its narrow profile, a motorcycle can be easily hidden in a car's blind spots (door/roof pillars) or masked by objects or backgrounds outside a car (bushes, fences, bridges, etc.). If you can't recognize or see the motorcyclist that is approaching, there is little one can do to avoid colliding with them. A-pillars have and continue to get bigger to account for stricter roof crush standards. With some of the newer A-pillars, the problem can get even worse for a motorcycle approaching from the right with a left turning vehicle because the plane of the hidden view consumes more of the continuous plane of travel for the motorcycle[9]. NHTSA intends to develop web copy, technical and animated illustrations, infographics, and social media content related to mechanical and roadway related blind spots.

Intersection Safety

In addition to mechanical and roadway blind spots, there are numerous cognitive "blind spots" that contribute to Looked But Failed To See (LBFTS) errors, a common intersection collision crash factor. Issues such as change blindness[10], motion camouflage, cognitive biases towards vehicle type, and perception and expectation errors all play a significant role in multi-vehicle intersection collisions. While many of these concepts are difficult to convey to the general public in narrative format, NHTSA hopes to develop interactive content to help deliver the needed information. One such interactive example is the Invisible Gorilla test.[11] NHTSA will be stratifying the intersection safety materials into three categories: looking strategies, perception strategies, and appraising strategies. NHTSA intends to develop web copy, technical and animated illustrations, infographics, and social media content related to intersection safety.

Mirror Position Management

It may seem inconsequential, but the improper use of a vehicle's rear-view and side-view mirrors contributes to collisions, particularly with smaller vehicles like motorcycles. With roughly 40% of a

[9] Crundall, D., Clarke, D., Ward, P., & Bartle, C. (2008). Car Drivers' Skills and Attitudes to Motorcycle Safety, pg 18.
[10] Crundall, et al., 2008. Pg 20.
[11] http://theinvisiblegorilla.com/gorilla_experiment.html

vehicle's perimeter hidden by blind spots, improper adjustment or lack of use of one's side-view mirrors can have dire consequences for motorcyclists. NHTSA intends to develop web copy, technical and animated illustrations, infographics, and social media content related to mirror position management.

Environmental Awareness

This category applies to multiple external safety issues that apply to motorcyclist behaviors and motorcycling dynamics. Rear end collisions account for a significant proportion of non-intersection related multi-vehicle crashes. The fact that motorcyclists often do not utilize their brakes to slow down (and consequently do not activate their brake lights) and instead use their transmissions to aid in deceleration is a concept that is not widely known among non-riding motorists. Other legitimate riding behaviors, such as weaving from left to right within a lane to maintain conspicuity, are necessary pieces to the motorist awareness puzzle. NHTSA intends to develop materials to address several of these environmental awareness issues, including web copy, technical and animated illustrations, infographics, and social media content.

Distraction Management

In-vehicle distractions have grown with the advent of driver assist features within vehicle systems and smartphone apps. One's capacity to pay attention to the relevant tasks associated with driving varies with age, mental aptitude, distractions, alcohol, drugs, and fatigue. Many of these concepts have not previously been included in outreach and educational materials, such as drivers' manuals. While many of these issues are salient for all types of drivers, NHTSA's motorist awareness efforts will specifically address in-vehicle distraction management, task interference and mental interference issues, and capacity limitations. NHTSA intends to develop materials to address these issues that include web copy, technical and animated illustrations, infographics, and social media content.

VI. Future Applied Research Opportunities

This document has attempted to utilize tools from other domains to help meet the needs of SHSOs, specifically as it pertains to motorist awareness initiatives. Despite that, there are still significant gaps in knowledge about the efficacy of motorcycle-related Share the Road campaigns. One example is that states are not required to, nor do they possess adequate funding for, message testing. However, there are two key caveats to consider:

> In the years since states began adopting STR messaging, multiple roadway safety campaigns have adopted the slogan of "Share The Road". NHTSA is aware that pedestrian and motor carrier initiatives have adopted the slogan. This can lead to message confusion about which behaviors are being targeted.
>
> The simplicity of the slogan "Share The Road with Motorcycles" is overtly vague. Without specific supporting executions, there is a growing body of evidence showing low levels of comprehension of what behaviors are desired.

Despite a limited body of information from the states that indicate low levels of comprehensions with STR messages, usually in the form of post-campaign convenience surveys, a more academic approach is needed to truly understand the gaps in message exposure, audience attention, message comprehension, message acceptance, message retention, and behavior outcomes. NHTSA hopes to conduct many of these research needs in the coming years, and the agency encourages external researchers to coordinate and tackle these needs.

Bandura's Self-Efficacy theory posits that self-confidence in achieving the desired behaviors is conditional on outcome expectations. Many of the existing STR campaigns lack explicit identification of potential outcomes (avoid crashing with a motorcyclist), and NHTSA knows of no campaign that has tested message efficacy.

Independent of the message testing, there exists little research regarding the execution strategies for motorist awareness campaigns. State motorcycle safety programs lack both funding and authority to conduct research on the best ways to spend limited funds to maximize the desired behavior outcomes. Additionally, the strategies that are employed with a large dollar campaign (i.e. Click It Or Ticket) differ significantly from those types of campaigns with limited budgets. Other issues requiring research include Message Variation, Message Sequencing, and Iterative Testing. States would benefit from technical assistance and academic research related to execution strategies.

VII. Example

The following example of a hypothetical motorist awareness initiative is intended to highlight elements needed for a comprehensive behavior change campaign, including sufficient data analysis strategies to adequately address the identified problem within a constrained budget. The example is not intended to be prescriptive.

1. Problem Identification

State X identifies that of the 227,489 injury and fatal crashes involving motorcycles from 2011-2014, 150,142 crashes involved multiple vehicles.

NOTE: Identify fatal AND injury crashes for a better risk exposure metric.
NOTE: Utilize multiple years (at least 3 to 5 years) for a better trend metric.

State X has allocated $250,000 for motorist awareness funding for FY 2017.

State X is a large state with a mix of rural and urban areas. The ability to reach the entire state's population with paid media with sufficient frequency is not feasible. The state decides to conduct a geo-spatial analysis and determines that 90% of multi-vehicle motorcycle crashes over the same time period occur in 27 different zip codes.

State X has a relatively short riding season (May-October), and 93% of all motorcycle crashes occur during these months.

Of the 150,142 injurious and fatal motorcycle crashes involving more than one vehicle, the following crash factors were involved:

State X: (2011-2014): Motorcycle: Injury and Fatal: Multi-Vehicle: Crash Factors*		
Intersection, Motorist Left-Turn	**70,223**	**46%**
Intersection, Motorcycle Left-Turn	222	0.1%
Rear-End, Motorcycle Striking Vehicle	27,256	18%
Rear-End, Motorist Striking Vehicle	**44,834**	**29%**
Motorist Distraction	31,992	21%
Motorist Looked-But-Failed-To-See (LBFTS)	**52,078**	**34%**
Environmental – Line of Sight	33,214	22%
Environmental – Time of Day	17,669	11%
Other/Unknown	43,095	28%

NOTE: Total Exceeds 100% due to crashes that involve multiple crash factors

2. Countermeasure Selection

While left-turn collisions are clearly the most attributable crash factor, intersection safety as a classification can have several underlying causes, including line of sight, LBFTS/inattentional blindness, and distraction. Therefore, the state chooses to develop several types of motorist awareness educational materials ($75 thousand):

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  NOTE: The use of "When Turning Left" increases efficacy by decreasing behavior duration and targeting time and location.

- Animated technical illustration showing driver's point-of-view (POV) and blind spots, line of sight and environmental obscuration

- Infographics
  Multiple illustrations showing 40% of perimeter of driver is blocked by blind spots, vertical line-of-sight blind spots, low-contrast blind spots, crash risk comparison between motorists and motorcyclists

- Animated technical illustration showing aerial/top-down diagram of intersection collision issues

- Website content with the following components:
    - long-form narrative of inattentional blindness/Invisible Gorilla video/test and how it impacts motorcycle safety
    - Information on approaching and proceeding through Intersections
    - Information on entering roadways from driveways and parking lots
    - Information on lane changing (blind spots, head and eye movement behaviors, differential speed of motorcyclists)
    - Differential speed in traffic (open vs congested lanes, speed variability of motorcycles)
    - Information on distraction, fatigue, task interference

- State Driver's Manual and Driver License Test content that incorporates technical illustration and multiple choice questions relating to intersection safety, mirror positioning management, crash risk with motorcycles, time arrival and gap acceptance cognitive issues relating to motorcycles.

3. Execution Strategies

Outreach:

- Post web content to relevant state-owned websites (i.e. DOT, HSO, DMVs, State Police) with specific emphasis during the months of May-October
- Deliver web copy and content to willing stakeholder websites statewide (local enforcement agencies, automobile dealers and associations, driver instruction schools, high schools, etc.)
- Deliver social media content to relevant stakeholders during the months of May-October
- DMS signs during May, possibly other months
- Approach DMV to provide routine information on common crash causes involving multi-vehicle motorcycle crashes, including Manual and Test content.

Earned Media:

- Develop and distribute press release copy to relevant stakeholders during May Motorcycle Safety Awareness Month. Include links to website content.
- Approach Out-Of-Home (OOH) media opportunities through unique press event strategies (blind spot exercise, invisible gorilla test, etc.)

Paid Media:

- Determine and implement schedule of paid placement of web advertisements through Google Search Advertising and Facebook Display Advertising to reach non-riding motorists in the identified 27 high priority zip codes during May-October ($150 thousand)

Evaluation:

- Digital Media Metrics
- Website exposure metrics
- Process metrics for Earned Media, Outreach
- Adoption metrics for stakeholders
- Awareness survey among motorists within priority zip codes ($25 thousand)