

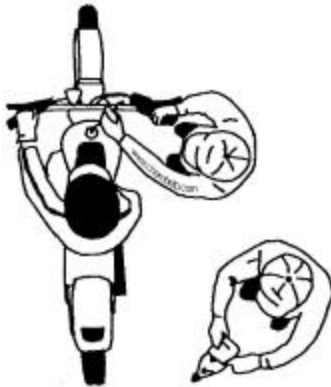


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Harrison & Real
Sound Training

Motorcycle and OHV Noise Education



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Field Motorcycle Noise Measurement Education Supplement

Noise Measurement Standard

The SAE J 1287 noise measurement testing procedure is the recognized American measurement procedure for motorcycles and ATV's.

This test method measures exhaust sound levels at specific engine speeds. Following this testing method as specified in the standard is critical.

The American technical community formally adopted the SAE J 1287 test method in 1980 after several

years of research.

The full SAE J 1287 standard is available through the Society of Automotive Engineers, www.sae.org. The SAE J 1287 procedure is published in the Motorcycle Industry Council's Stationary Sound Test Manual for Off Highway Motorcycles and all-terrain Vehicles. This publication is available by contacting the MIC at www.mic.org

SAFETY

Due to the fact that field exhaust noise measurement requires that the testing be performed with the engine running at significant speed, care needs to be taken to reduce risk to the vehicle operator and testing staff.

Sound levels from vehicles can be very high. Exhaust flow and discharge can dislodge particles of carbon, rust, dirt and other projectiles, this combined with pressure blast requires that eye and ear protection be utilized.

It is possible for the vehicle's transmission to inadvertently become engaged and unexpected vehicle movement can occur. Motorcycle exhaust systems can be very hot. The head pipe closest to the engine can be extremely hot and can produce severe burns. The muffler housing and tip can be hot as well, and care should be taken when working around these components. Be aware of these potential hazards. Many vehicles are not designed to idle for long periods. Be careful to avoid overheating stationary vehicles. Liquid cooled engines may discharge steam, hot water, and coolant. Excessive heat & pressure build up may cause the radiator to burst. **Avoid overheating the vehicle when performing a sound test.** Anti-freeze coolant is a health & environmental hazard.

Do not stand in front of the vehicle when performing a sound test!

In the event that the vehicle accidentally engages a gear, injury can occur.

Printed Resources

Popular motorcycle magazines have published many articles on sound. These include maintenance tips, sound testing of the popular 4-stroke Motocross bikes & ATV's as well as exhaust system information. The listed articles have outlines of independent sound testing results that Chris Real has obtained on current off road vehicles.

- ✂✂ Dirt Rider Magazine, December 2003
(Sound Testing MX Bikes & How to Repack Silencers) http://www.dirt rider.com/features/141_0309_sound/index.html
- ✂✂ Honda RedRider, November / December 2003
(Public Service Announcement)
- ✂✂ Dirt Rider magazine, June 2004
(Pipe Shootout)
- ✂✂ Dirt Bike magazine, July 2004
(Pipe Shootout)
- ✂✂ Dirt Wheels magazine, July 2004
(Pipe Shootout)
- ✂✂ Honda ATV RedRider, October 2004
Testing Information
- ✂✂ Honda RedRider, November 2004
Sound Test Method Education

Visit www.chemhelp.com
for updated printed
resources.



Rider Education & Outreach

Rider education is important to noise reduction. OHV exhaust systems require maintenance to maintain their effectiveness.

Exhaust system & muffler maintenance is important. 2-Stroke vehicles may have unburned fuel and oil residues in the muffler material. These deposits may reduce the performance of the muffler.

4-Stroke exhaust systems require maintenance as well. Frequent checking for exhaust leaks and packing material degradation is necessary to keep exhaust levels within specification. Crash damage can also contribute to increased sound levels.

When mufflers are maintained the noise level decreases, and the performance of the vehicle increases.

Public awareness activities help compliance.

Sound workshops are a good method of educating consumers on OHV noise reduction.

Resources Testing Equipment Sound Level Meters

The sound level meter is the most important part of the testing equipment.

Sound level meters are available in various performance levels. These performance levels conform to ANSI criteria, ANSI Type 1 meters are the most accurate, and are essential for enforcement purposes.

ANSI Type 2 meters may be used for screening purposes or “awareness” sound measurement, however they have wider tolerances and are thus less precise.

All sound level meters require calibration prior to use, and periodic maintenance.

The microphone of a sound level meter is very easily damaged. Water, shock loading pressure blast & debris will damage the sound level meter. A sound level meter cannot be field serviced, but if damaged, returned to the manufacturer for repair.

Mechanical Tachometer

Briggs & Stratton Vibration Tachometer PN: 19200
This mechanical tachometer is ideal for field RPM measurement. This instrument is available by special order from many small engine repair facilities. DPS Inc. stocks these instruments. (909) 981-5228

RPM Testing Data Off Highway Vehicles

Off road vehicle testing RPM data for use with the SAE J1287 testing procedure is available from a variety of sources:

Motorcycle Industry Council

www.mic.org

The MIC publishes a pocket sized sound test book. This book has the SAE J1287 motorcycle field-testing procedure as well as popular vehicle test RPM data.

Download RPM Data

http://www.ohv.parks.ca.gov/default.asp?page_id=23038

<http://www.ohv.parks.ca.gov/pages/1140/files/rpm%20data%20revised.pdf>

Sporting Regulations

AMA Rulebook www.ama-cycle.org

FIM Rulebook http://www.fim.ch/en/rules/Techniques/cer/rtcer2003/03-REGL%20TECH%20ENDURO_en.pdf

Ways to get poor sound test results

- 1. Not following the test procedure.**
- 2. Customizing the test procedure**
- 3. Use sound measuring equipment that does not meet ANSI standards.**
- 4. Not calibrating the equipment prior to using it.**
- 5. Using incorrect equipment settings.**
- 6. Using incorrect test RPM**
- 7. Using incorrect microphone location and angle.**
- 8. Holding your hand in front of the exhaust outlet.**
- 9. Not having the test vehicle at the correct temperature.**
- 10. Having people & reflective sources too close.**
- 11. Not confirming your results.**
- 12. Letting your buddies slide through.**

Testing Location

When selecting a field-testing location ambient noise levels must be considered.

Noise from traffic, public address systems, generators, radios, wind and people can contribute to inaccurate noise measurement.

Reflected sound is a concern for accurate sound measurement. Vehicles cannot be sound tested in trailers, truck or close to walls or other reflective objects.

Never try to sound test an OHV on a trailer or in a truck!

Spark Arresters

No discussion of OHV sound and mufflers would be complete without including spark arresters. Using spark arresters is a very good practice, and required on most public lands.

How Spark Arresters Work

Spark arresters work on the principle of trapping or pulverizing carbon particles that have a diameter greater than 0.023 in. Although they are not always 100 percent effective, a properly installed and maintained spark arrester will significantly reduce the risk of fire.

The most common types are screen type, or of a disc design. In a disc-type design, additional discs can be added to reduce backpressure and increase exhaust flow. (The use of a spark arrester may not minimize sound output. The addition of discs in a disc type exhaust system usually increases sound output.) Centrifugal design arresters separate and trap larger particles by separating them from the exhaust and trapping them.

Currently, a significant number of States, municipalities, federally managed lands, and all USDA Forest Service regions require that all internal combustion engines must be equipped with a spark arrester that meets the requirements established by the SAE Standard J335 or USDA Forest Service Specification 5100-1. The Code of Federal Regulations, 36 CFR 261.52, and orders written by USDA Forest Service line officers explain the requirements.

For more information on spark arresters

United States Department of Agriculture
Forest Service

<http://fsweb.sdtc.wo.fs.fed.us>

<http://www.fs.fed.us/eng/pubs/html/03511304/03511304.htm>

<http://www.fs.fed.us/eng/pubs/pdf/03511307.pdf>

National Wildfire Coordinating Group
Fire Equipment Working Team

<http://www.nwccg.gov/>

www.sae.org (spark arrester technical standard)

Consumer Education & Outreach



Chemhelp National Public Schedule, 2005

Nevada 200

Caliente, NV - April 1-3

World Mini Grand Prix

Las Vegas, NV , April 10-16

Grapevine ATV Jamboree

Gorman, CA – May 27-30

Ride For Kids Dualsport

Glen Helen, CA – June 10-11

Smokey Mountain Dualsport

Knoxville, TN – June 25-26

Alleghany ATV Jamboree

Caneaut Lake, PA - July 29-31

Loretta Lynn's MX Championships

Hurricane Mills, TN - August 1-7

JR Colorado 350

Grand Junction, CO, August 17-20

Rocky Mountain ATV Jamboree

Richfield, UT- September 18-23

Sierra Safari Trail Ride

Mammoth Lakes, CA – October 7-9

Elsinore Grand Prix

Lake Elsinore, CA - November 11-13

Barstow To Vegas Dualsport

Barstow, CA – November 25-26

Sound Training Classes are held at select events. Contact us for more information.

SOUND MEASUREMENT TRAINING

MOTORCYCLE SOUND MEASUREMENT

TECHNICAL INSPECTOR CLASS



Graduates of this 3-½ hour class will have learned how to take sound level readings of motorcycles and other Off Highway Vehicles. This class will provide a basic understanding of sound as it relates to motorized vehicles, teach the proper procedure for using sound level meters and acquaint the students with the SAE J 1287 testing method.

Students will learn how to perform sound checks at motorized recreation events.

This class is intended for club technical Inspectors and others who are concerned with Motorcycle and Off highway vehicle sound.

- ? **The Theory & Measurement of Motorcycle & ATV Noise**
- ? **Muffler Maintenance & “Spark Arrester 101”**
- ? **Transportation Chemicals & The Environment**
- ? Technical Lecture
- ? Equipment Use
- ? Equipment Selection
- ? Tabletop Workshop
- ? Resource Guide
- ? Written Examination
- ? Field Proficiency Signoff
- ? Training Documentation

MOTORCYCLE SOUND MEASUREMENT FOR LAND USE AGENCIES AND THE LAW ENFORCEMENT COMMUNITY



This 8-hour class is an intensive short course for Law Enforcement Officers. (Qualifies for P.O.S.T.)

Rob Harrison will provide the basic understanding of sound as it relates to motorized vehicles. The class will teach the proper procedure for using sound level meters and the SAE J1287 testing method, as well as how to perform sound checks. Graduates will be able to present their test results in court effectively.

Street motorcycles, off-road motorcycles, ATV's and other OHV's will be covered.

The class is taught by Robin T. Harrison, P.E., and Chris Real, CLS.

- ? **The Theory & Measurement of Motorcycle & ATV Noise**
- ? **Muffler Maintenance & “Spark Arrester 101”**
- ? **Basics of Environmental Acoustics**
- ? Technical Lecture
- ? Equipment Use
- ? Tabletop Workshop
- ? Resource Guide
- ? Written Examination
- ? Field Proficiency Signoff
- ? Training Documentation

Vehicle Noise Measurement & Training

Overview

The Harrison / Real sound training classes are fast paced training courses that teach current information for vehicle sound measurement. The instruction gives a true understanding of the physics of sound, and teaches accurate vehicle noise measurement procedures.

Attendees gain an understanding of the science of sound, a thorough knowledge of different sound measurement field tests for motorcycles both on road and off road, ATV's, snowmobiles, boats, off road cars, street rods and other vehicles.

Land Managers & Law Enforcement Sound Measurement Class

Law Enforcement training is a very comprehensive course. This instruction gives the background science and specific hands-on training to enforce sound resolutions, and to be able to accurately perform sound level measurements by nationally recognized procedures; and to be qualified to defend enforcement actions to courts and to the public. This class includes an introduction to the various noise laws and regulations, EPA, California, local, etc, as well as a comprehensive hands on training seminar on selection, calibration, and use of sound level measuring equipment for field noise measurement.

Passing attendees will receive certification & documentation, plus will have demonstrated true proficiency in understanding the principals of vehicle sound and will have had qualified instruction on using enforcement grade equipment and performing sound measurements upon vehicles. Two written examinations plus field proficiency review are administered. The course requires approximately 8 hours of instruction.

Course will qualify graduates for Police Officer's Standardized Training (P.O.S.T.) credits.

Civilian Sound Measurement Class "Technical Inspector Class"

This class is intended for vehicle dealers, sanctioning body members and event organizers to be able to perform accurate "awareness level" sound measurements upon vehicles. This class teaches basic sound principals, field measurement techniques and sound checks at sporting events. Additionally, this class touches upon chemical awareness for service locations and minimizing environmental hazards associated with motorized recreation. One written examination plus field proficiency review are administered. The course requires approximately 3 1/2 hours.

**For Class Information Contact
DPS Inc. (909) 981-5228**

Instructors



The team of Robin T. Harrison, P.E. and Chris Real, CLS offer a unique combination of experience, education and long-term expertise.

Robin T. Harrison, P.E.

Mr. Harrison is a licensed safety engineer in the State of California, and has been accepted as an expert witness in superior courts throughout the United States. Courts have recognized his expertise in the areas of warnings, human factors, accident reconstruction, acoustics, and mechanical and aeronautical engineering.

Rob has been an active motorcyclist since 1956, for ten years was a professional motorcycle racer, and has worked professionally in the area of motorcycle safety since 1969. A licensed attorney in the State of California, he has successfully defended motorcycle related cases.

He is the author of more than 100 technical publications or texts, has given numerous technical presentations, and has presented invited testimony before various public bodies, including the U.S. Congress. With both engineering and legal credential, Mr. Harrison is qualified to advise law enforcement agencies and manufacturers on both regulatory and legal questions. *Licenses, Professional Societies:* Registered Professional Engineer, California, Safety, License No. 1191 Registered Professional Engineer, California, Agriculture, License No. 77, Member of the State Bar of California, Member: Acoustical Society of America, American Institute of Aeronautics and Astronautics, International Institute for Acoustics and Vibration. Society of Automotive Engineers, past member of Motorcycle Industry Council Technical Committee. Past Chairman, Motorcycle Fuel Tank, Motorcycle Sound Level Subcommittees. Past Chairman, SAE Spark Arrestor Committee. Member, Helicopter Association, International Acoustics Committee Life Member, American Motorcyclist Association.

Chris Real, CLS

Chris Real is a long-standing participant in the specialty lubricants and chemical industry, with over 25 years of continuous activity in the specialty and high performance segment of the industry.

Chris has been directly involved in several forms of motorsports, and has participated for many years as a competitor, team member and sponsor. He has been responsible for a variety of technologies & specialized testing procedures for engines, fuels, lubricants and chemicals. He implemented the "CHEMHELP" environmental protection service center to minimize the environmental impact related to motorized recreational events in 1984 and expanded the educational aspect of this service to a national schedule in 2001. Initiated the OHV sound awareness program at educational & field activities that includes noise measurement enforcement training for land use authorities & implemented the "Quiet Bike Challenge"© award to bring user awareness to the OHV noise issue in 2001. Chris Real has authored and presented several technical papers on the subjects of tribology & lubrication and related procedures to various sections of the technical, lubrication and enforcement & educational community.

He is an active member of the Society of Automotive Engineers (SAE) The Society of Tribologists and Lubrication Engineers (STLE) The American Society for Testing and Materials (ASTM) The Association of Professional Consultants (APC) Chris is also active in numerous other industry associations. Certified by the Society of Tribologists and Lubrication Engineers as a Certified Lubrication Specialist, additionally, Chris has certifications for Hazardous Waste Operations & Emergency Responses. (HAZMAT) Chris is an active motorcycle enthusiast, and participates in numerous events each year as a rider, as well as providing technical or environmental protection services.



Training Information Request



Harrison & Real Sound Training

Your Name _____

Organization _____

Street Address _____

City _____ State _____ Zip _____

Phone Number () _____ - _____

FAX Number () _____ - _____

E-Mail: _____

Type of Training Needed

Law Enforcement / Land Manager

Technical Inspector / Industry

Consumer Outreach / Video

Indicate Preferred Class Location

Northern California Eastern US

Southern California Western US

Classes are on a national schedule. Contact us for locations and dates. Private classes available.

To receive more information please
complete this form and send it to:

DPS Inc.—Chemhelp

1160 Dewey Way, Suite D

Upland, CA 91786

Fax (909) 982-3747—Tel (909) 981-5228

What Best Describes Who You Are

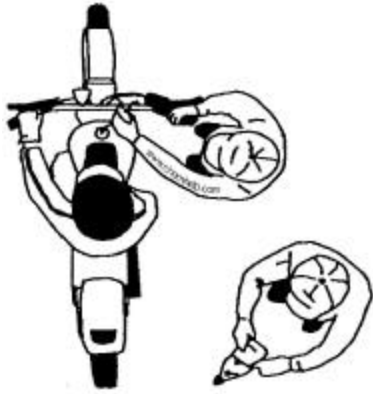
Event Organizer—Sanctioning Body Official

Industry Member—Retailer—Distributor—
Manufacturer—Media

Law Enforcement Officer—Land Manager

UPDATE

***Sound Training Video
Available Spring 2005***



1. Verify vehicle model identification.
2. Verify test RPM.
3. Check sound level meter. Confirm calibration.
4. Select meter settings: "A" weighted scale. Slow response is recommended
5. Microphone windscreen in place.
6. Check RPM instrument function.
7. Select site—16' clearance.
8. Confirm ambient conditions. Free of other sound sources. <10 dBA from test reading, Wind speed <20 mph.
9. Perform test.
10. Confirm test 3x
11. Indicate reading—note Pass / Fail

Sound Level Meters

Law Enforcement Level —Calibration Required —ANSI Type 1

Awareness Level—Calibration Recommended—ANSI Type 2

Available Services

Equipment calibration & selection assistance.

Field noise measurement studies

Racetracks— practice areas, event technical inspection, outreach & education.

Exhaust system testing & certification assistance.



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