National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: October 3, 2007

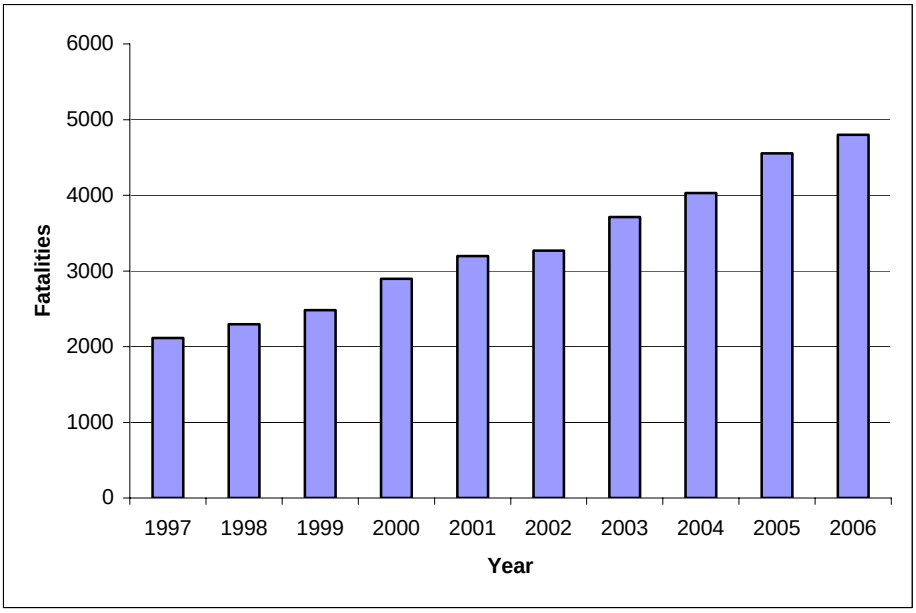
In reply refer to: H-07-40

«States_not_specifying_FMVSS_218_helmets»
(See attached List)

The National Transportation Safety Board is an independent federal agency charged by Congress with investigating transportation accidents, determining their probable cause, and making recommendations to prevent similar accidents from occurring. We are providing the following information to urge your state to take action on the safety recommendation in this letter. The Safety Board is vitally interested in this recommendation because it is designed to reduce injuries and save lives.

The Safety Board is concerned about motorcycle safety and the growing number of riders that have been killed or injured in motorcycle crashes. Since 1997, the number of motorcycle fatalities has increased 127 percent, an increase that far exceeds that of any other form of transportation. In fact, the number of motorcycle fatalities in any recent year has been more than double the number of deaths that same year from accidents in aviation, rail, marine, and pipeline combined. In 2006, for example, 4,810 motorcyclists died in crashes, and motorcycle fatalities accounted for more than 10 percent of all motor vehicle crash fatalities.[1] The following figure clearly shows the rising numbers. Although rising motorcycle use may partly explain this trend, increases in fatalities have outpaced increases in activity measures such as motorcycle registrations and vehicle miles traveled.

[1] *Traffic Safety Facts: 2006 Traffic Safety Annual Assessment – A Preview*, DOT HS 810 791 (National Highway Traffic Safety Administration, 2007).



Motorcycle fatalities between 1997 and 2006 (source: National Highway Traffic Safety Administration [NHTSA]).

To better understand the reasons behind these increasing numbers, the Safety Board held a public forum in September 2006 to 1) review current issues in motorcycle safety, 2) gather information about ongoing motorcycle safety research and initiatives, and 3) discuss safety countermeasures that may reduce the likelihood of motorcycle accidents and fatalities. The 2-day forum featured six panels covering motorcycle trends and safety statistics, vehicle design, rider protective equipment, training and licensing, public education and awareness, and rider impairment. Panelists represented government, motorcycle manufacturers, motorcyclist associations, state motorcycle rights organizations, researchers, trauma physicians, law enforcement, and insurance companies.

The forum focused on a number of areas in which motorcycle safety improvements are promising, including motorcycle helmet usage. According to the National Agenda for Motorcycle Safety (NAMS),[2] a partnership between NHTSA and the Motorcycle Safety Foundation (MSF), there is no better crash protection for a motorcyclist than the U.S. Department of Transportation (DOT) Federal Motor Vehicle Safety Standard (FMVSS) 218-compliant motorcycle helmet. Motorcycle helmets have been available for nearly a century, and appropriately designed helmets have been widely recognized as protective since studies following the death of British war hero T. E. Lawrence in 1935 from head injuries suffered after a motorcycle crash.[3]

[2] *National Agenda for Motorcycle Safety*, DOT HS 809 156 (U.S. Department of Transportation, 2000).

[3] N. F. Maartens, A. D. Wills, and C. B. Adams, "Lawrence of Arabia, Sir Hugh Cairns, and the Origin of Motorcycle Helmets," *Neurosurgery*, vol. 50, no. 1 (2002), pp. 176–179.

Helmet Effectiveness

Head injury is a leading cause of death in motorcycle crashes.[4] The use of a safety helmet, one that complies with FMVSS 218, is the "single critical factor in the prevention [and] reduction of head injury."[5] The main function of the helmet is to protect the rider's head, especially the brain, during a fall or crash. The FMVSS 218-compliant helmet is designed with a hard outer shell, an impact-attenuating liner, and a retention system to protect the structure and contents of the head in a variety of impact scenarios.

Helmets can be effective in both low- and high-speed crashes because crash speed is not directly related to head impact speed. In the Hurt Report, the severity of head impacts was determined by examining crash-involved helmet damage. This study found that 90 percent of head impacts were less severe than the single test impact required in FMVSS 218. Thus, FMVSS 218-compliant helmets are well designed to protect the head for the vast majority of motorcycle crashes.

The effectiveness of appropriately designed motorcycle helmets in preventing and mitigating head injury is unequivocal. A 1991 report reviewing published studies concluded that motorcycle helmet use has lowered fatality rates, prevented serious head injuries, and reduced the need for ambulance service, hospitalization, neurosurgical intervention, intensive care, rehabilitation, and long-term care in motorcyclist accidents.[6] The 2003 independent Cochrane Review of published studies found that helmets substantially reduced the risk of head injury and fatality in motorcycle crashes, and found no evidence of an increased risk of any other types of injury.[7] A 1996 DOT report noted that riders not wearing helmets are three times more likely to suffer brain injury than those riders wearing helmets.[8] According to another DOT report published in 2004, helmets are 37 percent effective in preventing *all* fatalities in motorcycle crashes.[9]

David Thom, one of the lead researchers involved with the Hurt Report, spoke at the Safety Board's Motorcycle Forum about the potential negative effects of helmets on safety. An active motorcyclist and researcher on motorcycle safety for three decades, Mr. Thom noted that helmets neither cause nor prevent neck injuries. A large number of scientific studies confirm

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[4]NHTSA, *Traffic Safety Facts*, Motorcycle Helmet Use Laws, January 2006.

[5]H. H. Hurt, J. V. Ouellet, and D. R. Thom, *Motorcycle Accident Cause Factors and Identification Countermeasures*, DOT HS 805 862 (Washington, DC: National Highway Traffic Safety Administration, 1981).

[6]*Highway Safety: Motorcycle Helmet Laws Save Lives and Reduce Costs to Society*, General Accounting Office (GAO), RCED-91-170 (1991).

[7]B. Liu, R. Ivers, R. Norton, S. Blows, and S. K. Lo, "Helmets for Preventing Injury in Motorcycle Riders," *Cochrane Database of Systematic Reviews*, Issue 4 (2003).

[8]*The Crash Outcome Data Evaluation System (CODES): Technical Report*, DOT HS 808-338 (January 1996).

[9]*Motorcycle Helmet Effectiveness Revisited*, DOT HS 809-715 (March 2004).

Mr. Thom's observations.[10] Similarly, helmets do not cause problems with vision or hearing.[11,12]

A number of motorcycle-related groups, including the National Association of State Motorcycle Safety Administrators, the MSF, and the American Motorcyclist Association, encourage riders to wear motorcycle helmets, and most do not oppose laws mandating such use by minors. The NAMS report, which was supported by NHTSA, the MSF, and motorcycle manufacturers such as BMW, Ducati, Harley-Davidson, American Honda Motor Company, Kawasaki, Suzuki, and Yamaha, included an urgent recommendation[13] to increase the use of FMVSS 218-compliant helmets. A national survey performed in 2006 by the Scripps Survey Research Center at Ohio University noted that, even of those individuals who had previously ridden a motorcycle *without* a helmet, 61 percent favored state requirements for motorcycle helmet use.[14]

The Safety Board recognizes, however, that some motorcyclists and many motorcycling organizations oppose mandating the use of motorcycle helmets by all riders. Most do not argue against the safety benefits of such helmets; instead, they contend that the government has no role in protecting the individual from foreseeable adverse outcomes if the individual chooses not to be so protected.

In the 1980s, opponents of seat belt use laws similarly asserted their personal freedom to drive without wearing seat belts. However, in 1985, the Motor Vehicle Manufacturers Association stated, "the evidence is clear and dramatic . . . safety belt users . . . experienced 80 percent fewer deaths from head injuries."[15] NHTSA estimates that from 1975 through 2005, seat belts saved more than 211,000 lives nationwide. During that same period, all states, except New Hampshire, enacted mandatory seat belt use laws; and usage rates have increased nationwide from about 12 percent in the early 1970s to 81 percent today. The Safety Board is confident that there is ample evidence that similar life saving results can be achieved through motorcycle helmet laws that apply to all riders and passengers.

Universal Helmet Laws

By 1976, following passage of the 1966 National Highway Safety Act, which withheld federal funding for states that had not enacted mandatory helmet laws, 47 states, the District of Columbia, and Puerto Rico had mandatory helmet laws that applied to all motorcycle riders.[16] Since that time, motorcycle groups have lobbied extensively against such laws, and restrictions

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[10]See, for instance: (a) GAO, 1991; (b) Liu, 2003; and (c) B. J. Eastridge, S. Shafi, J. P. Minei, D. Culica, C. McConnel, and L. Gentilello, "Economic Impact of Motorcycle Helmets: From Impact to Discharge," *Journal of Trauma* (2006), 60, pp.978 –984, among others.

[11]A. J. McKnight, and A. S. McKnight, "The Effects of Motorcycle Helmets Upon Seeing and Hearing," *Accident Analysis and Prevention*, vol. 27, no. 4 (1995), pp. 493–501.

[12] Hurt, 1981.

[13]See the attachment to this letter for a listing of all NAMS recommendations.

[14]Scripps Howard News Service, Poll Results: "Even Those Who Ride Without Helmets Favor New Laws," August 23, 2006.

[15]Motor Vehicle Manufacturers Association brochure (Detroit, Michigan: March 1985).

[16]M. M. Jones and R. Bayer, "Paternalism and Its Discontents: Motorcycle Helmet Laws, Libertarian Values, and Public Health," *American Journal of Public Health*, vol. 97, no. 2 (February 1997), pp. 208–217.

on federal funding contingent on such laws were removed (in 1976), partially re-enacted (in 1991), and then removed again (in 1995). Currently, only 20 states, the District of Columbia, and 4 territories have universal helmet laws (requiring all riders to wear a helmet), 27 states and 1 territory have partial laws (requiring minors and/or passengers to wear such helmets), and 3 states have no helmet laws.[17] (See the table below.) Each removal of federal funding restrictions was followed by a wave of repeals of universal helmet laws.

Motorcycle helmet law status for the United States and territories.[18]

Universal Helmet Laws	Partial Helmet Laws	No Helmet Laws
Alabama[a]	Alaska[c]	Illinois
California	Arizona[a]	Iowa
District of Columbia[a]	Arkansas	New Hampshire
Georgia	Colorado	
Louisiana	Connecticut	
Maryland[b]	Delaware[c]	
Massachusetts	Florida	
Michigan[b]	Hawaii	
Mississippi[a]	Idaho[a]	
Missouri	Indiana[b]	
Nebraska	Kansas	
Nevada[b]	Kentucky	
New Jersey	Maine[c]	
New York	Minnesota	
North Carolina[a]	Montana	
Oregon	New Mexico	
Tennessee	North Dakota	
Vermont	Ohio[b]	
Virginia[c]	Oklahoma	
Washington	Pennsylvania	
West Virginia[c]	Rhode Island[a]	
	South Carolina[a]	
American Samoa[a]	South Dakota[b]	
Northern Mariana Islands[a]	Texas	
Puerto Rico[a]	Utah[b]	
Virgin Islands[a]	Wisconsin	
	Wyoming[a]	
	Guam[a]	

[a]Law/regulation does not specify FMVSS 218 compliant.
[b]Law/regulation specifies a dated version of FMVSS 218.
[c]Law/regulation allows standards other than FMVSS 218.

These repeals have amounted to a vast experiment affirming the effectiveness of helmet laws and regulations in reducing death and injury. A 1991 review of studies of helmet use found that helmet use under universal laws ranges from 92 to 100 percent, while without a law or under a partial law (requiring only some riders to wear helmets), helmet use generally ranges from 42 to 59 percent. [19] A 1986 study concluded that the repeal of helmet use laws was associated with a 10.4

[17]NHTSA *Traffic Safety Facts*, January 2006.
[18]Law applies to all motorcycles as defined by the individual state.
[19]GAO, 1991

to 33.3 percent increase in the fatality rate (when calculated per accident).[20] The study also found that between 158 and 420 fewer motorcycle rider fatalities would have occurred in 1984 had the laws not been repealed. More recently, studies of states that have repealed their mandatory helmet laws within the last 10 years have shown similar patterns.

For example, Arkansas repealed its universal helmet law in 1997, and, 18 months after repeal, saw helmet use drop by two-thirds (from 97 to 30 percent).[21] After the repeal, Arkansas experienced more than double the number and rate of unhelmeted crash scene fatalities, and more than double the hospital admission rate for unhelmeted motorcycle crash survivors.[22] Associated with this increase in death and injuries was a substantial increase[23] in the amount of nonreimbursed charges for initial treatment.

After Texas repealed its universal helmet law in 1997, helmet use fell from 97 to 66 percent. More than 80 additional motorcyclists died in the 2 years following the law's repeal than in the 2 years preceding it. The number of unhelmeted riders with traumatic brain injuries skyrocketed from 55 in 1997 to 511 in 2001, and the number of unhelmeted riders who were placed in rehabilitation facilities saw similar increases, from 9 in 1997 to 90 in 2001.[24]

In Kentucky, helmet usage rates tumbled from 96 to 65 percent following repeal of the state's universal helmet law in 1998; motorcycle fatalities increased from 26 in the year prior to repeal to 42 in the year following repeal. Accident-involved motorcycle riders who did not wear helmets in Kentucky were 4 times more likely to suffer a traumatic brain injury[25] and severe head injury.[26,27] In addition, hospital charges alone averaged more than $25,000 more for the unhelmeted motorcyclist than for the helmeted motorcyclist involved in an accident.

Louisiana saw a drop from 100 to 52 percent of riders wearing helmets after it amended its helmet law in 1999 to remove the universal requirement for helmet use. The motorcycle fatality rate increased by more than 25 percent following the repeal, with unhelmeted accident-involved riders experiencing head injuries at twice the rate of helmeted riders.[28] Nearly 60 more motorcyclists died in the 2 years following the law's repeal than in the 2 years preceding it. In

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[20]V. A. DeWolfe, *The Effect of Helmet Law Repeal on Motorcycle Fatalities* (Contract), DOT HS-807-065 (Washington, DC: NHTSA, 1986).

[21]G. H. Bledsoe, S. M. Schexnayder, M. J. Carey, W. N. Dobbins, W. D. Gibson, J. W. Hindman, T. Collins, B. H. Wallace, J. B. Cone, and T. J. Ferrer, "The Negative Impact of the Repeal of the Arkansas Motorcycle Helmet Law," *Journal of Trauma*, vol. 54, no. 6 (December 2002), pp. 1078–1086.

[22]Additionally, the percentage of head injuries classified as severe was twice as high among unhelmeted crash-involved riders admitted to the hospital as compared to helmeted riders.

[23]That is, a total of $982,560 of additional potential revenue was lost during the study period.

[24]M. C. Race and M. C. Carlile, "Motorcycle-Related Injuries: the High Costs of Riding," *Texas Medicine*, vol. 100, no. 10 (October 2004), pp. 56–63.

[25]In this study, traumatic brain injury is defined using standard Centers for Disease Control and Prevention Case Definitions.

[26]Severe head injury was defined in this study as an Abbreviated Injury Scale (AIS) code of 3 or greater for the head.

[27]W. J. Christian, M. Carroll, K. Meyer, T. W. Vitaz, and G. A. Franklin, "Motorcycle Helmets and Head Injuries in Kentucky, 1995-2000," *Journal of the Kentucky Medical Association*, vol. 101, no. 1 (January 2003), pp. 21–26.

[28]E. L. Ho and M. J. Haydel, "Louisiana Motorcycle Fatalities Linked to Statewide Helmet Law Repeal," *Journal of the Louisiana State Medical Society*, vol. 156, no. 3 (May–June 2004,) pp. 151–152, 154–155, 157.

spite of a legal requirement for unhelmeted riders to carry health insurance, the insurance coverage for unhelmeted riders involved in accidents actually decreased by half following the change in the law. In 2004, in response to the continuing rise in deaths and injuries, Louisiana reenacted the universal helmet law and saw the total number of motorcyclist deaths decline in 2004 and 2005.

Florida repealed its universal helmet law in 2000. After the repeal, helmet wear decreased from 100 to 53 percent, motorcycle deaths increased by almost 50 percent, and the number of serious brain injuries doubled.[29,30,31] An estimated 117 motorcycle deaths in Florida could have been avoided from 2001 to 2002 if the universal law had remained in place.

The results of this experiment on motorcycle riders are the same in every state where it has been performed. When universal helmet laws are repealed, helmet usage rates decrease dramatically, while motorcycle deaths and injuries increase markedly, even when accounting for the changes in ridership that may be associated with the repeal of the universal law. It is likely that hundreds of deaths and thousands of serious injuries could have been avoided had the states that recently repealed their universal helmet laws not done so.

Why Universal Helmet Laws?

Most states that have repealed universal helmet laws recognize that younger riders may be unable to make a fully informed decision regarding helmet use. They have therefore required that riders under a certain age wear helmets. Unfortunately, it is difficult to ascertain the age of a motorcycle rider for the purposes of enforcing such a requirement without verifying the rider's age during a traffic stop. As a result, helmet usage rates for minors drop dramatically when universal helmet laws are repealed.[32] These younger riders are likely to be among the least experienced riders and are the most likely to engage in risky behaviors, often with an incomplete understanding of potential consequences.[33,34] Thus, the most vulnerable and least risk-averse segments of the motorcyclist population are more likely to be unprotected in the absence of universal laws.

The argument regarding helmet laws is often framed in terms of personal choice (for example, "it's my head"). Such an argument typically invokes the idea that motorcyclists are only hurting themselves by deciding to ride unprotected. For over 10 years, the Safety Board has been responsible for assisting families of those killed and injured in accidents. We do not accept

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[29]A. Muller, "Florida's Motorcycle Helmet Law Repeal and Fatality Rates," *American Journal of Public Health*, vol. 94, no. 4 (April 2004), pp. 556–558.

[30]S. Y. Kyrychenko and A. T. McCartt, "Florida's Weakened Motorcycle Helmet Law: Effects on Death Rates in Motorcycle Crashes, *Traffic Injury Prevention*, vol. 7, no. 1 (March 2006), pp. 55–60.

[31]G. A. Hotz, S. M. Cohn, C. Popkin, P. Ekeh, R. Duncan, E. W. Johnson, F. Pernas, and J. Selem, "The Impact of a Repealed Motorcycle Helmet Law in Miami-Dade County," *Journal of Trauma*, vol. 52, no. 3 (March 2002), pp. 469–474.

[32]See, for instance, Muller, 2004; and Kyrychenko, 2006, among others.

[33]S. A. Everett, R. A. Shults, L. C. Barrios, J. J. Sacks, R. Lowry, and J. Oeltmann, "Trends and Subgroup Differences in Transportation-Related Injury Risk and Safety Behaviors Among High School Students, 1991-1997," *Journal of Adolescent Health*, vol. 28, no. 3 (March 2001), pp. 228–234.

[34]D. A. Spain, P. W. Boaz, D. J. Davidson, F. B. Miller, E. H. Carrillo, and J. D. Richardson, "Risk-Taking Behaviors Among Adolescent Trauma Patients," *Journal of Trauma*, vol. 43, no. 3 (September 1997), pp. 423–426.

the notion that surviving friends and family are not affected when riders decide not to wear a helmet and are killed or injured.

In addition to family and friends, society as a whole pays the well-documented excess costs[35] for unhelmeted riders:[36] medical care costs; the potentially even greater costs from productivity losses of individuals injured, disabled, or killed; and the costs incurred for first responders. Especially tragic are the fatalities and injuries involving unhelmeted riders in accidents that would have required only a new helmet and cosmetic repairs to the motorcycle, had the rider been wearing a protective helmet.

It is because of the costs to society and survivors that personal freedoms must be balanced with the need to protect individuals from preventable illness, injuries, and fatalities. Passionate arguments regarding motorcycle helmets, seat belts, and many other issues revolve around questions of personal choice versus societal responsibility. The Safety Board has a record of support in the transportation arena for those measures that have proven effective in the mitigation of injuries and prevention of fatalities, such as mandatory seat belt use in cars. Similarly, the remarkable effectiveness of universal helmet laws in the prevention of death and disability among motorcyclists operating on public roads, particularly in light of rising rates and total numbers of individuals killed and injured in motorcycle crashes in this country, is a powerful argument for the adoption of such laws in all states.

The Safety Board commends states' efforts to maintain universal helmet laws and believes that many lives have been saved and countless injuries prevented because of these laws. Because DOT FMVSS 218 provides a proven effective U.S. testing standard that must be met by helmets designed for use by motorcyclists, the Safety Board believes that all states with a universal helmet law should ensure that their laws require usage of helmets that comply with DOT FMVSS 218, rather than a less specifically defined or less universally required standard.

Therefore, the Safety Board makes the following recommendation to the 8 states, the District of Columbia, and the 4 territories with universal motorcycle helmet laws/regulations not specifically requiring FMVSS 218-compliant helmets:

> Amend current laws to specify that all persons shall wear a Department of Transportation Federal Motor Vehicle Safety Standard 218-compliant motorcycle helmet while riding (operating), or as a passenger on any motorcycle. (H-07-40)

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[35]Dr. Ted Miller, Director of the Public Services Research Institute at the Pacific Institute for Research and Evaluation, presented 2005 data on the cost of motorcycle crashes and the effects of helmets on costs at the NTSB Public Forum on Motorcycle Safety. According to Miller, in 2005, 110,000 motorcyclists were involved in police-reported motorcycle crashes, and motorcycle crash injuries cost $17.5 billion, including costs of medical treatment, lost work, and quality of life. Although unhelmeted motorcyclists accounted for only 40,000 (or 36 percent) of the total motorcyclists involved in crashes, they accounted for $12.2 billion (70 percent) of the costs. Miller also estimated the 2005 average cost per crash-involved motorcyclist as $71,000 for helmeted and $310,000 for unhelmeted motorcyclists.

[36]See, for instance: (a) Eastridge, 2006; (b) J. H. Coben, C. A. Steiner, and T. R. Miller, "Characteristics of Motorcycle-Related Hospitalizations: Comparing States With Different Helmet Laws," *Accident Analysis and Prevention*, vol. 39 (2007), pp. 190–196; (c) Bledsoe, 2002; and (d) Christian, 2003, among others.

The Safety Board also issued safety recommendations to the FHWA and NHTSA, and the following recommendation to the states:

> Provide information to the National Highway Traffic Safety Administration (NHTSA) on the effectiveness of your motorcycle safety efforts to assist NHTSA with its effort to reprioritize the National Agenda for Motorcycle Safety recommendations. (H-07-37)

Please refer to Safety Recommendation H-07-40 in your reply. If you need additional information, you may call (202) 314-6177.

Chairman ROSENKER, Vice Chairman SUMWALT, and Members HERSMAN, HIGGINS, and CHEALANDER concurred in this recommendation.

[*Original Signed*]

By: Mark V. Rosenker
Chairman

Attachment 1 – National Agenda for Motorcycle Safety Recommendations

Urgent Recommendations

- Immediate action should be taken by government and industry to address the critical questions in motorcycle safety through comprehensive, in-depth studies as well as studies focused on specific topics.
- Continue to discourage mixing alcohol and other drugs with motorcycling.
- Use effective strategies to increase the use of FMVSS 218 compliant helmets.
- Educate operators of other vehicles to be more conscious of the presence of motorcyclists.

Essential Recommendations

- To better utilize data collected by law enforcement personnel, a uniform traffic crash report for police officers should be developed and deployed. A similar format should also be developed for emergency medical services reports. This will permit meaningful comparisons among jurisdictions. All concerned parties should share the resulting information.
- Mechanisms for building academic and funding capacity for ongoing and future motorcycle safety research should be explored.
- Study factors that affect and shape motorcyclists' attitudes and behavior and how they affect crash involvement.
- Using information about how motorcyclists form attitudes about safety issues, create programs that reduce dangerous behavior and reinforce safe behavior.
- Expand motorcycle safety programs to accommodate all who need or seek training.
- Conduct uniform follow-up research into the effectiveness and impact of rider education and training.
- Merge rider education and training and licensing functions to form one-stop operations.
- Commission studies to ensure that licensing tests measure skills and behaviors required for crash avoidance.
- Identify and remove barriers to obtaining a motorcycle endorsement.
- Develop and implement programs to allow all state motorcycle safety programs to issue motorcycle endorsements immediately upon successful completion of rider training courses.
- Enforce penalties for operating a motorcycle without a proper endorsement.
- Encourage states and jurisdictions to provide motorcycle specific training to license examiners administering testing for motorcyclists.
- Conduct research to determine which rider crash avoidance skills are most important.
- Develop countermeasures in training, license testing, and motorcycle technology to address any current crash avoidance deficiencies.
- Evaluate effectiveness of rider education and training in developing crash avoidance skills.
- Study how alcohol, drugs and other substances, including over-the-counter medications, can affect a motorcyclist's operating skills.
- Study the alcohol, drug and other substance use patterns of motorcyclists.
- Educate law enforcement about unique alcohol-related behavior of motorcyclists.
- Encourage partnerships with groups already involved in alcohol/substance abuse issues related to motor vehicle crashes, e.g., Mothers Against Drunk Driving (MADD), Students Against Destructive Decisions (SADD).
- Educate motorcyclists about the value of protective apparel by providing an information source on related research and a forum for the exchange of information.
- Find ways to more effectively communicate the benefits of helmet use and work toward making voluntary use of FMVSS 218 compliant helmets more widely accepted.

- Use effective strategies to ensure that all helmets in use meet FMVSS 218.
- Revise FMVSS 218.
- Remind motorcyclists that they may be overlooked and provide defensive strategies for overcoming this situation.
- Include questions regarding motorcyclists on driver's license tests and include information in driving manuals.
- Include the completion of a motorcyclist awareness class in sanctions against motorists found guilty of violating a motorcyclist's right-of-way.
- Adequate funding needs to be devoted to the development and implementation of motorist awareness issues.
- Insurers should write policies that stipulate that coverage or certain portions of coverage are not valid if the owner permits an unlicensed or improperly licensed operator to use the motorcycle.
- Educate law enforcement and judicial officials about unique motorcycle safety issues and resources.
- Encourage inclusion of law enforcement officials in Motorcycle Safety Program Assessments.
- Develop and implement standardized data gathering and reporting for motorcycle crashes.
- Include motorcycle crash investigation procedures in the basic course given to crash investigators.
- Appropriate sanctions should be applied to those found guilty of contributing to motorcycle crashes. The sanctions, such as mandatory attendance at a motorcycle awareness course, would be designed to expand knowledge of motorcycle issues.
- Traffic safety organizations outside of the motorcycling community can better influence motorcycle safety issues by becoming more educated about motorcycle safety issues and adopt them where applicable.
- Increase funding for motorcycle safety programs by elevating their importance to state highway safety offices.
- Representatives of the motorcycle safety community should be integrated into the larger highway safety community to improve cooperative efforts.
- Conduct research to determine how current motorcycle designs affect crash and injury causation.
- Implement the use of available tire and wheel technology and explore technology, such as run-flat tires, to reduce frequency of loss-of-control crashes caused by puncture flats.
- Study the effectiveness of linked and antilock braking in the field. If these technologies prove valuable, deploy them more widely.
- Conduct research to determine why other motorists fail to see and identify motorcyclists and implement countermeasures.
- Encourage motorcyclists to enhance their conspicuity.
- Encourage manufacturers to make motorcycle apparel and parts conspicuous.
- Reconsider state requirements that prohibit safe conspicuity-enhancing modifications, including safe modification to lighting systems.
- Study the safety implications of lane splitting.
- Identify and prioritize roadway hazards to motorcycle operation.
- Develop and revise highway standards on all levels—federal, state, county, and local—to reflect the needs of motorcyclists and encourage motorcycle-friendly design, construction, and maintenance procedures.
- Create a working group to recommend changes to highway standards to increase motorcycle safety.
- Post specific warnings for motorcyclists where unavoidable hazards exist.
- Revise the *Manual on Uniform Traffic Control Devices (MUTCD)* so that signage better communicates roadway or construction conditions that present hazards to motorcyclists.
- Educate motorcyclists about the hazards created by common roadway defects and maintenance methods. Emphasize riding skills required to negotiate these hazards through education and training.
- Take steps to remove slippery sealants and repair substances applied to road surfaces.
- Educate road design and maintenance personnel about conditions that pose hazards to motorcyclists.

- Educate motorcyclists about strategies to overcome the challenges that the designs of other vehicles create in the traffic environment.
- Integrate a motorcyclist treatment component in emergency medical personnel training.
- Integrate a motorcyclist treatment component in first-aid/bystander care training and encourage motorcyclists to obtain this training.
- Include motorcycles in the design and deployment of Intelligent Transportation Systems.

Necessary Recommendations

- Create a clearinghouse to distribute current, practical information about motorcycle safety based on recent research.
- Develop research-based safety information that can be used easily by the consumer media and in rider education and training systems.
- Explore public service announcements, advertising in enthusiast and near-enthusiast media, and any other viable avenues for distributing safety information.
- Increase the number of states conducting Motorcycle Safety Program Assessments.
- Establish benchmarks for rider education and training effectiveness and program operation excellence.
- Explore the effectiveness of on-street training.
- Develop an enhanced motorcycle licensing model using appropriate GDL concepts and evaluate its effectiveness.
- Evaluate the need for motorcycle simulator skills training.
- Examine technological approaches such as pre-crash warning and avoidance systems to enhance crash prevention.
- Conduct research regarding protective apparel effectiveness, and consider development or adoption of existing standards, if research justifies.
- Collect, organize, analyze, and distribute motorcycle-specific loss data from insurers to better understand safety issues, and to educate riders and other motorists on motorcycling safety issues.
- Develop guidelines for insurers to tie approved training, licensing, and safe-riding practices to premium reductions.
- Use information from research to implement other braking-related countermeasures.
- Provide additional training and education on proper braking and panic-braking techniques.
- Study the role of modifications in current motorcycle crashes.
- Educate users about how modifications and loads can change the operating characteristics of their motorcycles.
- Conduct research on the effect of automobile DRL on motorcycle safety.
- Educate motorcyclists about lane-use strategies, including HOV lane usage.
- Reduce roadway debris such as that resulting from uncovered loads and shorn retreads.
- Emphasize motorcycle safety issues as a consideration in the design of other vehicles.
- Investigate how the designs of other vehicles affect motorcycle safety.
- Identify opportunities to utilize the *EMS Agenda for the Future* to promote motorcycle safety.

Distribution List – FMVSS 218 only

Honorable Robert Riley
Governor of Alabama
State Capitol
600 Dexter Avenue
Montgomery, Alabama 36130-2751

Honorable Adrian M. Fenty
Mayor of the District of Columbia
John A. Wilson Building
1350 Pennsylvania Avenue, N.W.
Washington, D.C. 20004

Honorable Martin O'Malley
Governor of Maryland
State House
100 State Circle
Annapolis, Maryland 21401

Honorable Jennifer M. Granholm
Governor of Michigan
Post Office Box 30013
Lansing, Michigan 48909

Honorable Haley Barbour
Governor of Mississippi
Post Office Box 139
Jackson, Mississippi 39205

Honorable James A. Gibbons
Governor of Nevada
Executive Chambers
101 North Carson Street
Carson City, Nevada 89701

Honorable Michael F. Easley
Governor of North Carolina
20301 Mail Service Center
Raleigh, North Carolina 27699-0301

Honorable Tim Kaine
Governor of Virginia
Office of the Governor
Patrick Henry Building, Third Floor
1111 East Broad Street
Richmond, Virginia 23219

Honorable Joe Manchin III
Governor of West Virginia
1900 Kanawha Boulevard, East
Charleston, West Virginia 25305

Honorable Togiola Tulafono
Governor of American Samoa
Office of the Governor
Executive Office Building
Third Floor, Utulei
Pago Pago, American Samoa 96799

Honorable Benígno Fitial
Governor of the Northern Mariana Islands
Office of the Governor
Caller Box 10007
Capital Hill
Saipan, Marianas Province 96950

Honorable Aníbal Acevedo-Vilá
Governor of Puerto Rico
Post Office Box 902082
San Juan, Puerto Rico 00902-0082

Honorable John P. deJongh, Jr.
Governor of the U.S. Virgin Islands
Office of the Governor
Government House, 21-22 Kongens Gade
Charlotte Amalie
St. Thomas, U.S. Virgin Islands 00802

Safety Recommendation Reiteration List

SR Number	Reiteration Number	Report Number	Report Date	Accident Description	Accident City	Accident State	Accident Date
H-07-040	1	HAR-20-04	12/17/2020	Collision of pickup truck with trailer with group of motorcycles	Randolph	NH	6/21/2019