

# NOISE/NEWS

## INTERNATIONAL

Volume 15, Number 2  
2007 June

*A quarterly news magazine  
with an Internet supplement published  
by I-INCE and INCE/USA*

**NOISE-CON 2007**  
Travel Planning

**INTER-NOISE 2008**  
First Announcement  
See page 76

2006 Global Noise Policy Workshop

Quality Aspects of the European  
and Global Noise Policies on  
Environmental Noise

**MEMBER SOCIETY PROFILE**  
INCE/USA



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# NOISE/NEWS

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Volume 15, Number 2

2007 June

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Shanghai, China. Venue for INTER-NOISE 2008.  
Courtesy of the congress organizers.

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# NOISE/NEWS

## INTERNATIONAL

*The printed version of Noise/News International (NNI) and its Internet supplement are published jointly by the International Institute of Noise Control Engineering (I-INCE) and the Institute of Noise Control Engineering of the USA (INCE/USA).*

**I-INCE**

The International Institute of Noise Control Engineering (I-INCE) is a worldwide consortium of societies concerned with noise control and acoustics. I-INCE, chartered in Zürich, Switzerland, is the sponsor of the INTER-NOISE Series of International Congresses on Noise Control Engineering, and, with the Institute of Noise Control Engineering of the USA, publishes this quarterly magazine and its Internet supplement. I-INCE has an active program of technical initiatives, which are described in the Internet supplement to NNI. I-INCE currently has 46 Member Societies in 39 countries.

**INCE/USA**

The Institute of Noise Control Engineering of the USA (INCE/USA) is a non-profit professional organization incorporated in Washington, D.C., USA. The primary purpose of the Institute is to promote engineering solutions to environmental noise problems. INCE/USA publishes the technical journal, *Noise Control Engineering Journal*, and, with I-INCE publishes this quarterly magazine and its Internet supplement. INCE/USA sponsors the NOISE-CON series of national conferences on noise control engineering and the INTER-NOISE Congress when it is held in North America. INCE/USA Members are professionals in the field of noise control engineering, and many offer consulting services in noise control. Any persons interested in noise control may become an Associate of INCE/USA and receive both this magazine and *Noise Control Engineering Journal*.

**NNI Internet Supplement**

[www.noiseneewsinternational.net](http://www.noiseneewsinternational.net)

- Links to the home pages of I-INCE and INCE/USA
- Abstracts of feature articles in the printed version
- Directory of the Member Societies of I-INCE with links, where available, to the Member Society Profiles and home pages
- Links to I-INCE Technical Initiatives
- Calendar of meetings related to noise—worldwide
- Links, where available, to NNI advertisers
- Links to news related to the development of standards
- Link to an article “Surf the ‘Net for News on Noise,” which contains links to noise-related sites—worldwide

## Sustainable Noise Control Engineering

One of the issues that organizations such as INCE/USA needs to pay attention to in coming years is the “sustainability” of the discipline of noise control engineering. As our noise control engineering work force ages, we need to bring students and young engineers into our profession at a rate at least as fast as older engineers retire or move on to other careers. Based on the job postings on the INCE/USA and ASA websites, there has been a continuing demand for engineers in the field at all levels, but especially for engineers with BS and MS degrees with some training, experience, or even interest in noise control. Based on my own experience and in talking to others in the field, finding candidates to fill these “noise control practitioner” needs is becoming more and more difficult.

Addressing this situation is somewhat complex. Although there seems to be demand for students with training in noise control, that demand is relatively small compared to the demand for other “mainstream” disciplines within mechanical engineering. Also, research funding to sustain on-going undergraduate and graduate programs in noise control engineering is difficult to obtain—leading faculty members to other, more lucrative areas in order to fund their programs. In terms of the undergraduate, elective curriculum, noise control, if offered at all, can be lost among elective courses in more visible disciplines. In the absence of a noise control or acoustics research program, sustaining undergraduate courses requires both student and faculty interest in the topic and this can be difficult to maintain in isolation.

For the professional organizations such as INCE/USA and ASA, there are active student programs that help to promote and develop interest the field. We can all benefit by seeing that these are maintained and strengthened. Beyond these, perhaps there is more that could be done both organizationally and individually. One possibility that has been discussed by the INCE/USA Board of Directors is maintaining an inventory of courses

in, and related to, noise control engineering at the colleges and universities in the US. However, without substantial volunteer involvement, this is daunting task both to identify all that is offered today and then to keep it current. However, it may be an activity that some INCE/USA members maybe interested in pursuing. Beyond just being a catalog of courses, it could also be used to identify faculty members around the country who have some interest in noise control and acoustics, but are not connected a corresponding professional organization such as INCE/USA. If such people are identified, linking them to our organization may provide enough of a “support group” to sustain their interest in the field. This linkage could be membership or even a less formal liaison. Similar attempts to establish linkages with faculty in the past have met with only limited success, possibly because it generally relies heavily on the academic members of INCE/USA. Such a program may itself be more sustainable if it involves a larger portion of our members who have dedication to the sustainability of noise control engineering in general and a vested interest maintaining the flow of new engineers into the field. This “adopt-a-school” approach would not need to be academic in nature, but could be more a true liaison which provides information to faculty and students on interesting aspects of working in noise control engineering and some of its opportunities.

The question of supply, demand, and education in noise control engineering is the subject of a workshop to be held at NOISE-CON 07 next fall in Reno. The organizers of the workshop mailed a questionnaire to all members in the USA with the March issue of this magazine. If you have already returned it, thanks for the input. If not, see page 48 of this issue where the questionnaire has been reproduced. We all should think about the sustainability of our field—not just when we are desperately seeking candidates for our job openings—but also when we are not. I will very much appreciate your thoughts and comments on this subject as well as your offers to help. 



**Paul Donovan**

2006-2007 INCE/USA  
President

## Making a Noise About Noise



**Bernard Berry**

*European Editor  
I-INCE VP for Europe  
and Africa*

**T**hose of you who are of a "certain vintage" —in other words, if you did most of your work in the "noise field" in the last century, will remember the old noise control adage that "Good Public Relations are worth at least 10 dB of noise reduction." This relates to the observed fact that, if one took a very small step towards informing those members of the public most affected by a noise issue that someone was at least working on it, then negative reaction, in the form of complaints, annoyance etc., would be reduced.

But it is clear to those of us still working in the field today that we are dealing with a very different kind of public—much less easily satisfied with vague promises of action, and much more well informed. Public involvement in noise issues has changed dramatically over recent years, so I want to give some examples, and raise some general questions.

Of course much of the change has come about through the increasing sophistication of "pressure groups," and in particular the use of the Internet, which has changed our lives in so many other ways. Often such pressure groups have initially formed in order to mobilize public action response to a specific development which may affect their lives, such as the expansion of an airport, but the group then continues to grow and expand its area of interest and support to the public.

At this writing, we in the UK are about to have the annual Noise Action Week, organized by the NSCA—the National Society for Clean Air and Environmental Protection. A wide range of initiatives and events are planned in order to raise awareness of noise issues and to provide everyone involved in managing noise an opportunity to promote practical solutions to everyday noise problems.

See <http://www.noiseactionweek.org.uk/>. As an indication of how successful such events have been in the past, it should be noted that it all began with a single Noise Action Day, and has grown and grown.

Across Europe as a whole, governments, both national and local, are conscious of the growing need to explain major noise issues to the public. Perhaps the biggest such issue in recent years is that of Noise Mapping, in compliance with the 2002 EU Environmental Noise Directive. The relevant UK Department—Defra—organized a special Workshop to look at ways to help Member States, local authorities, national transport agencies, etc. prepare for the presentation of noise mapping data to the public. The workshop provided an opportunity for sharing good and bad experiences, learning about new presentation techniques; and discussing possible presentation strategies both at national and local level.

See copies of presentations at <http://www.defra.gov.uk/environment/noise/events/noisemap-workshop061005.htm>

These developments raise issues and questions with all of us as noise control professionals. Do we do as much as we can to communicate clearly to the public? Do we do as much as we should to make the public aware of what has already been achieved? Should we ourselves encourage the public to be more involved in the ongoing process of research into noise and its effects? Should we make more effort to find ways of involving the public in our international conferences?

Looking ahead to INTER-NOISE 2007 in Istanbul, as part of the ongoing work on a Global Noise Policy, a Workshop is being organized on the theme of "Public Pressure—the 'Silent' Force." This will explore ways of involving the public even more, through measures such as public education on the health effects of noise and quality of life issues, getting noise on the health curriculum in schools, creating public desire for quieter products, and changing attitudes towards noise without regulations.

Perhaps this Workshop will help to answer some of my questions—but, as ever, I welcome feedback by e-mail. 

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# Member Society Profile

## INCE/USA



**F**or more than 35 years, the Institute of Noise Control Engineering of the United States of America (INCE/USA) has helped American engineers respond to increasing demands for action to control environmental noise. INCE/USA was established in 1971 as a non-profit professional society with a primary objective to advance the technology of noise control with an emphasis on engineering solutions to noise problems. The group has never wavered from its original commitment to promote engineering solutions to environmental noise problems. With this dedication, INCE/USA was a major driver behind the 1974 founding of the International Institute of Noise Control Engineering.

Education has always been a key focus of the group. When Inter-Noise is held outside North America, the group hosts a Noise-Con conference in the U.S. The papers presented at this event cover all aspects of noise control engineering. The two-and-a-half day program also includes a large vendor Exposition of materials, instruments, and services in noise and vibration. This year's event will be held in October in Reno (see travel article on pages 44–47); a record number of abstracts have been submitted.

INCE/USA also plays a major role in Inter-Noise congresses held in North America. The group was a co-sponsor of the highly successful Inter-Noise 2006 held in December in Honolulu, Hawaii. INCE/USA is partnering with the Canadian Acoustical Association to host the 2009 event in Ottawa, Canada.

Nearly 1100 members strong, the INCE/USA membership includes members who are board certified, members, associates, and distinguished international members. INCE/USA members represent a board spectrum of professionals: independent consultants; environmental and industrial noise control engineers in all levels of industry and government; and teachers of noise control at our nation's universities. Any person interested in noise control may become an associate of INCE/USA. An elected Board and slate of officers govern the group. An executive director and business office staff provide day-to-day oversight. The business office can be reached by telephone at +1 515 294 6142 or by email at [ibo@inceusa.org](mailto:ibo@inceusa.org).

*This is the 58th in a series of articles on the Member Societies of International INCE.*

INCE/USA is aggressive in its efforts to recruit student members. In addition to a greatly reduced membership fee, full-time students are offered special conference rates and may participate in special paper competitions.

In recent years, INCE/USA has served as a forum for newly emerging disciplines in noise and vibration control engineering such as sound power measurement, active noise control, and sound quality engineering.

INCE/USA has two technical publications, *Noise Control Engineering Journal* and *Noise/News International*. Published bimonthly, NCEJ is a refereed journal of papers on noise and vibration topics. The journal editor selects papers with input from an advisory board. The periodical began publication in 1972; since 2005 it has been available in CD-ROM format. *NNI* is published jointly with International INCE.

From its inception, INCE/USA through its members has worked to create an organization dedicated to maintaining a high level of professionalism in its specialized field through its membership requirements, its demanding board certification program, and its requirements for maintenance of board certification.

More information on INCE/USA is available on its website: [www.inceusa.org](http://www.inceusa.org). 

Member Society Profile is a regular feature of the Noise News International. If you would like to have your society featured, please contact George Maling at [inceusa@aol.com](mailto:inceusa@aol.com).



# NOISE-CON 2007

[WWW.INCEUSA.ORG/NC07](http://WWW.INCEUSA.ORG/NC07)

## KEY DATES

### **Submission of Papers**

**16 July 2007**

### **Conference Pre-Registration**

**8 October 2007**

(on-site registration available at a higher fee)

### **Reservations for Hotel**

**20 September 2007**

## CONFERENCE INFORMATION

NOISE-CON 2007, the National Conference on Noise Control Engineering, will be held at the **Grand Sierra Resort and Convention Center in Reno, Nevada, 21–24 October 2007**. NOISE-CON 2007 promises to be the premier noise control engineering conference of 2007. A record number of abstracts in more than a dozen technical activity areas was submitted; a large noise control vendor Exposition is also planned.

NOISE-CON 2007 will open on Monday, 22 October, with a plenary session followed by parallel sessions and a reception in the Exposition area. Plenary sessions followed by parallel technical sessions are also planned for 23 October and 24 October. The Expo will be open during the reception, all day 23 October, and until noon 24 October. In addition, the INCE fundamentals and Board Certification exams will be offered on Sunday, 21 October, along with several short courses on Noise Control Engineering.



Stephen Hambric, of Penn State University, is General Chair for NC07, and Stephen Conlon, also of Penn State, is the Technical Chair. They have worked closely with the INCE Technical Activities Committee (chaired by Patricia Davies of Purdue University) to organize technical sessions for the conference. The event will feature:

- Pre-conference noise control seminars (held the Sunday before the conference)
- Many technical sessions on noise control issues
- A workshop on noise control engineering education—from academic and industry viewpoints
- A large vendor Exposition with displays of materials, instruments, and services in noise and vibration, along with an exhibition social
- Special events for students including a lunch with senior INCE members on careers in noise control engineering
- A student paper competition with a \$1,000 prize for the winners
- A reception at the National Automobile Museum, which displays more than 200 antique, vintage, classic, and special-interest cars from 1892 to present, the majority of which are from the world-famous collection of the late gaming pioneer and car buff Bill Harrah.



## CONFERENCE ORGANIZATION

The conference organizers are:

### General Chair

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### Conference Secretariat

**Pam Reinig**

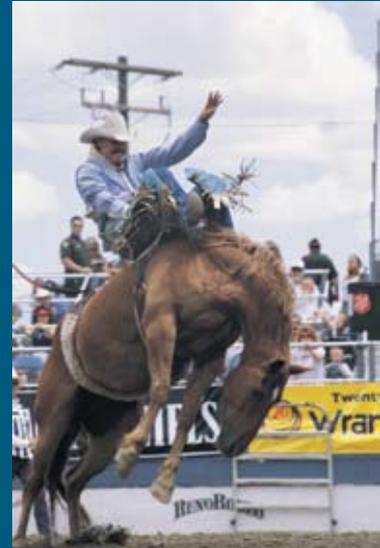
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## INTERNET INFORMATION

**Conference Web Site**—[www.inceusa.org/nc07](http://www.inceusa.org/nc07)

**INCE/USA Web Site**—[www.inceusa.org](http://www.inceusa.org)

## PLENARY LECTURES

There will be one plenary lecture each day of NOISE-CON 2007.

### Monday, 21 October

Sound transmission through building elements

*Ben Sharp, Wyle Labs*

### Tuesday, 23 October

Information technology fan noise and mitigation

*Eric Baugh, Willem Beltman*

### Wednesday, 24 October

Measuring acoustic properties of absorptive materials

*Ralph Muehleisen, Illinois Institute of Technology*

## TECHNICAL PROGRAM

Several sessions have been organized covering a wide variety of topics of relevance to noise control:

### Sources and Propagation

Noise Modeling and Mitigation  
Fan Noise  
Modeling of Emissions and Immissions  
Impulsive Sound Propagation

### Passive Noise Control

Vendor Products: Noise Control  
Vibration Damping for Noise Control

### Active Control

### Perception and Effects of Noise

Sound Quality

### Experimental Techniques and Instrumentation

Experimental Techniques and Instrumentation in Noise and Vibration

### Transportation Noise

Tire/Pavement Interaction Noise—OBSI  
Tire/Pavement Interaction Noise—General  
Noise from Transit Systems  
Aircraft Interior Noise  
Automotive  
Space System Aero and Vibro-Acoustics

### Community Noise

Community Noise Around Airports  
Methods to Verify Community Noise Limits Have Been Met—Measurements and Modeling  
Ground-Borne Noise and Vibration Modeling  
Low-Frequency Noise in Communities  
Noise Policies and Regulatory Strategies at the Local Level  
Environmental and Community Noise—Case Studies

### Measurement and Control of Product Noise Emissions

Information Technology Noise  
Measurement, Control, and Acceptability of Product Noise Emissions

### Prediction and Modeling Techniques

Numerical Methods in Structural Acoustics  
Statistical Energy Analysis and Energy Methods

### Building Acoustics

Multi-Family and Multi-Use Building Sound Isolation  
Noise Control for Schools: Update on ANSI S12.60  
Noise Control for Hospitals  
Plumbing, Elevator, and Building System Noise

### Policy and Standards

Engineering Noise Control: Regulatory Solutions or Incentives  
Workshop on Noise Policy—Engineering Education

### Structural Acoustics

General Structural Acoustics

## REGISTRATION

The registration fee for NOISE-CON 2007 is 375 USD for all persons (except students) registering before 8 October 2007. Online registration closes 8 October. On-site registration will be permitted at a cost of 425 USD. Students can register for 100 USD. Registration fees for all participants cover sessions, opening Expo Reception and Automobile Reception, and a CD-Rom of proceedings. Participants will also receive a program with detailed schedule, complete abstracts, and information on exhibitors.

## SHORT COURSES

Several short courses have been scheduled. Some information follows; detailed information and instructor bios are available online at the conference Web site.

All courses will be offered Sunday, 21 October (unless otherwise noted). Registration is available online; please register by 5 October to receive the early registration rate. Registrations will also be accepted later and on site, but at the higher rate (except for the courses on Acoustics in Multi-Family Construction) and are subject to availability. Each course is limited to 25 registrants.

Short courses are discounted for INCE members. If you're not a current member, you may wish to join before the conference to receive the special member rate. Membership information is available online.

### Some Lesser-Known Aspects of Vibration Control

*Instructor: Dr. Eric Ungar, Acentech*

If you want a fuller understanding of vibration control, this course is for you. In this one-day course you will learn about the following topics. The presentations will focus on concepts, with a minimum of mathematics.

- Overview of vibration control means: comprehensive checklist
- Energy and the velocity-displacement plane: recognizing nonlinear characteristics
- Damping mechanisms and models: physical causes and analytical representations
- Fallacies in vibration isolation: often-used erroneous assumptions
- When transmissibility does not tell the whole story: motion-dependent forcing
- High-frequency vibration isolation: dealing with component resonances
- Two-stage isolation: optimization and practical guidelines
- Waveguide absorbers
- Optimally tuned dynamic absorbers

### Two Half-Day Courses on Acoustics in Multi-Family Construction

*Instructor: Pablo Daroux, Wilson, Ihrig, and Associates, Inc.*

*2 pm – 5 pm Sunday (for acoustics design professionals)*

*3 pm – 5 pm Wednesday (for architects)*

Sunday afternoon course for acoustic design professionals: This course is intended for the acoustics

design professional interested in furthering his or her understanding of the various issues involved in the design of multi-family construction: from the initial noise survey of the site to determine exterior noise mitigation and building shell design requirements, through the many interdwelling sound and impact isolation issues and solutions involved, to practical techniques for the control of noise and vibration due to mechanical and plumbing building services. Numerous examples will be provided as well as schematic details of practical solutions to common issues. Common construction errors will be presented from several litigation cases.

Wednesday afternoon course for architects: This course is intended for the practicing architect interested in furthering his or her understanding of the various acoustics issues involved in the design of multi-family construction: from the design requirements of sound walls to control exterior noise through special building shell components, the many interdwelling sound and impact isolation issues and solutions involved, to practical techniques for the control of noise and vibration due to mechanical and plumbing building services. Numerous examples will be provided as well as schematic details of practical solutions to common issues. Common construction defects from several litigation cases and ways to avoid or minimize those will be presented.

### **Statistical Energy Analysis of Noise and Vibration Problems**

*Instructor: Dr. Bryce Gardner, ESI*

Predicting the transmission of noise and vibration through practical structures of engineering interest, across a broad frequency range, presents a number of challenges to an analyst. This course will provide an overview of modern predictive SEA methods, discussing the physics of high-frequency noise and vibration transmission from both modal and wave viewpoints. The derivation of the underlying SEA equations will be discussed, and the parameters used in an SEA model will be summarized. Particular emphasis will be placed on the theoretical aspects of the wave approach to SEA; the physics of wave propagation in commonly encountered structural and acoustic subsystems will therefore be discussed in detail. The calculation of the parameters that govern vibro-acoustic energy input, storage, transmission, and dissipation will be discussed. New developments in SEA will be presented including the coupling of SEA with finite elements analysis. ESI's VA-One software will be used to demonstrate the methods described in the course.

### **INCE Fundamentals Exam Preparation and Optional Exam**

*Instructors: James Barnes and Eric Wood, Acentech*

If you're considering taking the INCE fundamentals exam as one way to become a full member of INCE, this course is aimed at helping you understand and prepare for the exam. The exam is a two-hour, closed-book, multiple-choice examination with 75 questions drawn from the

fundamentals of acoustics and noise control engineering. Qualitative questions with descriptive responses and quantitative questions requiring only simple calculations are included in the examination. The purpose of the examination is to evaluate an individual's background in the field of noise control engineering. In this preparation course you will learn about the nature of the exam questions and responses and the wide range of concepts and topics covered. A minimum of mathematics will be included. If you feel comfortable with the material presented in the course, you may stay and take the actual fundamentals exam from 2 to 4 pm.

### **EXPOSITION**

An Exposition of companies that provide measurement instrumentation, materials and systems for noise control, and/or software for noise analyses will be held in conjunction with NOISE-CON 2007. The Exposition opens on Monday evening, 22 October, and closes at noon on Wednesday, 24 October. When this issue went to press, exhibitors included:

**3M Acoustic Solutions**  
**ACO Pacific, Inc,**  
**Bruel & Kjaer**  
**Casella USA**  
**Commercial Acoustics Division - Metal Form Mfg**  
**Data Physics Corp**  
**Diamond Manufacturing**  
**Eckel Industries Inc, Acoustic Division**  
**G.R.A.S. Sound and Vibration.**  
**IAC America**  
**Keene Building Products**  
**Kinetics Noise Control**  
**Larson Davis, Inc.**  
**LMS North America**  
**MBI Products Company, Inc.**  
**Navcon Engineering Network**  
**Overly Door Company**  
**PAC International, Inc.**  
**Plywall/Hoover Treated Wood Products, Inc.**  
**Pyrok, Inc.**  
**Quiet Solution**  
**Regupol-QT**  
**Scantek, Inc.**  
**Sound Fighter Systems, LLC.**  
**ViAcoustics**  
**Vibro-Acoustics**

### **SOCIAL EVENTS**

On Monday evening, there will be a reception for all Noise-Con registrants in the exposition hall. On Tuesday evening, there will be a reception at the National Automobile Museum (with admission paid for courtesy of the National Council of Acoustical Consultants), which displays more than 200 antique, vintage, classic, and special-interest cars from 1892 to present, the majority of which are from the world-famous collection of the late gaming pioneer and car buff Bill Harrah.

## ACCOMPANYING PERSONS PROGRAM

There will be no formal accompanying persons program, but the hotel will provide information to those who want to learn what activities are available in the area.

## GRAND SIERRA RESORT AND CONFERENCE CENTER

The Grand Sierra Resort and Conference Center is the exclusive site of NOISE-CON 2007. With the exception of Tuesday's social event, all activities will take place at this property. The newly renovated Grand Sierra offers numerous amenities, including pool, full-service spa, shopping, bowling, and a variety of entertainment venues.

A block of guest rooms at a discounted rate has been reserved for this. Early reservations are strongly recommended. Note that the special meeting rate is not guaranteed after 20 September 2007.

Please make your reservation directly with the hotel. When making your reservation, you must mention the Institute of Noise Control Engineering to obtain the special meeting rates, which are 119 USD single or double. Guest amenities include free parking, free airport shuttle to the Reno-Tahoe Airport, 24-hour room service, and guest room Internet access (fee based). This property is undergoing a multi-million dollar renovation. Most of the work will be completed by Noise-Con. Improvements include new restaurants, a wine bar, and two movie theaters.

A direct link to the hotel and its reservation system is available online at the conference Web site.

## ABOUT RENO

The "Biggest Little City in the World," Reno was Nevada's original gambling city, gaining national attention in the 1930s and '40s for its wide-open attitudes. Visitors can enjoy a visit to Reno's National Automobile Museum and the Nevada Museum of Art or stroll the shaded grounds of the University of Nevada, Reno, the state's oldest college.

Other popular attractions include:

- **Downtown River Walk**
- **1935 Reno Arch**
- **Animal Ark**
- **Fleischmann Planetarium**
- **Nevada Historical Society**
- **Sierra Safari Zoo**
- **Victorian Square**

## SPECIAL STUDENT ACTIVITIES

A student paper competition will take place at NOISE-CON 2007. Up to five outstanding student paper awards of up to \$1,000 each will be awarded. Additionally, winners will receive a CD containing PDF versions of volumes 1–48 of the Noise Control Engineering Journal. Papers will be judged on quality of both the written submission as well as the oral presentation at NOISE-CON 2007. Full competition rules and a competition entry form are available for download at [www.inceusa.org/nc07/links/StudentFormNC07.doc](http://www.inceusa.org/nc07/links/StudentFormNC07.doc).

**Student Luncheon Presentation**—A student lunch presentation is scheduled to give students a chance to meet some of the more senior members of INCE. On Tuesday, 23 October, Mandy Kachur of Acoustics by Design, INCE Vice-President of Public Relations, will present on careers in noise control. Pizza will be provided at the event, courtesy of the National Council of Acoustical Consultants.

**Student Mixer**—There will also be one student mixer on Monday, 22 October, that will give students an opportunity to meet with other students as well as to meet with members of industry and academia. This event provides opportunities for students to find out about job opportunities and additional education, as well as to begin developing a network of contacts to help launch their future careers. Refreshments will be provided. Time and location of the mixer will be announced at the meeting. Look for flyers near the registration desk and the message board.



# Questionnaire

An announcement of a workshop to be held in conjunction with NOISE-CON 2007 follows this paragraph. The co-chairs are seeking information from all members of INCE/USA to supplement the material that will be presented at the workshop and to obtain a wider view of noise control engineering education in the United States. Please assist us by providing answers to the questions below. The co-chairs would appreciate your response by September 30, 2007.

The third National Noise Policy Workshop will be held during NOISE-CON 2007 in Reno, NV, on Tuesday, October 23. The theme of this workshop is "U.S. Education in Noise Control Engineering." William W. Lang and George C. Maling, Jr. will be co-chairs for the workshop.

The implementation of noise policy depends on the education of noise control engineers in America. The workshop will feature morning and afternoon sessions with presentations by panelists from academia and industry. The panelists from academia will describe the course offerings and research at their institutions and the current demand for noise control engineers in the public and private sectors. They will assess the capability of higher education to supply these specialists. The panelists from industry will describe their role in reducing noise, the educational requirements for a successful industrial career, and industry demand for noise control engineers.

**1. Please identify yourself as:**

industry  consulting  academia  government  other (please specify) \_\_\_\_\_

**2. In your opinion, what is the balance between the supply of graduates with training in noise control engineering and the needs of the marketplace?**

balanced  undersupply of graduates  oversupply of graduates

**3. If you are not in academia, are graduates well prepared to meet the needs of your organization?**

yes  
 need additional training within the organization  
 need additional training from an outside source

**4. If you are not in academia, do you believe that a person needs a graduate degree to be effective in your organization?**

yes  no

**5. If you are in academia, how many courses related to noise control engineering are offered and approximately how many graduates from your institution find employment related to noise control engineering?**

courses \_\_\_\_\_  students \_\_\_\_\_

**6. Besides INCE/USA, the other professional organizations with a stake in noise control engineering are: (check all that apply)**

ASA  NCAC  SAE  ASME  AIAA  other (please specify) \_\_\_\_\_

**7. What three textbooks related to noise control engineering are the most important to you?**

1. \_\_\_\_\_  
2. \_\_\_\_\_  
3. \_\_\_\_\_

Would you be willing to supply additional information if contacted?  yes  no

Name \_\_\_\_\_ e-mail \_\_\_\_\_

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# 2006 Global Noise Policy Workshop

Honolulu, Hawaii  
4 December 2006

A fourth Global Noise Policy Workshop was held during INTER-NOISE 2006 in Honolulu, Hawaii, on Monday, December 4. The theme of the workshop was “**Implementation and Enforcement of Noise Control Policies.**” The workshop featured morning and afternoon sessions with presentations by experienced engineers from countries around the world.

Panelists spoke on the development, implementation, and enforcement of noise control regulations in their country at local, state, and national levels.

The following presentations were made during the first session of the Global Noise Policy Workshop. A discussion session followed. Summaries of the presentations as well as a summary of the discussion are included in this article, and material from the other two sessions will be featured in future editions of *NNI*. William W. Lang and Tjeert ten Wolde were co-chairs of the workshop.

## **Global Noise Policy Related to Tire/Pavement Interaction**

*Ulf Sandberg, Sweden*

## **Noise Policy in Mexico**

*Sergio Beristáin, Mexico*

## **Noise Law in New Zealand**

*Philip Dickinson, New Zealand*

## **Adapting to Global Noise Policies: The Turkish Example**

*H. Temel Belek, Turkey*

## **A Place for Flexibility in Noise Control Policies?**

*Marion Burgess, Australia*

## **Global Noise Policy Related to Tire/Pavement Interaction**

**Ulf Sandberg, Chalmers University of Technology, Göteborg, Sweden, and Swedish National Road and Transport Research Institute (VTI), Linköping, Sweden**

### **Regulations**

European legislation currently requires that tire/pavement noise levels do not exceed certain maximum limits. This legislation includes:

1. The European Tire Directive 2001/43/EC which specifies noise emission limits for tires, currently in effect for most new tires but not including all new tires until 2009 to 2011. Testing for this is made according to EU Directive 2001/43/EC which essentially follows ISO 13325. The nominal limit values vary from 72 to 79 dB according to tire section width, whether the tires are for cars, vans or heavy vehicles, and the use of the tires. Re-treaded tires, constituting about 50% of the tires in use on heavy vehicles, are not included.

Treatment of measured noise levels:

- Subtraction of 1 dB “to take into account any measuring instrument inaccuracies.”
- Truncation to “nearest lower whole value,” e.g., 75.9 dB becomes 74.9 dB becomes 74 dB (this margin is favorable to manufacturers)

2. United Nations Economic Commission for Europe (ECE), Global Technical

Regulation 117, “Approval of tyres with regard to rolling sound emissions.” This is an (almost) global legislation with contracting parties of 42 countries, including the EU but not the U.S.A. or Japan and is based on the EU Directive, which has been in force since 2005 (it took 4 years to adopt from the EU Directive), but does not include re-treaded tires.

3. Indirectly EU Directive 92/97/EEC (amending 70/157/EEC) “Sound level of motor vehicles” limits tire/pavement noise. This has been in force since 1996 and corresponds to ECE Regulation 51. This directive/regulation deals with vehicle noise of which tire/pavement noise is just a part, but in recent years the tires have become critical during testing and cannot emit too high a noise level. An analysis by the author shows that this directive/regulation is actually more restrictive to tire/pavement noise than the tire directive and regulation (for cars).

The speaker presented recently measured data for a large number of tires on the European market and compared this to the limits. The majority of tires were well below the limits. The conclusion was that the tire noise Directive 2001/43/EC and corresponding ECE Regulation 117 are totally ineffective. The vehicle noise limits according to Directive 92/97/EC and ECE Regulation 51 have some effect, but the latter relate to tires subject to substantial driving force and slip and *only* to tires used as original equipment on vehicles.

### **Implementation**

Each EU country has to implement immediately the EU Directives, or the

ECE Regulations. Countries or regional organizations that have agreed to be Contracting Parties to the ECE vehicle-related regulations must implement the individual regulation as quickly as possible if they voted in favor of it (presently 42 have endorsed R117): "INTENDING that Contracting Parties to this Agreement use the global technical regulations established under this Agreement as a basis for their technical regulations."

### **Enforcement**

Both the EU Directives and the ECE Regulations require Conformity of Production (COP) testing on randomly selected tires from the production line. Non-compliance will mean heavy penalties. Type-approved tires shall be marked with a symbol. If this symbol is missing, control authorities (vehicle inspection or police) may notice and report it; but this is rarely done. Non-type-approved vehicles or tires imported into a country that recognizes the Directives/Regulations must be individually tested to comply with the requirements.

In spite of the Directives/Regulations, there are loop-holes or "leaks." Some include:

- After type approval of a vehicle, the dealer or owner may exchange the tires with those which meet only the tire Directive or Regulation,
- Re-treaded tires are not covered by the regulations,
- Studded tires are not covered by the regulations,
- Tires designed to be quiet when new, may be noisier after 1000 km (tests are made only on new tires),
- All tire variants and dimensions are not tested, only what the tire manufacturers assume would be "the worst case" within a tire family,
- Old, non-regulated tires will be available for several more years, and
- It is unlikely that the existence of a limited number of imported, non-approved (for noise) "budget" tires would be noticed, so dealers could, in principle, make money by selling them if they would be willing to take the risk.

What are some possible solutions for the future? Environmental labeling could develop market forces with noise as a commercial argument. But at this time the consumers do not and cannot rely on commercial statements. Some environmental labeling systems include the Nordic Council of Ministers' label "the Nordic Swan" and the German Environmental Protection Agency's "Blue Angel." There is some evidence that tires which carry the Nordic Swan label have been selling better. Furthermore, regarding re-treaded tires, future regulations must require that these tires meet the same noise limits as new tires since these tires constitute a substantial part of the market and are the tires used for heavy vehicles.

Another option would be noise classification and labeling of pavements. An initiative taken in 2006 was a stakeholders' workshop presentation by David Delcampe of the European Commission-Environment DG, "Acoustical classification and conformity checking of road surfaces." The speaker considers it very likely that this will become a European standard within a few years.

Another solution could be to stimulate the purchase of quiet tires by offering economic considerations such as lower sales taxes, annual vehicle tax discounts, or even subsidies. This, however, is a politically sensitive issue which must comply with policy regarding free trade. Some countries interested in this approach are Sweden, Norway, Denmark, The Netherlands, and Austria. In the U.S.A., for economy reasons, tires are labeled with their rolling resistance (this is an indication of improved gas mileage); and this labeling is being considered to become mandatory in Europe, perhaps based on an "energy consumption" classification. The speaker suggested that including noise level information would be no different in principle than including a rolling resistance label.

### **Conclusion**

A Global Noise Policy may be to establish and enforce maximum limits and also to provide for environmentally-driven market forces to work. At this time the global noise policy regarding tire/road noise is weak, but there are strong attempts to make it much more effective.

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## **Noise Policy in Mexico**

**Sergio Beristáin**  
**IMA, ESIME, MEXICO**

### **Abstract**

Noise legislation in Mexico started in the 1970s when most of the standards and recommendations available nowadays were established. Several standards were modified in the mid 1990s, but most of them were just transposed to the national standards format without any technical change because the original issuing office was a federal ministry, not the official standards office.

### **Introduction**

In Mexican legislation, as in foreign and international legislation, noise is specified as the single sound or mixture of sounds made up of voices, music, machinery, or any other random sound source which exceeds the maximum sound pressure level for a given application or condition. The fixed noise level should not be exceeded no matter how much pleasure the noise may give some people.

Noise levels which can be measured while moving around the country range from some 40 dB(A) to over 100 dB(A), depending on activity, age, educational and economic levels of those producing it, the installation performance, and the type of machinery and its condition. At the higher levels it is desirable that there be full compliance with the standing legislation. Some people comply, and some do not, partly due to lack of knowledge and/or lack of interest.

## Development

Mexico has developed a standards system with two major divisions identified as NOM Norma Oficial Mexicana (Official Mexican Standard) and NMX Norma Mexicana (Mexican Standard), both are issued by the Standards Office at the Commerce Ministry and supported by different Ministries, which add extra letters to the standard identification. For example the Labor Ministry, Secretaria del Trabajo y Previsión Social, adds the letters STPS. The main difference between these two types of standards is that those starting with NOM are compulsory while the NMX serve as recommendations for a good quality-of-life or for products. Most of the standards related to noise are the NOM type, but only five of them refer to noise levels which should not be exceeded under certain circumstances, and only two are of general purpose. One is for noise in working environments, NOM-011-SPTS-1993 with a 90 dB(A)  $L_{eq}$  limit for an 8-hour period and 3 dB extra for half the time exposure. The second is related to environmental noise produced by fixed sources, NOM-081-ECOL-1994 (which can be workshops, commercial and non-commercial sites, or industrial installations) and the limits are: At the boundary of the property where the source or sources are located, the  $L_{eq}$  level should not exceed 68 dB(A) from 06:00 to 22:00 and 65 dB(A) from 22:00 to 06:00. Although these two standards are compulsory and, due to their general approach could be used in a wide range of situations, they do not cover all the possibilities, and their application so far is limited to industry.

There are three more standards with noise limits: NOM-079-ECOL-1994, NOM-080-ECOL-1994, and NOM-082-ECOL-1994, but they are very specific in nature and even more specific in application. They refer to the maximum noise level that motorcycles, cars, buses, and trucks can produce, depending on size, weight, and power,

either passing at a given acceleration rate, or at a certain distance from the exhaust pipe. The first and the last refer to brand new vehicles where only one specimen of each model is tested per year, and the results are reported by the manufacturer. The second is for exhaust noise, for application in a random way to moving vehicles, but it is not employed at all due to lack of test equipment, trained personnel, and open spaces with the minimum sound reflections required by the standard.

The government and some technical associations have developed educational and social campaigns in order to reduce noise in the city. Speeches have been given in some schools from pre-school level to university level. A few associates of technical societies adhere to the one-day-without-noise campaign; there has been some mention in the newspapers, usually in the cultural pages which are read by very few people. The Mexican congress on acoustics provides information about the noise problems in different areas of some cities mainly to the attendees and more often during the advertisement of each event.

So far the results are limited, partly because the distribution of information is not

adequate for the size of the country and partly because of the noisy way of living of the inhabitants. More campaigns are under way to increase awareness of noise and its effects because it is expected that education rather than legislation will be most effective to control

this problem among the population. It will take time, but legislation and legal supervision will help in the noisiest cases.

Nowadays, verification of noise standards compliance within industrial installations and in urban areas is occasionally done. In neighborhoods and construction areas verification is done only by demand. Nevertheless, there must be compliance

with the NOM standards at all times even without the surveillance of the Labor Ministry, the environmental authorities, the social security, or local authorities. Some industries comply on their own.

Experience shows that where there are no local or national standards for given noise or vibration conditions, references have been made to foreign or international legislation. But again, this practice is not widespread.

## Things to do

There are still many things to be done in order to properly control the noise; among them are:

- New standards to include areas where experience has shown the need for them, for instance in recreational areas, in educational sites, in public spaces often used for loud sound events, etc., together with people prepared to enforce them.
- Education from childhood on and noise control campaigns. Something has been done at all educational levels, but coverage is limited and still is not common practice.
- Scientific and technical associations organize speeches and meetings to make people aware of the problem. Few associations do it and mainly within their membership and invitees.
- Public address by radio, papers, posters, etc. A little is being done.

## Conclusions

Noise is annoying. It affects tranquility and performance and produces physical, physiological, and psychological harm depending on frequency, level, and exposure times. Protection of workers and the community against noise is an important matter that should be and is being addressed by the relevant authorities and requires participation from the whole community. Periodic evaluation of noise is essential in order to assure low noise levels and that these conditions prevail over the years. Noise sources deteriorate, people get used to slowly increasing noise levels, and some people are noisy by nature.

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*Education, not Legislation,  
Will be Most Effective in  
Controlling Noise.*

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Noise pollution is a problem that requires educational, technical, and legal solutions, some of which are very expensive. Generally speaking, it is more expensive to correct a noisy installation than to make it less noisy from the beginning.

New and specific standards in identifying risk situations are needed together with control infrastructure in areas like academic environments, leisure and recreational sites, load and passengers transportation centrals, cultural centers, commercial activity, and many others. Awareness and education could contribute to produce good results.

There is a need to create acoustical spaces to benefit the inhabitants of the cities, ranging from silent sites and those where the sounds produced as speech or music can be enjoyed and understood, and where the acoustical characteristics of the architecture do not adversely affect those sounds.

Noise in Mexico should be addressed seriously due to its distribution throughout the country and the variety of effects it produces on people.

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## Noise Law in New Zealand

**Philip Dickinson, Massey University Wellington, New Zealand**

New Zealand law has its origins in the British legal system and used British law until becoming a Dominion within the Commonwealth of Nations in 1907. After achieving Dominion status, New Zealand still relied mainly on British experience and, although producing its own laws, most were still copies or near copies of British law. *A Noise Control Act*, published in 1982, was almost an exact copy of the noise control act in the United Kingdom. In 1988, however, the Ministers of Environment, Transport, and Health (the same person) decided that it would be good to put laws pertaining to the environment

into one comprehensive Act of Parliament and the *Resource Management Act* was born and published in 1991. In the Act “environment” is defined as including people and communities, their health and amenity values. All environmental noise law is thus incorporated in this Act except for barking dogs which come under the *Dog Control Act* and regulations regarding the sound output at source for motor vehicles and aircraft come under the *Transport Act: Land Transport Safety Authority Regulations and the Civil Aviation Act* respectively.

Occupational noise law follows international trends and comes under the *Health and Safety in Employment Act*. The *Building Act* covers construction to restrict, within dwellings, noise from other dwellings and also from outside noise sources when triggered by the Resource Management Act. The Resource Management Act, similar to the old Noise Control Act does not give definitive sound levels not to be exceeded, but mandates that noise from any occupied land must not exceed a reasonable level. The responsibility for and the authority to set sound level criteria is placed on the local territorial authorities—and, unlike many other countries, this includes aircraft noise.

Like many torts, action under the Act is complaint driven. On receiving a complaint, the territorial authority can act in one or both of two ways: If the sound emission is *excessive*, a noise control officer appointed under the Act can demand the emission be ceased immediately. If this is not carried out, the officer, accompanied by a police constable, can seize or render inoperable the equipment making the noise. Exempt from this order are aircraft in flight or on their take-off or landing operations, motor vehicles on the road, and trains other than at a station. However, this is only in the interest of safety and does not absolve them from making excessive noise; they

are subject to the law as is also the *Crown* which means the appointed government and the military.

Unreasonable noise is handled by issuing a noise abatement order, an enforcement order issued by a judge, or a Court order. Such an order must state exactly what must be done and how, by whom it must be done, in what time period, and with what outcome. It is not something taken lightly as every word and direction has to be correct; and if not obeyed to the letter, the penalty can be very severe. For failure to obey an enforcement order or a Court order—up to 6 months in prison plus NZD 200,000 fine plus NZD 10,000 for each day the work has not been completed. Local territorial authorities set the environmental sound levels to be maintained and, in this, inevitably are guided by the World Health Organization (WHO) recommendations, or those from a national or international standard adopted as a regulatory instrument.

The rule relating to airports is of particular interest and perhaps unique. It follows the adoption of New Zealand Standard NZS 6805:1992 “Aircraft noise management and land use planning,” which employs the *airnoise boundary concept* introduced by this author in 1987. In this, the airport must work out the amount of noise it wishes to be allowed to make per day in, say, the next ten year period. This is presented to the local territorial authority in the form of two day/night sound exposure contours around the airport. Note: This is A-frequency weighted sound exposure (in pascal-squared-seconds, Pa<sup>2</sup>s) not sound exposure level, although the aviation industry has been very hesitant to use pascal-squared-seconds and, on more than one occasion, has gained permission in the Courts to use the equivalent day/night level.

The two sound exposure contours presented are the 100 Pa<sup>2</sup>s and 10 Pa<sup>2</sup>s contours; and

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### *There are Severe Penalties for Failure to Abate Unreasonable Noise*

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if the airport cannot contain the 100 Pa<sup>2</sup>s contour within its own property boundary, it must apply to the local territorial authority for permission to have an area outside its property boundary in which to contain the noise. The application is examined in the public domain where local people have input. If the proposed contour covers a noise-sensitive area such as a hospital or school, the contour may be shifted to avoid the area; or the noise sensitive activity may be relocated away from the airport noise at airport expense. If agreement is not reached, the case is discussed in the Environment Court, and a binding ruling given. A line on the map is then drawn, using natural features or ward boundaries, to enclose the 100 Pa<sup>2</sup>s contour; and this is called the airnoise boundary. A similar line to enclose the 10 Pa<sup>2</sup>s contour is then drawn and called the outer control boundary.

From then on, the airport must keep all noise in excess of 100 Pa<sup>2</sup>s inside the airnoise boundary, and a series of noise monitoring stations ensure this is done. The local territorial authorities must inspect all homes within the airnoise boundary and either buy up the property or provide insulation so that the internal sound level would be similar to that in an area where the outside environmental level met the recommendations of WHO. If any property is likely to receive more than 330 Pa<sup>2</sup>s, it should be purchased and the people re-housed. At 1000 Pa<sup>2</sup>s there is no question that the noise environment is a hazard to health and no residential building is permitted. Schools and hospitals are not permitted inside the airnoise boundary. Strict land-use controls are maintained inside the outer control boundary. Schools and hospitals are proscribed and no new subdivisions allowed.

Since the adoption of the standard and an edict by airport authorities to accept only aircraft meeting Chapter 3 Aircraft Noise Certification, aircraft noise complaints have

dropped substantially, e.g. at Wellington international airport in the early 1990s there were hundreds of noise complaints each month and in 2005 there were only 20 for the entire year.

Industry must also keep all unreasonable noise inside its boundary, but unlike transportation it has to meet lower levels: L<sub>A,eq</sub> 55 dB by day and 35 to 45 dB by night. Local authorities set the limits to meet, and these are often from past generations and still use the outdated centile levels. Port noise is controlled very similarly to that of aircraft with a national standard NZS 6809 (using the airnoise boundary) adopted as a regulatory instrument. This seems to be working quite well.

Occupational noise is handled by the Health and Safety in Employment Act which follows WHO guidelines using a limiting criteria of L<sub>A,eq 8 hrs</sub> 85 dB or 1 pascal-squared-hour per day, 5 days a week. If the daily noise exposure exceeds that of L<sub>A,eq 8 hrs</sub> 80 dB, all operations must be examined and steps put in place to ensure that the limiting criteria of 85 dB is not going to be exceeded. Areas where noise levels are such that the workers could

exceed their permitted daily noise exposure must be clearly marked, and employees entering these areas issued with hearing protection. Industry management must produce a noise management plan where the first line of attack must be the noise making

processes or machines. Shielding the noise from the machine operator and other workers is the second line of attack. Only as a last resort may management rely on hearing protection devices to meet the criteria. Penalties for non-compliance with the Act are severe. This is administered by the New Zealand Department of Labor.

New Zealand has no laws to protect personal health from excessive noise

exposure, so young people may expose themselves to high levels of noise without redress. Media and local sports heroes often seem to promote loud sound as an embodiment of power and enjoyment—something for modern youth to copy—and peer pressure does the rest. New Zealand statistics show that between 13% and 19% of young people entering industry already have hearing loss. Massey University studies on noise in schools and pre-schools are finding that many children already have a hearing loss before they get to high school. This needs serious attention.

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## Adapting to Global Noise Policies: The Turkish Example

**H.Temel Belek, Faculty of Mechanical Engineering, Istanbul Technical University, Istanbul, Turkey**

Article 56 of the Preamble of the Constitution of the Republic of Turkey, Health Services and Conservation of the Environment says that everyone has the right to live in a healthy, balanced environment and that it is the duty of the state and citizens to improve the natural environment, and to prevent environmental pollution. Article 57 says that the state shall take measures to meet the need for housing within the framework of a plan which takes into account the characteristics of cities and environmental conditions and supports community housing projects.

Environmental noise policy in Turkey was activated in 2005 July with the following historical background:

- Municipal Law No 1580 dated 1930 gave responsibility and authority to municipal police to deal with excessive noise complaints.
- Environmental Law No 2872 dated 1983 initiated a study to develop a “Noise Control Regulation” which was finalized in 1986 and remained in force until 2005.

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*Many Children Have  
Hearing Loss Before  
They Get to High School*

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- With the “Directive 2002/49/EC of the European Parliament and of the Council”, work started in 2003 December to prepare the new Regulations on Assessment and Management of Environmental Noise (AMEN)
- Entry negotiations to EU with Turkey formally began in 2005 October.

The 1986 Noise Control Regulation had some advantages at the time it was released. It formed a legal basis for individual complaints; however, emission, immission, and environmental noise issues were all combined in the same regulation. The regulation on the “Assessment of Environmental Effects” was later adopted on 2003 December 16, and reporting on the environmental effects of big industrial installations became effective. The 1986 Regulation also had some drawbacks: 1) activities concerned community noise sources like road traffic, air traffic, and industry were neglected; 2) responsibilities were overlapping between different institutions; 3) no significant application on the environmental or community noise issues were seen; and 4) problems related to noise were not thoroughly assessed as compared to the other environmental pollution parameters.

The regulations on assessment and management of environmental noise were based on the Directive 2002/49/EC which was a policy implementation rather than a regulation. They included the objectives, scope, responsibilities, basic criteria for noise and vibration, mapping, and action plans. Other information included were:

- Information to the public, collection and publication of data
- Approval procedure of noise maps and action plan
- Noise control permission certificate and assessment criteria
- Measurement, mapping and assessment
- Criteria efficiency and certificate assessment
- Assessment of objections, inspection,

encouragement and administrative sanctions

Annexes of the Regulation include:

- Noise indicators
- Assessment methods of noise indicators
- Estimation method for harmful effects
- Minimum requirements for Strategic Noise Maps
- Minimum requirements for Action Plans
- Data to be sent to the Ministry
- List of industries and installations requiring the Noise Control Permission Certificate

Implementation and enforcement of the regulations began with training after which technical personnel received one of three Certificates of Efficiency: 1) Type A - basic training, 2) Type B - noise mapping training, or 3) Type C - noise-control project training. The target dates for some action plans are:

- Noise monitoring systems for large airports by 2007 July 01,
- Issue of Noise Control Permission Certificates for industries and installations by 2008 July 01,
- Noise mappings and action plans for the highways, railroads and the large airports by 2022.

In addition, the EU Twinning Project on the harmonization and adaptation of the EU Directive on Environmental Noise started on 2006 March 26. This project between Turkey and Germany is scheduled to continue for 21 months and focus on noise mapping of pilot zones and conducting workshops for public institutions.

It is still too early to assess the effectiveness of the noise policies; a minimum of five years is necessary to evaluate the results. In Turkey some simplification of the regulation will be necessary, but local governments have begun implementation of some policies. Due to the lack of trained personnel, however, problems still exist. What is needed now is training of technical

personnel, education at all government levels, increased public awareness through communication and public relations, and public pressure on government authorities to add noise policy to their programs.

Using the EU example, Turkey has developed a reasonable noise policy and must now develop and encourage regional noise policies. The principles of noise policy development must be constantly updated as local problems and cultures are better understood. Turkey also supports the concept of a global noise policy to protect the world’s inhabitants from noise pollution and believes that such an international agreement should be prepared for U.N. attention.

Turkey feels that to attain their goal for quieter communities, the following plan should be started:

Short term actions

- Education of personnel
- Improvement of technical infrastructure
- Issue of “noise control licenses” for potential noise sources (industrial installations, entertainment centers etc.)
- Approval and control of noise insulation of buildings
- Issue of building usage certificate based on sound insulation

Medium term actions

- Preparation of noise maps for agglomerations, highways, railways, and airports
- Development of action plans based on noise maps to improve environmental noise quality
- Environmental, urban, and zone planning with soundscaping
- Development of quiet zones using noise maps
- Addition of noise maps and action plans as attachments to the plan documents

Long term actions:

- Improving the primary, secondary, and high school curricula to increase noise awareness

- Restructuring of noise control engineering degree curricula at the universities
- Developing new approaches to communication with the public on noise related issues
- Lobbying for a better noise policy at the government level

In conclusion, Turkey believes that noise pollution is an international problem to be tackled globally and is trying to deal with the problem by following global trends. Concerned countries must share their experiences to contribute towards a solution, but success is only possible with more education and training.

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## A Place for Flexibility in Noise Control Policies?

**Marion Burgess, Acoustics and Vibration Unit, UNSW@ADFA, Canberra, Australia**

### Occupational Noise Policy

According to Occupational Noise Policy in Australia, to reduce hearing loss in the workplace, the exposure limits are  $L_{eq,8hr}$  85 dB(A),  $L_{peak}$  140 dB(C). It is understood that this limit may not protect the entire workforce, but it limits the risk of hearing loss for most. For exposures above this level, a noise management plan must be implemented and, as an interim measure, workers are to be provided with appropriate personal hearing protection.

How is this limit enforced? Although assessments of workplace noise exposure limits are required, these limits are rarely checked by authorities unless it is a large organization and an audit is required. Other reasons for checking might be that the authority has decided to carry out a project which focuses on noise or an organization has experienced a large number of claims.

Is there an incentive? Apart from meeting its duty of care to the employees,

implementing a noise management plan may reduce the number of claims and result in a reduction in compensation premiums.

Codes of practice specify the usual hierarchy with priority for attention to noise at the source and personal hearing protectors only for short-term implementation. In practice it is up to management to assess their protection program and follow through with viable solutions. Unless there are available solutions at a suitable cost, it is usually only the larger organizations that have the resources to follow through with engineering solutions.

There is *no* flexibility in the limiting levels except for emergencies. However without noise assessments by outside authorities, enforcement may be erratic and management may not adequately pursue the options to hearing protectors (reduction at the source or path reduction). There is discussion on fostering an awareness of the benefits which result from dealing with noise below the limiting levels of 85 dB(A) for exposure to hazardous noise. But this will take time to be implemented.

### Environmental Noise Policy

Implementation of environmental noise policy is at the state level, except for type-approval of motor vehicles and aircraft noise. Although the approaches each state takes in implementing policy may be similar, there is only one common factor—the use of dB(A). The criteria which may be acceptable in one state may not be acceptable in another, and this causes the inevitable problems with cross border issues.

To enforce policy at a local level, issues and disputes are dealt with by the local council using guidelines from the state authority. Larger companies are managed by the state authority using a licensing system or similar regulatory method, but most action against existing facilities concerning noise issues is complaint driven. Also, the *environmental noise*

*impact assessment* process is triggered by the size of new developments or roads.

What is the purpose of an Environmental Noise Impact Assessment? Such an assessment includes a prediction of the immission noise levels, establishes criteria for acceptable levels in a community, and suggests appropriate mitigation measures if noise levels exceed the acceptable criteria. The assessment document outlines the options and recommendations on behalf of the proponent. The authority may accept that the criteria may not be met with reasonable and feasible control measures. There is then the option for the authorities to oversee negotiations between the proponent and the community.

### How effective is an Environmental Noise Impact Assessment?

The guidelines for a noise impact assessment are stated in policy and, in most states are based on zone or existing background. One state, however, requires consideration of both an intrusive criterion based on background and an amenity criterion based on zone, to avoid background creep. The project-specific noise level limits, however, are the most stringent. There is a spin-off benefit of this approach in that it introduces to the community the concept that there is not just one level that must be met – thus it provides a basis for discussion.

The basic assumption for setting criteria is that there is a level of noise which is acceptable to the community. But this acceptability criterion can lead to inequities if it is used exclusively as the basis for regulation. An impact assessment process allows all the stakeholders to participate in the development of criteria which is reasonable and feasible to everyone. Such cooperation will yield an optimal outcome of agreement between all parties on a goal for noise levels and recommended mitigation measures.

Larger projects may not proceed because the necessary mitigation measures may not be acceptable to the community or to the authorities or the cost of meeting the goal for acceptable noise levels cannot be achieved by reasonable or feasible measures. To deal with this, it may be possible to negotiate an agreement between the proponent, the community, and the authorities where the proponent offers a package of benefits to the community in exchange for that community's agreement to accept the additional the noise level, extended hours of operation or certain noise characteristics. The benefits which might be offered to the community in exchange for its acceptance of the change in the noise environment might be less noise at certain times, noise insulation of residences, improved community facilities or, in very rare cases, financial payments.

In summary: the enforcement of the environmental noise criteria for smaller industries is generally complaint driven. For medium and large industries the requirement for a license includes controls on environmental noise. The environmental impact assessment process is triggered by the size of the project and the project should not go ahead unless the authority considers that the noise will be controlled in an appropriate manner.

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## Discussion

Following the five presentations, a discussion was held. Below is a summary of the discussion. This includes questions (Q) from the attendees, answers (A) of the panelists, and comments (C) from both attendees and panelists. Bill Lang chaired the discussion. The discussion has been arranged by topic, and is not in the order in which the actual discussion took place.

### Excessive Noise Laws

**Q:** Philip Dickinson, is maximum flyover noise for schools consistent with the limit of 35-40 dBA for noise intrusion into classrooms?

**A:** Yes. When an aircraft is deemed too noisy by the local citizens, they complain to the airport. The airport can then say they will not accept that aircraft into the airport. You can't stop an airplane landing for safety reasons, but you can stop it from taking off. There are precedents for this. Also, when the school is being built, it has to be insulated to meet particular requirements.

**Q:** Philip Dickinson, some excessive-noise laws are intended for vehicles on the highway. How about a car standing or moving slowly on a street having an illegal exhaust system or a "boom box"?

**A:** That is one of our big problems because, by the time the police get there, the vehicle is gone. If they get there quickly enough, they can control it.

### Noise Emission Laws

**Q:** Panel, is there any country practicing the control of noise emissions from in-use vehicles, and what is its effectiveness?

**A:** (Ulf Sandberg) As far as I know, Norway has had a regulation regarding motorcycles, and I think they just did it for cars. The noise emissions are measured for the vehicle at the annual vehicle inspection.

**A:** (Marion Burgess) In Australia we have in-use noise emission limits which are generally checked at the re-registration time. Any vehicle not complying requires attention before the registration is renewed. There's also some in-use testing where the police go out; and if they think the vehicle from a subjective assessment exceeds in-use noise limits, a defect notice is applied and the owner must take it to be tested. The problem is that the boom-box car is certainly an irritating source of noise, but we have no regulations for this noise.

**C:** (Tjeert ten Wolde) I might add that the Netherlands has also some regulations for in-use vehicles, for example, related to mufflers and motorcycles.

**C:** (Paul Donovan) In the U.S. there are many state and local regulations, especially local, that forbid the modification of mufflers on vehicles.

### Community Noise Standards in Mexico

**Q:** Sergio Beristain, what role does land-use planning play in noise level reduction in Mexico?

**A:** So far, nothing. As you saw in the presentation, the only requirement is for 68 dB in the daytime and 65 dB at night. We have been trying to improve conditions in living areas and commerce areas. In Mexico City there was a reduction recently of 3 dB because the Mexican standards are now enforced. Mexico established a national standard, but in this standard it is allowable for any local authority or provincial authority to use a different standard within their jurisdiction provided it is better than the national one.

**Q:** Sergio Beristain, Mexico seems to have many standards. How are they enforced? In particular, who enforces the environmental standards?

**A:** The environmental standards are enforced by the Environmental Ministry but the problem in the noise area is that they have very few inspectors to enforce those standards. Most of the time enforcement is on demand. The standards state that the government should do random checks to determine the sources. If an installation knows it is going to be measured, they may try to reduce the noise for the inspection.

### Noise Regulations in Turkey

**Q:** Temel Belek, what are the details of Noise Control Permission Certificates?

**A:** Noise Control Permission Certificates are issued to industries and installations which are likely to produce noise. There is a long list of these in the regulations. And those installations, if they are at the development stage, must have noise abatement plans. They cooperate with the authorities who check that the noise

levels are below the allowed limits. If so, then they receive the certificate.

**Q:** Temel Belek, what is the role of stakeholders (public, industry, etc.) in noise legislation in Turkey?

**A:** Their role is varied. At the moment the government authorities are trying to understand the new regulation in more detail because of the increasing number of trains and rolling stock. A real impact will be felt, in my opinion, in subsequent years. The trend in industry is to try to avoid spending money to reduce noise levels. At the moment municipalities are trying hard to control noise levels by making continuous measurements at noisy locations.

**Q:** Temel Belek, is there a public awareness of noise impacts in Turkey?

**A:** Noise awareness is, in my opinion, a cultural thing. People in countries around the Mediterranean coast are less likely to complain about noise compared to Scandinavian countries. Public awareness is growing. For example, last summer the newspapers reported that nightclubs along the Bosphorus produced high-levels of noise creating many complaints. This was a big issue and was in the papers for quite some time. In the Turkish Acoustical Society we also organize events. A couple of years ago we did a cartoon contest to increase public awareness, and the cartoons were put on display. Other NGOs are also trying to increase public awareness. I must say that a lot remains to be done in this area.

**Q:** Temel Belek, Turkey is implementing the EU Directive on community environmental noise. Is this implementation limited to large cities where the inhabitants number more than 400,000?

**A:** As far as I know the EU has published a roadmap for cities of a certain number of people. We are following the same guidelines. Initially, as far as I know, four main cities are identified for airport noise, railway noise, highway noise, and industrial noise monitoring. These are the pilot cities.

**C:** (Tjeert ten Wolde) In the first stage only cities with more than 250,000 inhabitants

are included. In the second stage, cities with more than 100,000 inhabitants are incorporated in the process.

**C:** (Volker Irmer) Currently in Turkey, what Tjeert told us is right. The same requirements as in the European Union Member States will be applied in Turkey. But there are approximately 100 agglomerations in Turkey with more than 100,000 inhabitants, and it should be 10 with inhabitants more than 500,000. There are many municipalities with more than 500,000 inhabitants. Istanbul, for instance, has between 13 and 18 million inhabitants. Turkey has only one law for all environmental noise. Turkey has set limits for the immissions of roads, rails, aircraft, and industry; and they have set limits for the emission of cars following the EU Directive 2014. It is legislation that has some gaps and some overlapping, but I think during the next two to four years the input will guide Turkish legislation in the right direction. I am originally from the German environmental agency, and I'm now living in Ankara as part of a twinning project to help the administration of Turkey to implement the EU directives. The one I am concerned with is the EU directive on environmental noise.

**C:** (Dieter Schwela) Switzerland is another country that has a complete set of immission standards with respect to noise. Their regulation labeled LSV (decree on noise protection) defines noise immission levels for road, rail, aircraft, industry and trade, and shooting ranges.

**C:** (Bill Lang to Temel Belek) Is this what you were addressing? You said that Turkey has one overall regulation that includes both immission and emission requirements.

**C:** (Temel Belek) As I mentioned in my presentation, I only discussed environmental aspects. The other regulations for occupational and product noise are similar to EU regulations and have already been adopted.

## **Consumer Product Noise in New Zealand**

**Q:** Philip Dickinson, are there regulations in New Zealand with respect to consumer product noise?

**A:** We certainly have put noise control into operation. There are some children's squeaky toys that are putting out 135 dB. These certainly can injure a two- or three-month-old child. Some of the toy telephones that children use are at 98 dB. And we do have limits on some consumer products, such as lawn mowers. I do wish we could have a noise-level limit on stereos. Some products have labels, and some products are noise controlled.

## **Tire Noise Data**

**Q:** Ulf Sandberg, does the EU accept tire noise measurement data obtained in the countries which have signed the agreement but are not members of the EU?

**A:** I'm not able to answer that question, but Douglas Moore (GM, USA) may be able to answer it.

**A:** (Douglas Moore) Yes, you can measure those things outside the country. It's done through an authority that is recognized by one of the contracting parties. For example, the United States accepts tire noise measurements that have been done under the supervision of an official recognized by one of the contracting parties to the United Nations ECE regulation.

## **EU Road Traffic Noise Limits**

**Q:** Ulf Sandberg, do you have any idea about the changes and the timing for the introduction of higher limits for road traffic noise in the EU?

**A:** Are you referring to emission limits?

**C:** Yes. It was meant to be a very broad question for all the regulations related to road traffic noise, but we could focus on the tire/road noise. You mentioned a basic study and possibilities for tightening the limits for the tires. But what about general pass-by noise?

**A:** The Commission, according to the directive, was required to issue some further limitations on tire noise. I think it was in 2004 that they were

to have issued these, but they didn't do it. What the situation is at the moment, I don't know. We were called to a meeting with European tire organizations in early 2007 where we will discuss future noise limits with the Commission. What happens after that, I don't know. Evidently the issue is urgent because the Commission should have dealt with it long ago. With regard to vehicle noise emission limits, there is discussion in Geneva at the ECE level about establishing a new measuring method. That work is close to completion and is based on the work in an ISO group on the new measuring method to be adopted by the ECE. In parallel, there is discussion of the new emission limits that must be used together with the new measurement method. I have seen some suggestions for such limits; some of them have target years when these limits will be enforced. As far as I know, no decisions have been made. Maybe Douglas Moore would know more about the situation.

**C:** (Douglas Moore) In November WG29 accepted the proposal for the European Commission to establish a two-year monitoring program where the current test for vehicle noise emissions would still be in force. In addition, a new test procedure would be required and parallel measurements reported. This process will finish within two years, then must follow a discussion of limits. Based on that time frame any new limit will not be enforced before 2010. It was interesting that the EU proposed this schedule while the manufacturers wanted to put the new limits in force immediately. The EU did not wish to do this.

## **Low-Noise Tires and Pavements**

**Q:** Ulf Sandberg, is there a difference in noise levels from low-noise tires for different pavements?

**A:** Yes. The pavements make a large difference—at least as large as the difference between tires. It depends on which tire or road surface is used.

**Q:** Ulf Sandberg, are the effects of low-noise tires and low-noise pavements

synergistic with respect to reducing noise levels?

**A:** In general, no. This is not well researched so I'm not able to say if there may be some effects which are synergistic. Probably so, but not in general.

**Q:** Ulf Sandberg, while we have proposals to modify tires to produce quieter tires, do we have any initiatives to produce quieter roads and vehicles? If the answer is positive, what are these initiatives?

**A:** In my presentation I mentioned that the EU Commission had taken an initiative to consider working on a European classification system with respect to noise properties of pavements. There was a workshop this year in Brussels where this issue was discussed. I got the impression that most participants were in favor of establishing such a system. Next year there may be a formal initiative to start this work. The task may be given to a new group or to an existing group within CEN. CEN is the European Committee for Standardization.

**C:** (Tjeert ten Wolde) At the workshop in Tampere, Finland, Mr. DelCampe of the Environmental Department of the European Commission mentioned a research program in which tires and roads were seen as one system. In an attempt to find a more realistic approach than we have now, we must distinguish between tire noise and road surface noise while they are interacting.

**Q:** Ulf Sandberg, the new ECE regulatory action will include tire/road noise as part of the total noise emission measurement of a vehicle. What is the potential effect?

**A:** If that question refers to the new vehicle noise measurement method that has been developed in the ISO group, it is expected that the tire noise contribution will be larger than for the existing method. So, if the ECE decides to have the same corresponding noise emission limits that they have today when they apply the new measurement method the first time, then I predict that tires will play a bigger role than they do today.

**C:** (Douglas Moore) I fully expect that

because of the new method there will be increasing pressure from the vehicle manufacturers on the tire manufacturers for quieter tires; and that, in fact, the vehicle regulations will by far be the most stringent regulations on tire technology development as opposed to the tire directive.

## **Progress on Vehicle Noise Regulations**

**Q:** Tjeert ten Wolde, in your opening lecture this morning you stated that there was “disappointing” progress at the UNECE on vehicle noise regulations. What is the background for this assessment?

**A:** My final check for any regulation is its effect in practice. What is the effect on immission positions for a particular source? Regarding the changes in the emission measurement methods for road vehicles, I'm not very optimistic about the effectiveness. One reason is the effect of different road surfaces on the emission, which is not well understood. Also there are quality aspects in the methods which are not satisfactory, e.g. the emission regulations now say that when you have a difference of 3 dB in emission between different vehicles, it should be 2.5 to 3 dB at every immission position; but it does not. This is for both highway noise and city traffic noise. I believe the emission regulations for different types of vehicles have not taken into account the immission levels, which is the final judgment regarding the quality of the emission regulations.

**C:** (Ulf Sandberg) I agree with Tjeert tenWolde. The slide that I showed on “loopholes” or “leaks” listed a few of the reasons for this lack of effectiveness. Also, the test surface used now and in the near future is the ISO 10844 reference surface. That surface seems to emphasize differences in noise levels between different tires and different vehicles and does not consider that rougher road surfaces are more common in many countries. In that case the differences between tires and vehicles will be less. So there are a number of reasons for the lack of effective regulations.

**Q:** Sergio Beristain, will Mexico move to harmonize vehicle noise emission standards with the ECE requirements?

**A:** I don't know how local authorities will handle this, but most of the Mexican standards follow the ISO standards.

### Negotiating Acceptable Levels

**Q:** Marion Burgess, how do you define reasonable and feasible?

**A:** This is usually defined following negotiations between the proponent and the authority in the first instance. The proponent might object to the great expense associated with mitigation issues. The authority might acknowledge that it's a reasonable objection. That's usually how it's done—discussion between the proponent and the authority.

**Q:** Marion Burgess, aren't there also absolute levels to protect public health—sleep disturbance, cardiovascular effects—and not only negotiated levels?

**A:** Yes. As I mentioned in my presentation, there are two methods for establishing acceptable noise in the environment. There are specific values related to zoning and other values related to existing background noise levels. One goes to the negotiation stage if those cannot be complied with, and there would be an upper limit. Accepting an excessive level like 95 dB in a residential area is not negotiable!

### More on Tire Noise Data

**C:** (George Maling) I asked about the acceptance of tire noise data in the EU. I wasn't thinking about the U.S. because evidently they have not signed the agreement that Ulf Sandberg mentioned. But, if Korea is part of the consortium, would data taken in Korea by a tire manufacturer in Korea be acceptable in the EU?

**A:** (Douglas Moore) Yes. It doesn't matter where the data is taken, but under whose supervision was it taken? For example, the German authority has offices in Korea, China, and the U.S. Under their supervision it's as if it were German data independent

of where it was taken. Regarding the comment that the U.S. would not sign 117, that is true. The U.S. will not become a contracting party to the 1958 agreements to ECE, but they are a contracting party to the 1998 agreements. The U.S. will never become a signatory to the 1958 agreements because it will not give up the right of direct action against manufacturers, i.e., recalls or fines, that is possible in the '58 agreement because there is third-party approvals of products. One has to go back through the third party to get to the manufacturers. That principle is unacceptable to the U.S. government. The 1998 agreement was put in place to allow countries such as the U.S., China, and Japan to participate in the global regulatory process.

**C:** (Dieter Schwela) With respect to your question on implementation and enforcement, I think this is less a problem in developed countries, but it's a big problem in developing countries because of a lack of perception of the

health impacts of noise. But this is an issue that has to be considered in global policy because, as with air pollution, noise is also pollution. With air pollution it is often the implementation or the enforcement that is lacking in developing countries. Enforcing emission regulations is a problem where, perhaps, the developed country must help the developing country with the local policy. 

### Available on the INTER-NOISE 06 CD:

International INCE Report 01-1, Noise Emissions of Road Vehicles: Effects of Regulations. By the I-INCE Working Party on Noise Emissions of Road Vehicles. Ulf Sandberg, Convenor.

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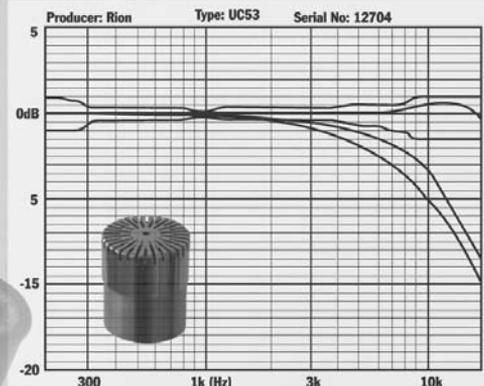
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# Quality Aspects of the European and Global Noise Policies on Environmental Noise

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## Introduction

Policies on environmental noise must be based on sound science and technology, but there are also political and legal requirements. In the first part of this paper, the various political, legal, and scientific aspects are identified. The scientific aspects include relevant definitions, sufficiently accurate assessment methods, and a clear distinction between emission, transmission, and immission. In principle, the scientific quality aspects can be very well combined with the legal and political requirements. In practice however, it is very common that one or more stakeholders have political or legal reasons to oppose improvement of the scientific quality.

In the second part of the paper, the European environmental noise policy is discussed. As compared with 10 years ago, the scientific quality of the present EU legislation and the related EU Member State legislation has been considerably improved, but there are still shortcomings. Some authorities and industries tend to oppose further improvements.

The same analysis is made for global noise policy, as proposed by I-INCE. Many of the shortcomings which are identified for the EU are also present at the global level, and therefore it seems logical to coordinate improvements at the United Nations (UN) level.

In this paper, environmental noise (community noise) is defined in the same way as in International INCE Publication 05-1, "A Global Approach to Noise

Control policy:" "unwanted sound in a non-occupational setting, indoors and outdoors, caused by sources over which an individual has little or no control, including sounds produced by neighbors." [1] This definition covers a wide range of receiving situations, transmission paths, and noise sources. Here, the emphasis is on residents inside their homes, in their gardens, and on their balconies while exposed to noise emitted by traffic (road, rail, air), industry, and other outdoor sources.

For scientists and engineers, it is obvious that policies on environmental noise must be based on sound science and technology. These policies, however, are also subject to political and legal considerations, which may affect the quality of the scientific content— positively or negatively.

## Sound Science

It is obvious that policies on environmental noise shall cover the actual problem and that quantities, measurement methods, computation methods and control measures shall serve this purpose. The logical requirements are the following:

1. There must be a clear distinction between emission, transmission and immission.
2. Emission quantities must be "relevant," which means that their physical definition and the operational conditions for which their value is determined, are such that a reduction

of the value of the emission quantity reduces the immission of noise at receiving positions by about the same amount. Ideally, a reduction of, for example, 5 dB of the emission quantity should also cause 5 dB reduction of noise at all receiving positions. Because of simplifications in the definition of the emission quantity and the operating conditions, the reduction of noise at receiving positions is usually somewhat less. When the average reduction is much less, the source description is obviously poor.

3. Immission quantities (noise indices/ noise indicators) must have a demonstrated relationship with effects. They must be clearly defined and there must be a well- defined method for the determination of their value.
4. Prediction methods for immission must be well defined and must be able to provide the value of an immission quantity without considerable

systematic error. The model must make a clear distinction between emission and transmission. The definition of the emission quantity is part of the model, but the emission data must be considered as input and not as an integral part of the model. The same is applicable to other data, as, for example, acoustical impedances of different surfaces and air absorption. The databases on noise emission (the input) and system characteristics must be well maintained.

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*The Scientific Quality  
of EU Legislation has  
Been Improved.*

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5. Immission measurement methods must be well defined, and provide the possibility of determining the value of an immission quantity without systematic errors.
6. Transmission quantities and the methods for the determination of their value must be well defined and sufficiently accurate.
7. The uncertainty of all of the assessment methods above must be given and be considered in the application of the results. Legislation must take uncertainty into account.
8. Limit values must be connected with a well-defined quantity.

Initially all stakeholders will usually agree with these requirements. However, experience shows that they often have reasons to compromise on the issue of scientific quality and accept, or even defend, approaches which have a limited relationship with the physical reality.

## The Political and Legal Aspects

### Introduction

Basic political questions which should be answered are the following:

1. Are market forces sufficient to solve the problem, and should they be stimulated?
2. Is the control of environmental noise a personal, a local or a national responsibility, or is it seen as a shared responsibility?
3. Which authorities are most suitable for contributions to the control of environmental noise?
4. Who shall pay?
5. Are the costs acceptable ?
6. To what extent must the public be informed about the noise situation and must the public be involved in the solution of problems?

Legal aspects to be considered are:

1. The coherence with other legislation.

2. The enforceability.
3. The legal certainty for citizens, trade, and industry.

The above aspects are discussed in the following paragraphs.

### Are Market Forces Sufficient?

A quiet surrounding can be bought.

Usually, expensive living areas are quieter than cheaper ones and expensive dwellings are better insulated than cheaper ones. In some countries, there are even systems to facilitate the market for quiet surroundings by the introduction of acoustical quality classes for surroundings or for dwellings. But even without such a system, market forces are always in place and produce a situation where protection against environmental noise is very much a matter of wealth. Thus, in a political situation where it is accepted that the quality-of-life (and health) is coupled to wealth, there is no direct need for immission oriented legislation. However, in other political situations, it may be concluded that the market forces do not protect everyone, and that immission-oriented legislation must be developed.

For the emission side, the “natural” market forces are weak because most buyers, users, and owners of the noisy objects are not *directly* interested in a limited noise emission. Thus, without legal requirements, the emission from road vehicles, trains, construction machinery, lawnmowers, local industry, and many other sources will not be significantly reduced. Because of the growing number of these noise sources, even expensive living areas can become more and more polluted. Thus, whatever the political situation, legislation on the control of noise emission is useful.

### Who is Responsible?

The answer to the question of whether the solution of the problem of environmental noise is a personal, a local, or a national responsibility, is, to a large extent, related to the definition of “health” by the national



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Tjeert ten Wolde was born in the Netherlands (1938). In 1962, he obtained his M.Sc in applied physics at Delft University. His thesis concerned the edge effect of sound absorbing materials. In 1973 he received a Ph.D at Delft University, based on a thesis with the title “Reciprocity experiments on the transmission of sound in ships.” He has published about 30 papers on noise control in international journals and conference proceedings. Additionally there are some 30 publications in the Dutch language.

In 1963 he joined the contract research organization TNO in Delft. TNO remained his employer till his retirement in 2001. Between 1963 and 1976 he worked, as a scientist, mainly on projects concerning the control of underwater ship noise. From 1976 to 1984 he was co-ordinator of a research program on the technical aspects of the Dutch act on environmental noise. This program concerned the computation and measurement methods, noise control at the source and noise control during the transmission. From 1984, he performed management tasks in the TNO Acoustics Division, shifting again to research and consultancy in 1996. From 1998 till 2001 he was seconded to the European Commission in Brussels (Belgium), with the task to take part in the development of two new European Directives on noise. Both directives have been adopted and they are presently being applied throughout the European Union. He retired soon after his presidency of INTER-NOISE 2001 in The Hague. Occasionally, he is still active as a freelance consultant.

Alongside his primary tasks, he also served in international standardization, the Dutch Acoustical Society, the Dutch Noise Abatement Society and the Dutch Health Council. At present, he still performs tasks for I-INCE and for the Dutch Committee on Environmental Impact Assessment.

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## Estimated shares in noise reduction

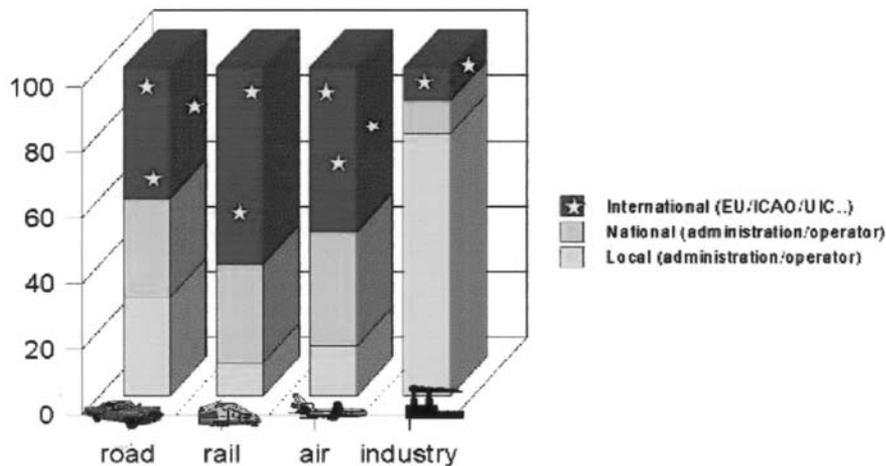


Fig. 1: Estimated shares of contributions to environmental noise control [25].

and local authorities. The World Health Organization (WHO) defines “health” as “a state of complete physical, mental, and social well-being, not merely the absence of disease and infirmity.” [2] Although many nations have officially adopted this definition, practice is different. In reality, in many countries, authorities limit policies on health to policies against disease and infirmity. In some countries, a pollutant is only accepted as an environmental problem when it is a cause of death. It is obvious that these different political attitudes create a wide range of possible attitudes towards the problem of environmental noise—ranging from no public action at all to extensive action. Thus, the answer to the question of responsibility is very dependent on the political situation.

### Which Authorities Shall Contribute?

Because of the fact that sound is usually not heard at distances of more than a few kilometers from a source, environmental noise is sometimes addressed as a local problem, which should thus be solved by local authorities. This may be true for some situations and some sources; it is certainly not valid for the noise from road, rail, and air traffic. Road traffic noise is not caused by one local vehicle but by many vehicles on roads, forming a transport system which is nearly everywhere where people live.

Thus looking at transport as a system, its noise emission is a global problem.

Regarding the reduction of noise immission, authorities at different levels should contribute. Figure 1 gives an estimate of their shares in the reduction of noise.

It shows that authorities at all levels are contributing, but that their shares are very much dependent on the type of noise. For industrial noise, local authorities are most important, but for the transport noises global authorities have the biggest share. The latter is mainly due to the fact that global authorities are best fitted to deal with the noise emission from products (such as cars and aircraft).

### Who Shall Pay?

In societies where environmental noise is seen as a personal matter, it is obvious that the receiver of noise will mainly pay the bill. When local or national authorities take the responsibility, costs will shift to the authorities and to the polluters.

### Are the Costs Acceptable?

National authorities designing legislation should, of course, consider the question whether or not the costs of the legislation are acceptable in relation to the political and economic situation in their country. It is usual in such cases that only the

operational costs of the legislation and the costs of measures are considered. However, the picture may change completely when the costs of the negative effects of noise are also taken into account (reduced price of dwellings, lost labor days, reduced learning by children in noisy schools, etc.). The way in which a cost-benefit analysis is performed is very much dependent on the political climate. It may be done in a “narrow” way (considering only some costs, benefits and stakeholders) or in a “wide” way (considering many costs, benefits and stakeholders), and with or without valuation (in money) of the negative effects. The results of these approaches may be very different.

### Shall the Public be Involved?

In an increasing number of countries, it is becoming normal for the public to be informed about construction projects with an environmental impact, and that the public has the opportunity to give its opinion and propose changes. Environmental noise is often part of such a process. Sometimes, it is part of a procedure on Environmental Assessment (EA), Environmental Impact Assessment (EIA) or Strategic Environmental Assessment (SEA), as for example required by the World Bank [3] and recommended by the Organization for Economic Cooperation and Development (OECD). [4] In other cases, involvement of the public is required by national legislation on EA, EIA or SEA, or by legislation on environmental noise.

It is less common that the public is regularly informed about noise in existing situations, but the number of countries where it occurs is increasing. However, there are also many parts of the world where the public is seldom involved, or only when they force it by public or legal action.

### Coherence With Other Legislation

It is obvious that the legislation must fit within the national legal system.

Worldwide, these systems are very different. There are, for example, important differences regarding the roles of the judiciary and jurisdiction.

### Enforceability

Legislation must be enforceable. But even when it is enforceable, authorities may choose to be lenient or lax.

### The Demand for Legal Certainty and its Influence on the Scientific Quality of Legislation

Citizens, trade and industry all ask for legal certainty, but in different ways:

- Citizens are interested in legislation which really protects them against noise. They are also interested in reliable information. When the legislation is changed, they ask for a degree of protection which is better or not less than before.
- Usually, trade and industry are interested in a minimum amount of legislation and if there is legislation, it should preferably be cheap and simple. Furthermore industry and trade want long term stability of the legislation so that they are able to plan investments and marketing. The long term stability stimulates a freeze of quantities and assessment methods, even when shortcomings are obvious. Limit values should remain constant or weakened, and if they are sharpened it should occur according to a long-term scheme.

Another party, which often acts as a stakeholder, is the administration itself. Lower authorities, which must implement central legislation, are sometimes negative about scientific improvements because it may be followed by a time-consuming and expensive process of revisions of noise licenses or land use plans. Central authorities may for example resist scientific improvements of legislation because such revisions would cause political problems with influential parties.

Finally the scientists themselves sometimes resist scientific improvements. Most scientists who play a role in environmental noise control are financially dependent on industry and authorities. Furthermore, many of them promote their own or their national methods and there is a strong tendency to hide the scientific shortcomings of these methods. Consultants and other scientists may say that certain methods are “good enough,” without proper evidence. Often it is said that the quality of the methods is not very important as long as the errors are consistent. In that case, it is believed that the absolute values may be wrong but that improvements will be right. This is undoubtedly true in some cases, but there are obvious cases where it is definitely wrong. Furthermore, in most legislation, the absolute values of emission and immission also play an important role.

The public is interested in the physical reality and in the related effects. Often, the legislation is formulated in such a way that the public believes that it is dealing with reality in the best possible way. Instead, the legislation may create a legal reality, which is rather different from the physical reality. This is, for example, the case when standard computation methods for immission are defined by the legislation. In such methods, the quantities to be determined are no longer defined by their physical definition, but by the standardized method.

Figure 2 shows an example of possible influences as described in this section.

## The Noise Policy of the European Union

### Introduction

In 1970, the first “directives” on the reduction of noise emission by products were issued and implemented in the national legislation of the Member States of the European Union (EU). In the next decades, directives for more and more machines were added. Around 1997, the

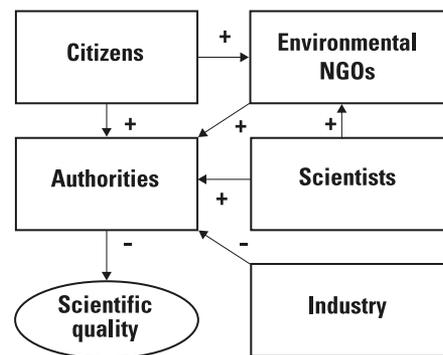


Fig. 2: Schematic representation of possible influences on the scientific quality of legislation. NOTES: + = positive influence; - = negative influence/no action for improvement. The case is typical for existing legislation. It results in an attitude by the authorities in which they do not take initiatives for the improvement of the scientific quality, partly because of pressure from industry and partly because of legal reasons.

EU Member States agreed on a further harmonization and modernization of their legislation on environmental noise [5, 6] and adopted the following policy:

1. Modernization of the noise emission directives and extension of the number of machines covered by these directives.
2. Development of a general directive on environmental noise.
3. Stimulation of research.

Since then, steps have been taken to implement this policy.

### The Broader Scope of the EU Environmental Noise Policy

The EU policy on environmental noise fits within a broader scope of environmental policy, policy on health and safety, transport policy and policy on the creation of an open market in the European Union.

Important elements of the EU environmental policy are general “framework” directives on air pollution and water pollution. [7] The general directives on air pollution and water pollution are both based on the following principles:

1. Determination, as accurate as possible, of the actual pollution.
2. Attention to emission, transmission, and immission.

**Table 1. Overview of the EU legislation on noise emission into the environment.**

Noise Source(s)	Document code(s)	Requirements
Subsonic aircraft	80/51/EEC	Type approval ("certification") with limit values
Subsonic jet aero planes	89/629/EEC	Type approval with limit values
Motor vehicles (cars, trucks, vans, buses)	70/157/EEC, 73/350/EEC, 84/372/EEC, 84/424/EEC, 96/20/EC, 1999/101/EC	Type approval with limit values
Tires for motor vehicles	2001/43/EC	Type approval with limit values
Motorcycles	97/24/EC	Type approval with limit values
Trans-European high speed trains and railway infrastructure	Directive 96/48/EC and the Commission Decisions 2002/735/EC and 2002/732/EC	Limit values and/or recommendations for rolling stock and/or infrastructure
Trans-European conventional trains	2001/16/EC and Commission Decision 2004/446/EC	Recommendations for rolling stock
Recreational craft (boats)	2003/44/EC	Type approval with limit values
Equipment for use outdoors	2000/14/EC and 2005/88/EC (amending Directive 2000/14/EC)	Type approval with marking (labeling) and for some machines also limit values

3. Application of the best available science and technology.
4. Information and consultation of the public.
5. Action plans.
6. Limit values for emission and for immission.

The general directive on environmental noise follows the same lines.

Another element of the EU environmental policy is laid down in directives on Environmental Impact Assessment (EIA) and Strategic Environmental Assessment (SEA). [8] Environmental noise is fully incorporated in these directives. The directives on EIA and SEA include requirements for informing the public and requirements regarding the participation of the public in the developments of plans.

The EU Directives on Noise Emission Table 1 gives an overview of the existing EU directives on noise emission. [9 – 11]

Most directives require type approval with limit values. One directive (2000/14/EC) requires the application of a label for all the equipment covered by the directive and limit values for some.

The directives on the emission by aircraft follow the requirements of the International Civil Aviation Organization (ICAO). In

addition to the directives on the emission by aircraft, there are also two directives on the limitation of the operations of aircraft from airports relative to noise control. [12]

For motor vehicles (cars, vans, trucks, motorcycles), the EU follows the developments in the World Forum for Vehicle Regulations within the United Nations Economic Commission for Europe (UNECE), and the related developments in the International Organization for Standardization (ISO). For tires it has developed its own methodology.

The emission directives for trains cover both high speed trains and conventional

rolling stock. The directives include recommendations for the railway tracks. They are developed in close cooperation with the International Union on Railways (UIC).

The directive on outdoor equipment (2000/14/EC) has many elements from ISO standards, but also methods and approaches which are not yet covered by such standards.

### The General Directive on Environmental Noise

According to reference 9, the European Directive 2002/49/EC, relating to the Assessment and Management of Environmental Noise, [13] "has the aim to provide a common basis for tackling the noise problem across the EU. The underlying principles of this text, are similar to those for other overarching environment policy directives:

- Monitoring the environmental problem; by requiring competent authorities in Member States to draw up "strategic noise maps" for major roads, railways, airports and agglomerations, using harmonised noise indicators  $L_{den}$  (day-evening-night equivalent level) and  $L_{night}$  (night equivalent level). These maps will be used to assess the number of people annoyed and sleep-disturbed respectively throughout Europe.
- Informing and consulting the public

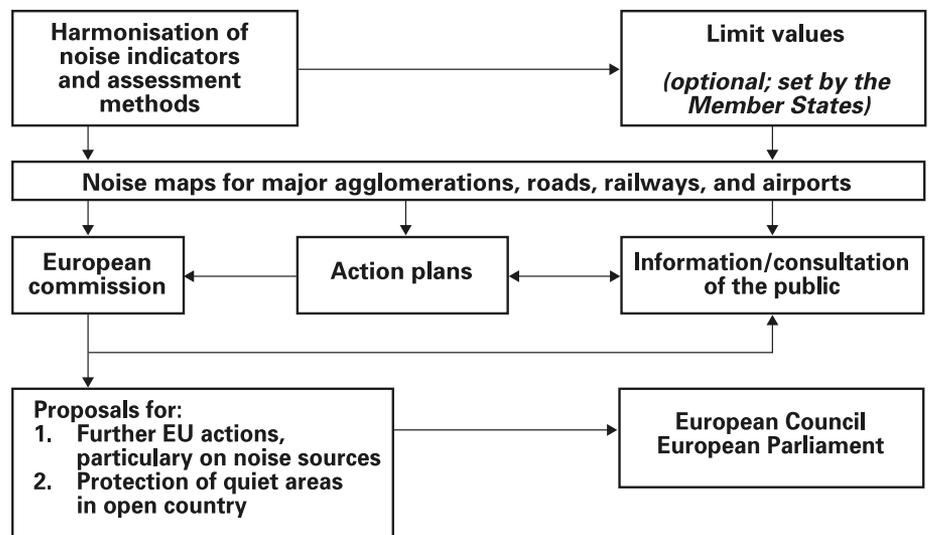


Fig. 3. Overview of the European directive 2002/49/EC on environmental noise.

about noise exposure, its effects, and the measures considered to address noise, in line with the principles of the Aarhus Convention [14].

- Addressing local noise issues by requiring competent authorities to draw up action plans to reduce noise where necessary and maintain environmental noise quality where it is good. The directive does not set any limit value, nor does it prescribe the measures to be used in the action plans, which remain at the discretion of the competent authorities.
- Developing a long-term EU strategy, which includes objectives to reduce the number of people affected by noise in the longer term, and provides a framework for developing existing Community policy on noise reduction from source. With this respect, the Commission has made a declaration concerning the provisions laid down in article 1.2 of the directive with regard to the preparation of legislation relating to sources of noise.”

These principles are also shown in figure 3. The noise indicators (the day-evening-night level  $L_{den}$  and the equivalent noise level over the night period  $L_{night}$ , both averaged over a year), were recommended by a special working group. [15, 16] They are defined in an annex of the directive.

The assessment methods for the determination of the value of the noise indicators concern:

- Measurement methods for  $L_{den}$  and  $L_{night}$
- Computation methods for  $L_{den}$  and  $L_{night}$ .

Furthermore, it is recommended that dose-effect relations be applied for the determination of the number of annoyed and sleep disturbed people. Such dose-effect relations will be introduced in future revisions of the directive.

For the time being, the EU Member States are allowed to use their own national computation and measurement methods, provided that the results do not differ significantly from the “recommended

interim methods” as defined by the European Commission. It is the intention that improved methods will be introduced in future revisions of the directive and that all Member States will adopt these.

An important element of the directive is the communication with the public by the publication of the mapping results and the discussion on action plans. Another element of this communication is the periodic publication of a report by the European Commission with a survey of mapping results and action plans for all agglomerations, major roads, railways and airports in the EU.

Although the technical content of the directive is immission oriented, it also gives the European Commission the task to improve the emission oriented legislation [26] and to develop policy for the protection of relatively quiet areas in the open country.

The development of the noise policy in the EU is accompanied by research projects covering the following subjects:

1. Improvement of computation and measurement methods,
2. dose-effect relations,
3. noise control of sources such as aircraft and lawnmowers, and
4. noise valuation.

Details can be found on the websites [9] and [17].

In a special article of the directive, it is stated that the technical content of the annexes shall be regularly adapted to technical and scientific progress.

### **The Legislation on Environmental Assessment**

Environmental assessment is a procedure that ensures that the environmental implications of decisions are taken into account before the decisions are made. The process involves an analysis of the likely effects on the environment, recording of those effects in a report,

undertaking a public consultation exercise, taking into account the comments and informing the public about that decision afterwards. Environmental assessment can be undertaken for individual projects such as a dam, a motorway, an airport or an industrial plant (‘Environmental Impact Assessment’, “EIA”) or for plans, programs and policies (‘Strategic Environmental Assessment’, “SEA”). EU directive 85/337/EEC covers EIA, the recent directive 2001/42/EC provides rules for SEA.[8]

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## **Critical Evaluation of the EU Policy**

### **Political and Legal Aspects**

It is clear that the EU considers environmental noise as a public health problem, with a great responsibility for national and local authorities. However, the reality is not yet completely in accordance with this principle, and individuals and action groups sometimes still have to fight for action.

The official position of the EU is that the polluter shall pay and many EU and Member State measures reflect that principle (for example the measures related to the emission by products, airport noise and noise emitted by industrial sites). However, the costs related to the most important source of environmental noise, road traffic, are still mainly carried by the owners of dwellings and by the taxpayers, and there are no indications that this will change in the near future.

Most of the emission oriented legislation is market access legislation, which also serves the creation of one European market for products. Most of the emission oriented directives define emission limit values, but some are stimulating market forces by the provision of information in the form of labels or other product information. So far, it has not been investigated whether the latter approach is effective. Furthermore, for some machines,

**Table 2: Evaluation of political aspects.**

Political or legal aspects	Present situation	Outlook
Environmental noise is a public health issue	Only partly realized	Slow progress. The ultimate goal will not be reached.
The polluter shall pay	Most costs still for taxpayers and the polluted individuals.	Slow progress. The ultimate goal will not be reached.
Access to information	No access for many EU citizens.	Quick progress
Effective emission legislation	For several noise sources, including road vehicles, it is known that present legislation is not very effective.	Slow progress
Investments in noise control	High in some EU Member States; low in others. Considerable EU research program.	Rapid increase of investments in new EU Member States
Enforcement of EU Directives	Mixed picture	Slow progress
Stimulation of market forces	Has no strong emphasis in the EU policy.	Slow progress
Cost-benefit analysis with both costs and benefits in terms of money	Much appreciated by some EU Member States and some other stakeholders. Poor state-of-the-art.	Slow progress
Cost-benefit analysis with the benefits in terms of health	Stimulated by the general noise directive 2002/49/EC. Preferred by some EU Member States and some other stakeholders. Not yet completely developed.	Good progress

the limit values are such that they hardly stimulate the development and sale of quieter equipment. This is, for example, the case for several sources of road traffic noise. Tightening of limit values is often successfully blocked by the related industrial sector. So far, the European Commission has not performed a general investigation into the effectiveness of the emission legislation regarding the reduction of noise immission.

The EU Member States are all subject to the “Aarhus Convention” which gives EU citizens the right of access to environmental information, to participate in the decision making and access to justice.[23] These rights are not only incorporated in the directives on EIA and SEA, but also in the directive on environmental noise. At present, many EU citizens do not have access to reliable information on environmental noise and it is interesting to see how the EU legislation will improve this situation.

EIA is very suitable for situations in which there is little specific legislation on the environmental components. In the last decades, however, the amount of specific EU legislation has rapidly increased, and there are doubts about the added value of EIA in the EU. This is even more the case

in EU countries with extensive additional national legislation on environmental issues. To some extent this is also applicable to SEA.

The directives are enacted, implemented, and enforced by the national legislation of the Member States. This implies that the main aspects are identical, but that details are different from Member State to Member State. One of those “details” is the degree of enforcement, which is different from Member State to Member State and also different for the various directives. Table 2 provides a schematic overview of the above and some other aspects.

## The Scientific and Technical Aspects

### Noise Emission Legislation

The final test for noise emission legislation is its “relevancy,” i.e., its contribution to a reduction of noise immission at various reception positions. Such tests are seldom done, but there have been investigations indicating that the effectiveness of the legislation is reasonably good for aircraft and poor for cars and trucks.[18] Furthermore, it has been shown that the poor effectiveness of the legislation for cars and trucks is partly caused by shortcomings of

the test method (the considered emission quantity, the operating conditions and the test conditions). Looking at the test methods for some equipment covered by directive 2000/14/EC, it must also be feared that they are also not as “relevant” as one would wish. For some equipment (road vehicles, aircraft, trains), there are ongoing efforts to improve the methods, but progress is very slow.

In spite of the large differences between the EU directives on noise emission, there are a number of common elements:

- For definitions and measurement methods, most directives rely on international standards. In some directives, there are additional definitions and measurement methods.
- Uncertainty is not taken into account, not in the test method, nor in the interpretation of the results. There is one exception: directive 2000/14/EC on outdoor equipment, but even in this directive there is no direct reference to the relevant ISO Standard 4871.[20]
- All test methods have a simplified representation of the emission and all neglect directivity:
  - All methods for moving transport vehicles are pass-by methods in which the immission at one or more specific reception positions is measured.
  - For stationary machines the radiated sound power level is the usual quantity to be considered.
  - Most methods only consider A-weighted results.

The effect of the simplifications on the relevancy of the method for certain reception positions (truck noise in higher apartments, aircraft noise at large distances from airports, positions behind noise barriers, etc.) is not well known.

- The test methods for trains and for road vehicles both have the complication of the interaction with the supporting structure (the track/the road) and both still deal poorly with this aspect. For trains, the problem has been recognized for some time, and solutions

**Table 3: Evaluation of some scientific aspects of the EU environmental noise directive (2002/49/EC)**

Aspect	Present situation	Outlook
Definitions of noise indicators (noise indices)	1. Reasonably precise definitions. 2. The directive provides a considerable degree of harmonization in Europe.	1. Small improvements by a future revision of the directive. 2. Ongoing harmonization
Determination of the value of noise indicators	1. Measurement and computation both allowed. 2. There are recommended interim methods. 3. Member States (MS) are still allowed to use their national computation methods. 4. There will be systematic differences between results from different MS, undermining the possibility of data comparison.	Commission proposal for improved harmonized computation methods. Acceptance by the MS for "strategic noise mapping" is uncertain. General acceptance for all MS legislation is unlikely.
Noise mapping and software	Extensive guidance from the European Commission (EC).	Gradual improvement
Dose-effect relationships	Guidance reports from the EC. There are, however, still a number of open questions.	Gradual improvement.
Noise control	Some guidance from the EC.	Various research projects. Gradual improvement.
Uncertainty in MS legislation.	Not correctly handled. "Solved" by standard computation methods and assuming that the results have zero uncertainty.	Strong resistance to face this aspect and to handle it more correctly.

are underway. For road vehicles, the problem has been long neglected. The European Commission is now planning a research program for an integrated approach in which vehicle, tire and track are considered as one system.[27]

- There is a general problem concerning the balance between relevancy and simplicity of the test methods. It may be feared that in too many cases simplicity has been too dominant in the design of the method.

It is clear that there is much room for improvement. However, the European Commission and most EU Member States show little drive to stimulate such improvements.

### The General Noise Directive

The European Commission has tried to base the directive on the best available science and technology. The definitions are reasonably precise, common assessment methods were proposed, and it was announced that improved common methods should be developed. Table 3 provides an overview and an evaluation of some scientific and technical aspects.

Further information on most of the contents

of Table 3 can be found on various websites and in many articles and reports, as for example [7, 12, 16, 17 and 25]. That is, however, only partly the case for the matter of uncertainty. On one hand, there is a growing attention to the uncertainty of computation methods, measurement methods and dose-effect relations – see for example [28] – but on the other hand, the question how uncertainty should be incorporated in immission oriented legislation is hardly touched. The wish for simple legal certainty and legal continuity seems to block the discussion on that issue. Consequently it seems sensible to make some remarks here.

There are a number of ways to handle uncertainty more correctly than it is done at present:

1. The first is to "give" the uncertainty to one of the parties involved, by adding it to or subtracting it from the computed or measured value. Unfortunately this requires a political decision which can often not be made because of an equilibrium between opposing political influences.
2. The second is to reduce the uncertainty as much as possible. Improvements can be introduced by periodic updates of the official method and by continuous

maintenance of the emission data base. The obligation for updates and maintenance should be included in the legislation. The legislation should also describe the legal consequences of the periodic changes of the official method. Furthermore, data should be published on the uncertainty of the method.

### The Legislation on Environmental Assessment

In principle, EIA and SEA should use the best available science for the assessment of the environmental quality. In practice however, this is often not the reality. In Member States with national computation methods within the scope of noise legislation, these methods are also applied for EIA and SEA. Too often, the results of these methods poorly represent the reality, because of the limited quality of the computation models and/or the poor quality of the input data. Poor quality of emission input data is for example a problem for EIA studies on airport noise.[24] The European Commission is aware of these problems and is trying to stimulate actions for improvement.[24]

## The I-INCE Proposal for a Global Noise Policy

### Introduction

I-INCE Technical Study Group 5 made an inventory of the problems which can best be handled at the global level, and made proposals for global actions on these issues.[1] For community noise (environmental noise), the main subjects that are recommended for global action are:

1. Standardization and harmonization of market-access legislation for noisy products.
2. Further development of international standards and harmonization of legislation on quantities, measurement methods, measuring instruments, and computational methods. Procedures should be developed to evaluate the uncertainty of the methods.

**Table 4: Most important authorities and organizations that are active for the development of worldwide policies on community noise.[1]**

Authority/ Organization	Members	Tasks relative to community noise
WHO	UN Member States (nations)	Raise awareness of the effects of noise and various noise policy approaches to reduce exposure to community noise. Stimulate the development of community noise policies around the world. Assist Member States in the development of national and local noise policies.
ICAO	More than 185 States ("Contracting States" or nations).	Harmonization of legislation and rules related to noise produced by civil aviation.
UNECE	European UN Member States (nations)	Prepare European harmonization of noise-emission requirements for motor vehicles.
ISO	National standards institutes from participating or observing nations	Develop international standards for procedures for measurement and assessment of noise.
WTO	148 countries	Promote sustainable development.
OECD	30 nations	Provide guidance to its member countries with development of community noise policies.
World Bank Group	Member countries	Provide financial support for economic development, taking into account environmental conditions, including noise.
UIC	Railway companies	Promote the development of a railway system which is less noisy than the road or air transport systems.

The I-INCE report also provides an inventory of the present global actions and provides proposals for the political actions that could lead to a global noise policy.

### Present Global Actions

There are many organizations dealing with global actions related to environmental noise. The most important are listed in table 4.

In the discussion on the present global actions, I-INCE concludes the following:

*At the present time, important actions are taking place in the development of worldwide noise policies. Some of these actions are for one category of noise only and are mainly driven by the interests of a specific branch of industry. The best-developed area for Global Noise Control Policy is aviation where ICAO has the lead. Somewhat similar developments are underway for the automotive industry, but not for road transport as a whole, and for rail traffic where UIC has the lead. Developments in these three sectors are uncoordinated.*

*The United Nations Economic Commission for Europe (UNECE) Has a General Mandate for the Development of Worldwide Vehicle Noise Emission Regulations*

*The situation is somewhat different in Europe where coordinated actions are underway that are either valid for all means of transport (for example, by the work of UNECE- WHO) or for all sources of community noise, such as the large number of noise Directives discussed earlier. Furthermore, in Europe the developments on community noise are part of a strong general approach to environmental issues. I-INCE Technical Study Group 5 concluded that worldwide development of noise policies should, as far as reasonable, reflect a philosophy similar to the European approach, while still incorporating useful noise policy concepts and approaches from other organizations, such as OECD, WHO and others, as well as various national noise policies which have been useful over the past several decades. Both emission and immission noise policies will need to be incorporated in the development of a Global Noise Control Policy and should be coordinated with each other.*

*In general, based on the review given in previous sections, one can say that*

*the organizations, which could play a part in the development of a worldwide noise policy, are either in place or could rather easily be oriented towards such development. The needed noise policy concepts already exist within these organizations. However, a worldwide policy on community noise also needs a strong foundation in international standards for quantities, measurement methods, measuring instruments, computational methods, and procedures for determining the uncertainty of a measurement or prediction. More work is needed to provide these international standards at an acceptable level of quality.*

### Critical Evaluation of the I-INCE Proposal

The proposal covers many of the problems which are identified in this paper, and it should therefore be welcomed as a positive contribution to global noise control.

Regarding its factual contents, the report needs one important correction: in 1998, **UNECE obtained a general UN mandate** for the development of worldwide vehicle regulations. Since then, many non-European nations have joined the process. Nevertheless, so far, the results of UNECE regarding noise emission regulations have been too strongly dominated by the interests of the global automotive industry [18], but the 1998 agreement provides the opening for a more balanced approach in which the relevancy of the methods for improvement of the environment and the matter of the uncertainty of the methods may get a more important place. Progress on this issue and on the related limit setting is one of the most vital issues of future noise control. [30]

Another less important shortcoming of the I-INCE report is that it does not say very much on Environmental Impact Assessment and Strategic Environmental Assessment, in spite of the fact that the World Bank [3] and other international organizations are using it successfully in less developed countries. This subject could however be further elaborated by I-INCE Technical

Study Group 6 on Community noise: environmental noise impact assessment and mitigation, and by I-INCE Technical Study Group 7, which has the task to proceed with the work of TSG 5.

## Conclusions and Final Remarks

1. The scientific quality of much legislation on environmental noise is not satisfactory. Although hard data are scarce, it is certain that scientific shortcomings may considerably reduce the effectiveness of such legislation. Improvement of the “relevancy” of assessment methods, the reduction of uncertainty, and the incorporation of uncertainty in the legislation, are primarily political and legal problems, although the scientific problems are also considerable.[28]
2. For several of the identified shortcomings, global action is required.
3. So far, noise control scientists have their input for noise control legislation very much adapted to the political and legal demands, and have developed a practice which is often unrealistic from the scientific point of view. It is recommended that this attitude be changed so that noise control scientists become more firm regarding the use of sound science and technology in noise legislation.
4. The problems concerning the application of sound science and technology are not unique for legislation on environmental noise. Some legislation on air pollution shows similar problems.

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*Madrid Will  
Host the 19th  
International  
Congress on  
Acoustics*

## EUROPE

### **Euronoise 2009 to be Held in the UK**

Euronoise 2009 will be held on 2009 October 25-28 in Edinburgh, Scotland, UK at the Edinburgh International Conference Centre EICC. The conference will be organized by the Institute of Acoustics in the UK with Bernard Berry as the General Chair.

### **ISO 532:1975 Loudness Standard to be Revised**

At its meeting in 2006 September in Madrid, the International Organization for Standardization's Technical Committee 43, Subcommittee 1 decided to revise ISO 532:1975, Acoustics—Method for calculating loudness level, and set up a working group, WG9, to do the revision. Laura Ann Wilber (USA) has been named convenor of the working group with Joachim Scheuren (Germany) as the co-convenor. Tomasz Letowski (USA) has been appointed project leader. The current standard specifies two alternative methods for the calculation of loudness, the "Stevens method," and the "Zwicker method." The work on the revision is expected to begin in the very near future.

## SPAIN

### **19th International Congress on Acoustics**

Madrid will be host to the 19th International Congress on Acoustics (ICA) on 2007 September 2-7. The congress follows immediately after the INTER-NOISE 07 congress, which is being held in Istanbul, Turkey on 2007 August 28-31. The 19th ICA is held under the auspices of the International Commission for Acoustics, and is being organized by the Sociedad Española de Acústica and the Instituto de Acústica in collaboration with the Ayuntamiento de Madrid. The congress program will consist of the presentation of keynote lectures, invited papers in structured sessions, and contributed papers.

### **One-day workshop**

The International Institute of Noise Control Engineering and Noise Control Foundation, in cooperation with the European Acoustics Association's Technical Committee on Noise (EAA TC-NOISE) have organized a one-day workshop to

be held on September 4. The theme of the workshop is "Education in Noise Control Engineering" and will focus on academic training—current and future—in the technical aspects of noise control. The panelists participating in the workshop will come from the leading universities and institutions of higher learning in the following countries: Belgium, Czech Republic, Finland, France, Germany, Italy, Norway, Spain, Sweden, Switzerland, The Netherlands, Turkey, and United Kingdom. These institutions are producing graduate engineers with formalized training in the control of noise at its source and in the community.

*For more information on the venue, the technical program, and hotel accommodations, go to [www.ica2007madrid.org](http://www.ica2007madrid.org)*

## UNITED KINGDOM

### **Meeting on Noise from Aircraft to be held in Birmingham**

The Measurement and Instrumentation Group of the Institute of Acoustics (IOA) has organized a one-day meeting on 2007 September 25. The subject of the meeting is Perception, Consideration and Closure...a better way of dealing with noise from aircraft. The meeting will be held in the Arden Hotel in Birmingham, UK.

The meeting is intended to identify future prospects of the reduction of human reaction to aircraft noise by the introduction of collaborative understanding between complainant, investigator and measurement standards.

Aircraft noise is being radically reduced through a rigorous technical program by both engine and airframe manufacturers. Operational improvements are also being implemented to reduce the noise or change the impact on the community.

Some questions are:

- What do complainants actually feel the problem is? Are we sympathetic to their needs and do we have a measurement system that reflects the actual concerns?
- So what can be done to improve the customer interface and support the genuine cases in regard to measurement of effect and level of concern felt by many who live close to busy airports?

For more information, see the Institute of Acoustics web page, [www.ioa.org.uk](http://www.ioa.org.uk)

### **Award for Promoting Acoustics to the Public**

The Institute of Acoustics (IOA) has established an Award for Promoting Acoustics to the Public. The award has been created to encourage activity that generates greater awareness of the importance of acoustics outside the acoustics' fraternity, that is to people without acoustical expertise. The award may recognise either a single piece of outstanding work or sustained long-term activity.

Examples of work would include: Writing articles for the non-acoustic press; Authoring web pages; Demonstrations and lectures; Work with schools to promote acoustics; Media work on TV or radio; Exhibitions. The Institute would particularly welcome applications which demonstrate a proactive engagement with the public; instances where the applicants have initiated and developed new activities, rather than simply responding to opportunities provided by others. Innovative and ground-breaking engagements are particularly welcome. Nominations can be for individuals, charitable organizations or companies. In the case of nominations for companies, it is necessary to show that the public engagement has gone above and beyond what might be expected to be the usual activities of a company. The deadline for submission of nominations for the 2007 award has passed, but the award will be given in 2008 if a worthy submission is made. For more information on awards made by the IOA, go to [www.ioa.uk/medals.asp](http://www.ioa.uk/medals.asp).

### **NSCA Spring Workshop—Managing Noise**

The UK National Society for Clean Air and the Environment (NSCA) sponsored a spring workshop on 2007 March 15-16 devoted to the subject of managing noise. Among the topics covered were strategic management of noise, managing city noise, managing transport noise, noise action planning, and soundscape design. The papers from the workshop may be downloaded from <http://domain1252046.sites.fasthosts.com/noise/>.

The NSCA also sponsors Noise Action Week which, this year was held on May 21-25. Noise Action Week gives everyone involved in managing noise an opportunity to raise awareness of the impact excessive noise can have on us at home, at work, at study, and at leisure, and to promote practical solutions.

Noise Action Week provides the opportunity to:

- Encourage us all to consider the noise we make and the noise that bothers us.
- Promote practical solutions to everyday noise problems.
- Promote communication and consideration between neighbors.
- Raise awareness of local authority, housing, mediation and other services available to help people tackle noise problems.
- Educate and inform noise makers and noise sufferers about noise reduction remedies.

### **Think you've got noisy neighbors? It could be tinnitus!**

One in four people with tinnitus initially thought the noises they could hear were coming from their surroundings, such as their TV, traffic or noisy neighbours! In fact thousands of people each year make noise disturbance complaints of this nature to their local council, when what they are actually experiencing is tinnitus.

That's according to new research released by RNID, the UK national charity for deaf and hard of hearing people, and the British Tinnitus Association (BTA) to mark the start of National Tinnitus Week (19-25 February 2007).

In a survey of more than 1,000 people with tinnitus conducted by the two charities, 25% of people said when they first experienced tinnitus, they didn't realise the noises were coming from their ears or head. Many people reported that they first thought their tinnitus was noise coming from their neighbours, traffic, or from a household appliance, such as the constant sound of their fridge or TV.

*New IOA Award  
for Promoting  
Acoustics to  
the Public*

*continued on page 77*

*Congratulations  
to Professor  
Robert J.  
Bernhard*

## **BRAZIL**

### **SAE Brazil to Hold Noise and Vibration Conference**

The Society of Automotive Engineers in Brazil has announced a call for papers for a Noise and Vibration conference to be held in Florianópolis/SC Brazil on March 30th through April 1st 2008. The Technical Program will cover most aspects of vehicle noise, vibration, and harshness (NVH) with presentations on the latest research, techniques, and trends in identifying, measuring, and eliminating NVH issues in vehicles. The deadline for abstracts is the 18th of September 2007 with the complete paper due on the 18th of January 2008. The Congress President is Professor Samir Gerges who is an active, Board Certified member of INCE/USA and was the president of INTER-NOISE 2005 held in Rio de Janeiro. More information regarding the conference may be obtained at [www.saebrasil.org.br](http://www.saebrasil.org.br).

## **USA**

### **Bernhard is Named Vice President for Research at Notre Dame**

Robert J. Bernhard, associate vice president for research and professor of mechanical engineering at Purdue University, has been elected by the University of Notre Dame Board of Trustees to the newly-created position of vice president for research, effective August 1. He also was appointed a full professor in the Department of Aerospace and Mechanical Engineering. Professor Bernhard served as president of INCE/USA in 1994, and was given the INCE/USA Distinguished Noise Control Engineer award in 2005. He is also in his second term as the Secretary General of I-INCE.

Bernhard is one of the nation's leaders in noise control engineering, with a focus on tire and traffic noise, numerical noise control design methods, noise source identification, active noise and vibration control, and machinery noise control applications. He has directed the research of 49 engineering graduates and is the co-author of more than 170 journal and conference publications on various aspects of noise control engineering, numerical methods, vibrations and design.

Bernhard is a frequent consultant to industry and government and has had his research activities funded by more than a dozen corporations as well as by NASA, the U.S. Department of Transportation, the Indiana Department of Transportation, the Federal Aviation Administration, the Federal Highway Administration and the National Science Foundation.

A graduate of Iowa State University, Bernhard worked from 1973 to 1977 as an engineer with Westinghouse Electric Co. in Baltimore. At the same time, he worked on and earned his master's degree in mechanical engineering from the University of Maryland. He returned to Iowa State in 1977 to pursue his doctorate and to serve on the engineering faculty as an assistant professor of freshman engineering.

After completing his doctoral studies, Bernhard joined the faculty of the School of Mechanical Engineering at Purdue in 1982. He has been affiliated with the Acoustics and Noise Control Research Program of the Ray W. Herrick Laboratories at Purdue, and served as its director from 1994 to 2004. He has been the director of the Institute for Safe, Quiet and Durable Highways since 1998 and for the last three years has served as Purdue's associate vice president for research.

### **NASA to Sponsor a Workshop on Revolutionary Aircraft.**

The National Aeronautics and Space Administration (NASA) will hold a workshop on Revolutionary Aircraft for Quiet Communities on 2007 July 24-26. The workshop will be held at the NASA Langley Research Center in Hampton, Virginia, USA.

This workshop will focus on challenges and opportunities for community and passenger noise control due to revolutionary changes in aircraft design. Dramatic advances in light-weight structures, reduced-emissions propulsion, active flow control, and propulsion/airframe integration along with societal demands for enhanced mobility will drive the development of radically different aircraft. Acousticians must participate in the development of such concepts in order to minimize noise control

challenges and to ensure the exploitation of all noise control opportunities.

More details on the workshop may be found at <http://www.nianet.org/workshops/quietaircraft.php>

### **JPDO Document is Available**

The Joint Project Development Office (JPDO) has released a new version of their Concept of Operations for the Next Generation Air Transport System. The 226-page document is Draft 5, Version 1.2 dated 2007 February 28. Noise is at the top of the list of environmental issues critical to the NextGen. A slightly edited version of the preface follows:

The Joint Planning and Development Office (JPDO) is developing a Concept of Operations (CONOPS) for the Next Generation Air Transportation System (NextGen). The final version of the CONOPS will provide an overall, integrated view of NextGen operations in the 2025 timeframe, including key transformations from today's operations.

The development of the CONOPS is an iterative and evolutionary process that will encompass the input and feedback of the aviation community. This is Version 1.2 of the document, which includes accepted comments resulting from an internal review and an expanded breadth of the NextGen concepts.

The purpose of this document is to provide the aviation community with a view of the NextGen CONOPS and receive their comments for improvements. Details of the JPDO comment and review process can be found at the Tech Hanger at [www.jpdo.aero](http://www.jpdo.aero).

This document identifies key research and policy issues that need resolution to achieve national goals for air transportation. In many cases, this document presents "aggressive" concepts that have not been validated, but are envisioned to maximize benefits and flexibility for NextGen users. Many potential futures are possible, and much will depend on the insights gained by the evolution of the CONOPS.

The name of the PDF file is NextGenConOpsv1.2.

For more information, go to the JPDO web site, [www.jpdo.aero](http://www.jpdo.aero).

### **O'Hare Noise Levels Decline Again in 2006**

Officials at the O'Hare Noise Compatibility Commission (ONCC) have reported that noise levels declined in 2006. ONCC officials attributed the aircraft noise reduction around O'Hare International Airport to quieter aircraft fleets; greater adherence to the nighttime O'Hare Fly Quiet Program, which is designed to reduce aircraft noise over residential areas through the use of preferred departure runways and flight paths; and other technological and operational improvements.

The City of Chicago's Airport Noise Monitoring System (ANMS) measures noise at 30 sites around O'Hare, and the ONCC reports those results to its members and the public on a monthly basis.

The largest decline was reported at site #3 in Bensenville, where the 2006 Day-Night Average Noise Level (DNL) was 61.0, down 6.3 from the 67.3 DNL recorded when the baseline readings were taken in 2000. Other large improvements were recorded in Melrose Park (-5.2), Northlake (-4.9), Schiller Park (-4.4), Park Ridge (-4.0), Elk Grove Village (-3.1), Des Plaines (-2.7), Mt. Prospect (-1.9), and Arlington Heights (-1.6).

ONCC Chairperson, Arlington Heights Mayor Arlene J. Mulder, said the report affirms the effectiveness of the Chicago Airport System's noise mitigation programs and the ONCC's multifaceted approaches to address aircraft noise issues. "We are glad to see continuing progress in our efforts to mitigate the noise coming from O'Hare air traffic. We still have much work to do, but we truly appreciate the efforts and contributions of many other stakeholders in realizing these noise decreases, including pilots, controllers, airline and maintenance managers," Mulder said. 

*The Noise  
Climate Around  
O'Hare Airport  
is Improving.*

## CHINA

### INTER-NOISE 2008 to be Held in Shanghai

INTER-NOISE 2008, The 2008 International Congress and Exposition on Noise Control Engineering, will be held at the Shanghai International Congress Center, Shanghai, China. The opening session will be held on Sunday, October 26, 2008 in the late afternoon, and the meeting will close on Wednesday afternoon, October 29. The theme of the meeting is "From Silence to Harmony."

The congress is being sponsored by the International Institute of Noise Control Engineering (I-INCE), and is being organized by the Acoustical Society of China (ASC) and the Institute of Acoustics, Chinese Academy of Sciences (IACAS). Professor Jian Tian, the President of ASC and Director of IACAS, will be the congress president, and Dr. Xiaodong Li of IACAS will chair the technical program.

The I-INCE Congress Selection Committee and Board of Directors will meet on October 25. Technical Study Groups and the I-INCE General Assembly will meet on October 26.

Technical papers on all aspects of noise control engineering are welcome, and instructions for the submission of abstracts will be given in the congress announcement and call for papers, which will be issued in August, 2007.

The Oriental Riverside Hotel Shanghai, integrated with the Congress Center, will be the most convenient for delegates, but arrangements are being made for delegates to stay at other hotels within 3 km of the Congress Center. Bus transportation to the Center will be provided.

*For further information on the congress, contact Dr. Xiaobin Cheng, Institute of Acoustics, Chinese Academy of Sciences, P.O. Box 2712, Beijing 100080, China.*

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*e-mail: in2008@mail.ioa.ac.cn*

*Website: www.internoise2008.org*

## JAPAN

### INCE/Japan Spring Meeting

INCE/JAPAN held the 2007 spring meeting on April 26 at National Institute of Advanced Industrial Technology (AIST) in Tokyo Waterfront. The meeting was composed of structured sessions. The topics selected this year were as follows:

1. Active noise control,
2. sound design in commercial space,
3. assessment of ground borne vibration caused by transportation, and
4. noise and vibration from equipments in building.

About 200 engineers and researchers joined the meeting and 28 papers were presented. During the meeting, a workshop on "sound amenity" was held following the related presentations by invited speakers. One of the invited speakers showed examples of artificial sound design in hotel lobbies and shopping malls. It was shown that the selection of sound source such as classical music, rock music, and singing bird's voice was a delicate problem, because the atmosphere of a commercial place strongly depended on the kind of the sources. It was also shown that the sound should be identified as background sound and the sound pressure level should be slightly above the background noise. Otherwise the designed sound would become nothing but noise. The total tuning-up of the sound environment that is recognized as comfortable must depend on sound designer's sense of beauty.

### ASJ Spring Meeting

Prior to the INCE/J meeting, the Acoustical Society of Japan (ASJ) held the 2007 spring meeting on March 13-15 at Shibaura Institute of Technology in Tokyo Bay Area. About 1400 researchers attended the meeting and 600 papers were presented. A special session of "Road traffic noise prediction at cross section of highways" was organized. Four invited papers were presented in the session, which were all reports of the technical committee of ASJ. The contents of the report were noise prediction by dynamic traffic simulation and by a simple engineering method, noise propagation in built-up area, and noise mapping method. It is reported that "ASJ RTN-Model 2008" is the next target of this technical committee.

*INTER-NOISE*

*2008 to be*

*Held in*

*Shanghai, China.*

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# LISTEN ...



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### European News *continued from page 73*

For further information visit [http://www.rnid.org.uk/mediacentre/press/2007/ntw\\_07.htm](http://www.rnid.org.uk/mediacentre/press/2007/ntw_07.htm)

#### London Ashford Airport Plans are Rejected

People living near London Ashford Airport (Lydd) in Kent have voted against its plans for expansion in two town referendums.

The airport wanted to build a new terminal building to handle up to 500,000 passengers a year - the equivalent of 10 flights a day. It has also submitted a planning application for two runway extensions, together 444 m in length.

The main reason for the rejection appears to be the presence of a large nature reserve near the airport. However, the BBC reported that demonstration flights with a Boeing 737-300 were held to show what noise levels would be. The BBC also reported that LAA spokesman Robin Gordon said the 737-300 was the noisiest of its marque. "We have deliberately chosen the 737 with the noisiest engines so that people really understand this is the worst possible case for Lydd," he said.

According to the BBC, protesters said watching the landing was "like waiting for a bomb to come and land on your property."

### Asia-Pacific News *continued from page 76*

#### THAILAND

##### Thailand Airport estimates B120 billion for noise compensation

Airports of Thailand will need government money to buy out residents withering under the onslaught of aircraft noise from nearby Suvarnabhumi airport, with total compensation payments estimated at 3.7 billion US\$. The company has completed its estimates of compensation for owners of property to the north and south of the eastern and western runways, an Airports of Thailand (AOT) source said yesterday. Of this 0.03 billion US\$ will be offered to schools, hospitals, government agencies and public places around the new Bangkok airport. The rest will go to owners of private property suffering from the noise. The problem is, AOT does not have the money to pay the compensation, because of the debt associated with the construction of the new Bangkok airport.

# International Representatives

Below is a list of international contacts for the advertisers in this issue. The telephone number is followed by the fax number where available. In cases where there are several telephone numbers per location, or several locations within a country, a bullet (•) separates the telephone number(s) from the respective FAX number. Advertisers are asked to send updated information by e-mail to: [IBO@inceusa.org](mailto:IBO@inceusa.org).

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## **Ecophon Acoustic**

### ***Ecophon Acoustic Bulletin is Available Online***

The Ecophon Acoustic Bulletin is a source of information on sound absorptive ceilings and walls as well as on room acoustics, research, standardization, etc. Go to <http://www.acousticbulletin.com/EN/>

## **Scantek, Inc**

### ***New Precision Calibrator for Non-contact Displacement and Velocity Transducers***

Scantek, Inc., is pleased to announce the availability of the Model VC12D from MMF. The precision instrument was developed for the calibration of non-contact displacement sensors. Its fastening device for displacement sensors is detachable for the calibration of accelerometers and velocity transducers. The vibration level is selectable between 10  $\mu\text{m}$  RMS and 10  $\mu\text{m}$  PEAK value. The factory calibration of the MMF Calibrators is based on a primary reference standard of German National Metrology Authority (PTB). The instrument is supplied with factory calibration certificate. For more information, visit [www.scantekinc.com](http://www.scantekinc.com).

### ***Sound level Meter and Analyzer: Powerful, Small, and Multi-functional***

Scantek has also announced the availability of the Norsonic Sound Analyzer N-140. This precision hand-held sound analyzer is designed for the most demanding users. The N-140 is packed into a small real time analyzer featuring sound recording.

Applications include:

- Sound recording
- Environmental noise
- Building acoustics
- Noise source identification with FFT
- Industrial hygiene
- Product development
- Quality control
- Noise mapping
- Sound power determination
- Speech intelligibility - STIPA
- Vibration measurements

For more information, visit [www.scantekinc.com](http://www.scantekinc.com).

## ***Scantek, Inc. Introduces Software for Sound Power Determination***

Scantek has introduced a new software package from Norsonic for determination of sound power levels. The new software, named Nor1035 NorPower, is fully XP compatible software that takes measurement data from any Norsonic instrument and calculate the correct sound power levels in accordance with most of the ANSI S12.5x and ISO 3740-series of standards. Both the existing standards as well as the draft versions of the upcoming revised series are available. The list will be enhanced as new versions become available.

In addition to the post processed calculations, a separate module named CtrlPower is available. With this module, the entire measurement process may be controlled from the PC. Hence, a complete sound power system may be put together using the Norsonic instruments as measurement front-ends. The concept is easy to use, and follows much of the same user interface philosophy already known in the NorBuild software package for building acoustics. After the calculation process, the NorPower will print out a complete test report including the logo from the test laboratory. There is also a feature for direct comparison of repeated measurements in order to visualize product improvement steps. For more information, visit [www.scantekinc.com](http://www.scantekinc.com).

## **Larson Davis**

### ***Larson Davis Debuts Redesigned Homepage at [www.larsondavis.com](http://www.larsondavis.com)***

The Larson Davis division of PCB Piezotronics (PCB®), has announced the redesign of its website, located at [www.larsondavis.com](http://www.larsondavis.com). The new site provides updated tools to aid customers in selecting the right sound, noise and vibration monitoring products for their application requirements.

The new Larson Davis home page offers a new look that includes organization by products, services sales support and news information. The fully searchable product database is broken down into various product groups: Sound Level Meters,

*Ecophon Acoustic*

*Scantek, Inc*

*Larson Davis*

## **LMS Virtual.Lab Acoustics**

including the SoundTrack LxT® and the new Model 831; Data Acquisition Systems, such as the LMS Pimento and DSS; Human Vibration Meters, such as the HVM100 and IHVM100; Spark® Dosimeters; Acoustic Calibrators; Microphones & Accessories; and Software Products, such as Blaze® and DNA. Product pages include all necessary products and specification sheets, with all applicable information software and technical specifications within each page.

### **Larson Davis Products Address New ANSI Standards for Construction and Demolition Worker Hearing Loss Prevention**

Two classes of instruments from the Larson Davis division of PCB Piezotronics, Inc. (PCB®) can be used to effectively measure noise exposure levels, as recommended in the new American National Standards Institute (ANSI) Standard A10.46-2007, "Hearing Loss Prevention in Construction and Demolition Workers," protecting tradesmen, laborers, supervisors and others engaged in these two extremely noisy types of work. The standard provides a comprehensive means for determining risk of hearing loss from overexposure to noise on the worksite, and ways to effectively limit the exposure.

All Larson Davis Spark® series of personal Noise Dosimeters and the SoundTrack LxT® Sound Level Meter offer automatic calculation of Noise Dose and Time-Weighted Average noise levels, as well as maximum and peak exposure levels, which are required to address this standard. The low-cost Spark® series offers an additional advantage of being able to use an optional fixed microphone, for easy conversion from personal dosimetry to area or task-based measurement techniques.

ANSI has also issued another standard to help protect workers in construction trades, ANSI S2.70-2006, "Guide for the Measurement and Evaluation of Human to Vibration Transmitted to the Hand", intended to help prevent injuries from powered hand tools commonly used in the construction and demolition industry. To help address this standard, Larson Davis offers the HVM100 Human Vibration

Meter, designed to measure hand-arm and whole body vibration. Much like Spark® Dosimeters and the SoundTrack LxT®, HVM100 can download data results to a PC using the simple but powerful Blaze® software for Noise and Vibration Exposure analysis and reporting.

For more detailed specifications, or additional information on these products, please visit [www.larsondavis.com](http://www.larsondavis.com).

### **Larson Davis Microphone Power Supply Offers Enhanced Battery Life**

Larson Davis, a division of PCB Piezotronics, Inc., has introduced the addition of Model 2221 power supply to its growing line of acoustical accessories. Model 2221 is a single-channel power supply, designed for use with traditional, externally polarized condenser microphones. The 2221 has the ability to supply 0 Volt or a 200V polarization voltage. User selectable features include a flat (Z), A, or C-weighting filters and a 0, 20 or 40 dB gain switch. One of its features is the enhanced battery life, which can last up to 40 hours on a set of AA batteries. This battery life can be approximately doubled when using e-Lithium batteries. The unit can also be run with on-line power via supplied adaptor.

For detailed product specifications, drawings or additional information, please visit [www.larsondavis.com](http://www.larsondavis.com)

---

### **LMS Virtual.Lab Acoustics**

#### **EADS selects LMS Virtual.Lab Acoustics in support of aerospace research activities**

LMS has announced that EADS Corporate Research Center Germany (CRC-G) selected LMS Virtual.Lab Acoustics as one of their solutions to simulate the vibro-acoustic performance of aerospace systems. EADS is a global leader in aerospace, defense and related services. The EADS Group includes the aircraft manufacturer Airbus and the world's largest helicopter supplier Eurocopter. EADS deployed LMS

Virtual.Lab Acoustics at its Corporate Research Center in Munich, Germany, for research purpose to optimize the vibro-acoustic performance of aircraft and spacecraft assemblies.

EADS CRC-G selected LMS Virtual.Lab Acoustics to perform simulations on the interior and exterior noise of new aircraft designs. Regulations for exterior noise and requirements for passenger comfort become continuously more stringent. EADS therefore optimizes acoustic performance needs early in the design process to avoid problems that require expensive changes in the late stages.

For more information on LMS Virtual.Lab, please visit [www.lmsintl.com/virtuallab](http://www.lmsintl.com/virtuallab).

### **PCB Piezotronics**

#### ***PCB Piezotronics Releases New Capabilities Brochure "Sensors for Aerospace Testing & Monitoring"***

PCB Piezotronics (PCB®) has announced the release of a new 8-page, full color capabilities brochure entitled, "Sensors for Aerospace Testing & Monitoring." The brochure highlights specific sensor and instrumentation products available for qualification testing; ground vibration testing; vibration and fatigue testing; structural dynamics; engine vibration monitoring; flight test; launch, shock and separation studies; Health and Usage Monitoring Systems (HUMS); cabin noise evaluation; wind tunnel testing; and flutter testing.

For further information, contact Andrea Mohn, Marketing Coordinator, Tel: + 684 0002 ext. 2216, Fax: +716 684 0987, E-Mail: [mktg@pcb.com](mailto:mktg@pcb.com) or visit [www.pcb.com](http://www.pcb.com).

#### ***PCB Offers Extended Response Pressure Microphone***

PCB Piezotronics (PCB®) a designer and manufacturer of vibration, acoustic, pressure, force, and torque sensors, has introduced Model 377A13, a prepolarized, 1/2" pressure response type microphone, operating from ICP sensor power, which offers extended frequency capability to

20k Hz (+ 2 dB). This microphone is designed for applications requiring matching magnitude and phase at any position, to properly measure changes caused by microphone presence in the sound field, such as those required in confined spaces, like small cavities, couplers, or impedance tubes.

New Model 377A13 has a frequency range of 4 to 20k Hz (+ 2 dB). The maximum linear dynamic range has been increased to 160 dB, with a low noise floor rating of 20 dB(A). It has an operating temperature of -40 to +120 oC.

For further information, contact Andrea Mohn, Marketing Coordinator, Tel: + 684 0002 ext. 2216, Fax: +716 684 0987, E-Mail: [mktg@pcb.com](mailto:mktg@pcb.com) or visit [www.pcb.com](http://www.pcb.com). 

***PCB Piezotronics***

## **The INCE/USA Page at the Atlas Bookstore**

[www.atlasbooks.com/marktplc/00726.htm](http://www.atlasbooks.com/marktplc/00726.htm)

### **INTER-NOISE 06 Proceedings**

This searchable CD-ROM contains the 662 papers presented at INTER-NOISE 06, the 2006 Congress and Exposition on Noise Control Engineering. This, the 35th in a series of international congresses on noise control engineering was held in Honolulu, Hawaii, USA on December 3-6, 2006. The theme of the congress was "Engineering a Quieter World."

The technical topics covered at INTER-NOISE 06 included:

- Aircraft and Airport Noise Control
- Community Noise
- Fan noise and aeroacoustics
- Highway, automobile and heavy vehicle noise
- Machinery noise
- Noise policy
- Product noise emissions
- Sound quality.

### **The NOISE-CON 05 Proceedings**

This searchable CD-ROM contains 198 papers presented at the joint NOISE-CON 05/ASA 150th meeting as well as 749 papers from the NOISE-CON conferences held in 1996, 1997, 1998, 2000, 2001, 2003, and 2004 as well as the papers from the Sound Quality Symposia held in 1998 and 2002. All papers are PDF files.

Several papers are taken from sessions organized by the Noise, Architectural Acoustics and Structural Acoustics Technical committees for this 150th ASA meeting. The three plenary lectures related to noise and its impact on the environment are included. Also included are papers in one or more organized sessions in the areas of aircraft noise, tire/pavement noise, and hospital noise.

# Acknowledgements

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# Conference Calendar

Below is a list of congresses and conferences sponsored by International INCE and INCE/USA. A list of all known conferences related to noise can be found by going to the International INCE page on the Internet, [www.i-ince.org](http://www.i-ince.org).

## 2007 August 28-31

### INTER-NOISE 2007

#### *The 2007 International Congress and Exposition on Noise Control Engineering*

Istanbul, Turkey.

Contact: Turkish Acoustical Society

Yeni Krizantem Sok. No 78

Ic Levent, 34330 Istanbul, Turkey

Tel: +90 212 279 95 22 • Fax: +90 212 264 65 07

E-mail: [contact@internoise2007.org.tr](mailto:contact@internoise2007.org.tr)

Internet: [www.internoise2007.org.tr](http://www.internoise2007.org.tr)

## 2007 October 22-24

### *NOISE-CON 07, The 2007 National Conference on Noise Control Engineering*

This conference will be held at the Grand Sierra Resort in Reno, Nevada.

Contact: Institute of Noise Control Engineering,

INCE/USA Business Office, 210 Marston, Iowa State University, Ames, IA 50011-2153

Tel. +1 515 294 6142 • Fax: +1 515 294 3528

E-mail: [IBO@inceusa.org](mailto:IBO@inceusa.org)

Internet: <http://www.inceusa.org>.

## 2008 July 27-30

### NOISE-CON 08

#### *The 2008 National Conference on Noise Control Engineering*

The conference will be held at the Hyatt Regency Dearborn, Dearborn, Michigan. The 2008 Sound Quality Symposium will immediately follow the conference.

Contact: Institute of Noise Control Engineering,

INCE/USA Business Office, 210 Marston, Iowa State University, Ames, IA 50011-2153.

Tel. +1 515 294 6142 • Fax: +1 515 294 3528

E-mail: [IBO@inceusa.org](mailto:IBO@inceusa.org)

Internet: <http://www.inceusa.org>.

## 2008 October 26-29

### INTER-NOISE 2008

#### *The 2008 International Congress and Exposition on Noise Control Engineering*

Shanghai, China

Contact: Institute of Acoustics, Chinese

Academy of Sciences, 21 Beisihuanxilu Road, Haidian District, Beijing, P.R. China.

Tel: + 8610-62553765 • Fax: +8610-62553898

E-mail: [internoise@mail.ioa.ac.cn](mailto:internoise@mail.ioa.ac.cn)

Internet: [www.internoise2008.org](http://www.internoise2008.org)

# Directory of Noise Control Services

Information on listings in the Directory of Noise Control Services is available from the INCE/USA Business Office, 210 Marston, Iowa State University, Ames, IA 50011-2153; +1 515 294 6142; Fax: +1 515 294 3528; IBO@inceusa.org. The price is USD 400 for 4 insertions.

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email@ngctestingservices.com  
http://www.ngctestingservices.com

**Mark your calendar and plan to participate!**

## NOISE-CON 2007

The 2007 National Conference and Exposition on Noise Control Engineering  
Reno, Nevada, USA  
October 22-24, 2007

[www.inceusa.org](http://www.inceusa.org)

- Technical Sessions. See the planning and abstract submission information on the Internet at [www.inceusa.org/nc07](http://www.inceusa.org/nc07)
- Exposition. A major exposition with displays of materials, instruments, and services in noise control engineering. Contact the Expo manager, Richard J. Peppin. [PeppinR@ScantekInc.com](mailto:PeppinR@ScantekInc.com)
- Seminars. On Sunday, October 21.
- Student paper competition and Martin Hirschorn IAC Prize.
- Travel planning. See page 43 of this issue.

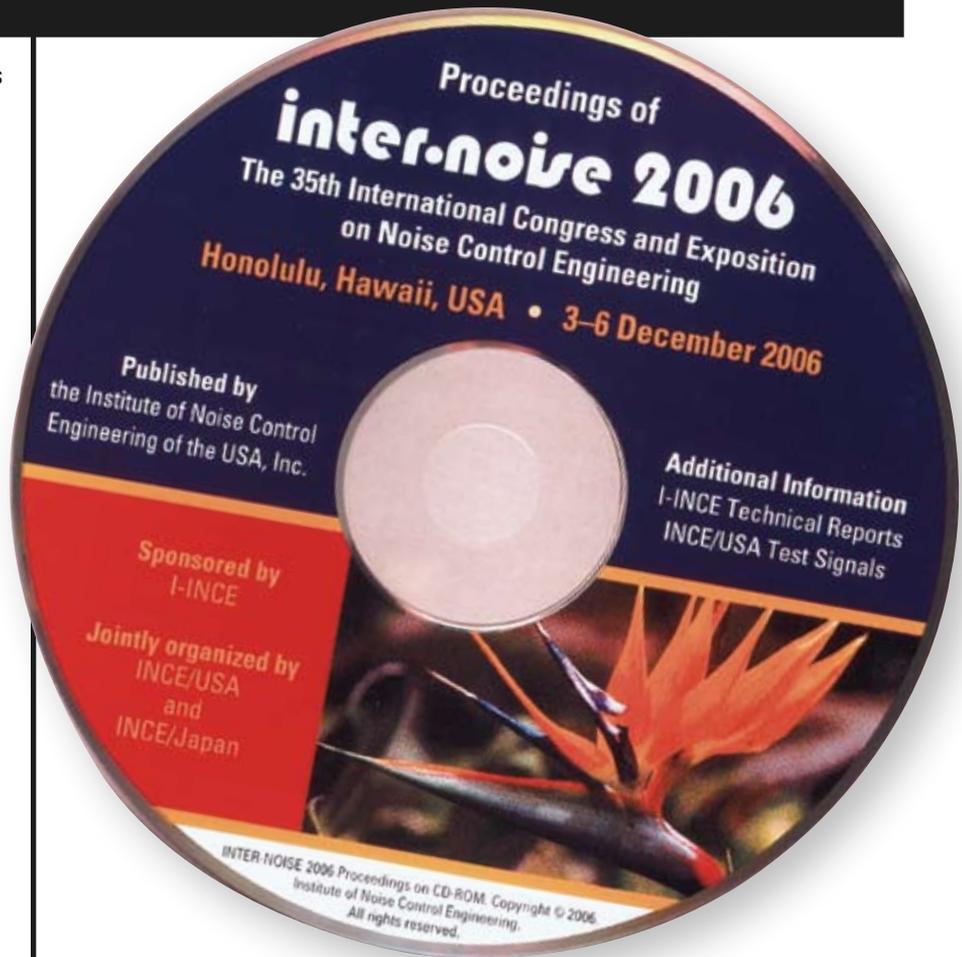
# INTER-NOISE 06 CD-ROM

This searchable CD-ROM contains the 662 papers presented at INTER-NOISE 06, the 2006 Congress and Exposition on Noise Control Engineering. This, the 35th in a series of international congresses on noise control engineering was held in Honolulu, Hawaii, USA on December 3-6, 2007. The theme of the congress was "Engineering a Quieter World."

The technical topics covered at INTER-NOISE 06 included:

- Aircraft and Airport Noise Control
- Active Noise and Vibration Control
- Building Acoustics
- Community Noise
- Barriers
- Fan noise and aeroacoustics
- Highway, automobile and heavy vehicle noise
- machinery noise
- noise policy
- product noise emissions
- railway noise
- sound quality

These papers are a valuable resource of information on noise control engineering that will be of interest to engineers in industry, acoustical consultants, researchers, government workers, and the academic community.



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