

Noisy Motorcycles

An Environmental Quality-of-Life Issue

a roundtable sponsored by
The INCE Foundation and The Noise Control Foundation

hosted by
The National Academy of Engineering, Washington, DC

George C. Maling, Jr. and Cori Vanchieri, Rapporteurs

William W. Lang and Eric W. Wood, Editors

The logo for the Institute of Noise Control Engineering of the USA (INCE). It consists of the letters 'INCE' in a bold, stylized, outlined font. The letters are white with a dark blue outline, and they are set against a light blue background.

Institute of Noise Control Engineering of the USA

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FINAL REPORT

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Institute of Noise Control Engineering of the USA

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ORGANIZATIONS

Advancing Noise Control Engineering

The **International Institute of Noise Control Engineering (I-INCE)** is an international, nonprofit, nongovernmental consortium of more than 40 member organizations with interests in the control of noise and vibrations that produce noise. I-INCE was chartered in Zürich in 1974 on the basis of Swiss Civil Law. The objectives of I-INCE are to sponsor annual international congresses on noise control engineering in the INTER-NOISE series as well as other specialized conferences, and to promote cooperation in research on the application of engineering principles for the control of noise and vibrations. I-INCE undertakes technical initiatives and produces reports on important issues of international concern within the I-INCE field of interest.

The **Institute of Noise Control Engineering of the USA (INCE/USA)** is a nonprofit, professional-membership organization incorporated in 1971 in Washington, DC. A primary purpose of the Institute is to promote engineering solutions to noise problems. INCE/USA is a Member Society of the International Institute of Noise Control Engineering (I-INCE). INCE/USA has two publications, the *Noise Control Engineering Journal* (NCEJ) and *NOISE/NEWS International* (NNI). NCEJ contains refereed articles on all aspects of noise control engineering. NNI contains news on noise control activities around the world, along with general articles on noise issues and policies.

The **Institute of Noise Control Engineering Foundation (INCE Foundation)** is a nonprofit, tax-exempt, publicly supported, charitable organization established in 1993 and incorporated in New York as a Section 501(c)(3) organization. The purposes of the Foundation are to support, promote, and advance scientific and educational activities directed toward the theory and practice of noise control engineering and to promote and support such scientific and educational activities through grants, funding, and financial assistance to various individuals, institutions, and organizations.

The **Noise Control Foundation (NCF)** was established in 1975 to provide administrative services to the newly-formed INCE/USA. It is a nonprofit, tax-exempt organization incorporated in New York as a Section 501(c)(3) organization. At the end of the century when administrative support for INCE/USA was transferred to a commercial organization, NCF was re-chartered to be devoted to the development of national and international policies as related to the technological aspects of noise control engineering.

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Preface

The report, *Technology for a Quieter America*, was published by the National Academies Press in October 2010 and was the result of a five-year study by the National Academy of Engineering (NAE) of the environmental noise situation in the United States. The report includes findings and recommendations for government, industry, and public actions that may mitigate or eliminate those noise sources that pose a threat to public health and welfare.

In 2011 the Institute of Noise Control Engineering (INCE) Foundation and the Noise Control Foundation established the Technology for a Quieter America (TQA) Follow-up Program to identify specific noise topics and to develop relevant recommendations aimed at improving the noise climate in the United States. The TQA Follow-up Program consists of a series of events involving experts in selected TQA topic areas to further assess specific noise issues and publish a series of recommended remediation measures.

This report presents the results of one TQA Follow-up event, a roundtable titled *Noisy Motorcycles—An Environmental Quality of Life Issue*, which was sponsored by the INCE Foundation and the Noise Control Foundation. The roundtable was hosted by the NAE at the National Academies Keck Center, Washington, DC, on October 24, 2012. Several factors led to the roundtable. First, it is widely recognized that excessive motorcycle noise is a quality-of-life issue in the United States. Second, the Environmental Protection Agency's (EPA's) federal regulation regarding motorcycle noise emissions (40CFR205) is now over 30 years old and does not reflect current motorcycle design, technology, or operator use patterns. Third, various elements in the regulation currently preclude effective enforcement of noise emissions from motorcycle exhaust systems by state or local authorities. Finally, on May 10, 2012, President Obama issued an Executive Order titled "Identifying and Reducing Regulatory Burdens," directing all federal agencies to review and revise or rescind those requirements that impose unnecessary burdens on industry and the public and that are without public benefit.

The roundtable and this report respond to the above factors. The agenda for the roundtable, developed with emphasis on specific elements of the current federal motorcycle noise regulation, is presented in Appendix A. Appendix B identifies the wide variety of interests represented at the roundtable, where participants offered their respective positions and recommendations.

It is expected that there will be a continuing dialog between roundtable participants and related stakeholders, particularly state and local governments, manufacturers of motorcycles, and manufacturers of replacement exhaust systems. We anticipate that the EPA will consider appropriate revisions to the federal regulation that will replace confusion with clarity and provide needed enforcement tools to state and local authorities to provide necessary benefits to the public.

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Acknowledgements

This report has been reviewed in draft form by members of the Technology for a Quieter America (TQA) Advisory Board, all of whom are noted for their technical expertise in noise control engineering and acoustics. The rapporteurs, George Maling and Cori Vanchieri, were assisted in the preparation of this report by a technical editing team consisting of Eric Wood, whose efforts before, during, and following the roundtable have been invaluable, as well as the co-chairs of the roundtable, Kenneth Feith and William Lang.

The Steering Committee members are grateful to the many stakeholders whose representatives participated in the roundtable. They shared their expertise, insights, and best ideas to establish a collegial atmosphere. Representatives of federal regulatory agencies, state and local governments, universities, consultancies, and consumer organizations participated in the roundtable. These included EPA, DOT, State Police, state government, local government, and environmental groups.

The following organizations representing motorcycle manufacturers, riders, and aftermarket manufacturers contributed actively to the discussion:

- The Motorcycle Industry Council
- The American Motorcyclist Association
- American Honda Motor Co., Inc.
- Yoshimura R&D of America
- Vance and Hines

A complete listing of attendees and their organizations can be found in Appendix B.

Thanks also to the staff of the NAE, which hosted the roundtable. Proctor Reid, Program Director, and his assistant Vivienne Chin made the roundtable possible through their supportive efforts to ensure that the event ran smoothly. The nine references to motorcycles and motorcycle noise in the NAE's TQA report provided the motivation for this roundtable.

Finally, thanks to the NAE's Committee chaired by George Maling, that produced the *Technology for a Quieter America* report with its numerous findings and recommendations which served, in part, to focus attention on motorcycle noise.

Quote-Unquote

“Some motorcycle owners change exhaust pipes to personalize the appearance. And many who modify their bikes' exhaust systems simply want the noise, often for vanity's sake.”

Jim McCaslin former CEO of Harley-Davidson, *Motorcycle Cruiser*, February 2009

“At the moment, many law-enforcement agencies find their hands tied. They cite motorcyclists for an obviously loud exhaust, but in court they lose because the wording of laws makes the standard unclear or the measurement requirements too difficult.”

Art Friedman, *Motorcycle Cruiser*, February 2009

“So from an implementation standpoint, what makes the most sense is doing it at a state level...”

Imre Szauter, American Motorcyclist Association,
Noisy Motorcycles roundtable, October 24, 2012



Roadside Sign in Maine

“Of the myriad issues facing motorcyclists today, excessive motorcycle sound has become the single greatest threat to American motorcycling's future. It's among the most controversial and potentially divisive issues in motorcycling and, we believe, the issue over which motorcyclists have the most control.”

Edward Moreland Chairman, Motorcycle Sound Working Group
Vice President, American Motorcyclist Association Government Relations
Sound Advice, July 2005

“I think sometimes, you know, they say the patient has to agree he's sick before he can ever get well. I think we have to admit that this rule, and I think maybe I can say this, since I had a role in it, this rule has been a failure.”

Charles Elkins, former director of the noise control program
at the U.S. Environmental Protection Agency

“I can envision one of the responses from a District Court judge who's going to hear the case if it's contested, is: Trooper, you're asking me to now enforce a federal law; am I hearing you correctly? And the life expectancy of that case then in the court would be very short lived.”

Sergeant Stephen Kace, New Hampshire State Police
Noisy Motorcycles roundtable, October 24, 2012

“The single greatest threat to motorcycling in America—both on- and off-highway, including ATVs—is excessive exhaust sound.”

Rob Dingman, president American Motorcyclists Association,
RoadRacing World.com, February 10, 2009

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EXECUTIVE SUMMARY

In December, 1980, the U.S. Environmental Protection Agency (EPA) issued a federal regulation on the noise emissions of motorcycles¹ under the authority of the Noise Control Act of 1972. Although EPA's Office of Noise Abatement and Control (ONAC) was defunded in 1981, the regulation is still part of the Code of Federal Regulations (40CFR205). After 32 years of experience with the regulation, there is general agreement that it has not accomplished its intended goal of reducing motorcycle noise emissions. While the regulation has served to insure that all motorcycles entering commerce from major original equipment manufacturers (OEM) are in compliance with the regulation, as written, there are unintended consequences once the product enters service, including modifications that negate the noise control elements installed by the OEM. These regulatory deficiencies would benefit from clarifications and revisions. Motorcycle design has changed, the test procedure has proven difficult to implement, state and local government enforcement is rare, and there is widespread use of motorcycle exhaust systems that are not compliant with the regulation. Excessive motorcycle sound has become the single greatest threat to American motorcycling's future. It's among the most controversial and potentially divisive issues in motorcycling.

President Obama's May 10, 2012, Executive Order, "Identifying and Reducing Regulatory Burdens," tasked government agencies to examine the effectiveness of regulations. This report is a summary of a roundtable sponsored by the INCE Foundation and the Noise Control Foundation that was hosted by the National Academy of Engineering on October 24, 2012. This report includes recommendations for revisions to 40CFR205 that will increase benefits to the public, and assist state, and local authorities as well as manufacturers of motorcycles and aftermarket exhaust systems in assuring compliance with the regulation. Participants at the roundtable included motorcycle manufacturers and exhaust system manufacturers, trade associations, a standards organization, federal, state, and local government agencies, noise control engineers, and the public. The following topics were discussed:

NOISE TEST PROCEDURES

The noise test procedure in the regulation, a full-throttle maximum acceleration test, requires a test track and professional drivers and therefore is not an effective enforcement tool for state and local governments. A stationary test referred to as SAE J2825 Recommended Practice, promulgated by SAE International could, with changes, be a

¹ *Code of Federal Regulations, Title 40 (Protection of Environment), Part 205 (Transportation Equipment Noise Emission Controls), referred to as 40CFR205 throughout this report.*

supplementary procedure that would aid both exhaust system manufacturers and state and local governments in evaluating exhaust system noise.

ACOUSTICAL ASSURANCE PERIOD

The regulation includes an Acoustical Assurance Period (AAP), which specifies a relatively short period during which a motorcycle's noise abatement elements must be in compliance with the federal regulation during street usage. Some have interpreted this to mean that, once the AAP has expired, the regulation no longer applies. The wording of the regulation needs clarification that noise emission limits apply for the life of the motorcycle.

EXHAUST SYSTEMS

The vast majority of newly manufactured motorcycles, which contain catalytic converters as part of their exhaust systems, are compliant with the regulation. There is no need to change the current noise standard for on-street motorcycles. Noise problems occur when the original equipment manufacturer's exhaust system, including the catalytic converter, is replaced with noncompliant components. If aftermarket exhaust system manufacturers were allowed to use a simpler test that was less of a financial burden such as a modified SAE J2825, problems of noncompliant aftermarket exhaust systems could be reduced.

In addition, the federal regulation treats street-legal motorcycles quite differently from motorcycles used in competition. However, many owners/operators convert street-legal motorcycles to competition bikes for racing, then back to street-legal bikes. This appears to be disallowed in the current regulation and should be addressed.

TAMPERING

Modifying the exhaust system is considered tampering and is not permitted if the change causes the noise emissions to exceed limits specified in the regulation. However, because state and local authorities do not have a simple in-use noise emission test it is not feasible to enforce tampering provisions. EPA acceptance of SAE J2825 could enhance enforcement.

LABELING

The federal regulation requires labeling of both the motorcycle and exhaust system to indicate compliance. However, labels can be difficult to find and motorcycle owners/operators don't like them. In addition, a label may indicate compliance even when the motorcycle and or exhaust system has become noncompliant. A change in the regulation to replace the label with a two-dimensional bar code (e.g. QR code) that includes noise levels measured according to SAE J2825 could assist with state and local enforcement. The regulation could also be clarified to require that the bar code be maintained in a readily visible location.

STATE AND LOCAL ISSUES

Throughout the roundtable, EPA's acceptance of a stationary noise test procedure such as SAE J2825 was offered as a possible solution to existing barriers to street ready motorcycle noise control. However, preemption considerations raise questions as to whether exhaust system manufacturers and state and local governments are permitted to

use such a procedure. Does the federal regulation on the noise emissions of motorcycles preclude these entities from adopting a stationary noise test procedure that is different from the procedure within the regulation? Participants suggested that the EPA address this issue either in the federal regulation or in a model noise emission ordinance for motorcycles.

Other state and local issues pertain to alternative enforcement procedures such as an audibility-at-a-distance regulation and educational opportunities to change the behavior of motorcyclists who prefer “loud pipes.”

RECOMMENDATIONS

Recommendations for each chapter are included in the final chapter of this report.

INTRODUCTION

BACKGROUND

On October 24, 2012, the National Academy of Engineering (NAE) hosted a roundtable sponsored by the INCE Foundation and the Noise Control Foundation. The purpose of the roundtable was to discuss motorcycle noise in America, its adverse impact on the public, and the feasibility of making the U.S. Environmental Protection Agency's (EPA) regulations more user friendly for state and local enforcement officials to adopt and enforce. The agenda for the roundtable can be found in Appendix A. Participants included representatives from the motorcycle industry, motorcycle users, local and state law enforcement officials, relevant Federal government agencies, and consultants. Attendees are listed in Appendix B.

The roundtable was a follow-up event to implement the findings and recommendations of the NAE's *Technology for a Quieter America* (TQA) report (NAE 2010). The TQA report identified motorcycles as having a major adverse noise impact on communities and the quality of life of their residents. Excessive motorcycle sound has become the single greatest threat to American motorcycling's future. It is among the most controversial and potentially divisive issues in motorcycling.

This situation exists today even though federal noise emission limits on new motorcycles have been in place since the late 1970s.² Although state and local government authorities have endeavored to correct this situation through state laws and local ordinances, they have been less than successful. This is, in-part, because of federal preemption of state laws, a very complex motorcycle noise test procedure required by the federal regulations, and the absence of an in-use testing procedure that is relatively easy to implement by state and local authorities.

In 1972, Congress passed the Noise Control Act of 1972 (see Box 1-1), which provides that the Administrator of the EPA shall coordinate the programs of all federal agencies relating to noise research and noise control.³

² 40 CFR Part 205, Subparts D and E

³ Full text of the Noise Control Act can be found at <http://www.nonoise.org/lawlib/usc/42/42uscind.htm>

BOX 1-1
The Noise Control Act of 1972, an excerpt

“(a) The Congress finds—

- (1) that inadequately controlled noise presents a growing danger to the health and welfare of the Nation’s population, particularly in urban areas;
- (2) that the major sources of noise include transportation vehicles and equipment, machinery, appliances, and other products in commerce; and
- (3) that, while primary responsibility for control of noise rests with state and local governments, Federal action is essential to deal with major noise sources in commerce control of which require national uniformity of treatment.

“(b) The Congress declares that it is the policy of the United States to promote an environment for all Americans free from noise that jeopardizes their health or welfare. To that end, it is the purpose of this Act to establish a means for effective coordination of Federal research and activities in noise control, to authorize the establishment of Federal noise emission standards for products distributed in commerce, and to provide information to the public respecting the noise emission and noise reduction characteristics of such products.”

As directed by the Noise Control Act, the EPA identified a number of products it determined to be major sources of environmental noise. The EPA published a report on May 28, 1975, identifying new motorcycles as a major source of noise (*Federal Register* 40CFR23105, May 28, 1975).

In December 1980, the EPA Office of Noise Abatement and Control published “Regulatory Analysis for the Noise Emission Regulations for Motorcycles and Motorcycle Exhaust Systems” (EPA 550/9.80.217) and “Regulatory Analysis Appendices for the Noise Emission Regulations for Motorcycles and Motorcycle Exhaust Systems” (EPA 550/9.80.218). The purpose of these two reports was to document the EPA’s findings and present its analysis related to the motorcycle and aftermarket industries. This included moving and stationary noise level test procedures, test sites, noise level databases, the effects of motorcycle noise on public health and welfare, noise reduction technologies, cost of compliance with noise limits, economic impacts, noise regulations in the United States and overseas, a national motorcycle noise control emphasis plan, and consideration of public comments.

Later in December 1980, the EPA issued regulations providing noise emission limits that apply to manufacturers of 1983 and subsequent model year motorcycles for distribution in commerce in the United States and to manufactures of motorcycle replacement exhaust systems. See the Code of Federal Regulations, 40CFR205.

In 1981 the Administration concluded that noise issues were best handled at the state or local government level and phased out the EPA's funding for noise abatement and control. Although not formally transferring primary responsibility of regulating noise to state and local governments, the closure of the federal noise program office effectively placed future noise control with state and local authorities. However, the Congress did not rescind the Noise Control Act of 1972 and its follow-on, the Quiet Communities Act of 1978, which expanded EPA's mission to control noise pollution, as well as undertake research and public information initiatives.⁴ Therefore, both remain in effect today, and the EPA continues to have responsibility for their implementation.

Motorcycles continue to be among the top environmental noise sources and people "cannot find the peace and quiet in their homes that they deserve" (NAE 2010, pg. 13). While the motorcycle noise regulations have been in place for more than three decades, enforcement has become less and less effective over the years. Although most motorcycle manufacturers comply with the EPA regulations by producing relatively quiet vehicles, the problem of excessive noise is primarily due to removal or tampering with their exhaust system, the manner in which some riders operate their motorcycles, and the ready availability of replacement exhaust systems that are noncompliant for street use.

"Everybody at this roundtable agrees that the concept of reducing the noise from an excessively loud motorcycle would be a good thing for this country," noted Acentech's Eric Wood, president of the Institute of Noise Control Engineering of the USA. Tom Austin, representing the Motorcycle Industry Council (MIC), responded that "There are millions of Americans who own motorcycles that disagree with that concept. I think they believe they have a right to have whatever exhaust system on their bike they want. Some of those riders," he added, "believe that loud pipes save lives."

That said, Mr. Austin continued later, "You've got people who really like loud bikes, and MIC and its member companies have come to the decision that for those people that really like loud bikes, that's too bad. We've got to do something to change their habits."

Because of the complexity of the current EPA procedure for determining compliance with the regulations, it is difficult for state and local authorities to prove that the noise limits in the regulations are being exceeded. The regulations also impose costs on industry and on consumers. If a cost-benefit analysis were to be performed today, the results would arguably differ significantly from what they were 30-plus years ago. Technology has changed, the number of motorcycles has greatly increased, and their usage has changed from a recreational vehicle primarily used on weekends or in the countryside to a primary form of transportation for some.

Since 2003 the number of motorcycles owned and used in America grew 19 percent to approximately 10.4 million. That is a 58 percent increase since 1998, estimated then at 6.6 million, according to the Motorcycle Industry Council Owner Survey of 2008.⁵

⁴ Text of the Quiet Communities Act can be found at <http://www.nonoise.org/lawlib/usc/42/4913.htm>

⁵ Information on the MIC motorcycle owners' survey can be found at http://www.mic.org/downloads/newsreleases/2008_Owner_Survey_LH_5-21-2009.pdf

SCOPE AND PURPOSE OF THE ROUNDTABLE

The roundtable focused on those elements of the current federal regulations that fail to provide effective motorcycle noise control by means of federal, state, and local noise control programs as noted in the TQA report (NAE 2010). The objective of the roundtable was:

Through the combined and collaborative efforts of informed participants from state and local governments, the motorcycle manufacturing and replacement parts industry, select federal agencies, and environmental NGOs, the roundtable will identify and assess those elements of the federal regulations that are considered to be obstacles to achieving and maintaining the mandated motorcycle noise reductions.

Discussion focused on the federal regulations as presently written and the changes that are needed to make them more effective for state and local enforcement and to resolve some of the ambiguities that have caused misunderstandings with the terminology and some of the requirements of the regulations.

Justification for the roundtable was validated by the President's May 10, 2012, Executive Order, "Identifying and Reducing Regulatory Burdens."⁶ This order directs all federal agencies to review and revise or rescind those requirements that impose unnecessary burdens on industry and the public and that are without public benefit. The order specifically invites "... public suggestions about regulations in need of retrospective review and about appropriate modifications to such regulations." In view of the President's Executive Order, the question now is: Do we need the motorcycle noise regulations? And, if yes, do they need modification?

The goals of the roundtable and this resulting report are:

1. To benefit the public by reducing motorcycle noise through improvements in federal regulations and better enforcement by state and local governments,
2. To assist state and local governments that wish to reduce the impact of motorcycle noise through regulations, ordinances, and other means consistent with the noise emission requirements of the current federal regulations,
3. To identify those parts of the current federal regulations that should be modified in light of today's technology,⁷
4. To suggest changes to the current federal regulations that could reduce the cost of compliance by manufacturers of motorcycles and exhaust systems, and
5. To be responsive to the President's Executive Order related to federal regulations.

⁶ The President's Executive Order can be found at www.whitehouse.gov/the-press-office/2012/05/10/executive-order-identifying-and-reducing-regulatory-burdens

⁷ The Motorcycle Industry Council presented specific recommendations for regulation revisions. Their full PowerPoint presentation is available at www.incefoundation.org/motorcycles/MIC.pdf

This report does not suggest changes to the noise emission limits within the regulations or to requirements for competition or for off-road motorcycles.

Prior to the roundtable, the organizers identified several key areas of the current federal regulations and sent them to participants. Each relates to specific sections of 40CFR205, and are listed below.

- Noise emission standards (§ 205.166)
- Consideration of alternative test procedures (§ 205.167)
- Labeling requirements (§ 205.169)
- Warranty (§ 205.173-1)
- Tampering (§ 205.173-2)

Issues related to all of these sections of the federal regulations are addressed in this report. The following chapters summarize the presentations and discussions at the roundtable. Chapter 2 discusses alternative test procedures and presents one procedure that could be used for compliance testing by state and local officials. Chapter 3 deals with the Acoustical Assurance Period currently in the regulations. Chapters 4, 5, and 6 cover exhaust systems, tampering issues, and labeling. Chapter 7 covers state and local issues related to motorcycle noise. The report ends with recommendations for solutions and next steps.

NOISE MEASUREMENT PROCEDURES

The current regulations regarding motorcycle noise emission controls contain a complex protocol for testing and certifying that a motorcycle meets noise emission standards (defined in Appendix I of Subpart D of 40CFR205). Because it is an acceleration test (wide open throttle), a test track and highly trained professional riders are essential and generally only available at major original equipment manufacturers (OEMs). As a practical matter, the required compliance test cannot be used for enforcement by state and local authorities. Consequently, in some cases, state and local governments have adopted their own test procedures (see Chapter 7). Unfortunately, when these tests are contested in court they frequently result in a dismissal of the violation.

At the roundtable there was no effort to propose a change to how motorcycle manufacturers must test their products regarding noise emissions (described in Appendix I, subpart D of 40CFR205). The discussion focused on other test procedures that would make field or in-use testing a feasible enforcement tool for state and local governments as well as other federal agencies such as the National Park Service, whose staff are in the field looking for modified exhaust systems that are too loud. For these entities, the federal test is impractical.

If a state police officer, for example, pulls over a motorcycle because it is too noisy, he or she has no “legally acceptable” way to measure the noise emission. If the motorist challenges the law officer to prove that the vehicle is too noisy, the only existing option is to test the vehicle according to Appendix I, Subpart D of 40CFR205.

Similarly, manufacturers of exhaust systems and mufflers find it difficult and expensive to use the EPA test procedure of 40CFR205. Before a muffler is available for sale, it must be tested, via the test track procedure, on every motorcycle for which it was designed. Tim Welch of Yoshimura R&D of America, an aftermarket exhaust manufacturer, stated that the current regulation fails to legitimize and make practical a simplified compliance testing protocol for *aftermarket* manufacturers. The current cost of \$4,000 (the minimal cost for sound compliance testing alone), he said, is crippling an entire industry; and very few companies in the industry can manage that type of expense.

SUMMARY OF THE EPA NOISE TEST PROCEDURE

The EPA noise measurements are conducted along a straight and level test track. The motorcycle is operated along the test track accelerating at fully open throttle and highest gear consistent with achieving maximum speed over the prescribed course. Noise measurements are made at 15 meters (49.2 feet) from the left and right sides of the

motorcycles during multiple maximum acceleration tests. The test requires experienced professional drivers. Even with experienced drivers, the test is dangerous to perform. See Figure 2-1.



FIGURE 2-1. A motorcycle undergoing the EPA noise test procedure. Photo presented at roundtable by the Motorcycle Industry Council.

THE SAE J2825 RECOMMENDED PRACTICE

One test procedure, proposed by industry (SAE J2825), received a good deal of discussion. To summarize, the procedure is as follows:

The SAE J2825 Recommended Practice noise measurements are conducted with the motorcycle stationary and operating at engine speeds between idle and 5000 rpm based on engine configuration (number of cylinders). Noise measurements are made at 0.5 meters (20 inches) at a 45 degrees angle behind the exhaust outlet(s) (see Figure 2-2). As the current regulation is written, however, this procedure would not qualify as an *alternative test procedure* (see below).



FIGURE 2-2. A motorcycle undergoing the SAE J2825 test procedure. Note the test requires there be no curb within 10 inches of the exhaust outlet. Photo presented at roundtable by the Motorcycle Industry Council.

LIMITS OF THE TERM “ALTERNATIVE TEST PROCEDURE”

The EPA regulation includes provisions for an *alternative test procedure*. However, the regulation requires an alternative procedure to produce measured results that are closely correlated with those from the regulatory test and must identify all test motorcycles that would not pass the federal noise emission standard as currently drafted. An objective of an alternative testing provision could be to make it more technically and economically feasible for exhaust system manufacturers to do the test and also enable testing in the field by law enforcement officials.

However, the existing criteria for an alternative test, as described in § 205.154 of 40CFR205 (see Box 2-1), is a difficult standard to meet. As a result, no alternative test procedures are known to have been submitted and approved for use by the EPA.

BOX 2-1

§ 205.154 Consideration of Alternative Test Procedures

Consideration of alternative test procedures.

The Administrator may approve applications from manufacturers of motorcycles for the approval of test procedures which differ from those contained in this subpart so long as the alternative procedures have been demonstrated to correlate with the prescribed procedure. To be acceptable, alternative test procedures must be such that the test results obtained will identify all those test motorcycles which would not comply with the noise emission standards prescribed in § 205.152 when tested in accordance with the measurement methodology specified in Appendix I. After approval by the Administrator, testing conducted by manufacturers using alternative test procedures will be accepted by the Administrator for all purposes including, but not limited to, selective enforcement audit testing.

[45 FR 86708, Dec. 31, 1980, as amended at 47 FR 57720, Dec. 28, 1982]

Two major limitations make it difficult for any test to qualify as an alternative test procedure: 1) any application submitted to the EPA must come from a manufacturer of motorcycles. Clearly, those who would use an alternative test procedure are those other than the OEM motorcycle manufacturer, i.e., exhaust system manufacturers and state and local governments. 2) The procedure must identify **all** motorcycles that would not comply with the noise limits of §205.152 of the EPA noise emission standard.

A few states, for example Maine and New Hampshire, have adopted the SAE J2825 Recommended Practice, but it is not widespread. Because of preemption language within the current regulation (see Chapter 7), it is not clear that state and local governments can use the SAE procedure as an enforcement tool to determine noncompliance with the federal regulation. Participants debated how to address the perceived obstacles. More details are presented in Chapter 7.

THE SAE J2825 RECOMMENDED PRACTICE IN DETAIL

In 2009, the Motorcycle Industry Council (MIC), working with SAE International, developed the SAE J2825 Recommended Practice, “Measurement of Exhaust Sound Pressure Levels of Stationary On-Highway Motorcycles” (Austin et al., 2009). It offers a standardized way to measure the exhaust noise emitted by a stationary motorcycle, perhaps curbside or at a test station. The procedure establishes instrumentation, test site, test conditions, operating procedures, measurements, and sound level limits.

The measurement requires the placement of a calibrated sound meter at a 45-degree angle 20 inches from the exhaust pipe of a running engine. The procedure spells out how to do the test with the motorcycle at idle and at a predetermined engine speed, depending on the type of vehicle (3- and 4-cylinder engines vs. other configurations that include twin-cylinder engines).

The SAE J2825 test recommends a noise level limit of 92 decibels (dBA) at idle for all machines. If a vehicle is over the 92 dBA limit, a second test is done at a higher rpm. For three- or four-cylinder machines, the test is at 5000 rpm and the noise limit is 100 dBA. For two-cylinder motorcycles and other configurations, the test runs at 2000 rpm and the noise limit is 96 dBA.

Adopting the test requires an investment in equipment, described by Tom Austin, representing MIC: a Type I sound meter with a windscreen, a calibrator for the sound meter, a wind-speed meter, and a measuring device to make sure the meter is 20 inches and 45 degrees from the exhaust outlet. For motorcycles that do not have an integral tachometer, a portable device is needed to measure rpm. A portable, printer would assist with recording the measurement. Austin said this equipment can be purchased for less than \$1,000, although a high-end system can run closer to \$2,500. Training requirements for implementing the test are minimal.

The EPA test measures the total noise radiated from an accelerating motorcycle measured at 15 meters (horizontal axis). The SAE J2825 test measures the close-in noise at 0.5 meters radiated from the exhaust outlet while the motorcycle is stationary, in this case while operating at 2000 rpm (vertical axis).

Figure 2-3 includes a red solid vertical line extending upward from 80 dBA on the horizontal EPA scale. Measurements along and to the left of the red solid vertical line comply with the EPA 50-foot test standard. Measurements to the right are greater than 80 dBA and exceed the EPA test standard.

Figure 2-3 also includes a red dashed horizontal line extending to the right from 96 dBA on the vertical SAE scale. Measurements along and below the red dashed horizontal line were at or less than 96 dBA and, therefore, pass the SAE 0.5 meter test. Measurements above are greater than 96 dBA, and therefore, fail the SAE test.

Measurements within the lower left quadrant of Figure 2.3 indicate compliance with both the SAE J2825 and the EPA test standards. Measurements within the lower right quadrant indicate compliance with the SAE J2825 test standard and failure of the EPA test standard. Measurements within the upper right quadrant indicate failure of both test standards.

The upward sloping dark line on Figure 2-3 represents a best-fit of the relationship between the EPA and SAE measured data for the 45 motorcycle and muffler combinations. As would be expected, the SAE exhaust measured noise levels increase as the EPA total noise levels increase. However, there is considerable scatter of data points above and below this line. Figure 2-3 indicates that noise measurements conducted in accordance with the SAE J2825 test procedure can be expected to identify a portion of motorcycles with modified exhaust systems that fail the EPA test standard, but not 100 percent. The 96 dBA level at 2000 RPM catches 90 percent of the open pipes.

From existing studies presented at the roundtable, SAE J2825 would not pass the EPA regulation's strict criteria as an alternative *compliance* test. Participants discussed whether SAE J2825 could be considered a suitable test, to be used to test noise emissions on an EPA-approved motorcycle that is on the road, or has had a new exhaust system installed after the bike leaves the dealer.

Austin asserted that EPA approval of SAE J2825 as an alternative *in-use or field* test procedure would have three benefits (Austin 2012):

- Provide state and local officials a simple, inexpensive, effective and EPA-approved roadside test procedure;
- Provide aftermarket exhaust system manufacturers an economically feasible alternative test to use for certifying exhaust systems; and
- Reduce the number of loud motorcycles in use.

He added that OEMs support SAE J2825 as an alternative test for replacement systems because it offers direct economic benefits and increased floor traffic for their dealers who will be able to sell compliant aftermarket systems. He added that a more enforceable standard would have a positive effect on the public acceptance of motorcycles.

Representing the public, Les Blomberg from the Noise Pollution Clearinghouse expressed concern that the SAE J2825 is not strict enough. Because the SAE procedure is quite different from the current federal procedure, he stated there are motorcycles that would fail the EPA test, but pass the SAE test. He would prefer to see an alternative test that would fail every vehicle that is failed by the EPA test. He also wants to make sure that any wording change in the regulation would not require a vehicle to pass the EPA test or the J2825 test. His concern is that such language would allow a driver who fails J2825 to claim that his motorcycle passes the EPA test, which an enforcement officer can't determine. Roundtable participants agreed not to recommend a change in the requirement that motorcycles meet the EPA test standard.

Austin explained that MIC would like to see a paragraph added to the regulation stating that compliance with J2825 is an acceptable alternative to the EPA standard, only for replacement systems. This would make it economically feasible for aftermarket sellers to certify the product is reasonably quiet and passes the noise emission standard of J2825.

Sgt. Stephen Kace of the New Hampshire State Police expressed concern about the safety of implementing the second part of the SAE J2825 test, which would be undertaken if the vehicle is too noisy at idling. Revving a motorcycle to 2000 or 5000 rpm at curbside may be too dangerous for law enforcement personnel and for the rider of the vehicle. He said that if a vehicle is measured at higher than 92 dBA at idling, it should be taken to a separate location for further testing at the higher rpms. He would rather see a focus on the 92 dBA limit for the idling motorcycle only, which has "an accurate, demonstrated correlation with the current EPA standard test level." Perhaps, he offered, a motorist driving a vehicle that fails at idling could be directed to get the motorcycle inspected, just like an automobile pulled over for having defective equipment has to be taken to a vehicle inspection station. At the inspection station, a full SAE J2825 test could be done.

The SAE J2825 Recommended Practice is designed to not fail any motorcycle that would be expected to pass the EPA acceleration test limits. To meet the EPA current requirement for an Alternative Test Procedure, that is to not pass motorcycles that would fail the EPA acceleration test, it appears that the three limits in Table 2⁸ of the current SAE J2825 Recommended Practice for stationary measurements would be reduced by 8 dB for the 5000 rpm test and 16 to 17 dB for the 2000 rpm and idle tests.

Because the SAE J2825 Recommended Practice with limits proposed by industry would not meet the regulation's requirement as an Alternative Test Procedure, roundtable participants discussed whether the SAE procedure with the proposed limits could be considered a suitable procedure to be used to identify motorcycles with modified exhaust systems. Since motorcycles must be tested to meet the § 205.152 requirements when they

⁸ Found in Section 9.1 of SAE J2825.

leave the factory, the objective of a suitable test would be to catch motorcycles operating on the street with loud modified exhaust systems (see Chapter 4).

With no dissensions, participants agreed that the SAE J2825 measurement method is a reasonable procedure for quantifying the close-in exhaust noise from a stationary motorcycle. However, there was not agreement about the reasonableness of the current noise limits within Table 2 of SAE J2825 Recommended Practice. Some participants pointed out that the current SAE limits catch (fail) those motorcycles with the loudest exhaust systems. Other participants noted that published measurement data demonstrate some noisy motorcycles fail the EPA test limits but pass the SAE test limits. Those participants offered the opinion that the current SAE J2825 limits are too high and should be reduced.

IS PREEMPTION A BARRIER TO RECOMMENDING A DIFFERENT IN-USE TEST?

Preemption means that if a federal noise emission standard exists with certain requirements, state and local governments are not allowed to issue a standard with different noise emission levels. For example, if a state or local government were to try and require that newly manufactured motorcycles have noise limits, say, 10 dBA below the federal limits, they would be preempted from doing so. However, the preemption only applies to those requirements *explicitly* stated in the federal rule.

Current preemption language within the regulation might be interpreted to make SAE J2825 unusable by state and local governments. But if the federal test procedure is impractical, even dangerous, for adoption as a motorcycle noise control requirement, is there any relief possible from the preemption principle?

In this case, the regulation explicitly states that street motorcycles produced in model years following 1986 must not produce noise emissions in excess of 80 dBA as measured in accordance with the EPA test procedure.⁹ An important point: The EPA maximum acceleration test and the SAE J2825 Recommended Practice measure noise at two different distances from the vehicle, and they have two different noise level standards. The EPA test measures noise at a distance of 15 meters from the motorcycle. SAE J2825, on the other hand, measures during different motorcycle operating conditions, much closer, at 0.5 meters from the exhaust outlet, with a noise level limit of 92 dBA. These distinctions become important in light of preemption concerns. By going with a higher noise level limit of 92 dBA during idling, would SAE J2825 still be considered to be preempted by the EPA, even though it's a different test done at different distances from the exhaust system?

⁹ To see the relevant language of 40CFR205.152, visit www.gpo.gov/fdsys/pkg/CFR-2010-title40-vol24/xml/CFR-2010-title40-vol24-sec205-152.xml

ACOUSTICAL ASSURANCE PERIOD

The Acoustical Assurance Period (AAP) has been a point of confusion among the motorcycle user, original equipment manufacturer (OEM), aftermarket industry, and law enforcement communities. This chapter describes the AAP as it is defined in the regulation, followed by a discussion of the original intent of the language and its subsequent interpretation. This chapter includes recommendations for needed clarifications. The role of a warranty, in terms of noise emissions, is also discussed.

Roundtable participants considered a series of questions: Does an AAP serve a purpose? Should it remain or should the group recommend that it be revised in some fashion or removed and captured into a warranty provision? Given that the real problem is owners of on-street motorcycles and motorcycle dealers replacing OEM exhaust systems and mufflers with noncompliant components, would a change in the AAP help the overall noise problem? How would a change in the AAP affect preemption issues?

WHAT IS THE ACOUSTICAL ASSURANCE PERIOD?

The Acoustical Assurance Period (AAP) is defined within the federal regulation as a period of time or distance driven during which a new vehicle or exhaust system must comply with the federal standard (see Box 3-1).

BOX 3-1

§ 205.151 Acoustical Assurance Period

Section 205.151(a)(7)

(7) Acoustical Assurance Period (AAP) means a specified period of time or miles driven after sale to the ultimate purchaser during which a *newly manufactured* vehicle or exhaust system, properly used and maintained, must continue in compliance with the Federal standard.

The operative words in Section 205.151(a)(7) are “newly manufactured.”

Additional information about the AAP appears with the table of noise limits in § 205.152. The language states that the motorcycle must be designed, built, and equipped so as to not produce noise emissions in excess of levels specified for an AAP of “one year or a distance of 6000 kilometers (3730 miles) after the time of sale...” (see Box 3-2).

BOX 3-2
§ 205.152 Noise Emission Standards

Section 205.152 Noise Emission Standards

(3) Street motorcycles must be designed, built and equipped so that, when properly maintained and used, they will not produce noise emissions in excess of the levels specified in paragraph (a)(1) of this section, for an Acoustical Assurance Period of one year or a distance of 6000 km (3730 mi) after the time of sale to the ultimate purchaser, whichever occurs first.

The AAP was included in the regulation to ensure that a motorcycle and its exhaust system are made of quality materials and will operate at low noise levels for some period of time. The AAP was put in place so that the manufacturers understand that they must build a system with good workmanship and quality materials that will last for at least a year or 6000 kilometers of in-use service. In a way, the AAP was a de facto warranty, according to Ken Feith, formerly of the EPA. If an exhaust system failed to comply during the AAP, it would be the *manufacturer's* responsibility to make repairs so that the vehicle would meet the required noise emission standards.

Thus, the AAP is basically a requirement of the EPA that falls on the manufacturer. The AAP differs from a typical warranty, which is an agreement between the manufacturer and the owner for a specified period of time. The current AAP definition says nothing about the obligations of the owner/operator before or after the period has expired.

“There are some in the rider community who say that beyond the acoustic assurance period I have no responsibility to comply with the federal sound emission regulations,” said Imre Szauter of the American Motorcyclist Association.

This interpretation is not what the government intended when the regulation was promulgated, according to Feith, who was involved in writing the regulation. The AAP was established in the 1970s and thus addressed the state of exhaust system technology of that period. Its time and distance specifications were principally predicated on the fact that “motorcycles were being used essentially for recreational purposes and not as a primary source of transportation,” he said. And, at that time, “the mufflers had a very limited life, so we put in the regulation the requirement on the manufacturer that they effectively had to [warrant] the exhaust system for 3730 miles or one year.”

Two things have changed: Many motorcycles are now used for regular transportation, as noted in Chapter 1. Therefore, an AAP could easily be reached in less than one year. And today's motorcycle exhaust systems are designed to be integral components of a “system” as well as being more robust, so the need for the AAP may be obsolete. A more effective approach may be covered by a manufacturer's warranty.

At the roundtable, there was little interest on the manufacturers' side in a longer period for the AAP, which could be expensive to implement. But given that the real problem is

installation by owners of noncompliant illegal exhaust mufflers, how would an extension of the AAP help address the overall noise problem?

Representing local government, Steve Glueck of the city of Golden, Colorado, recommended that the regulation clearly apply to the life of the vehicle.

Pamela Amette, Motorcycle Industry Council (MIC), noted that the durability of the exhaust systems is not the problem. Noise problems occur with tampering and removing of noise-muffling baffles. “So even if you did increase the AAP, it’s not going to address the problem.”

Jim Leonard of Vance and Hines, an exhaust system manufacturer, said his group would prefer not to change the AAP.

Charles Shamoon, New York Department of Environmental Protection, suggested that language could read that, “After the expiration of such warranty period, then the owner or operator of such vehicle must meet these standards for the life of the vehicle. So that way, you don’t have to get rid of your assurance period.”

Participants offered no compelling reason to remove the AAP from the regulation, but there was general agreement that the regulation should be modified to make it clear that the noise emission requirements apply for the life of the motorcycle. Also, to make the situation even clearer, the AAP should not be placed in the table of noise limits, §205.152 Noise Emission Limits. The AAP requirement should appear elsewhere in the regulation.

The prohibition on tampering (§ 205.162-2) clearly applies to anyone, including owners, without time or distance limitations (see Chapter 5). Thus, the noise limits should be interpreted as extending for the life of the motorcycle. This apparent conflict between the AAP and the tampering provision should be resolved to make it clear that the AAP applies to the manufacturer and not the owner/operator.

WARRANTY

As with any product, the buyer has the right to expect the product will perform as intended. The manufacturer puts in place a warranty that guarantees the product will operate properly for a period of time; if it fails to do so, the manufacturer is expected to repair or replace the product.

Although Subpart B of the motorcycle noise emission regulation reserves specific warranty requirements in Section 205.162-1(b), the motorcycle exhaust regulation at Subpart E contains a specific warranty (see Box 3-3).

BOX 3-3
§ 205.173 Warranty

Section 205.173-1 Warranty

(a) The exhaust system manufacturer must include in the information supplied to the ultimate purchaser pursuant to § 205.173-4, the following statement:

Noise Emission Warranty

[The manufacturer] warrants that this exhaust system, at time of sale, meets all applicable U.S. E.P.A. Federal noise standards. This warranty extends to the first person who buys this exhaust system for purposes other than resale, and to all subsequent buyers. Warranty claims should be direct to _____. (Manufacturer shall fill in this blank with his name, address and telephone number.)

For vehicles there are several different kinds of warranties. There is the warranty that the manufacturer puts on the entire product or part of the product, which is separate from the warranty required by the EPA for air emissions compliance, which is separate from the AAP, the de facto warranty for noise compliance. As an example, a Harley-Davidson warranty¹⁰ is shown below:

Noise Emission Warranty. Harley-Davidson warrants that these mufflers, at the time of sale, meet all applicable United States E.P.A. Federal noise and emissions standards. This warranty extends to the first person who buys these mufflers for purposes other than resale, and to all subsequent buyers. Warranty claims should be directed to an authorized Harley-Davidson Dealer.¹¹

The AAP could be replaced by a warranty, which would cover the motorcycle and its exhaust system for a given period of time and mileage, provided, of course, that there is no tampering and no exhaust system replacement. This would benefit the owner/operator of a motorcycle since it might lengthen the time when the manufacturer continues to be responsible to the owner for repairs.

Tom Austin, MIC, pointed out that for the exhaust emissions warranty, the distance is a function of the size of the engine in the motorcycle. For a larger motorcycle, Class 3, which fits the category of most street motorcycles, the emissions warranty is five years or 30,000 kilometers.

¹⁰ Editor's note: Warranty example obtained after roundtable.

¹¹ www.harley-davidson.com/en_US/Media/downloads/Service/isheets/-J04264.pdf

If the AAP is deleted and replaced by a warranty, manufacturers should be consulted regarding the warranty period. The government's interest is in having the motorcycle meet the noise emission requirements, and not who pays for fixing the problems—the manufacturer or the owner.

Being clear that the noise limits apply for the life of the motorcycle regardless of whether there is an AAP or warranty in place would help those involved in enforcement, according to Karen Trevino of the National Park Service. “When you're out on the road, it's got to be really simple,” she said. Local law enforcement can't be expected to know what the warranty is on the motorcycle before they issue a citation. On the other hand, AAP and warranty periods are unrelated to when local law enforcement officers can issue a citation for excessive noise.

MIC's Austin offered an analogy from automobile emissions to describe what states can do for enforcement. “All of the states that have vehicle emissions inspection programs require compliance regardless of whether the vehicle is within the warranty period. If it's in the warranty period, it's the manufacturer's obligation to fix the problem, if it hasn't been tampered with. If it's beyond the warranty period, the standard still applies at the state inspection station, but it's the owner's responsibility to bring it into compliance. And I've never heard of any legal problems with states being able to enforce that emissions requirement beyond the warranty period.”

Once the motorcycle leaves the showroom, the owner becomes responsible to maintain all systems in good working order in accordance with applicable state and local vehicle regulations.

It is generally agreed that the EPA test procedure is impractical for anyone except the manufacturers, who also find it difficult (see Chapter 2). This makes checking for compliance difficult. State and local law enforcement need a simplified, feasible approach to identify those motorcycles that are *clearly* not in compliance with the regulation. That is one stated purpose of the SAE J2825 Recommended Practice described in Chapter 2.

Feith asked if the warranty that applies to the exhaust emissions could include language that makes it also applicable to noise requirements. The result would be a federal warranty requirement for the performance of the vehicle in terms of emissions, both exhaust and noise.

4

EXHAUST SYSTEMS

This chapter covers changes in motorcycle exhaust system design, the types of modifications that are made to exhaust systems, how they affect noise emissions, and the lack of data on the magnitude of the problem.

DEFINITION OF AN EXHAUST SYSTEM

The definition of an exhaust system as stated in the federal standard § 205.151(a)(15) is important to consider because of the significant changes that have occurred during the past 30 plus years in motorcycle technology and system design.

BOX 4-1

§ 205.151(a)(15) Exhaust System Definition

Section 205.151(a)(15)

Exhaust system means the combination of components which provides for the enclosed flow of exhaust gas from the engine exhaust port to the atmosphere. “Exhaust system” further means any constituent components of the combination which conduct exhaust gases and which are sold as separate products. *“Exhaust System” does not mean any of the constituent components of the combination, alone, which do not conduct exhaust gases, such as brackets and other mounting hardware.*

A major change in motorcycle exhaust systems has been the addition of a catalytic converter, which converts pollutant gases into less harmful ones. Most new motorcycles have a catalytic converter, which is now a required part of the air emission standards.¹²

Because the catalytic converter tends to reduce the motorcycle exhaust noise, it has also become an important part of the noise control system. This has positive and negative ramifications for modified bikes, according to Tom Austin, representing the Motorcycle Industry Council (MIC). Austin further stated some motorcycles can meet the noise emission requirements even if the muffler is removed or replaced with an aftermarket muffler, as long as the catalytic converter remains in place. “There are motorcycles that will comply with the EPA noise standard if you remove the muffler and just test it with the [catalytic converter],” he said.

¹²40CFR PART 86—Control of Emissions from New and In-Use Highway Vehicles and Engines at <http://law.justia.com/cfr/title40/40-18.0.1.1.1.html>

Austin added that very few motorcycles, however, will comply if the catalytic converter is removed and the muffler is left in place. The shell of the exhaust system—with the label saying the system complies with 40CFR205—remains in place, implying that the bike is in compliance when it is not.

When asked if today riders take off the catalytic converter and muffler or go with a hollow shell muffler to create a noisier vehicle, Austin replied, “Yes, that is one of the most significant problems right now with motorcycles being modified after they’re in customer services—removing the catalytic converter. So we end up for the first time having the noise of the motorcycle not only being a public nuisance, but an air quality issue.” The definition of an exhaust system should clarify that a catalytic converter, a noise-muffling component, is an integral part. According to Austin, MIC advocates using a roadside noise test to identify motorcycles that may be running without a catalytic converter.¹³ “Getting the compliant exhaust system back on that bike” would improve both noise and exhaust emissions, he said. Accordingly, updating the definition of an exhaust system may merit consideration.

MODIFIED EXHAUST SYSTEMS

There was general agreement by participants that the vast majority of original equipment manufacturers (OEMs) produce motorcycles with exhaust systems that comply with 40CFR205. It was also generally agreed that the noise nuisance from motorcycles is caused by modified exhaust systems as well as the way some riders operate their vehicles (accelerating hard to attract attention). Options for resolving these situations were the primary focus of the roundtable.

Roundtable discussions addressed the fact that exhaust systems can be modified in several ways to greatly increase noise. Ken Feith, formerly with the EPA, explained, “It really speaks to removing the exhaust system, coming directly out of the headers and going to straight pipes (see Figure 4-1¹⁴), ... bypass valves, those kinds of things.”¹⁵

¹³ Editor’s note: Post roundtable, Ken Feith questioned whether such a determination would hold up in court.

¹⁴ Editor’s note: Figures were not provided at roundtable, but are included here for clarification.

¹⁵ Editors note: Details of how a motorcycle could be modified to increase its noise emissions were not discussed. To clarify, an OEM’s compliant exhaust system could be replaced by (a) straight pipes without baffles, (b) hollow-core (open center design) mufflers, and (c) any exhaust system designed for closed-course or competition use. The Internet displays many “how to” articles and videos for making motorcycles louder. “Make your motorcycle sound louder and more powerful by “drilling out” the exhaust or removing the baffles.” (<http://www.peacemakersexhausts.com/product.html>). Cutout mufflers are available for “rumble when you want it, quiet when you need it.” A pipe with a diverter mechanism replaces part of the OEM’s exhaust system. The rider can push a button on the handlebars to choose the loud sound with a straight pipe or the quiet sound with the system’s muffler.



FIGURE 4-1. Exhaust systems that appear to have little or no muffling installed. Obtained from Internet post-roundtable.

Such acts are considered tampering and violate § 205.162-2 and § 205.173-2, as discussed in Chapter 5. In addition, a rider can readily buy a competition-use exhaust system for his or her street-legal bike: “We all know that when you walk into a dealership, you don’t have to certify whether you’re going to use it on or off the road; so you can buy whatever you wish,” Feith added.

Some people, according to Tim Welch of Yoshimura R&D of America, will change their street or off-road legal bike to use it as a racing bike, take it to a track to race it, then change it back to a street legal bike and ride it to work. It is unlawful to ride these motorcycles on the street because the exhaust system has been modified (along with other parts of the bike) for racing, making them no longer street or off-road legal. However, they are permitted for competition on the racetrack. The regulation states exhaust systems that are manufactured and sold for such use must be labeled “for competition use only” or “not legal for street or off-road use” (see Figure 4-2). This report does not address competition bikes, unless they are used on the road. “Competition motorcycle” (as defined in 40 CFR205.151(a)(3)), means: “any motorcycle designed and marketed solely for use in closed-course competition events.” This does not exempt “off-road motorcycles” from compliance.



FIGURE 4-2. Harley-Davidson Screamin’ Eagle brand aftermarket exhaust system for a Harley-Davidson FLT. Supplied post-roundtable.

According to the current regulations, motorcycles that are modified for racing then made compliant for street use, are not allowed. Some participants at the roundtable suggested the rule be revised so as to not prevent exhaust system modifications for those bikes while being used in closed course competition events, as long as the bikes are made compliant before returning to street use (Austin, 2012).

At the roundtable, participants asked: How many noncompliant exhaust systems are being manufactured, and how many are made noncompliant by the owner? It will be difficult to determine the fraction of the motorcycles on the road that are operated with modified exhaust systems without a roadside test. Les Blomberg, representing the public, said “I think that would be important to know the scope of the problem so that we can move forward.”

One estimate comes from MIC, which has self-reported data on motorcycle exhaust modifications. In its most recent survey from 2009, MIC has data from 1120 on-highway motorcycle owners; 35 percent responded that they had modified or replaced the original exhaust system on their vehicles. Of those with modified/replaced exhaust systems, 36 percent responded that the noise increased “greatly” and 37 percent responded that the noise increased “slightly”. So, at least in the MIC sample of riders, 12 percent to 13 percent of the on-highway bikes may be operating with modified/replaced exhaust systems that produce greatly increased noise levels.¹⁶

COMPLIANT EXHAUST SYSTEMS

Yoshimura’s Welch noted that his company has made efforts to ensure its exhaust systems are compliant with EPA’s regulations for both on and off-road motorcycle use, but there are financial barriers to doing so.

Welch also stated that nearly 80 percent of his company’s sales are slip-on exhausts. The company recently decided to invest in exhaust noise testing and found that nearly 90 percent of its products, which had been considered noncompliant were, in fact, compliant when equipped with a sound insert device that the company offered as an accessory available with the exhaust system.

Welch said Yoshimura addressed tampering by making the insert a permanent installation so that customers couldn’t remove it. The company also added the EPA label to its exhaust systems. All they had to do to bring their products into compliance was to invest in the testing and labeling.

However, Welch noted that, “without widespread roadside enforcement, our sales for compliant exhausts, which on the market we sell, I think, for a premium of maybe \$20 to \$50 more than the non-standard exhaust are...horrible.” He suggested there are likely two

¹⁶ Data submitted by Roundtable participant Pamela Amette, MIC, after the roundtable meeting.

reasons for the weak sales: 1) Riders aren't willing to spend the extra for a compliant exhaust when enforcement is weak or nonexistent, and 2) some riders want the noise.

When MIC tested more than 50 aftermarket systems in 2006 and 2007, Austin said, none of the systems were technically compliant because they did not have the EPA label (see Chapter 6). But when tested, "there were a number of them without the EPA label that actually complied" using the full-throttle acceleration standard in 40CFR205 Subpart D Appendix I, he said.

Austin said that companies may not put in the effort to test and label their systems because the EPA's website says that EPA has decided the principal responsibility for noise enforcement rests with state and local authorities. When their take-away impression is that no federal requirement exists, there is no incentive to comply, he added.

Representatives from companies such as Vance and Hines and Yoshimura stated they have tried to address compliance even without real enforcement at the federal and state levels, because they recognize the EPA regulation is the national law and must be complied with. They are bringing their products into compliance and avoiding having to include a disclaimer that the products are for competition use only. To support this movement, however, Austin stated, "We think there has to be a whole lot more enforcement at the state level to create that incentive for people to have compliant systems, which means the states need a simple roadside test."

TESTING PROCEDURE

Several roundtable members stated that to confirm that an exhaust system is compliant with the federal law involves very expensive testing, a barrier for manufacturers, particularly small manufacturers of aftermarket exhaust systems (see Chapter 2). According to Section 205.171-6, exhaust system manufacturers must use the test procedure of Appendix I of the regulation (see Box 4-2).

BOX 4-2

§ 205.171-6 Testing Procedure

(a) The manufacturer of the exhaust system must conduct one valid test in accordance with the appropriate test procedure specified in Appendix I for each exhaust system selected for testing under this subpart.

Welch asserted that "... a minimum cost of \$4,000 to test a vehicle using the EPA test procedure of 40CFR205 for noise compliance... is crippling an entire industry. You can probably count on one hand how many companies in the industry could manage that type of expense."

It was suggested that the SAE J2825 test procedure could be adopted to evaluate motorcycle exhaust system noise (see final chapter, Recommendations).

TAMPERING

The main goal of 40CFR205 Subparts D and E is to reduce the noise emissions of motorcycles. The regulation makes an exception for *competition motorcycles*, those motorcycles designed and marketed solely for use in closed course competition events.¹⁷

Sections 205.162-2 and 205.173-2 of the regulation address modifications (tampering) to those motorcycle components and systems that are intended for the reduction of noise emissions (see Boxes 5-1 and 5-2).

BOX 5-1
§ 205.162-2 Tampering

Section 205.162-2 Tampering

(a) For each configuration of vehicles covered by this part, the manufacturer shall develop a list of acts which, in his judgment, constitute the removal or rendering totally or partially inoperative, other than for purposes of maintenance, repair, or replacement of noise control devices or elements of design of the vehicle.

(b) The manufacturer shall include in the owner's manual the following information:

(1) The statement:

Tampering With Noise Control System Prohibited

Federal law prohibits the following acts or causing thereof:

(1) The removal or rendering inoperative by any person other than for purposes of maintenance, repair, or replacement, of any device or element of design incorporated into any new vehicle for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use, or (2) the use of the vehicle after such device or element of design has been removed or rendered inoperative by any person.

¹⁷ 40CFR 205.151

BOX 5-1
§ 205.162-2 Tampering (continued)

(2) The statement:

Among those acts presumed to constitute tampering are the acts listed below.

Immediately following this statement, the manufacturer must include the list developed under paragraph (a) of this section.

(c) Any act included in the list prepared pursuant to paragraph (a) of this section is presumed to constitute tampering; however, in any case in which a presumed act of tampering has been committed and it can be shown that such act resulted in no increase in the noise level of the vehicle or that the vehicle still meets the noise emission standard of §205.152, the act will not constitute tampering.

(d) The provisions of this section are not intended to preclude any state or local jurisdiction from adopting and enforcing its own prohibitions against the removal or rendering inoperative of noise control systems on vehicles subject to this part.

BOX 5-2
Section 205.173-2 Tampering Prohibition

Tampering Prohibition

Federal law prohibits any modification to this exhaust system which causes the motorcycle to exceed the Federal noise standard. Use of the motorcycle with such a modified exhaust system is also prohibited.

Public Law 92-574, The Noise Control Act of 1972, Section 10(a) and Section 11(a) clearly define Prohibited Acts and Enforcement respectively that include tampering.

In summary, § 205.162-2 obligates the manufacturer to define what tampering means and says that tampering is prohibited, unless such modifications do not result in a failure to meet federal noise emission regulations. The burden is on the owner/user not to tamper in such a way as to increase the noise emissions beyond stated levels. It also allows state and local law enforcement to enforce limits on tampering. Section 205.173-2 says that a motorcycle with an exhaust system that has been tampered with is prohibited from use. Further, Public Law 92-574, Section 11 stipulates the punishment for the first violation shall be \$25,000.00 per day of violation or by not more than one-year imprisonment or by both..

At the roundtable participants discussed several issues and questions regarding the provisions on tampering. There was general agreement that the original equipment manufacturers (OEMs) are given too much discretion to define what actions constitute tampering and that state and local law enforcement officials do not have the means to determine whether tampering has occurred. They also considered: Does a tampering provision offer an option for citing motorcycles that do not follow the regulations? Is the current language in the regulations still appropriate and clear to manufacturers, dealers, service and repair stations, and owners/operators? Will treating excessive noise as evidence of tampering help reduce noise overall?

INTERPRETATION OF CURRENT LANGUAGE ON TAMPERING

Because the regulations call for manufacturers to provide a list of what constitutes tampering, aftermarket manufacturers expressed concerns that the tampering provision has been used by some to define tampering as use of any non-OEM equipment, which puts aftermarket manufacturers at a disadvantage. The language has created unintended conflict, according to Tom Austin, representing the Motorcycle Industry Council (MIC), because some manufacturers have “come up with language that is to the detriment of the aftermarket.” Some OEMs define tampering to include the use of “parts other than those specified by the manufacturer,” he said, which can preclude use of compliant aftermarket systems. If an exhaust system manufacturer puts its equipment through testing to certify that its system is compliant with EPA’s air and noise emissions regulations and with the California Air Resources Board’s emission regulations, the owner can still be told that using that certified part is tampering.

MIC would prefer that the EPA develop a standardized list of what constitutes tampering so there is uniformity among all. Austin noted that OEMs are not intentionally devising exclusive lists to harm aftermarket manufacturers. But when required to devise a list, they go the simplest route and state that any part they don’t recommend would be considered tampering.

Austin provided MIC’s suggested language to define tampering:

Replacement of any component of the intake or exhaust system with a component that has not been certified to be compliant with EPA noise standards for the vehicle model on which the component is installed.

Ken Feith, formerly with the EPA, commented that the language suggested by MIC removes any OEM requirement but makes clear the equipment must be EPA certified. The intent of the language on tampering, Feith added, was to ensure that people weren’t modifying their motorcycles. “We had no predisposition toward any particular manufacturer.”

Two other shortcomings of the tampering provision relate to compliance testing by state and local law enforcement. First, it is difficult or impossible for enforcement officials to

determine if nonobvious acts of tampering have occurred. It can even be difficult to determine at an inspection station. Second, the tampering provision requires a determination as to if the tampering has caused the motorcycle noise to exceed the applicable federal noise standard.¹⁸ This determination however is an impossible task for the EPA, for local law enforcement or for the owner, short of shipping the motorcycle to a test track to perform the test from 40CFR205 Subpart D Appendix I.

Sgt. Stephen Kace, New Hampshire State Police, requested that tampering language not be used as a compliance tool by state and local law enforcement. Law enforcement may suspect tampering has taken place, but if the label says the vehicle is in compliance, issuing a citation becomes difficult. Local law enforcement can't prove that the motorcycle exceeds noise limits because there is no approved test to run, outside of a test track with professional operators.

“Compliance will need to be sought elsewhere, as the men and women roadside will not have the wherewithal, nor the funding, to be able to start disassembling and looking for any crooked parts, and have ever-changing, evolving lists of what those parts are supposed to be during any snapshot in time,” Kace added.

Some tampering can be spotted visually with ease, for example, “If you see ... a straight pipe on a bike, well, that's tampering, because you know that the bike should have had some other things,” said Feith. Kace agreed. However, some forms of tampering are less obvious during a visual inspection. Some states, including Wisconsin, have implemented invasive procedures to test for tampering, but local law enforcement takes strong exception to the procedure, according to Kace.

State Police in northwestern Wisconsin have adopted anti-tampering provisions under state law, according to Feith. All of their police in cars and motorcycles carry two-foot billy clubs, which they can use to probe a motorcycle's exhaust system in search of baffles. If the club can be inserted too far into the pipe, the bike is considered illegal. “No baffles, you're in violation,” Feith said. Labeling becomes irrelevant. “Parts of this can be adopted into state and local law.”

However, there are compliant exhaust systems that have no baffles, so the test is sometimes ineffective. Kace noted that his motorcycle has no baffles, yet it contains a system to quiet the sound of the explosions, making it a legal exhaust system in his state. “If someone were to take their baton or some other implement and insert it in the orifice of my exhaust system and start rattling it around, I would go right out of my mind,” he added.

¹⁸ Editor's note: Section 205.162-2(c) indicates “in any case in which *a presumed act* of tampering has been committed and *it can be shown* that such act resulted in no increase in the noise level of the vehicle or that the vehicle still meets the noise emission standard of § 205.152, the act will not constitute tampering.”

Some participants argued that the sound of a loud muffler is enough evidence of tampering, or at least that the motorcycle does not meet the EPA requirements. There shouldn't need to be a test of tampering, per se. Instead, a test of noise levels is what's needed. During the roundtable, Eric Wood, Acentech, offered the opinion that police officers know simply by listening when a motorcycle is producing excessive noise; they don't need test procedure equipment and instruments. Police officers can be trained and should be allowed to issue citations for excessive noise based on the officer's opinion. The citation would require that the owner bring the motorcycle to an inspection station for noise testing. This he said is similar to when a police officer issues a citation after observing what he or she considers to be defective equipment on any motor vehicle.

If the tampering provisions were clarified at the federal and state levels to make clear that a rider could be cited, some people would be discouraged from tampering, Feith said. "The mere threat of it happening is a deterrent."

IMPORTANCE OF TAMPERING PROVISION

The wide-ranging discussion regarding tampering pointed up the potential importance of this provision, which clearly places the responsibility for noise emissions on owners/operators rather than manufacturers. Section 205.162-2 states that the use of the vehicle is prohibited after evidence of tampering is found.¹⁹ Having the tampering provisions in place will help avoid excessive noise for the life of the vehicle.

Further, the discussions highlighted the importance of Section 205.162-2 to the discovery by state and local officials of tampering. A tool is needed to obtain evidence of tampering, and a modified version of SAE J2825 could serve as that tool. An important question is whether state and local governments can establish their own noise limits with regard to the use of SAE J2825 for stationary testing, not manufacturer compliance testing. The argument against preemption is that SAE J2825 does not impose more stringent noise emission requirements than the federal standard; failure to meet the limits is good evidence that tampering has taken place. However, according to discussions at the roundtable, the SAE J2825 Recommended Practice as currently drafted passes many bikes that fail the federal standard.

ACTS LIKELY TO CONSTITUTE TAMPERING

Motorcycle owners are well within their rights and do not violate tampering provisions when modifying or replacing noise control devices or elements of design as long as such acts do not cause the noise to exceed the federal standard.²⁰ Acts likely to constitute illegal tampering include the installation of by-pass exhaust systems, removal or puncturing the muffler, removal of baffles, header pipes, or any other component that conducts exhaust gases, if such acts cause the motorcycle noise to exceed the applicable

¹⁹ 40CFR 205.162-2

²⁰ 40CFR 205.162-2

federal standard. Installation of a noncompliant exhaust system would also be expected to constitute tampering.

The regulation requires manufacturers to include in their operators manuals information about what constitutes tampering (see Appendix C, for an example).

6

LABELING

Under 40CFR205, two labels must be permanently affixed to each motorcycle—one on the motorcycle frame and one on the exhaust system. Section 205.158 defines the requirements for the motorcycle label (see Box 6-1) and Section 205.169 describes the requirements for the exhaust system label (see Box 6-2). In both cases, the label must be readily visible.

BOX 6-1

§ 205.158 Labeling Requirements

Section 205.158 Labeling requirements

- (a)(1) The manufacturer of any vehicle subject to this subpart must, at the time of manufacture, affix a label, of the type specified in paragraphs (a)(2), (3), and (4) of this section, to all such vehicles to be distributed in commerce.
- (2) The label must be plastic or metal and be welded, riveted, or otherwise permanently attached in a readily visible position.
- (3) The label must be affixed by the vehicle manufacturer to the vehicle in such a manner that the label cannot be removed without destroying or defacing it, and must not be affixed to any piece of equipment that is easily detached from such vehicle.
- (4) The label must be lettered in the English language in legible block letters and numerals, which must be of a color that contrasts with the background of the label.
- (5) The label must contain the following information:
- (i) The label heading: Motorcycle Noise Emission Control Information;
- (ii) The statement:
- This ___ (model year) ___ (model specific code) motorcycle, ___ (serial number), meets EPA noise emission requirements of ___ (noise emission standard) dBA at ___ (closing rpm) rpm by the Federal test procedure. Modifications which cause this motorcycle to exceed Federal noise standards are prohibited by Federal law. See owner's manual.

BOX 6-2
§ 205.169 Labeling Requirements

Section 205.169 Labeling requirements

(a) The manufacturer of any product (including the manufacturer of newly produced motorcycles) subject to this subpart must, at the time of manufacture, affix a permanent, legible label, or mark of the type and in the manner described below, containing the information provided below, to all such exhaust systems or exhaust system components to be distributed in commerce.

(b) The labels or marks shall be affixed in such a manner that they cannot be removed without destroying or defacing them, and must not be applied to any part which is easily detached from such product.

(c) The label or mark shall be in a readily visible position when the exhaust system or exhaust system component is installed on all motorcycles for which it is designed and marketed.

(d) All required language shall be lettered in the English language in block letters and numerals in a color that contrasts with its background.

(e) The label or mark must contain the following information:

(1) For exhaust systems subject to the noise emission standards of § 205.166:

(i) The label heading: Motorcycle Exhaust System Noise Emission Control Information;

(ii)(A) For original equipment and replacement exhaust system, the following statement:

This (manufacturer's name) exhaust system (serial number) meets EPA noise emission requirements of (noise emission standard) dBA for the following motorcycles: (list of model specific codes). Installation of this exhaust system on motorcycle models not specified may violate Federal law.

(B) For exhaust system components designed and marketed for motorcycles, and tested in accordance with § 205.168 as a constituent of a complete exhaust system comprising non-original equipment components (other than itself), as provided for in § 205.166(b)(3), the following statement:

This (manufacturer's name) (type of component) (serial number), when installed with a legal (type of component), meets EPA noise emission requirements of (noise emission standard) dBA for the following motorcycles: (list of model specific codes). Installation of this exhaust system components on motorcycle models not specified may violate Federal law.

(iii) The model specific code must be the same as used by the motorcycle manufacturer and described in § 205.158(a)(6).

BOX 6-2 (continued)

(2) For exhaust systems designed solely for use on competition motorcycles (as defined by § 205.151(a)(3) and so designated and labeled by the manufacturer), the statement:

This product is designed for use on closed course competition motorcycles only and does not conform to U.S. EPA noise emission standards. Used on motorcycles subject to EPA noise regulations constitutes tampering and is a violation of Federal law unless it can be shown that such use does not cause the motorcycle to exceed applicable Federal standards.

(3) For exhaust systems designed solely for use on motorcycles manufactured before January 1, 1982, the statement:

This product is designed for use on pre-1982 model year motorcycles only and does not conform to U.S. EPA noise emission standards. Use on motorcycles subject to EPA noise regulations constitutes tampering and is a violation of Federal law unless it can be shown that such use does not cause the motorcycle to exceed applicable Federal standards.

(4) For replacement exhaust systems manufactured in the United States solely for use outside the U.S. and not conforming to the noise emissions standards of this regulation, the statement: “For Export Only.”

The labeling requirement, according to Ken Feith, who helped write the regulation at the EPA, was believed to provide a simple means for an initial nonquantifying enforcement action. “[An enforcement officer] could simply look for the required label on the exhaust system. If there’s a question about it, ... he or she writes a warning citation, and [the owner/operator has] to verify that this is in fact a legitimate legal system.”

Feith added, “Labeling is a nice, cost-effective enforcement tool, if it works. But we’ve been told it doesn’t work.” If labeling is not effective as presently used, he asked participants, then what might be its replacement? How can we make enforcement easier at the state or local level?

Roundtable participants who expressed strong opinions that labeling is ineffective noted that labels can be difficult for law enforcement to find, motorcyclists don’t like having labels on their vehicles, and labels can imply compliance on a motorcycle that’s actually been modified to increase noise emissions.

Several participants were in favor of finding ways to revise the labeling requirements to make them a more effective enforcement tool for state and local authorities while keeping

in mind the esthetics of the vehicle. Proposals included replacing a lengthy label with a bar code, and noting stationary noise levels on the label.

LABELS CAN BE DIFFICULT TO FIND

Although the regulations state that the label must be affixed in a readily visible position, labels are often placed in locations that are hard to find and may, in some cases, require disassembly of some parts. Labels are placed out of the way so as not to damage the esthetic of the bike, but it is inappropriate to ask state and local authorities to get down on their knees or backs to access the labels on exhaust equipment, said Eric Wood of Acentech.

Dean Jaeger, formerly of Harley-Davidson, noted that some manufacturers follow the regulation but the label still ends up hidden: “For some manufacturers who have full coverage cosmetic shields on their exhaust pipes and mufflers, it’s illegal to put a label on a removable component of the exhaust system. So putting a label or bar code on a cosmetic shield that’s covering the muffler would be illegal. Therefore, the label goes underneath the shield or at some place that might not be readily visible, not because it’s cosmetic, but because it’s functional.”

“Perhaps the exhaust system isn’t the appropriate place, because there are so many different configurations,” said Yoshimura’s Tim Welch. “Perhaps on the steering head, where we already place VIN (Vehicle Identification Numbers) numbers ... it has to be visible to law enforcement officers anyway for purposes of verification of ownership.”

RIDERS DON’T LIKE LABELS

From the point of view of motorcycle owners and operators, labels are unattractive, whether attached to the motorcycle or the exhaust system. “The motorcycling community is very passionate,” said Imre Szauter, representing the American Motorcyclist Association. “We’re not going to be happy with any kind of labels on the outside of our vehicles indicating that we’re compliant with some state, federal, or local regulations. That’s not why I paid \$20,000 for my motorcycle.”

Tom Austin, Motorcycle Industry Council (MIC), agreed. “That’s why we spent so much time and money developing SAE J2825, because we know it’s something that unlike a label, will actually work. It will identify excessively loud motorcycles. Labels don’t. Plus [labels] are esthetically a disaster from the perspective of most motorcycle owners.”

Wood responded, “... to say that they can’t put up with some kind of a sign, image on their bikes, is just wrong. Every one of them has a license plate in the back of their bike, just like we all have license plates in the back of our cars.”

Representatives of the riding community said they'd prefer a communications campaign so riders know about local enforcement. "You don't have to spend a ton of money to get the word out to our community," said Szauter. "We do it every month in our magazine."

Les Blomberg of the Noise Pollution Clearinghouse asked that labels be viewed as a component of the complete noise reduction enforcement system. "It is useful. It can be circumvented, obviously. It is not perfect," he said "I think it's important to keep the label, and to remember that it's part of an entire system, and that we should find a way to incorporate the other components in that system."

While the rider community is passionate about the look of their motorcycles, the general public has strong feelings about motorcycle noise as well, said Karen Trevino, of the National Park Service (Trevino, 2012). "Homeowners in Manhattan feel equally strongly about their property values, and I have people in national parks who feel ... that they've saved up for five years to take their family of four from New Jersey to Grand Canyon to have a nice experience. They're not really happy when it's... impacted by a lot of motorcycle noise, and we do hear about it all the time."

LABELS INDICATE COMPLIANCE, EVEN ON NONCOMPLIANT VEHICLES

It was generally agreed by participants that labels describe the condition of the motorcycle and exhaust system as it left the factory. A bike could be tampered with to increase the noise output, but a label may still exist stating that the bike is in compliance.

There are plenty of instructions online on how to modify an OEM exhaust system while keeping the label intact, said Jim Leonard of Vance and Hines. "There is a real-world argument out there that it's a bit of a farce to just go by the label."

Austin agreed: "if you have an end user who's changed the intake side of the system,²¹ the bike still has the label on it. The law enforcement officer looks at the label and says, well, I guess the bike complies, and it doesn't comply."

Austin said he expects expanded enforcement of labeling to make counterfeit labels commonplace. There are "counterfeit labels by the millions that are being used right now to get around helmet laws. There's no reason we won't see the same thing with noise."

Manufacturers and bike enthusiasts argued against the utility of the label. AMA asked that labels be eliminated. "Motorcycle owners already bemoan the number of mandated labels and stickers that detract from the appearance of their vehicles." Szauter went on, "The AMA has endorsed the use of the SAE J2825 Recommended Practice as a practical, economical, reliable, and reproducible 'in-use' or 'curb-side' (stationary) test procedure that negates the need for any embossed label requirements of motorcycle exhaust system components."

²¹ Editor's note: to increase the noise level.

MIC's Austin, agreed. "If there's a concern about noise, measure the noise."

LABELING PROPOSALS

The labeling proposal that gained the most support came from Eric Wood, Acentech, who suggested that all of the information currently on the labels could be stored in a database accessible via an optical machine-readable bar code placed on both the motorcycle and the muffler.²² The bar code would have to be accessible for scanning with a cell phone or other device, by someone standing next to the bike, not on hands and knees.

For the motorcycle, much of the information required on the label, including make and model of the bike, is already in the VIN. A bar code could supplement this information.

Eric Zwerling of Rutgers University supported the idea: "I agree completely with Eric Wood's solution about a bar code. I think that's an excellent approach." QR codes are becoming quite common, hold more information than one-dimensional codes, and applications are available to read and decode these with smart phones. Trevino of the National Park Service said that the Department of Transportation's Volpe National Transportation Systems Center should be able to develop a "bar code to label information" application [Editors' note: Volpe has studied air and noise emissions near National Parks²³ and has developed bar code tracking systems for a freight transportation distribution system of the U.S. Army²⁴].

Reacting to the bar code proposal, Pam Amette, MIC, said a bar code would only indicate compliance for a new muffler on a new motorcycle, which she said is "a very small niche of the 10 million motorcycles out there." The bar code wouldn't label the mufflers that are modified after they are sold. "Having a bar code on a system doesn't ensure that it's compliant." Charles Shamon, New York Department of Environmental Protection, noted that a bar code has the potential of making the biking community happy because there could be less confrontation between law enforcement and riders. "There's less confrontation with your system. That's a big plus."

Austin warned that motorcyclists will avoid confrontation by making counterfeit labels, as they do today with helmets. "I don't see any reason to believe that the exact same thing won't happen if there's a push to focus on labeling for noise compliance." Speaking to the concern over counterfeit labels, Shamon stated, "Under the bar code . . . counterfeiting would be very diminished. Counterfeiting is fraud, and that's a felony. I don't think people want to go there." Austin disagreed: "People are willing to do whatever it takes to ride the way they want to ride and have their bike look the way they want it to look."

²² Editor's note: in the exhaust system labeling requirements, the expression "label or mark" is used in several places. The word "mark" is not defined, but could be interpreted as being a bar code or a two-dimensional QR (Quick Response) code.

²³ <http://www.volpe.dot.gov/nps/docs/dot-vntsc-nps-05-01.pdf>

²⁴ http://www.volpe.dot.gov/infosrc/highlights/98/sept/d_national.html

A handful of jurisdictions (including California²⁵, the city of Boston²⁶, and the city of Denver) have adopted labeling rules, but enforcement, according to some roundtable participants, is minimal. Making enforcement more likely to happen appears to be a critical component of a labeling system.

Participants also discussed requiring that motorcycle manufacturers carry out the J2825 test on the vehicle and note on the bar code what level the vehicle tested at. That provides a noise level that law enforcement could test the vehicle using J2825 test procedure, if the jurisdiction adopts a testing law or ordinance. “There can be tolerances built in here,” said Feith. “This then assigns another metric that can be used as an enforcement tool.” Feith also suggested that the motorcycle only needs a label on the body of the motorcycle, not on the muffler as well. Any exhaust system on that bike would have to test at or below the level noted on the label of the motorcycle.

Wood agreed that the J2825 number could be in the database with the VIN. Dean Jaeger, formerly of Harley-Davidson, noted that this approach is used in European countries for reference levels for stationary sound levels and has been proven to be effective.

Les Blomberg liked Feith’s suggestion of adding the J2825 level to the label, stating that it works with existing laws and will make enforcement easier. “Now you’ve created a tool that will allow the police officer to immediately know if that vehicle has been altered in a way that increases the noise levels.”

“I’m really intrigued with that idea and it sounds like a possible solution,” said Welch, regarding requiring a whole bike label rather than an exhaust label and having OEMs provide a roadside test standard, “with the provision that there’s a reasonable correction factor.”

Charles Elkins, formerly of the EPA, summarized: “Aftermarket manufacturers would not have to test to the EPA standard. They would simply have to be able to tell the buyer, ‘if you put this system on your bike, you will meet a number of X, using the curbside number.’” He noted that compliance would increase because riders would know what level they were allowed to run at. Another benefit is that aftermarket manufacturers would no longer have to run the pass-by test currently required by the regulation.

Sgt. Kace expressed concern that this system would require law enforcement to have additional knowledge and/or access to an additional database. Feith said the number could be right on the label.

²⁵ For text of the California law, see www.leginfo.ca.gov/pub/09-10/bill/sen/sb_0401-0450/sb_435_bill_20100928_chaptered.html

²⁶ For text of the Boston rule, see www.cityofboston.gov/cityclerk/hearing/upload_pdfs/docket_pdfs/065805312009.pdf

STATE AND LOCAL ISSUES

THE POWER OF STATE AND LOCAL GOVERNMENTS

One of the goals of the roundtable was to assess and clarify the role and latitude of motorcycle noise enforcement actions by state and local governments as permitted by the Federal motorcycle noise regulation. As noted in *Technology for a Quieter America* (NAE 2010) controls at the state and local level have suffered due to real and implied federal barriers to their actions. According to Ken Feith, formerly with the Environmental Protection Agency (EPA), state and local governments were given an important role in the motorcycle noise regulations, but, he said, "...some ambiguities have crept up in this regulation over the past 30 years due to changes in technology, operator use patterns, and in some cases simply due to misunderstandings with the text and requirements of the regulation terminology."

Feith acknowledged that much of the confusion as to the role of state and local governments revolves around the preemption language of the regulation: "The problem that is presented by the federal rule, as most of you know, is the preemption part, and depending on the state or local attorneys, the easy way out is to say we're preempted, we can't do anything. And they don't do anything"

However, he continued, "...when you look at the regulation and ... carefully read it, you see that there's a wide open window for state and local governments to do a lot of things without running ... into problems with preemption."

PREEMPTION

One perceived barrier to local and state government action on noise is the preemption provision of the regulation. Federal preemption exists when a federal regulation specifies a set of conditions or standards that must be complied with on a national basis. Such conditions and standards cannot be arbitrarily altered without due process and agreement by the federal government, according to Feith. In the case of the federal noise emission regulation for motorcycles, preemption means that because federal noise emission standards are specified along with certification procedures, they cannot be altered by state or local jurisdictions in any manner that would increase or reduce their level of stringency, applicability, or the specified compliance requirements. However, where preemption is spelled out in detail, in Section 6 of 42 USC 4905, noise emission standards for products distributed in commerce, the text clearly notes that state and local governments can take other steps to control noise (see Box 7-1).

BOX 7-1
42 USC 4905 Section 6 Preemption Language

From: 42 USC 4905 Section 6

(e)(1) No State or political subdivision thereof may adopt or enforce-

(A) with respect to any new product for which a regulation has been prescribed by the Administrator under this section, any law or regulation which sets a limit on noise emissions from such new product and which is not identical to such regulation of the Administrator; or by the manufacturer of such product, any law or regulation setting a limit on noise emissions from such component when so incorporated.

(2) Subject to sections 17 and 18, nothing in this section precludes or denies the right of any State or political subdivision thereof to establish and enforce controls on environmental noise (or one or more sources thereof) through the licensing, regulation, or restriction of the use, operation, or movement of any product or combination of products.

(f) At any time after the promulgation of regulations respecting a product under this section, a State or political subdivision thereof may petition the Administrator to revise such standard on the grounds that a more stringent standard under subsection (c) of this section is necessary to protect the public health and welfare. The Administration shall publish notice of receipt of such petition in the Federal Register and shall within ninety days of receipt of such petition respond ...

Section 6 of the regulation states that state and local governments may not set a limit on noise emissions from motorcycles that is different from the EPA limit. Next, it says these groups are not precluded from establishing controls on environmental noise via licensing, restrictions on product usage or adoption and enforcement of standards and requirements identical to the federal requirements. Finally, if a state or local government wishes to set more stringent noise emissions because of local needs, it must petition the EPA administrator to do so.

From the roundtable, there were questions about the intent and role of preemption. What are states allowed to do and not allowed to do? Are there changes to request in the regulations regarding preemption that would reduce real and perceived barriers to appropriate noise control?

Source: www.gpo.gov/fdsys/granule/USCODE-1995-title42/USCODE-1995-title42-chap65-sec4905/content-detail.html

According to a strict interpretation of the preemption rule by some roundtable participants, if state and local governments wish to control the noise emissions of motorcycles, they must adopt and enforce the federal regulation. As a practical matter, however, state and local governments cannot adopt regulations identical to the federal regulation because the test procedure required for enforcement, as defined in Appendix I of Subpart D of 40CFR205, is too complex and costly, requiring a test track and professional drivers. Their hands are tied.

And what about preemption by another federal agency? Could the National Park Service issue its own motorcycle noise regulations? The answer is “no,” without first consulting with the EPA. Under the Noise Control Act of 1972, the EPA has the sole federal responsibility for promulgating regulations on the noise emissions of motorcycles. However, nothing prevents the National Park Service from imposing operational requirements and restrictions on areas and hours of use.

Representatives from several of the manufacturer groups stated that approving SAE’s J2825 Recommended Practice as a supplementary stationary test (see Chapter 2) would be “a good first step.” Said Jim Leonard of Vance and Hines, “[J2825] meets a lot of criteria for the aftermarket, for the public at large, the manufacturers, everybody involved.”

In order for more exhaust system manufacturers to willingly pay to bring their systems into compliance, said Tom Austin, representing the Motorcycle Industry Council (MIC), “we think there has to be a whole lot more enforcement at the state level to create that incentive for people to have compliant systems, which means the states need a simple roadside test.”

Austin suggested, “If, for example we could get a legal opinion out of EPA saying we’ve looked at this, and we think J2825 is the proper test procedure to be using for roadside enforcement, and ‘... we think you’ve demonstrated it does not conflict with our standard,’ that might be very helpful.”

Feith added, that . . . “could open the door for state and locals to use [J2825] without preemption.”

“The federal rule is not resulting in lower noise in the community,” said Charles Elkins, formerly with the EPA. “Why don’t we first put into place a program, and maybe this standard is the first step of it, to see if we can take the noisiest motorcycles off the road. And that’s going to take a lot of work, because we need a lot of states doing it, not just New Hampshire.” Then ask, do we still have a motorcycle problem? If we do..., then let’s analyze what that problem is, and then let’s have another session, and let’s fix the problem.”

Others interpret the existing regulation as saying that state and local governments currently have the power to control motorcycle noise. “As a consultant to various states (Maryland, Florida, Illinois, Massachusetts), I have always thought of the Noise Control

Act of 1972 as amended in Section 6 as only applying to manufacturers,” said Chuck Dietrich. “I always consulted with my clients to develop their own in-use²⁷ [test] using models that have been worked on elsewhere, starting with California, and to leave... the business of regulating new motorcycle noise and the complicated test procedure that goes with it to the manufacturers. The problem isn’t listening to the bike as it’s driven out of the showroom. It’s what happens in the next few miles, and that’s a different story.”

State and local governments appear to have other options as well. For motorcycles, Section 205.162-1(d) implies that they could use excessive noise as evidence of tampering (see Box 7-2).

BOX 7-2

§ 205.162-1(d) State and local prohibitions against tampering

Section 205.162-1(d)

The provisions of this section are not intended to preclude any state or local jurisdiction from adopting and enforcing its own prohibitions against the removal or rendering inoperative of noise control systems on vehicles subject to this part.

Furthermore, Section 205.173-3 appears to say that the owner is responsible to keep motorcycle noise from increasing or he/she may be subject to enforcement by state and local authorities with their own noise abatement ordinances (see Box 7-3).

BOX 7-3

§ 205.173-3 Owner responsibility

Section 205.173-3

The manufacturer must include the following statement pursuant to 205.173-4 with each product of that category the manufacturer puts into commerce:

Warning: This product should be checked for repair or replacement if the motorcycle noise has increased significantly through use. Otherwise the owner may become subject to penalties under state and local ordinances.

Are these statements being interpreted correctly? Is there room for multiple interpretations?

²⁷ Editor’s note: Dietrich is referring to developing their own standards for a roadside test for noise emissions to see if owners/operators are maintaining their motorcycles at appropriate noise levels.

EDUCATIONAL AND BEHAVIORAL OPPORTUNITIES

Several roundtable participants suggested that educational efforts could play an important role in changing rider behaviors. Many bikers are passionate about maintaining the appearance and mechanical condition of their motorcycles. Some are equally passionate about their perceived right to modify their bike to gain attention by producing excessive noise that turns heads. That perceived right by some riders is a root cause of the problem of excessive noise. Sergeant Kace from New Hampshire noted that even with a compliant motorcycle, it is easy to rev up the engine and make a lot of noise. Therefore, education can be an important function for state and local governments.

For example, using a mix of education and local ordinances, the city of Golden, Colorado, works on convincing bikers to take it easy when arriving in town. Steve Glueck, representing Golden, explained: “We don’t want our residents to be unhappy all the time that the bikers that come to our downtown area and visit our restaurants and bars make a whole lot of noise when they arrive and when they leave.” He added, “Our biggest problem is not whether they have compliant equipment on their bike. It’s how they behave when they come in and out.” Through education at local bars and restaurants, the program, called *Silence is Golden: Ride & Drive Community-Friendly Partnership*,²⁸ lets bikers know, “they’re very welcome in our community, but they’re more welcome if they just lay off a little bit on the accelerator when they’re leaving and arriving.”

To accompany the education program, Golden also has a local noise ordinance. The aim was to issue enough tickets and have them stand up in court so word spread that behavior in Golden needed to improve. If the officer believes the bike is loud or if it’s not labeled as a compliant system, he or she issues a ticket. And the officer’s decisions have stood up in court.

Sgt. Stephen Kace, New Hampshire State Police, said he educates local law enforcement about New Hampshire’s law.²⁹ If they complain that the testing is cost prohibitive, he explains that the equipment can be bought for “a nominal fee,” in the range of \$800. But, he admitted, “It’s still a long, arduous process to educate law enforcement.” Local courts need to be educated as well, he added.

“New Hampshire is the first in the nation to adopt the SAE J2825 as written,³⁰ Kace said. “The State of Maine³¹, our bordering state, has adopted a variation of that... We now

²⁸ Golden, Colorado’s campaign is described in *The Police Chief*, vol. LXXVI, no. 5, May 2009. www.policechiefmagazine.org/magazine/index.cfm?fuseaction=display_arch&article_id=1796&ssue_id=52009

²⁹ Find the text of New Hampshire statute 266 at www.lawserver.com/law/state/new-hampshire/nh-statutes/new_hampshire_revised_statutes_chapter_266

³⁰ New Hampshire statute 266:59-a became effective January 1, 2013; for text, see www.lawserver.com/law/state/new-hampshire/nh-statutes/new_hampshire_revised_statutes_chapter_266

have the roadside or curbside testing, if you will, and we're very encouraged about what's going to come out as a result of that."

One educational approach that Maine uses, which was shared at the roundtable, is to post roadside signs stating, "Please Ride Quietly" (see Figure 7-1). That may be an option for motorcycle license plates as well.

The behavioral issues are also important to the National Park Service, stated Karen Trevino. "People go to these places to get away from the noise. That's why people by and large visit many national parks." However, she pointed out, the parks aim to welcome people, "including those who come in on their motorcycles." She said the National Park Service is considering a "ride respectful" campaign, to strike a balance of welcoming everyone to the parks and responding to complaints about noise from motorcycles (NAE 2013).



FIGURE 7-1. A sign posted on a Maine roadway.

In July 2005, the American Motorcyclists Association (AMA) published a second printing of *Sound Advice* a report of the Motorcycle Sound Working Group formed in response to: "Of the myriad issues facing motorcyclists today, excessive motorcycle sound has become the single greatest threat to American motorcycling's future." The report presents AMA's approach to better manage excessive motorcycle sound and provides a wide range of recommendations including educational opportunities for addressing this issue, some of which are reproduced in Box 7-4.

³¹Maine's law can be found at www.maine.gov/dps/msp/licenses/documents/Vehicle%20Inspections/ExhaustlawChanges2010.pdf

BOX 7-4
AMA's Educational Recommendations

On-highway motorcycle OEMs should partner with rider and dealer organizations in support of awareness and education programs to curb excessive motorcycle sound.

On-highway motorcycle OEMs should continue to produce and sell EPA-compliant exhaust systems.

The aftermarket exhaust industry should seek opportunities to promote responsible use of products through its advertising.

On-highway motorcycle riders/rider groups should develop a social awareness campaign in a useable format for distribution to educate riders regarding the effect motorcycle sound can have in many riding areas.

On-highway motorcycle riders/rider groups should partner with interested parties to create, promote and fund campaigns to increase rider awareness of the negative effects of excessive motorcycle sound and the resulting impact on the surrounding community and motorcycling.

The motorcycling media should work with advertisers, industry, motorcycle rider groups, etc., to better inform the riding community of the negative effects of excessive motorcycle sound.

The motorcycling media should promote a community-conscious attitude to riders.

Source: www.americanmotorcyclist.com/legisltn/soundbook.pdf

STATE AND LOCAL LAWS

It is not the purpose of this report to present a compilation of laws and regulations. However, there is activity in New York City, California, Colorado, Maine, and New Hampshire, the first state to adopt the SAE J2825 standard.

Because, in Dietrich's judgment, Section 6 only applies to manufacturers, he says Section 6 is not the place to offer guidance for state and local governments. He suggested, instead, that EPA issue a model ordinance as guidance to state and local governments. The EPA has the power to do so, according to Feith, and it issued a model ordinance in the mid 1970s in response to the regulation's requirement that EPA assist state and local governments (EPA 1975). An updated, simple model ordinance is one way to introduce the SAE J2825 procedure as an option for stationary testing, agreed Eric Zwerling of Rutgers University and others.

Sgt. Kace made it clear that state law enforcement officers are not well positioned to enforce federal laws when he said, “I can envision one of the responses from a District Court judge who’s going to hear the case if it’s contested: ‘Trooper, you’re asking me to now enforce a federal law; am I hearing you correctly?’ And the life expectancy of that case then in the court would be very short lived.”

Nick Miller of Harris Miller Miller & Hanson, a noise consulting firm, said, “I’d like to see an outcome being some kind of recommendation that there be a model in-use regulation or ordinance that incorporates ... the SAE test procedure plus other things about how to develop this, how to work with the courts, the stakeholders and so forth, to build a real effective enforcement mechanism.”

The AMA published in September 2009 a *Model On-Highway Motorcycle Exhaust System Sound Emissions Ordinance* that they propose could be adopted by local or state authorities. Their model ordinance is based on the measurement procedures and sound level limits provided in SAE J2825 Recommended Practice (AMA 2009).

Districts including New York City have employed a “plainly audible” standard in noise ordinances. Charles Shamoon, New York Department of Environmental Protection, described New York’s program. Plainly audible is defined as any sound that can be detected by a person using his or her unaided hearing faculties. A paper by Zwerling, Shamoon, and Myers (2012) titled, *Analysis of the “plainly audible” standard for noise ordinances* includes sample language:

No person shall cause or permit any motorcycle to operate on a public right-of-way where the muffler or exhaust generates a sound that is plainly audible to another individual at a distance of 200 feet or more from the motorcycle. (This provision may be used as probable cause to curb the vehicle for further inspection, if such is desired).

With this approach, police officers don’t need sound level meters or calibrators to identify a bike that is producing excessive noise. Plus, Shamoon noted, riders can self-regulate. “They can [ask] a friend: ‘Can you hear my bike at 200 feet?’” One drawback, however, is the potential for confrontations between police and riders. Eric Wood noted that police officers should be authorized to issue citations for excessive noise that requires the rider to get the motorcycle inspected. Golden, CO, uses this approach, according to roundtable participant Steve Glueck, and courtroom judges respect the police officers’ opinions.

California’s state bill 435, as described by Judy Rochat, Volpe Center Acoustics Facility, focuses on labeling (Rochat, 2012). Motorcycles and aftermarket exhaust systems manufactured on or after January 1, 2013, that do not display an EPA exhaust system label are considered in violation. Because the California law applies only to bikes manufactured in 2013 or later, some roundtable participants say the regulation is weak.

From the discussion, several approaches to state and local enforcement are worth considering, including the stationary test procedure of SAE J2825 and the “plainly audible” test used in New York City.

ACTION BY FEDERAL GOVERNMENT

Catrice Jefferson, representing the EPA, suggested a path with respect to the adoption of a stationary test procedure (SAE J2825). The EPA needs evidence that this test, when applied in the field, will correct many of the noise problems that are perceived to be associated with motorcycles. The simple solution is to make SAE J2825 either an option or a requirement under the federal regulation, she said. Or, perhaps, a legal opinion from the EPA states that this approach has been studied and that SAE J2825 is the proper test procedure to be using for roadside enforcement. Further, it has been demonstrated not to conflict with the existing EPA standard. If the report of the roundtable asks for a legal opinion on the alternative test procedure, that may encourage an opinion from the EPA General Counsel’s office and possibly the EPA Enforcement office. The other option, as discussed, is the production of an updated model ordinance by the EPA.

CONCLUSIONS

One of the purposes of the roundtable was to explore how state and local governments can be more proactive in control of motorcycle noise. The federal government gives state and local governments a great deal of power to control motorcycle noise. Although this chapter does not contain a listing of state and local laws,³² a diversity of approaches and requirements were discussed. To the extent that this directly affects manufacturers of motorcycles and aftermarket exhaust systems, it must be recognized that the goal of preemption is to prevent manufacturers from having to deal with a large number of perhaps conflicting requirements on noise emissions.

Responding to an industry representative who called for more enforcement, Feith summarized, “What you’re saying is that we need to involve state and local governments in a more proactive way, and that walks back to one of our initial objectives, ...to provide them with the means and the tools in order to do that, and remove those things in the regulations, those elements in the regulation that may prevent them from doing it.”

If the EPA were to formally recognize SAE J2825 as a measurement tool for the field identification of motorcycles that do not meet the federal standard, it would encourage state and local governments to adopt a single field procedure and would assist manufacturers that might otherwise face a variety of local requirements.

³² *Editor’s note: AAA publishes a list of state laws related to motorcycle noise limits at <http://drivinglaws.aaa.com/laws/motorcycle-noise-limits/>*

RECOMMENDATIONS

To address issues and concerns raised during the roundtable discussions, the editing team developed the recommendations below. They are considered to be of considerable importance to improve control of motorcycle noise in the United States. Taken together, the recommendations aim to make clear that the noise emission requirements are in place for the life of the motorcycle, that the manufacturer has a responsibility to build a vehicle from quality materials that will last a reasonable period of time, and that the responsibility for meeting the requirements when the AAP expires rests with the owner and not the manufacturer. To determine whether or not the motorcycle emits excessive levels of noise when it is on the road, law enforcement needs a court-acceptable stationary test of noise levels that is recognized by the Environmental Protection Agency (EPA) and not preempted. The recommendations below are organized to follow the logic of the chapters.

NOISE TEST PROCEDURES

RECOMMENDATION 1

So that local and state government, law enforcement, and other federal agencies have a practical test for in-use evaluations of motorcycle noise emissions, the EPA should acknowledge the SAE J2825 Recommended Practice as a procedure for stationary testing of motorcycles. Consideration should be given to lowering the noise level limits in SAE J2825, which many persons believe are too high. Such addition would remedy the present legal difficulty faced by state and local enforcement authorities who are now held to the complex test procedure and attendant noise levels as specified in 40CFR205 Subpart D Appendix I. This stationary test is not being recommended as a replacement for the OEM motorcycle manufacturer compliance test.

RECOMMENDATION 2

When an exhaust system manufacturer is mounting its system on a motorcycle that has been tested and meets the § 205.152 limits, then the manufacturer should be allowed to use a simpler test procedure to show the muffler meets federal regulations. The current certification requirement under 40CFR205, Subpart E is to test each exhaust system or category of exhaust systems on *each* model motorcycle for which it is marketed. The global growth in motorcycle designs and performance since the promulgation of this regulation has made the above requirement a significant economic barrier to aftermarket manufacturer compliance. Therefore, the EPA should acknowledge the SAE J2825 for use by exhaust system manufacturers. This recommendation supports the President's Executive Order of May 10, 2012, calling for simplified procedures and regulations. So that this recommendation does not lead to the acceptability of noisy replacement mufflers, the noise level limits in SAE J 2825 should be lowered if the Recommended Practice is used for this purpose.

RECOMMENDATION 3

In view of the difficulties in implementing the federal test procedure on modern motorcycles, even by manufacturers, EPA should contact manufacturers for suggestions as to how the procedure could be modified to simplify implementation.

RECOMMENDATION 4

The EPA should develop, publish, and make readily available to interested parties technically and legally appropriate advice for state and local agencies as to noise level test procedures and noise level limits that can be incorporated into their regulations to adopt and enforce limits on motorcycle noise. This advice should include clarification as to EPA's intent with regard to preemption provisions within the motorcycle noise regulations. This advice should include considerations of the EPA Administrator's responsibilities as defined in the Noise Control Act of 1972, the Quiet Communities Act, Executive Order 13132,³³ and Executive Order of May 10, 2012.³⁴

RECOMMENDATION 5

SAE International should update Recommended Practice J2825 to include a table of sound pressure limits, for each test procedure, that are established to fail those vehicles that fail the federal EPA requirements. Also, in Section 9.1 of J2825, SAE International should eliminate the requirement that any standards based on the procedure not use lower levels than 92, 96, and 100 dB. Several roundtable participants felt that these levels are too high.

RECOMMENDATION 6

SAE International should make available for public review the test data and vehicle identifications employed in the development of Recommended Practice J2825.

RECOMMENDATION 7

SAE International should make available to parties interested in J2825 justification for a) selection of 92 dBA as the sound pressure limit for all engine configurations at idle test conditions as provided in Section 9.1, b) subtracting 2 dBA from measurements for certain motorcycles as provided in Section 9.2, c) the microphone location tolerations in Section 8.3, and d) field calibrations specified in Sections 8.2.1 a and b.

ACOUSTICAL ASSURANCE PERIOD

RECOMMENDATION 8

The EPA should clarify that the noise limits in the regulation apply for the life of the motorcycle. The Acoustical Assurance Period (AAP) was put in place to communicate that the manufacturer must build a system with reasonably good quality materials that will last a year. After that, the motorcycle must still meet noise emissions requirements,

³³ <http://www.gpo.gov/fdsys/pkg/FR-1999-08-10/pdf/99-20729.pdf>

³⁴ http://www.whitehouse.gov/sites/default/files/2012regburdens.eo_rel.pdf

but it becomes the owner/operator's responsibility to comply. Adding this clarification to a confusing part of the regulation supports the May 10, 2012, Executive Order.

RECOMMENDATION 9

The AAP should remain a part of the regulation. There does not seem to be a compelling reason to remove the AAP from the regulation. It serves as a de-facto warranty imposed on manufacturers by the government for a short period of time. If Recommendation 8 is implemented, there should be no further confusion as to the role of the AAP.

RECOMMENDATION 10

Discussion of the AAP and the required noise limits should not appear in the same part of the regulation. The fact that the specification of the AAP and the noise limits appear in the same section of the regulation has been used by some as "proof" that the noise limits in the regulation apply only during the AAP, and that there are no noise limits after that period.

RECOMMENDATION 11

If AAP is removed from the regulation, it should be replaced by a warranty. The provisions of any warranty (time, mileage) should be at least as long as the AAP, and depends on the expected life of the motorcycle and the exhaust system. Separate from the AAP, the length of a manufacturers warranty is a marketing issue between the manufacturer and the owner/operator. It should not be seen as a limit to the time the vehicle must meet noise emission standards; it is a statement of responsibility for making repairs that bring a vehicle in line with standards – owner/operator or manufacturer. During warranty, the manufacturer is responsible. After, the owner/operator is responsible.

EXHAUST SYSTEMS

RECOMMENDATION 12

The EPA should consider whether the definition of an exhaust system in 40CFR205 requires revision in light of the exhaust emission standards that were promulgated subsequent to 40CFR205. Of particular concern is the introduction of the catalytic converter since it appears to be critical, not only to reducing air emissions, but also to reducing noise in today's motorcycle exhaust systems.

TAMPERING

RECOMMENDATION 13

Currently, the manufacturer of a motorcycle is responsible for designating those acts that constitute tampering. In some cases, this responsibility may have been abused to the detriment of manufacturers of compliant replacement exhaust systems. To provide some uniformity among manufacturers, the EPA should also provide a standard list of items that constitute tampering, regardless of motorcycle manufacturer or category of

motorcycle. It should also stipulate in the regulation that OEM's cannot intentionally designate tampering acts that would preclude aftermarket parts manufacturers from providing regulatory compliant replacement parts.

RECOMMENDATION 14

The EPA should make clear in the regulatory requirements that the tampering provisions apply to all persons for the life of the motorcycle. In other words, noise limits for owners/operators remain in effect for the life of the motorcycle and do not expire at the end of the AAP.

RECOMMENDATION 15

The EPA should make clear in the regulatory requirement, beyond the text requirement for the owner's manual (205.262-2), that federal law prohibits the use of the vehicle after removal or rendering inoperative of any device or element of design incorporated for the purpose of noise control, unless the vehicle still meets the applicable noise emission standard.

RECOMMENDATION 16

The EPA should develop, publish, and make readily available to interested parties clarification that motorcycles and exhaust systems must maintain compliance with the noise limits for the life of the motorcycle.

RECOMMENDATION 17

The EPA should develop, publish, and make readily available to interested parties appropriate and effective methods and advice by which state and local enforcement agencies can inspect motorcycles to determine if tampering has occurred.

LABELING

RECOMMENDATION 18

EPA should consider the use of a bar code in place of the current labeling requirements. This would reduce the size of the label, addressing the concerns of owners/operators who don't like to see labels on their vehicles. The bar code for the bike could be placed near the Vehicle Identification Number (VIN).

RECOMMENDATION 19

The VIN is already required to be affixed to motorcycles, and contains at least some of the information required by EPA to be on a label. One-dimensional bar codes are very commonly used on products, and QR codes (two-dimensional bar codes) are becoming more common. It is recommended that EPA consider the use of bar codes in place of the current motorcycle labeling requirement. Since alphanumeric characters are used for the 17-character VIN, the VIN can appear on the bike and be incorporated into the QR code. The specifications should also include a place for the noise data obtained from a SAE J2825 measurement reported by the manufacturer.

RECOMMENDATION 20

EPA should work with industry to develop a QR code to be placed on the exhaust system in a readily visible location.

RECOMMENDATION 21

EPA consider requiring OEM motorcycle manufacturers and exhaust system manufacturers to conduct the SAE J2825 test during their compliance certification test and provide those noise levels in their owner's manual and on the compliance label.

RECOMMENDATION 22

EPA consider the incorporation of more definitive language in the regulation and owner's manuals that expand the prohibition regarding counterfeit labels or covering, removal or defacing of labels throughout the life of the motorcycle. The intent is to make clear that the bike cannot be operated if the label has been removed, covered, destroyed, defaced, or counterfeited.

RECOMMENDATION 23

EPA should clearly define the term "mark" that is referred to in § 205.169 (b), (c), and (e) of the regulation and consider an explicit inclusion of two dimensional "bar codes" to fulfill the intent of the present term "mark", provided the bar code and its associated application software contain all language presently required on the conventional label.

STATE AND LOCAL ISSUES**RECOMMENDATION 24**

A coalition of manufacturers of motorcycles and exhaust systems should approach the EPA with a proposal to correct what is now an impossible situation with regard to enforcement of state and local noise laws. Adoption of the measurement procedure of SAE J2825 Recommended Practice should be part of the request, with maximum noise levels to be negotiated. The aim is to have a test procedure that is practical for state and local governments.

RECOMMENDATION 25

EPA should offer a legal opinion as to whether the J2825 measurement procedure can be used by state and local governments for in-use testing.

RECOMMENDATION 26

EPA should clarify what state and local governments can do to reduce motorcycle noise in the field – either by amending the current regulation or by issuing a model motorcycle noise ordinance. Note that the American Motorcyclists' Association has published a model ordinance. Either one of these procedures would help to promote uniformity in the way state and local governments approach the motorcycle noise issue.

RECOMMENDATION 27

If EPA produces a model ordinance, as recommended here, sample language regarding citations may include:

If a citation is issued, it might impose 1) a fine for excessive noise, 2) an additional fine if the exhaust system label was not readily visible and appropriate for on-street use, 3) increasing penalties for repeated offenses, 4) the requirement that the exhaust system be repaired, and 5) that the vehicle be brought to an inspection station.

Additional model language may include a statement such as:

To maintain peace and order and reduce the occurrence of unnecessary loud noise, automobiles and motorcycles shall be equipped with exhaust systems and exhaust mufflers maintained in good working order and the sound heard from such vehicles while operating on public roadways shall not exceed the sound commonly heard from typical well-maintained vehicles as observed by authorized police officers and inspectors. Vehicles and vehicle exhaust systems shall have appropriate and readily visible noise emission labels required by EPA.

RECOMMENDATION 28

States concerned with motorcycle noise should look to state and local governments, such as Golden, Colorado, and New Hampshire, to develop education-based programs to encourage riders to keep noise low. Find a way for states to share information on their motorcycle noise programs.

RECOMMENDATION 29

Court records could be searched to determine when/why judges do or do not uphold state and local noise regulations related to vehicle noise.

RECOMMENDATION 30

State environmental agencies could be surveyed to determine opinions about state and local noise regulations related to vehicle noise and their concerns about the federal regulation.

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Appendix A

ROUNDTABLE AGENDA

Noisy Motorcycles—An Environmental Quality of Life Issue A TQA Follow-on Roundtable

**Keck Center, National Academy of Engineering
Washington, DC
October 24, 2012**

INTRODUCTION - Welcome

- Opening: Roundtable purpose and expected outcome, introduction of participants, guidelines for discussion

MARKET DESCRIPTION (MOTORCYCLES, PRESENT AND FUTURE)— REPLACEMENT EXHAUST SYSTEMS (PRESENT AND FUTURE):

- Major motorcycle technology changes 1976 to 2012
- Motorcycle market information
- Aftermarket exhaust systems technology
- Aftermarket parts market information

REGULATORY APPLICABILITY (§ 205.150 – MOTORCYCLES AND § 205.164 – EXHAUST SYSTEMS):

- Identification of Federal requirements that merit reconsideration
- Identification of any conflicts between Federal requirements and state and local regulations:
- Identification of motorcycle and after-market parts manufacturers issues with current Federal requirements:
- Recognition of differences between U.S. and pending UN globally-harmonized motorcycle noise standards:
- Examples of state laws

ACOUSTICAL ASSURANCE PERIOD (AAP) / WARRANTY (§ 205.152(a)(3)&(4) – Motorcycle AAP, § 205.162-1 – Warranty, § 205.166(a)(3)&(4) – Exhaust System AAP, § 205.173-1 – Warranty):

- Identification of AAP impact on long term effectiveness of Federal regulation:
- Identification of relationship between AAP, Federally-required warranty requirements and standard manufacturer warranty:

ALTERNATIVE TEST PROCEDURES (§ 205.154 – Motorcycle, § 205.167 Replacement Exhaust Systems):

- Differences between U.S. and pending UN certification testing requirements
- In-use, curb-side testing – SAEJ 2825
- Relationship of Federal regulation to in-use testing:
- Simplified replacement exhaust systems compliance test procedure:

TAMPERING (§ 205.162-2 – Motorcycle, § 205.173-2 - Exhaust Systems):

- Identification of Federal requirements that merit reconsideration
- Recommendations to counter the tampering issue

LABELING (§ 205.158 – Motorcycle, § 205.169 - Exhaust Systems):

- Identification of Federal requirements that merit reconsideration
- Adverse impact of exhaust system design and common add-ons to Federal labeling requirement
- Recommendations to enable effective state and local enforcement (15 min.) (Roundtable)
- Consideration of added information for curb-side testing (10 min.) (Roundtable)

DEFINITIONS (§ 205.151 – Motorcycle, § 205.165 - Exhaust Systems):

- Identification of Federal definitions that merit updating and/or elaboration
- Recommendations on amended definitions

OTHER TECHNOLOGY-RELATED ISSUES:

- Air emission requirements and noise
- Applicability of Federal regulation to electric motorcycles

RECOMMENDATIONS TO RESOLVE CONFLICTS:

- Recommended revisions to Federal regulation to achieve intended citizen benefits - will not address more stringent noise limits
- Recommendations that enhance enforcement of state laws
- Recommendations that enhance enforcement of local ordinances
- Recommendations that can reduce regulatory burden on manufacturers

DISCUSSION

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Appendix B

PARTICIPANTS LIST

Noisy Motorcycles—An Environmental Quality of Life Issue A TQA Follow-on Roundtable

Keck Center, National Academy of Engineering
Washington, DC
October 24, 2012

Pamela Amette
Motorcycle Council, Inc.

Tom Austin
Sierra Research

Eric Barnes
American Honda Motor Co.,
Inc.

Les Blomberg
Noise Pollution
Clearinghouse

Tom Burroughs
Consultant

Chuck Dietrich
Retired

Charles Elkins
EPA (Retired)

Kenneth Feith
EPA (Retired)

Steve Glueck
City of Golden, Colorado

Deane Jaeger
Harley-Davidson (Retired)

Catrice Jefferson
EPA

Sgt. Stephen Kace
New Hampshire State Police

William Lang
Noise Control Foundation

Jim Leonard
Vance and Hines

George C. Maling, Jr.
TQA Chair

Elena Mikalis
Department of Commerce

Nicholas Miller
Harris Miller Miller &
Hanson

Proctor Reid
National Academy of
Engineering

Judy Rochat
Volpe Center Acoustics
Facility

Chris Roof
Volpe Systems Center

William Salmon
CAETS

Charles Shamoon
New York Department of
Environmental Protection

Rajendra Singh
Ohio State University

Imre Szauter
American Motorcyclist
Association

Karen Trevino
National Park Service

John Vanderwolf
Department of Commerce

Tim Welch
Yoshimura R&D of America,
Inc.

Eric Wood
Acentech, Incorporated

Eric Zwerling
Rutgers University

Appendix C

Sample Text on Noise in Owner's Manuals (1) and Warranty Language (2)

(1)

EPA NOISE REGULATIONS IN THE UNITED STATES

EPA noise regulations require that the following statements be included in the Owner's Manual.

EPA Regulations

TAMPERING WITH NOISE CONTROL SYSTEM PROHIBITED: Federal law prohibits the following acts or the causing thereof: (1) The removal or rendering inoperative by any person other than for purposes of maintenance, repair, or replacement of any device or element of design incorporated into any new vehicle for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use, or (2) the use of the vehicle after such device or element of design has been removed or rendered inoperative by any person.

AMONG THOSE ACTS PRESUMED TO CONSTITUTE TAMPERING ARE THE FOLLOWING:

1. Replacing the muffler(s) and/or the entire exhaust system with parts not certified to be noise legal for street use.
2. Removing or modifying the muffler internal baffles in any way.
3. Replacing the air intake/cleaner assembly with one not certified to be noise legal for street use.
4. Modifying the air intake/cleaner assembly in such a way as to make the vehicle no longer noise legal for street use.

Harley-Davidson recommends that any and all noise related maintenance be done by an authorized Harley-Davidson dealer using genuine Harley-Davidson parts.

2013 HARLEY-DAVIDSON MOTORCYCLE NOISE CONTROL SYSTEM LIMITED WARRANTY

The following limited warranty applies to the noise control system, is in addition to the MOTORCYCLE LIMITED WARRANTY and EMISSION CONTROL SYSTEM LIMITED WARRANTY, and applies only to Harley-Davidson motorcycles sold in the U.S.

Harley-Davidson warrants to the first owner and each subsequent owner that this motorcycle is designed and built so as to conform at the time of sale with applicable regulations of the U.S. Environmental Protection Agency (as tested following F76 Drive-By test procedure) and that it is free from defects in factory materials and workmanship which can cause this motorcycle not to meet U.S. Environmental Protection Agency Standards within one (1) year from initial retail purchase and delivery from an authorized Harley-Davidson dealer or one (1) year from the [second] anniversary of the last day of the model year of the motorcycle, or 3,730 miles (6,000 kilometers) whichever occurs first. Any unexpired portion of this limited warranty will be transferred to subsequent owners, upon the resale of the motorcycle during the limited warranty period. If the motorcycle was used as a demonstrator or company motorcycle, then the limited warranty period may have started and/or expired prior to the initial retail sale. See an authorized Harley-Davidson dealer for details.

Source: Noise control system tampering warning in 2013 Harley-Davidson owner's manual. Obtained post-roundtable.

(2)

TAMPERING WITH NOISE CONTROL SYSTEM PROHIBITED

Federal law prohibits the following acts or the causing thereof: (1) the removal or rendering inoperative by any person other than for purposes of maintenance, repair, or replacement, of any device or element of design incorporated into any new vehicle for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use, or (2) the use of the vehicle after such device or element of design has been removed or rendered inoperative by any person.

Among those acts presumed to constitute tampering are the acts listed below:

- removing or puncturing the muffler, baffles, header pipes, screen type spark arrester (if equipped) or any other component which conducts exhaust gases
- replacing the exhaust system or muffler with a system or muffler not marked with the same model specific code as the code listed on the Motorcycle Noise Emission Control Information label, and certified to appropriate EPA noise standards
- removing or puncturing the air cleaner case, air cleaner cover, baffles, or any other component which conducts intake air.

Source: Muffler tampering warning in manual for 2002 Suzuki Volusia. From Maine Citizens Against Loud Motorcycles (www.mecalm.org). Added post-roundtable.