NOISE/NEWS INTERNATIONAL

Volume 13, Number 2
2005 June

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

FEATURE:
Tire/Pavement Noise in Europe and the United States

INTER-NOISE 06
Announcement and Call for Papers

Member Society Profile
Canadian Acoustical Association

ACTIVE 06
First Announcement

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Volume 13, Number 2 **2005 June**

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Courtesy of George Maling, Jr.

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.noisenewsinternational.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

Activities Within INCE/USA

The INCE/USA infrastructure has undergone some changes since the deserved retirements of George Maling, Jr., as managing director and his capable wife Norah as the director of the INCE/USA Business Office. INCE/USA will forever be indebted to George and Norah for their unselfish and long service to the Institute. Paul Schomer effectively served as the executive director from 2001 through September 2004, while the INCE/USA Business Office continues operation under the outstanding leadership of Pam Reinig at Iowa State University. The role of the executive director within INCE/USA is currently under review by a special committee led by 2004 President Joe Cuschieri, who is also serving as the Interim Executive Director.

After nine years of outstanding service and leadership, David Holger, the Editor-in-Chief of *Noise Control Engineering Journal* (NCEJ) had to resign this position because of his expanded administrative duties at Iowa State University. Alan Marsh then stepped in to provide exceptional service as the interim Editor-in-Chief over the past year and a half. After an international search was completed, the Institute has named Courtney Burroughs as the new Editor-in-Chief of NCEJ; his appointment became effective 2005 July 1. There are plans to begin publishing NCEJ electronically in 2006, along with the traditional paper copy. This is an important initiative because it will greatly expand the readership of the archival articles published in this journal. Within the next few months there will be two special issues of NCEJ published. The first will contain the plenary and student prize winning papers from ACTIVE 2004; Scott Sommerfeldt is the editor of this special issue. The second special issue will contain several expanded papers from the International INCE Symposium – Fan Noise 2003 – which took place in Senlis, France. Symposium organizers Alain Guedel and Jean Tourret are assisting the present author in organizing this special issue.

The November-December issue of NCEJ was a special issue presenting the draft report from the I-INCE Technical Study Group 5: Global Noise Policy. Furthermore, in a previous issue of *Noise/News International* and in the Proceedings of NOISE-CON 2004, there is an overview of the current state of affairs of noise policy within the USA. The technology and policies of noise control engineering in the USA is also the subject of a study currently being initiated by the National Academy of Engineering with considerable assistance from prominent INCE/USA members that make up a steering committee. Collectively, these activities are helping to shape noise control technology and new policies in the USA. We are reminded that the USA has neither a unified national noise policy or agency that addresses noise issues, including product noise regulation. INCE/USA is clearly playing a very important leadership role in helping to improve this situation.

The INCE/USA has been recently holding more joint meetings with other professional organizations. NOISE-CON 2004, held in Baltimore, Maryland, was jointly organized with Committee ADC40 of the Transportation Research Board; the theme of this conference was transportation noise. NOISE-CON 2005 is jointly held with the 150th Meeting of the Acoustical Society of America in Minneapolis, Minnesota. And, in December 2006, INCE/USA will jointly host INTER-NOISE 2006 in Honolulu, Hawaii, with INCE/Japan. With financial assistance and support from the INCE Foundation, we have continued to offer student paper competitions at conferences and scholarships to needy graduate students wishing to pursue advanced degree work in noise and its control. This has proven to be a viable approach to attracting young professionals to the field of noise control engineering as indicated by an ever increasing roster of student members.

There is a move within INCE/USA to have its Board Certification exam for noise control engineering be made equivalent to the Professional Engineering (PE) exams offered for many other engineering disciplines. We believe that this is the key to having our exam accepted by the individual states (within the USA) for PE licensure in the field of noise control engineering.

In summary, INCE/USA continues to make important contributions to the noise control engineering profession through its educational programs, conferences, publications, and certification procedures. Together with all of the officers and directors of INCE/USA, I wish to thank you, the members and friends of INCE, for your support and encouragement of the many INCE/USA activities and programs. Please visit our website www.inceusa.org, or write to me directly at president@inceusa.org for further information on our activities.

Jerry Lauchle
President, INCE/USA

Acoustics and Communication

Marion Burgess

Asia-Pacific Editor

For participants from the Asia Pacific region, travel to International Conferences that are outside our region involves some preparation as we usually try to utilize efficiently the opportunities such travel offers. Thus, as INTER-NOISE 05 approaches, it is time to plan not just for the conference but for the associated travel. During the time of the conference the informal chats over coffee or lunch can be as valuable as formal presentations in the sessions. Likewise, the opportunity to visit colleagues in the general region can be equally valuable. Even in this modern day with fast electronic means of communication, face-to-face meetings and experiences of the environment in which the colleague is working are still important. Such experiences help one to understand some aspects of the different approaches to noise control in other countries.

In a recent *NNI* editorial, Bernard Berry discussed the problems that can occur with the use of jargon and obscure language when communicating with those outside our speciality area. Similar communication problems can arise between colleagues all working within the same general area. These problems arise when the communication needs to extend beyond the scientific and technical terminology that is commonly understood—such as when there is an overlap into other areas. This aspect has been highlighted in recent work associated with I-INCE Technical Study groups investigating noise control policies. It is necessary to compare controls such as regulations, laws, acts, standards and guidelines. These terms can have quite different meanings in different countries and it has become necessary for a list of agreed definitions to be distributed to all of the respondents. This is the only way to achieve some form of consistency in the responses.

Communicating with politicians and their bureaucrats on scientific and technical matters leads to a completely different sort of problem! And it's not something that most scientists and engineers have the opportunity to do. In an attempt to increase the knowledge and understanding of science and technology issues by the politicians, the Federation of Australian Scientific and Technological Societies (FASTS) organizes a day called "Science Meets Parliament." All the Australian federal politicians are given the opportunity to have a 20-minute meeting with groups of two or three scientists. Each participating scientist is allocated to meet with at least two politicians. At the 2005 event, over 200 Australian scientists were involved. The first day provided background on the main issues of concern in general as well as providing suggestions on how to communicate with the politicians. We felt well prepared to communicate the message.

Of course we were each hoping to be allocated to a minister or similar high-ranking politician and that our views would be taken note of with almost immediate effect. While a few were lucky, this was not the reality for most of us. It was quite a struggle for the three of us to get any real discussion during my first interview. However, we hope the reason was not that we were not communicating but rather because that politician had recently lost his seat and was just completing the last couple of months of his term. The second interview was with a current Minister for Immigration. He was certainly much more interested in talking about the need for skills. However, it was only when he began to ask about motor sports noise that I felt the communication was really effective. It turned out that the reason he was interested was that his voters were concerned about the noise from a motor sports facility in their area. So we had found some common ground – an important step in achieving effective communication!

Engineering a Quieter World

inter•noise 2006

Call for Papers

Welcome Message

Dear Colleagues,

The Organizing Committee of the 35th International Congress and Exposition on Noise Control Engineering (INTER-NOISE 2006) extends a warm welcome and invitation to participate fully in what promises to be the premier noise control engineering conference of 2006. The INTER-NOISE 2006 Congress, sponsored by the International Institute of Noise Control Engineering (I-INCE) and co-organized by the Institute of Noise Control Engineering-Japan and the Institute of Noise Control Engineering-USA, will be held at the Sheraton Waikiki Hotel, Honolulu, Hawaii, USA, from 3–6 December 2006, immediately following the joint ASA/ASJ meeting in the same venue.

In addition to being an interesting and pleasant venue for the congress, Honolulu is truly a crossroads of the Pacific. The Congress will feature a broad range of high-level research papers from around the world, as well as an extensive exhibition of noise and vibration control and measurement equipment and systems. Distinguished speakers will provide additional stimulation for our technical sessions and discussions with a focus on our theme of "Engineering a Quieter World."

We sincerely welcome you to INTER-NOISE 2006, invite you to participate fully in all aspects of the Congress, and eagerly anticipate what will undoubtedly be a technically successful and personally enjoyable Congress in one of the most beautiful locations in the world.

Sincerely,

David Holger, Co-President

Sonoko Kuwano, Co-President

INTER-NOISE 2006 Congress and Exhibition Organizing Committee

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Sonoko Kuwano

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USA	Robert Bernhard
USA	Rajendra Singh

http://www.internoise2006.org

Jointly organized by INCE-USA and INCE-Japan

Sponsored by I-INCE

Paper Submissions

- ***Abstracts Due*** 15 May 2006
- ***Notification of Acceptance*** 30 June 2006
- ***Papers Due*** 18 August 2006

Plenary Speakers

- ***Railway Noise***
  Tatsuo Maeda
- ***Noise Policy***
  Tjeert ten Wolde
- ***Sound Propagation***
  Gilles Daigle

Technical Program

Technical papers in all areas related to noise and vibration control are invited for inclusion in the technical program. The broad theme of the Congress is "Engineering a Quieter World," and papers of specific relevance to this theme are especially encouraged.

In addition to the thematic tracks identified on page 40, papers are welcome in broad technical areas of noise and vibration control including noise generation and sources, measurement and identification techniques, sound radiation and propagation, modeling and simulation, noise and vibration control devices, aeroacoustics, noise and vibration policies and standards, building acoustics, community and environmental noise, active and passive noise and vibration control, human perception and response to noise and vibration, signal processing, and materials for noise and vibration control.

The Congress will consist of more than 10 parallel sessions as well as a poster presentation area. A number of thematic session tracks and special technical sessions are being organized, and proposals for the organization of additional special sessions are welcome. Prospective organizers of additional sessions should contact Scott Sommerfeldt (scott_sommerfeldt@byu.edu) or Ichiro Yamada (i-yamada@center.aeif.or.jp).

Call for Papers *Instructions for Abstracts*

Abstracts for INTER-NOISE 2006 must be submitted as an e-mail attachment. Attachments must be Word documents with no special characters or equations. Do not submit your abstract as a PDF file.

Please use the following format and send your abstract to: internoise2006@inceusa.org. The subject of the e-mail should be IN06 abstract submission.

I. Paper title. Capitalize only the initial letter and special letters such as: Korean, NAH, Rayleigh, Worldcup, etc. (20 words maximum).
II. I-INCE subject classification (classify your paper using the detailed classification of subjects at http://www.i-ince.org or http://www.internoise2006.org).
III. First author's name, organization, title, postal address (including country), phone, fax, and e-mail (essential) for correspondence.
IV. Additional authors' names and addresses (if any).
V. Indicate specific type of paper.
   - Invited paper (include the session title and organizer)
   - Paper intended for oral presentation
   - Paper intended for poster presentation
VI. Text of the abstract. The text of the abstract must not exceed 200 words. The text should be typed double-spaced and should include:
   - A brief description of the problem being addressed
   - Why the problem is important
   - Description of the original contribution of the work
   - Pertinent conclusions
VII. Number or code of the special session, if applicable. Please refer to the Web site of INTER-NOISE 2006 for the information on the topics of special sessions, session code, and its organizers.
   - Sample abstracts will be posted on the Web site.
   - Receipt of your abstract will be acknowledged within two weeks, along with an abstract identification number.
   - Your abstract will be published with only minor copy editing in a booklet to be available at the conference.
   - Final manuscripts must be submitted by 18 August 2006. When abstracts are accepted, authors will receive additional instructions on formatting and transmitting papers.

All registrants for INTER-NOISE 2006 will receive a printed booklet containing all abstracts, the final technical program, and a CD that will include all INTER-NOISE 2006 papers. Conference organizers reserve the right to schedule papers for appropriate sessions and appropriate format (poster versus oral presentation).

Conference Information

Registration
On-line registration and downloadable registration forms will be available 1 January 2006. The completed registration form can be mailed, faxed, or e-mailed to the Conference Secretariat.

Exposition
A large Expo with displays of materials, instruments, and services in noise and vibration control engineering will be held at the conference venue during the conference. Organizations and companies wishing to participate as exhibitors should contact Richard Peppin, Expo Manager, Scantek, Inc., 7060 Oakland Mills Road #L, Columbia, MD 21046 or PeppinR@ScantekInc.com.

Venue
The conference venue is the Sheraton Waikiki. The hotel has nearly 1,700 guest rooms, most of which will be refurbished before the conference. Over two-thirds of the rooms directly face the Pacific Ocean. Guest rooms include amenities, such as irons and ironing board, in-room safe (fee may apply), hair dryer, color TV, and mini-refrigerator.

The hotel is easily accessible from Honolulu International Airport.

Language
The official language of the conference is English.

Official Invitation
On request, the Organizing Committee will be happy to send a personal invitation for participation in the Conference. It must be understood that such an invitation is only to help visitors obtain funds for travel and accommodation or a visa and is not a commitment on the part of the organizers to provide any financial support. Please contact the Conference Secretariat for these letters.

Conference Secretariat
INCE/USA Business Office
210 Marston Hall
Iowa State University
Ames, Iowa, USA 50011-2153
515 294-6142 • ibo@inceusa.org

General Information

Visa
Requirements for entry into the state of Hawaii from foreign destinations vary according to country. Please check with the nearest U.S. embassy or consulate for passport and visa information.

Climate
INTER-NOISE 2006 is scheduled during Hawaii's "winter" season. Participants can expect average daytime temperatures of 26˚C (78˚F) and ocean temperatures of 24˚C (74˚F).

Time Difference
Relative to Greenwich Mean Time, Hawaii is -10 hours.

Currency and Credit Cards
The unit of currency in Hawaii is U.S. dollars. Foreign currency and travelers' checks can be converted at banks. Exchange counters are located throughout the airport and at many major hotels. Internationally recognized credit cards are accepted at most hotels, shops, and restaurants.

Electricity
Most hotel outlets will be 110 volts. Always check the power supply before using electrical equipment.

Social Programs

- **Sunday, December 3**
  Opening Ceremony/Welcome Reception
- **Monday, December 4**
  Exposition Opening Reception
- **Tuesday, December 5**
  Congress Banquet (tickets required)
- **Wednesday, December 6**
  Closing Ceremony and Reception

Accompanying Persons Programs

- **Monday, December 4**
  Honolulu and Vicinity Sightseeing Tour
- **Tuesday, December 5**
  Polynesian Cultural Center
- **Wednesday, December 6**
  Oahu Half-day Sightseeing

Special Multi-session Technical Tracks

- Sound Quality
- Noise Policy
- Sound Propagation
- Aircraft and Airport Noise Control
- Highway, Automobile, and Heavy Vehicle Noise
- Railway Noise
- Machinery Noise
- Fan Noise and Aeroacoustics
- Active Noise and Vibration Control
- Vibroacoustics and Vibration
- Building Acoustics
- Barriers
- Noise Control Materials
- Environmental Noise and Soundscapes
- Numerical Simulation, Prediction, and Modeling
- Measurements and Instrumentation
- Community Noise
- Effects of Sound on Humans
- Effects of Vibration on Humans
- Low Frequency Noise and Infrasound

Canadian Acoustical Association

The history of the Canadian Acoustical Association (CAA) dates back to a meeting of 18 persons interested in acoustics held at the National Research Council in Ottawa, Ontario, on March 29, 1962. The discussions there indicated that activities in acoustics within Canada should be structured and coordinated. The following year, a second meeting was held, and the group adopted the title *Canadian Committee on Acoustics* for its activities. Tom Northwood was appointed Chair and Tony Embleton was appointed Secretary. The group continued its activities for the next nine years, holding regular meetings each year at different locations in the Provinces of Ontario and Quebec.

The year 1972 was a major milestone for the committee. During a meeting at McGill University, Montreal, Quebec, the question was raised: "Where do we go from here?" Two items discussed were the publication of a newsletter and a change in the name of the organization. The first issue of the newsletter was published, and a guest article dealt with the question of how the organization should be structured: as a committee, an association, or a society. Regular annual meetings continued, and at the meeting in 1974, the name *Canadian Acoustical Association /L'Association Canadienne d'Acoustique (CAA/ACA)* was adopted. *The CAA Newsletter* continued to be published, and, by 1975, its circulation exceeded 250. The incorporation process was initiated in 1976 by Hugh Jones, and the organization was officially incorporated on April 22, 1977.

The CAA became a Member Society of International INCE in 1978 with John Hemingway appointed as the first CAA representative. Work continued on the improvement and upgrading of the newsletter; its format was changed in 1978, and in 1983 it became more of a technical journal with news and its name was changed to *Canadian Acoustics*. The journal is currently published quarterly, including refereed papers in both of Canada's official languages (English and French), with Ramani Ramakrishnan serving as Editor-in-Chief.

A major event in the history of the CAA was the organization of the 12th International Congress on Acoustics, which was held in Toronto, Ontario, in 1986 July in conjunction with the 25th meeting of the CAA. The meeting was a great success with 954 participants from 36 countries.

The CAA holds its general conference, *Acoustics Week in Canada*, in the fall of each year at different locations across the country. Conferences generally draw 100–150 participants and consist of special plenary seminars, a symposium of two or more days of organized sessions on all aspects of acoustics, laboratory or concert-hall tours, and a social program (reception, banquet, awards ceremony). Summary papers are published in a proceedings issue of *Canadian Acoustics*. Recent meetings have been held in Ottawa (2004), Edmonton (2003), Charlottetown (2002), Toronto (2001), Sherbrooke (2000), and Victoria (1999).

In 2005, the CAA is holding two meetings: a special joint meeting with the Acoustical Society of America in Vancouver, British Columbia, was held in May (chaired by Murray Hodgson and Stan Dosso), and, in October, *Acoustics Week in Canada* in London, Ontario (chaired by Meg Cheesman and Vijay Parsa).

The CAA actively encourages and supports excellence in students and young professionals

continued on page 71

This is the 50th in a series of articles on the Member Societies of International INCE. This is an update of a profile published in the 1996 March issue of NNI (Vol. 4, No. 1).

2006 International Symposium on Active Control of Sound and Vibration

18-20 September 2006

ACTIVE 06. The **2006 International Symposium on Active Control of Sound and Vibration**, is being organized by the South Australian Division of the Australian Acoustical Society. The Symposium will be held on 18-20 September 2006 at the **University of Adelaide**, which is located in the center of the city of Adelaide. Plans call for 2½ days of technical presentations with two plenary speakers on each day reviewing topics of special relevance.

The Symposium is a continuation of the series of biannual meetings on Recent Advances in Active Control of Sound and Vibration and the series of ACTIVE Symposia, which have been held for the past 15 years.

The Active Noise and Vibration Control group at The University of Adelaide was established by Prof. Colin Hansen in 1987 with a grant from the Sir Ross and Sir Keith Smith fund. The group undertakes fundamental and applied research in active noise and vibration control and applies the results of research to the development of commercial controllers and to the installation of practical systems in industry.

Michael Kidner and Carl Howard of the Active Noise and Vibration Control group at The University of Adelaide will be the general chairmen for the Symposium. Anthony Zander, also of The University of Adelaide, will be the chair of the technical program. It is expected that approximately 100 technical papers will be presented covering all aspects of active control, including noise and vibration, enclosed sound fields, "smart" materials, and commercial applications.

Adelaide is located on the south central coast of Australia and is a beautiful, well-planned city of 1 million people that is friendly, safe and clean. It is renowned for having a relaxed, cosmopolitan lifestyle. It enjoys a Mediterranean climate, with the average daily maximum temperature for September of 18.8C (66F). The city center is surrounded by parks and its wide uncluttered avenues make it easy to walk and drive around. Adelaide is a center for the arts and has an outstanding reputation for its food and wine. Adelaide also boasts the highest number of restaurants per capita in the country, with a diverse range of high-quality cuisines.

Within 20 minutes drive of the city center to the west is over 30km of white sandy beaches and, to the east, an idyllic expanse of rolling hills, winding country lanes, vineyards, orchards and nature parks. Adelaide is an ideal destination for nature lovers with its carefully preserved habitats and sanctuaries for native animals, birds and flora. The Adelaide area has four of the country's premium wine-growing regions: the famous Barossa Valley, McLaren Vale, Clare Valley, and Adelaide Hills. New Yorker magazine once described Adelaide as "possibly the last well-planned and contented metropolis on earth." It is truly a Great Provincial City.

For more information see the symposium web site at:
http://www.active2006.com

The most recent ACTIVE Symposium, ACTIVE 2004, was held in Williamsburg, Virginia on 2004 September 20-22 with Richard J. Silcox of the NASA Langley Research Center as the general chair and Gary P. Gibbs, also of NASA Langley, as the technical program chair. Twenty-one countries were represented at the symposium and papers were received from 17 countries. Plenary lectures were presented by Robert L. Clark, Colin Hansen, Stephen J. Elliott, and Joachim Scheuren. A total of 101 papers was presented in the following categories: Active Control in Ducts, Active Jet Noise Control, Active Sound Control, Active Structural Acoustic Control, Active Vibration Control, Actuators and Sensors, Algorithms and Architectures, Audio Applications, and Semi-Active (Adaptive) Control. In addition to the papers presented at ACTIVE 04, the CD-ROM produced for the symposium contains an additional 494 papers on active control. These papers were presented at the ACTIVE symposia in 1995, 1997, 1999, and 2002, and during the active control sessions at NOISE-CON 97. The CD-ROM may be ordered for 70 USD plus shipping and handling from the INCE/USA page at the Atlas Bookstore, www.atlasbooks.com/marktplc/00726.htm.

Managing Uncertainty in Noise Measurement and Prediction — An International INCE Symposium Report

Managing uncertainties in noise measurements and prediction is becoming a new challenge for noise and vibration control engineers. This subject was featured at the first international symposium, organized by INCE/Europe, held under the "umbrella" of International INCE and supported by the European Acoustics Association. The Centre Technique des Industries Aerauliques et Thermiques (CETIAT) also assisted with the symposium organization. The French Noise Information and Documentation Centre (CIDB) had the practical organizational responsibilities.

Uncertainties may arise from many sources: precision of the instrumentation, requirements of procedures, environmental conditions, variability of noise emission, performance of the laboratory, human factors, validity of a numerical model, mesh-grid resolution etc, and should be given considerably more attention in many situations.

The symposium was held in June 2005 from the 26th to the 30th in Le Mans (France) in the joint buildings of the Ecole Nationale Supérieure d'Ingéniegurs de Mans (ENSIM) and the Institut Supérieur des Matériaux du Mans (ISMANS), schools of engineering. On June 26, a short course titled "Basics of Uncertainties for Acousticians" was offered; 35 persons participated in the short course.
Le Mans is situated 200 kms southwest of Paris (55 min by TGV), and famous worldwide for its 24-hour sports car race but also renowned for its beautiful medieval city center. On Monday evening, a welcome reception was held in the town hall followed by a guided tour of the medieval town and an organ concert in the St. Julien Roman cathedral. On Wednesday, all delegates were invited to a bus trip on the famous "circuit des 24 heures" and a fabulous dinner served among the beautiful vintage cars in the "musée de l'automobile."

On Monday morning, Jean Marc Breteau, ENSIM Manager, and Maurice Henry, President of the Université du Maine, welcomed the nearly 300 delegates coming from 32 countries. Jean Tourret, INCE/Europe President and Chairman of the Symposium, explained the motivations of INCE/Europe in having organized the meeting.

- To remind acousticians and noise and vibration control engineers why they should provide confidence intervals when delivering noise data and discuss how it should be done
- To highlight the current practice within the various domains of applications
- To enable users to make reasonable estimates of what can be required and achieved in terms of accuracy

He also thanked all the organizations that helped in promoting and hosting the event (European Commission, ENSIM, ISMANS, Université du Maine, CETIAT), the 13 exhibitors, and all the individuals who served so efficiently on the Organizing and Technical Committees.

Alice Debonnet-Lambert then explained that CIDB decided to co-organize the symposium in view of bringing to the noise community a clearer vision of the economical and political issues of uncertainties management.

Five plenary lectures where given just after the opening session in order to bring a global picture of the situation in the following areas:

- The Approaches for Measurement Uncertainties Evaluation
  Marc Priel - LNE / France
- Treatment of Measurement Uncertainty in International and European Standards on Acoustics
  Klaus Brinkmann - ISO/TC 43 chairman / Germany
  Roger Higginson - CEN/TC 211 chairman / Germany
  Leif Nielsen - Danish Standards Association, ISO/TC 43 and CEN/TC / Denmark
- Dealing with Uncertainties in European Standards
  Jean Jacques - INRS / France
- The Various Sources of Uncertainties in Acoustic Consultancy Work
  Marc Louwers - IMPEDANCE / France
- Sources of Uncertainties in Acoustic and Vibration Simulations
  Jean-Pierre Coyette - Free Field Technologies SA / Belgium

Two other plenaries were given during the next two days

- Uncertainties in the Prediction of Environmental Noise and Noise Mapping
  Wolfgang Probst - ACCON GmbH / Germany
- Human Response - the Ultimate Uncertainty
  Brigitte Schulte-fortkamp - Technischen Universität Berlin / Germany

One hundred ten technical papers were given in three to four parallel sessions covering five main areas of interest:

- Instrumentation
- Sources of Noise and Vibration
- Buildings and Construction Products
- Environment/Transport/Traffic
- Occupational Noise and Vibrations

Specific discussion sessions were organized on the following two themes:

- Variability of noise performances of products due to the manufacturing or aging processes and to environmental conditions
- Managing acoustical uncertainties in daily life for consultants and noise control engineers

On Wednesday afternoon, a plenary discussion session was held on the theme "Managing uncertainties in noise… a shared responsibility," which mixed reports given by session chairmen, statements produced by key actors or stakeholders and contributions of participants.

The papers presented at the symposium have been published on a CD-ROM, which is available from CIDB, 12-14 rue Jules Bourdais, 75017 Paris. Tel. +33 01 47 64 64 64. Email: idb@cidb.org. The proceedings may also be ordered from INCE Europe, Riverside House, Oakland Vale, New Brighton, Merseyside CH45 1LQ, UK. Tel. +44 (0)151 638 0181; Fax: +44 (0)151 639 5212; Email: information@inceurope.org

Any technical questions concerning the symposium should be directed to Jean Tourret, Jean1tourret@aol.com. The web site for the symposium is www.uncertainty-noise.org. Email: cidb@cidb.org

The following companies participated in the exhibition:

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Comparative Measurements of Tire/Pavement Noise in Europe and the United States

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Background

The effect of changes in pavement surface on traffic noise has been widely demonstrated in the literature for situations typical of community noise exposure. Much of this work has been presented in studies of the application of "quiet pavements" in Europe. In general, the reduction in noise is most effective for higher speeds and for light vehicles, and, to a lesser extent, for medium- and heavy-duty trucks. In the states of California and Arizona, reductions in traffic noise of 3 dB to as much as 9 dB have been measured when tire/pavement source levels were reduced by similar amounts.[1,2,3] Because of this potential for affecting noise levels in the community, state departments of transportation have become increasingly interested in the use of "quiet pavements" in highway applications.

Fig. 1. Sound intensity probe mounted on right rear wheel of test vehicle.

With this interest in characterizing pavements for tire noise performance, the sound intensity method has been recently applied to measuring the effect of pavement on tire/pavement noise on active roadways in the states of California and Arizona.[4] The methodology for these measurements has followed that originally developed at the General Motors Corporation for tire noise research,[5] and for isolating tire noise under acceleration as in the ISO 362 passby test.[6] Using this methodology, a fixture is mounted on the wheel of a test vehicle so that sound intensity can be measured very close to the tire/pavement interface, as illustrated in Figure 1. Data are collected opposite the leading and trailing edge of the tire contact patch and averaged together to obtain the acoustic energy propagating away from the tire to the wayside. In 2002, the California Department of Transportation (Caltrans) funded the development of the application of this technique to evaluating the performance of highway pavements.[4] After demonstrating the correlation of sound intensity levels to cruise passby levels for a test vehicle on multiple pavements using multiple tires, a large database of tire/pavement noise was developed covering a range of pavements used in California and Arizona.

With the development of this database, there was considerable interest in applying this same measurement approach to pavements in Europe. In May of 2004, a delegation from the United States (U.S.) undertook a "scanning" tour of European countries to discover and document the state-of-art practice in European technology for quiet pavement systems. The Europeans have been experimenting with quiet pavement design much longer than the U.S. Although this tour was successful in its qualitative assessment, there was, because of measurement method and test tire differences between researchers in Europe and the U.S., no common scale to compare the performance of European pavements to those in the U.S. To fill this void, Caltrans funded a project to perform sound intensity measurements in Europe that could be compared directly to those in the California/Arizona (CA/AZ) database. This became the Noise Intensity Testing in Europe or "NITE" Project.

Project Definition and Preliminary Work

In principle, sound intensity measurements of European roadways could readily be accomplished because the sound intensity fixture and measurement equipment are quite portable. However, to definitively tie the European data to the CA/AZ database, the same tire design (Goodyear Aquatred 3) as used in the U.S. was required for the European testing. Because the U.S. test tire was not available in Europe, tires were shipped from the U.S. It was also necessary to identify a test vehicle that could accommodate the P205/15R tire size used in the CA/AZ data. With the assistance of General Motors, it was determined that the 2004 Chevrolet Malibu and 2004 Opel Vectra had common wheel designs and could accommodate the P205/15R tire size. This allowed direct comparison testing between the CA/AZ test tire and the test tire to be used in Europe prior to shipping the new test tires. To accomplish this, "back-to-back" sound intensity measurements were

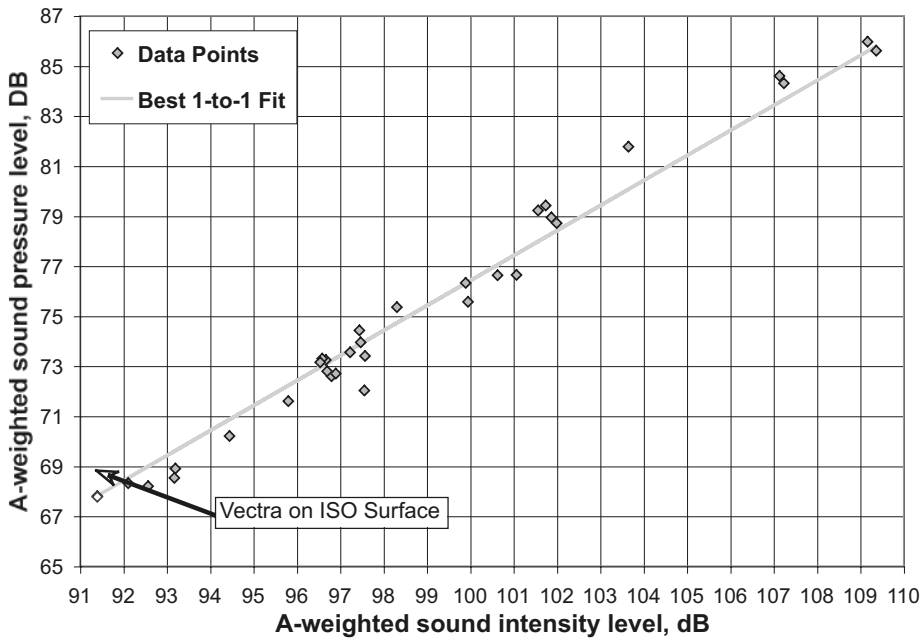

Fig. 2. Comparison of passby noise levels for cruise operation measured at 7.5 m to sound intensity for vehicle speeds of 56 to 97 km/h on 12 different pavements using 3 different tire designs with results from the Opel ISO 10844 test track surface.

made on four different pavements for the CA/AZ tire as mounted on the normal 1998 Subaru Legacy Outback test vehicle and the tire for the European testing as mounted on a Chevrolet Malibu. In this testing, the levels for a normal test car were found to be on average 0.5 dB higher than the Malibu. Consistent with other testing of this tire design mounted on other vehicles and test trailers, the range of difference was 0.1 to 0.8 dB.

For testing in Europe, an Opel Vectra was provided by General Motors. Prior to the pavement testing, sound intensity and passby tests were conducted at the Opel Proving Ground on their ISO 10844 test track surface used for vehicle passby noise development. For constant-speed-cruise-conditions, the relationship between sound intensity and passby levels was identical to that demonstrated in the CA/AZ testing, as illustrated in Figure 2.

After the verification testing at the Opel Proving Ground, sound intensity measurements began on the European roadways in late September of 2004. Some care was involved in the selection of potential test sites for the NITE project. Input was obtained from several sources including European researchers, the technical literature, and the observations of some of the members of the AASHTO[a]/FHWA[b] Scan team. In addition to the five official and one unofficial countries visited by the Scan team (France, the UK, the Netherlands, Denmark, Italy and Belgium) three additional countries were identified as having pavements that would be of interest to the NITE project. These were Germany, Austria, and Sweden. Prior to the start of testing, the scope was limited to five countries that were in the closest geographic proximity, and possessed some pavements that were known to be quieter and/or had been the subject of other research. These were the Netherlands, Germany, France, Belgium, and Denmark. Of these, only Denmark was missed due to weather and time constraints. In all, 68 pavements were measured. Of those, 61

[a] *AASHTO is the American Association of State Highway Transportation Officials*
[b] *FHWA is the U.S. Federal Highway Administration*

Paul R. Donavan

Paul Donavan received his master and doctorate of science degrees in Mechanical Engineering and Acoustics from the Massachusetts Institute of Technology in 1976. He began his professional career in environmental noise working in the Washington D.C. area at Wyle Laboratories and then at the National Bureau of Standards. In 1979, he moved to Michigan to work at General Motors— initially doing tire/pavement noise research. In his 20 years at the GM Noise and Vibration Laboratory, Paul led vehicle noise control activities in the areas of tire, aerodynamic, and passby noise, and structureborne noise analysis. Since 2001, he has been at the acoustical consulting firm of Illingworth & Rodkin, Inc., in Petaluma, California, where he continues his work in tire/pavement noise and more general environmental noise.

He has been a member of the Acoustical Society of America since 1973 and is currently a member of the Noise Technical Committee. Paul is also a member of the Noise and Vibration Committee of the Society of Automotive Engineers. He served as president of INCE/USA in 2001. He is currently president-elect, and will serve again as INCE/USA president in 2006. Paul is also currently the I-INCE Vice-President Pan-America, and serves as Pan-American Editor for this magazine.

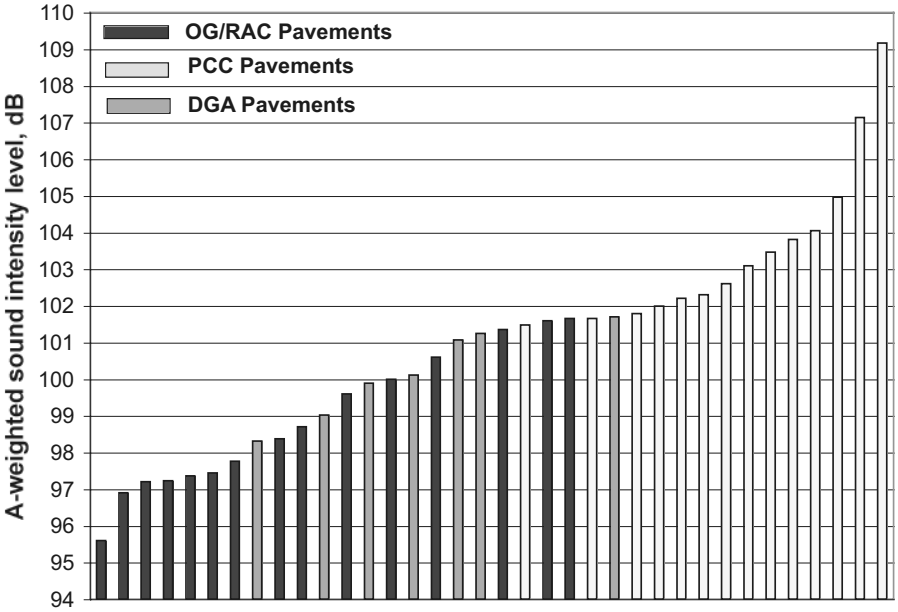

Fig. 3. Range of tire/pavement noise sound intensity levels for pavements in California and Arizona.

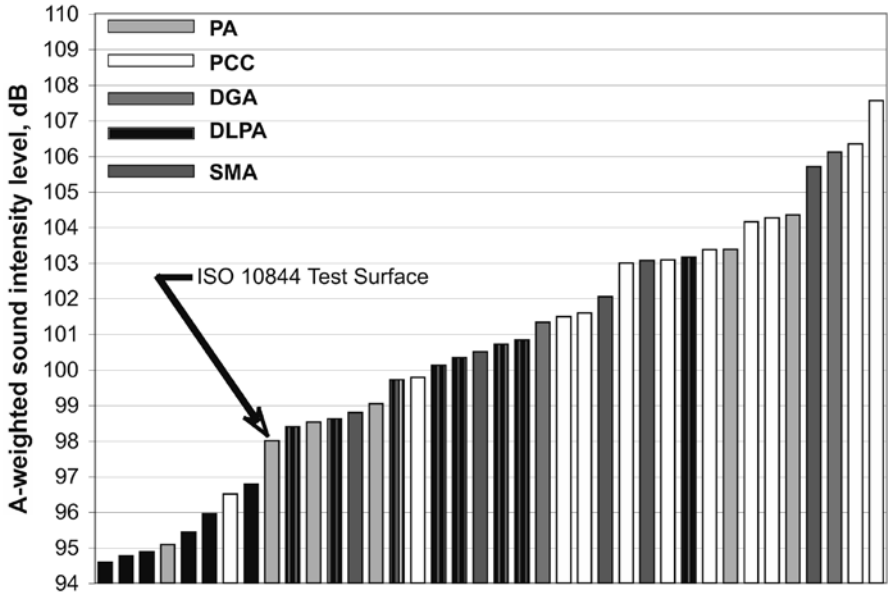

Fig. 4. Range of tire/pavement noise sound intensity levels for pavements in Europe under the NITE Project measured at 97 km/h.

were measured at 97 km/h (60 mph) and 34 were measured at 56 km/h (35 mph) with the Goodyear Aquatred 3. An alternate tire, which had been occasionally used in CA/AZ testing (Uniroyal Tiger Paw AWP), was also measured at 56 km/h on 32 pavements. Some of the sites in Germany had been included in a CPX round-robin study conducted in July of 2003,[7] which would allow some comparison to the NITE results.

Results of Testing

As a prelude to the NITE results, it is instructive to review the results of testing on various pavements in California and Arizona. Since its inception, the database has grown to over 100 different pavements and bridge decks. The overall, A-weighted sound intensity levels[c] of a representative cross section of these different pavements are given in Figure 3. These data, collected at a test speed of 97 km/h and excluding the typically higher level bridge decks, display a range of over 13 dB. Within this data set, generic pavement groupings include "PCC" for Portland Cement Concrete, "DGA" or "DGAC" for Dense Graded Asphalt Concrete, and "OG/RAC" for Open Graded/Rubber Asphalt Concrete. The data of Figure 3 can be coarsely grouped by performance and pavement type. First, the pavements with the lowest one-third of the levels are either open-graded and/or rubberized asphalt. The middle one-third are mostly dense-graded asphalt with some overlap of OGAC and the quieter of the PCC surfaces. The upper one-third is dominated by PCC except for a "chip seal" surface that contained very large, angular aggregate that generated high levels of lower frequency noise. With some idea of type and condition of existing pavement on highway, these data can be used to roughly estimate the specific improvement might be expected by modifying an existing surface.

A portion of overall results of the NITE testing is provided in Figure 4 in a format analogous to the CA/AZ results of Figure 3. Figure 4 spans the loudest pavement measured with an overall A-weighted level of 107.6 dB for a transversely tined PCC in the Netherlands to the quietest A-weighted level at 94.6 dB, which was a double layer porous asphalt (DLPA) also in the Netherlands. This range is almost identical to the CA/AZ database (95.6 to 109.2 dB[A]) although the absolute levels are shifted slightly upward. It should be noted that no attempt was made to account for different test temperatures in these data. The measurements in Europe were completed in a relatively small temperature range spanning about 15° to 21°C (60° to 70°F). The CA/AZ database spans a generally wider range, from about 13° to 32°C (55° to 90°F) with some more extreme temperatures both lower and higher. Any effect of temperature on sound intensity measurements has not been documented at this time and, as a result, no corrections were applied. Also, no offset was applied to account for the apparent average

[c] *The term "overall" is used here because the data were also studied using A-weighted, one-third octave band levels. In this article, the overall A-weighted levels were calculated from one-third octave band data in the 500-5000 Hz one-third octave bands.*

difference between the NITE test tire/car and that used for collecting the CA/AZ data.

For NITE data in Figure 4, in addition to DLPA, the designations for (single layer) porous asphalt (PA) and stone mastic (or matrix) asphalt (SMA) have been added. In California and Arizona, SMA is not as widely used as it is some other states in the U.S. Although SMA is somewhat similar to DGAC, it's characterized by high stone-to-stone contact, a more viscous binder, and low air voids.

In order to facilitate comparison between the European and CA/AZ databases, the results of both are displayed on the same graphs for different pavement groupings. In Figure 5, data for DGA and SMA are presented. For this grouping, the range of levels for the European and CA/AZ surfaces is very similar. For the grouping of quieter pavements, porous AC, OGAC, and RAC, the European surfaces span a slightly larger range on both the low and high ends of the data, as illustrated in Figure 6. The quietest European surfaces are typically double layer porous AC and are about 1 to 2 dB quieter than the lowest CA/AZ surfaces. An example of DLPA pavement is shown in Figure 7. Typically, the top layer is constructed of smaller aggregate to reduce noise while the lower layer uses larger aggregate to improve drainage. Different top layer aggregate sizes are used to optimize noise performance. On the higher end, the noisier European surfaces are single layer porous with larger aggregate sizes. Sound intensity levels for PCC are given in Figure 8. For these surfaces, the higher levels in both Europe and CA/AZ are transversely tined with the highest being the random transverse tined studied in Arizona.[8] On the quieter end, one European surface is remarkably lower than any of the others. This is a section of the B56 roadway near Düren, Germany. This was a porous, ground PCC surface. Excluding some of the exceptions noted, the apparent range of different pavement groupings was found to quite similar between the European countries and California and Arizona.

Results for the 56 km/h NITE data are shown in Figure 9. The range of these data is smaller than that in the 97 km/h data. However, the

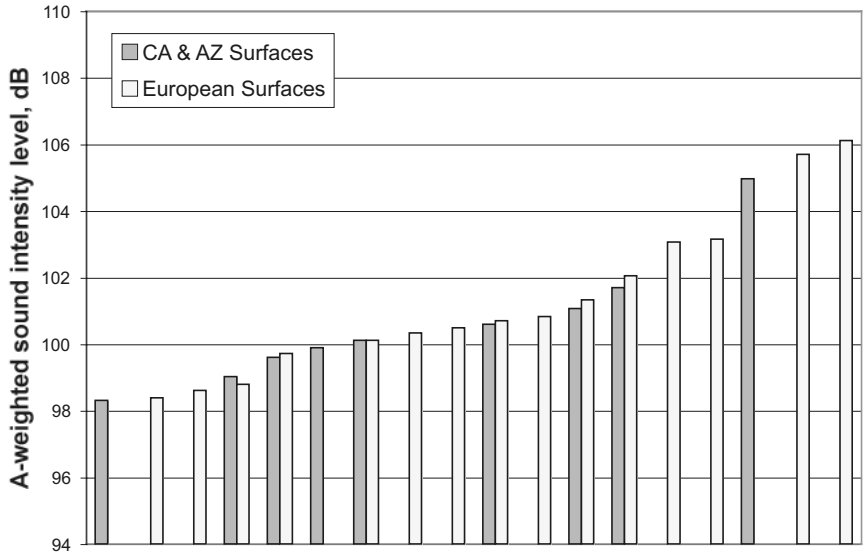

Fig. 5: Comparison of sound intensity levels for DGA and SMA pavements in California, Arizona, and Europe at 97 km/h.

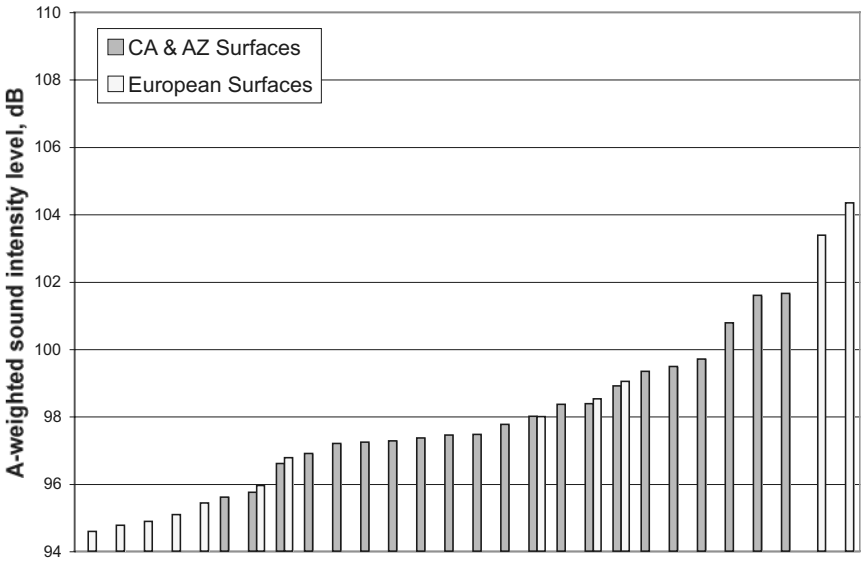

Fig. 6: Comparison of sound intensity levels for DLPA, PA, OGAC, and RAC pavements in California, Arizona, and Europe at 97 km/h.

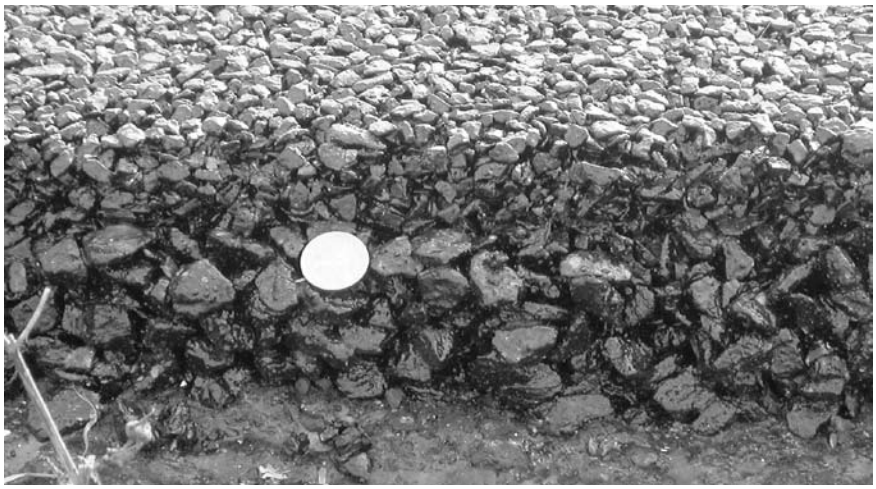

Fig. 7: Double layer porous AC construction in the Netherlands with 6 to 8 mm aggregate on top layer.

noisier transversely tined PCC surfaces were not included in this data set. Relative to limited 56 km/h data obtained in California, the range of 10 dB is similar. Further, the levels for the quietest and loudest pavements in both data sets are virtually identical between the NITE and CA/AZ data. Similar to the 97 km/h results, the ground porous PCC pavement was almost as quiet as the quietest AC pavements. A second pavement, unground porous PCC, is also included in this data set (not in the 97 km/h data set), and it also performed well—being only about 1 dB higher than the ground section. Also included in the data of Figure 9 are two ISO 10844 test track surfaces. These data, along with that from a test track in the U.S., have recently been used to examine the relationship between the tire/pavement noise of the ISO surface and pavements more commonly occurring in both U.S. and Europe.[9]

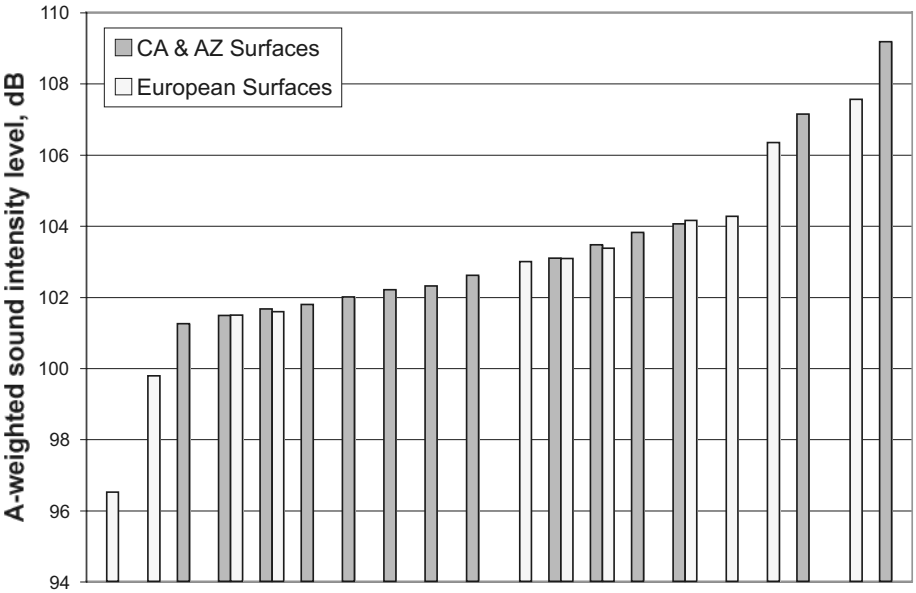

Fig. 8: Comparison of sound intensity levels for PCC pavements in California, Arizona, and Europe at 97 km/h

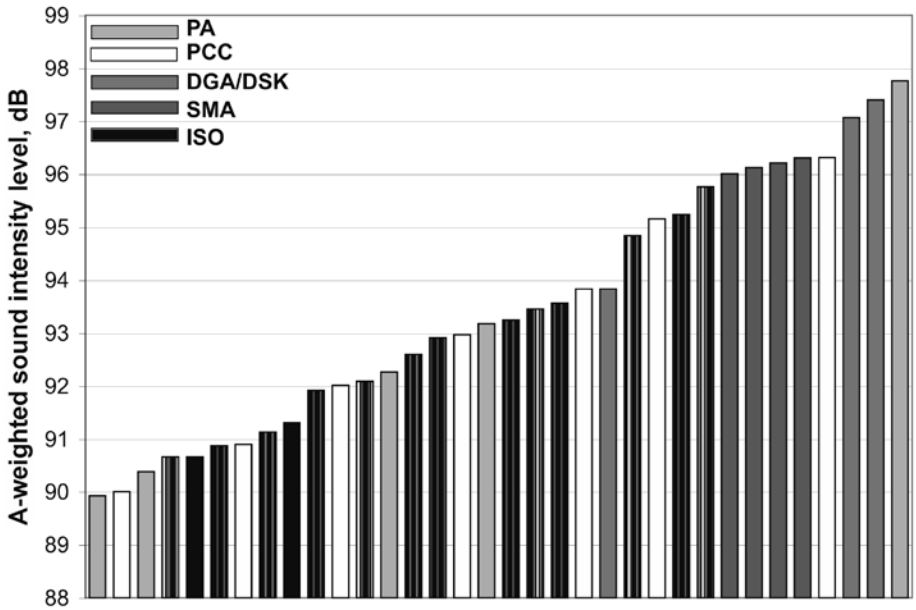

Fig. 9. Range of tire/pavement noise sound intensity levels for pavements in Europe under the NITE Project measured at 56 km/h.

Comparisons between the NITE and CA/AZ Results

One of main purposes of the NITE project was to determine if the pavement technology in Europe produced quieter pavements. Large reductions for quiet pavements relative to some baseline pavements have been reported in the literature from Europe. Comparing Figures 3 and 4, the range and level of tire/pavement noise appears to be quite similar. The issue of relative improvements can be examined more closely by comparing the range of commonly occurring pavements to quiet pavements for Europe and the U.S. Because the lowest levels were measured in the Netherlands, these data were chosen for comparison. In Figure 10, several DGAC and PCC pavements, which were found on existing motorways, are plotted with two different DLPA pavements. The typical improvement in level with the DLPA is about 10 dB. In Arizona, although there is a limited amount of longitudinal and random transverse tined PCC, the bulk of the PCC is uniform transverse tined. Relative to Arizona Asphalt Rubber Friction Courses (ARFC) overlays that have been recently applied in the Arizona Quiet Pavement Pilot Project, reductions on the order of 9 dB are typical, as illustrated in Figure 11. In California, however, the range of possible improvement is smaller primarily due to the absence of the use of transverse tining for on-grade PCC surfaces. (See Figure 12.) As a result, the typical higher levels are about 3 dB lower than Arizona or the Netherlands, and the range of possible improvement is on the order of 6 dB. These data emphasize that the benefits of a quiet pavement will be a function of both the performance of the quiet pavement and the pavement that it replaces. It also emphasizes that care must be taken in assuming that the reductions found in one state or country will be realized in another.

The quieter pavements measured in Europe, California, and Arizona are compared in Figure 13. In Europe,

the quieter pavements are "drainage" pavements, intentionally constructed to be water (and air) permeable. As a result, they should provide sound absorptive characteristics, which would decrease tire noise generation and propagation. For the CA/AZ surfaces, high permeability is not necessarily achieved with the open-graded designs. Further, there has been no indication of improved sound absorption of these surfaces relative to others. However, two of three CA/AZ pavements contain rubber, which is not commonly found in European pavements. At this time, the role of the rubber content on noise performance is not understood. Another difference is that European porous pavements tend to be thicker, by 40 to 120 mm, than porous pavements in the U.S. For the CA/AZ rubberized pavements (AZ ARFC & LA 138 RAC[O]), the overlays are thinner (25 to 30 mm total thickness), but can achieve virtually the same acoustical performance of the thicker permeable European surfaces. A final difference between the European pavements and the CA/AZ pavements is aggregate size. The European pavements have maximum aggregate sizes of 6 to 8 mm. The CA/AZ pavements range from 9.5 mm to 12.5 mm. The relationships between permeability, porosity, pavement thickness, aggregate size, and rubber content are clearly an area for further investigation.

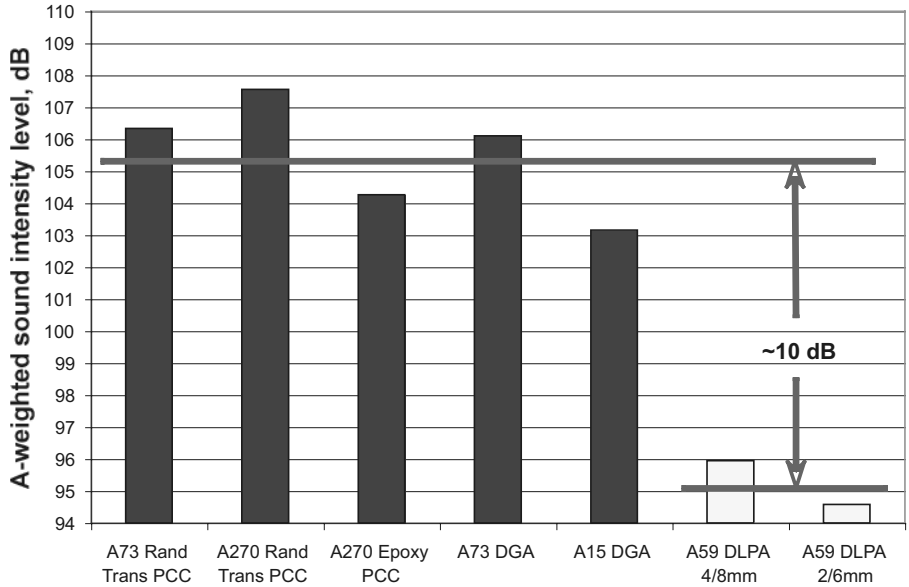

Fig. 10: Typical noisier pavements in the Netherlands compared to typical quiet pavements.

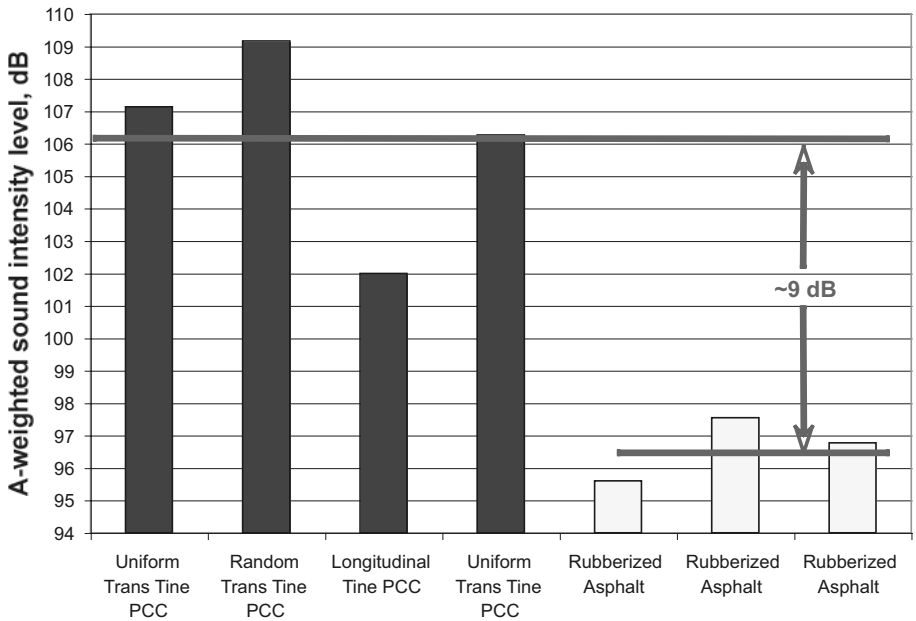

Fig. 11: Typical noisier pavements in the Arizona compared to typical quiet pavements.

Summary

Although not a replacement for wayside traffic noise measurements, the sound intensity method has proven to be a very useful approach in evaluating the influence of pavement on tire/pavement noise generation. With its ease of deployment, portability, and time efficiency, sizable, consistent databases have been readily developed for California, Arizona, and four countries in Europe. Within Caltrans, it is quickly becoming the preferred, scientific tool for evaluating pavements and guiding quiet pavement applications with wayside measurements to follow where practical.

From the Caltrans studies performed in California and Arizona, the following observations have been made:

1. Pavement type can reduce tire/pavement noise up to 8 or 10 dB depending on the existing and final pavement.
2. A significant range in tire/pavement noise performance is in each of the generic groupings of pavement (PCC, DGAC, and OGAC/RAC).
3. Surface roughness/texture controls the lower tire/pavement noise frequencies (below approximately 1000 hertz).
4. As a group, open-graded and/or rubberized asphalt concrete show the best tire/pavement noise performance.
5. Grinding of PCC surfaces can be effective in reducing tire/pavement noise by reducing texture effect (such as transverse tining) and by reducing joint slap.

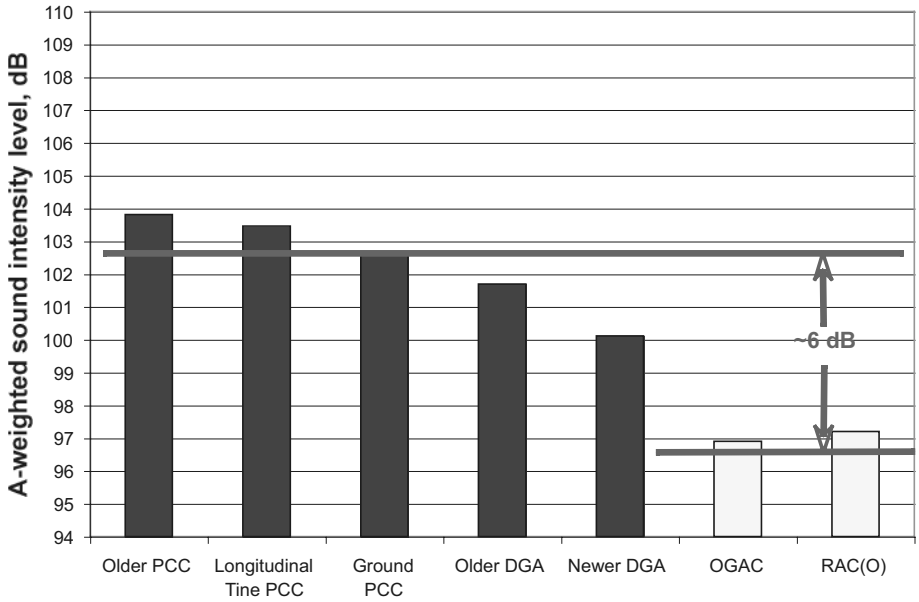

Fig. 12: Typical noisier pavements in California compared to typical quiet pavements.

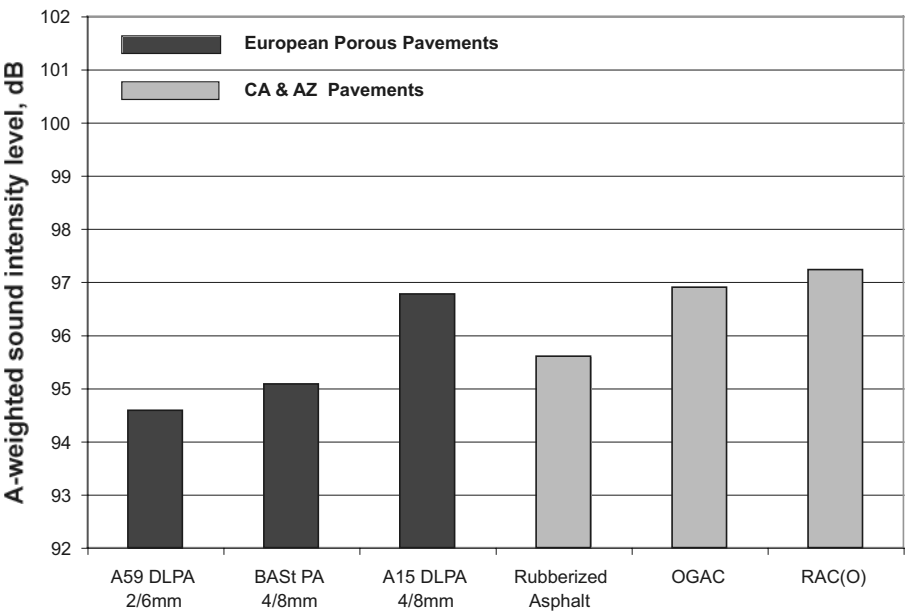

Fig. 13: Quietest pavements in Europe and California/Arizona.

The first three of these where confirmed in the NITE testing. Since ground PCC and rubberized AC surfaces were not studied in the NITE project, these were neither confirmed nor discounted. From the NITE testing, the following observations were made:

1. Highly porous two-layer AC constructions provide only slightly better tire/pavement noise performance than the quiet pavements currently in use in California and Arizona.
2. Porous PCC can produce tire/pavement noise performance similar to that of other quiet pavements.
3. Exposed aggregate PCC surfaces were not found to be particularly quiet relative to longitudinal texture.
4. The range in tire/pavement noise performance of SMA pavements is similar to that of DGAC, and both are at least loosely related to aggregate size.

Acknowledgements

The bulk of this work was sponsored by the California Department of Transportation (Caltrans) with the assistance of Bruce Rymer. Partial funding of the NITE testing was provided by the Federal Highway Administration through the efforts of Mark Swanlund. Logistical assistance of the NITE testing was provided by General Motors, specifically Harald Schlöffel of Opel and Douglas Moore of GM North America. Suggestions of test sites and contacts in Europe were provided by Prof. Robert Bernhard of Purdue University, Larry Scofield formerly of the Arizona Department of Transportation, Dr. Ulf Sandberg of the Swedish Road and Transport Research Institute, and Romain Buys of ROBUCO. I am particularly grateful for the assistance of the researchers in individual countries who hosted the NITE testing, including Dr. Klaus-Peter Glaeser in Germany, Dr. C.J. van Blokand and Chiel Roovers in the Netherlands, Dr. Fabienne Anfosso-Lédée in France, and Dr. Luc Goubert in Belgium.

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Davies Named VP for Technical Activities

INCE/USA

Overview of INCE/USA Technical Activities

The INCE/USA Board of Directors named Patricia Davies as Vice President of Technical Activities for INCE/USA. This Activity has 12 Technical Committees (TCs) that cover the field of noise control engineering and assist INCE/USA with various projects. The main focus for these 12 TCs is 1) to produce special sessions at INCE/USA conferences, and 2) to produce special theme issues of *Noise Control Engineering Journal (NCEJ)* every three years.

Suggestions for conference session titles, volunteers for organizing and participating in conference sessions, and ideas for special issues of *NCEJ* are all welcome. We are also in the process of reviewing the structure of the Committees and setting up sub-committees. We would like to have a person help lead each subcommittee to aid the Committee Chairs in organizing technical committees. Please contact the relevant Committee Chair if you are interested in becoming involved in INCE technical activities. The name of the chair(s) and the scope of each committee is given below.

Sources & Propagation
Victor Sparrow (vws1@psu.edu)
This committee brings together INCE members with interests related to noise sources and how that noise propagates to the listener. Regarding noise sources, the committee promotes characterizing noise sources, understanding their radiation mechanisms, and devising noise control methodologies via source modification. Regarding propagation, the committee seeks improved methods for measuring and predicting the propagation of noise through both structures and air. Source alteration techniques, outdoor and indoor sound propagation, and scattering and diffraction are all within the purview of the sources and propagation technical committee. The committee is committed both to developing new understanding of how the sound from real noise sources is generated and gets to the listener and to applying engineering principles to minimize the noise.

Passive Control
Ahmet Selamet (selamet.1@osu.edu)
The objective of the committee is to promote activities and disseminate information in passive control of noise and vibration. Areas of interest include, but are not confined to, analytical, computational, and experimental efforts on: (1) reactive, dissipative, and hybrid mufflers and silencers; (2) flow noise and suppression; (3) flow-acoustic coupling and suppression; (4) flow-structure interaction; and (5) acoustical materials used for sound absorption, damping, vibration isolation, structures, and sound barriers. The foregoing objective is achieved by: (1) organizing technical sessions for NOISE-CON and INTER-NOISE meetings, thereby creating an effective exchange environment between research and application communities; and (2) encouraging participants to publish their works in the *Noise Control Engineering Journal.*

Active Control
Scott Sommerfeldt (scott_sommerfeldt@byu.edu)
The purpose of the Active Control Technical Committee is to foster research, applications, unified practice and communication of new techniques in the active control of sound and vibration. Areas of interest to the committee include not only applications involving noise and vibration control, but also sound field reconstruction and other novel applications of active control. Subtopics of interest include physical principles of active control, algorithms, transducers, sensing and actuating techniques, and hardware design. To accomplish these objectives, the Committee seeks to do the following: (1) organize sessions for NOISE-CON and INTER-NOISE meetings; (2) provide continued support for the ACTIVE symposia, which have been held on a regular basis; (3) encourage members and others to publish active control research and case histories in the *Noise Control Engineering Journal*; and (4) provide a forum for information exchange as a means of promoting research and unified practice in the field.

Perception and Effects of Noise
Wade Bray (wbray@headacoustics.com)
This group has focused on organizing sessions for conferences and one-day symposia (SQS98 and SQS 2002) associated with INCE and international INCE meetings. Topics of interest include:

1. Sound quality modeling: metrics, psychoacoustic testing, standardization
2. Binaural sound quality
3. Sound quality of environmental sounds
4. Designing the sound of products
5. Influence of attributes other than loudness on sound quality
6. Human response to vibration and coupling of response to noise and vibration
7. Modeling and predicting annoyance including the influence of information and context on response modeling.
8. Surveying and psychoacoustic testing techniques.

Experimental Techniques and Instrumentation
Teik Lim (teik.lim@uc.edu)
The committee acts as a forum for the dissemination of information on new instrumentation and experimental methods in the fields of noise control and acoustics. This forum is established through periodic meetings at NOISE-CON and INTER-NOISE conferences, sessions organized at these conferences, and the organization of seminars or short courses in conjunction with these same conferences. From these conferences the committee will work with the *Noise Control Engineering Journal* Board to identify papers of special merit for inclusion in the *Journal*. In addition, the committee strives to provide an interface to international and national groups standardizing measurement procedures. Finally, the committee facilitates the coalition of divergent approaches to the same measurement problem and acts as a resource for those looking for information on current measurement developments. The primary subject classifications for the work of this committee include: 71, Instruments for noise and vibration measurements, 72, Measurement techniques, 73, Test facilities (design and qualification), 74, Signal processing, and 81, Standards.

Our goal is to develop an active committee that can fully participate in INCE. In case you are not familiar with the Technical Committees, their role is threefold. They are responsible for serving as a technical focus in the organization of conference sessions, assisting the *Noise Control Engineering Journal* editors in seeking technical papers, and in disseminating technical information inside and outside of INCE. In a few instances these committees have gone farther in organizing seminars and special conferences. There is no reason why this committee could not be an active contributor to INCE.

Transportation Noise
Nicholas Miller (nmiller@hmmh.com)
The Transportation Noise Technical Committee will provide forums for the exchange of technical and regulatory information related to the development and application of noise and vibration research, and methodologies to the transportation industry. A major thrust of the technical exchanges will be the integration and dissemination of applied research results into the industrial community. Technical topics will cover noise and vibration tests, analysis and processes that are related to surface transportation noise concerns from customer and regulatory perspectives.

Industrial Noise
Mike Lucas (Mike_Lucas@irco.com)
The Industrial Noise Control Committee provides a forum for exchange of technical and regulatory information related to the management of industrial noise. Areas of interest to the Committee include the application of programs, approaches, technologies, and products for controlling occupational and community exposure to noise generated by industrial processes, facilities, and equipment. In particular, the Committee seeks to do the following: (1) organize sessions for NOISE-CON and INTER-NOISE meetings; (2) sponsor specialized workshops and seminars in conjunction with NOISE-CON and INTER-NOISE meetings; (3) encourage INCE members and others to publish, in *Noise News International* and the *Noise Control Engineering*

INCE/USA Technical Activities

Journal, case histories as well as accounts of successful programs and approaches related to the management of industrial noise; (4) serve as an information exchange and clearinghouse for members and others interested in the management of industrial noise; (5) form alliances with other professional and trade organizations whose charters overlap or complement those of the Committee; and (6) develop, provide, and/or advertise the availability of educational materials for members and others to use in their outreach and guidance programs.

Community Noise
Larry Finegold (LSFinegold@earthlink.net)
The Community Noise Technical Committee is formed for the purpose of promoting the use of noise control engineering technologies to reduce noise exposure in communities across America to levels that adequately protect the health and welfare of the U.S. population. We will pursue the following general priorities:

1. Promote the development and use of state-of-the-art noise control technologies.
2. Support the development of modern national and local government noise management and land use policies, including increased cooperation between industry and government on noise control issues.
3. Support programs to educate the public on the adverse effects of community and environmental noise exposure.
4. Support the continued professional development of the noise control engineering community and promotion of their services to communities.
5. Coordinate INCE/USA community noise activities with those of other national and international professional acoustics organizations and government agencies.

Information Technology Equipment Evolving to Measurement and Control of Product Noise Emissions
Matt Nobile (nobile@us.ibm.com)
In the proposed restructuring of this area, Information Technology Equipment will become a subcommittee under this more general heading. Other proposed subcommittees are: household small and large appliance noise, household power tool (including lawn and garden) noise, HVAC and refrigeration systems noise.

The mission of the Information Technology Equipment Technical Committee is noise control engineering relating to information technology equipment (ITE), with a primary focus on acoustical measurement technology, methodology, and standardization. In addition to organizing special sessions at INCE conferences and soliciting technical papers for *NCEJ*, the principal activities of the Committee are to monitor, elucidate, and continually reevaluate the technical underpinnings of the acoustical standards and test codes pertinent to the ITE industry. Given that our members are volunteers with limited time and resources, the activities undertaken by the committee should meet the following practical criteria: (1) can be reasonably handled by the resources available; (2) are directly related to the mission of the TC/ITE; (3) are important to the IT industry as a whole; (4) are timely, in terms of work being done by other committees allied to the IT industry (such as standards writing groups); (5) are of strong interest to a majority of the TC members or potential TC members; (6) are within the realm of expertise of the TC members or potential TC members; and (7) are of a non-proprietary nature to allow competing firms to cooperate freely. The results of TC/ITE activities should benefit either INCE members in general or members of working groups developing standards and test codes for the ITE industry.

Prediction and Modeling Techniques
Satha Raveendra (satha.raveendr@coliak.com), Nolan Dickey (nsd@leopard6.eng.ohio-state.edu)
This committee will provide a forum for the dissemination and clarification of information related to the direct application of large-scale computer analysis codes or software to noise control and acoustic problems. Analysis methods or codes of interest include finite and boundary element methods, statistical energy analysis, ray tracing, transfer matrix and other computational techniques for addressing interior and exterior sound propagation and radiation issues including interactions with vibrating structures and other media. An attempt will be made to establish

a clear forum on the applicability of existing or new codes and numerical techniques to contemporary noise control problems in industry or society. To facilitate this important task, the committee will organize special technical sessions for NOISE-CON and INTER-NOISE meetings, solicit authoritative papers for *Noise Control Engineering Journal*, and provide a forum for its members in maintaining and developing the science and art of computer modeling. Other activities may include the formulation of benchmark noise control problems for analysis verification, organizing round-robin modeling exercises, and serving as liaisons with other technical committees or professional societies.

Building Acoustics
Kenric VanWyk (kvanwyk@acousticsbydesign.com)
The objective of the Building Acoustics Technical Committee is to advance the understanding of acoustical performance of building components, materials, and systems, with the ultimate goal of improving the acoustical quality for buildings of all types. This is done by organizing technical sessions at INCE conferences, encouraging the publication of papers on related topics, and disseminating relevant information to the Noise Control Engineering community, American Institute of Architects, American Society of Heating, Refrigeration, and Air Conditioning Engineers, other professional groups, and the public. Primary topics include criteria for sound quality in buildings, acoustical performance of building materials including standard construction materials as well as special acoustical products, prediction of sound levels in buildings, sound propagation through building structures and sound produced by HVAC, electrical and plumbing systems. The committee seeks to identify building noise control topics of interest to the building development, design, and owner sectors through two means: 1) the consulting practice of acoustical consultants on the committee and 2) standards activities in the building acoustics areas. Once identified, NOISE-CON and INTER-NOISE sessions would be developed that address these areas of interest. Persons who are working in these areas and are known by committee members would be invited to give papers at these sessions. These would be individuals known to committee members directly or indirectly through contacts with other members. The invited papers would form the basis of a session to which a general solicitation of papers would be made. The next, and most critical step, is to encourage presenters to prepare manuscripts for submission to *NCEJ* for consideration for publication. Of immediate interest to the committee is the current interest in classroom acoustics resulting from the publication of ANSI S12.60 "Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools." The committee hopes to sponsor NOISE-CON special sessions that address the problems of classroom ventilation system noise control, measurement strategies responsive to the standard, feasibility assessments of standard limits and guidelines, etc.

Standards
Brandon Tinianov (Brandon@QuietSolution.com)
This technical activity represents the technical interests of INCE as a voting member in the American National Standards Institute (ANSI) Committee S12 on Noise. The Acoustical Society of America (ASA) provides the Secretariat for the committee. Its mission is the development of standards, specifications, and terminology in the field of acoustical noise pertaining to methods of measurement, evaluation, and control of environmental and occupational noise.

Recent standards activity is highlighted by the adoption of ASNI S12.60-2002 "Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools." The standard represents a significant change in the focus of school design with room acoustics and intruding noise as key elements in the success of learning environments.
There has also been work surrounding the evaluation of sound power in both reveberant and free field environments. Standards recently re-approved include ANSI S12.12 and ANSI S12.30. Several related ANSI standards have been replaced as Nationally Adopted International Standard (NAIS) documents. They include S12.51, S12.53/1, S12.53/2, S12.45 and S12.56.

Asia-Pacific News

Marion Burgess, Asia-Pacific Editor

AUSTRALIA

Science Meets Parliament 2005

Science Meets Parliament (SMP) is a day when a wide range of scientists have the opportunity to talk with politicians. It is organized by the Federation of Australian Scientific and Technological Societies (FASTS) which works to "influence the formulation of science and technology policy to the economic, environmental and social benefit of our nation." For the second time, the Australian Acoustical Society participated in this event and a representative joined over 200 scientists for this day. Groups of three scientists were allocated for meetings with interested politicians. There is no specific matching between the scientists and the politicians so the topics discussed are on more general issues associated with support for science and technology. It's very hard to assess any outcomes for acoustics in particular from participation in such an event. However, one politician was particularly interested in discussing control of noise from a motor sports venue, which was a burning issue in his electorate, and so may remember the meeting. See the Editor's View in this issue of *NNI*.

JAPAN

Are Japan's Policies Based on Noise Emission or Noise Immission Criteria?

Recent international discussion about noise control policy is focused on both noise *emission* and noise *immission*. Looking at Japanese noise regulations and standards that have been developed since the 1970s, these concepts are not necessarily clearly distinguished in this legislation. Professor Hideki Tachibana, Chiba Institute of Technology, held a meeting for free discussion in Tokyo on 2005 April 21, and he presented recent international topics on noise control policy. The subject for discussion started with "What is noise emission? What is noise immission?" Further discussion included "How are they related to Japanese regulations and standards?" Mr. Larry Finegold joined the discussion and explained the international definitions of these terms. It is clear that Japanese Environmental Quality Standards for Noise were originally based on the concept of noise immission and laws were introduced for general community noise, road traffic noise, Shinkansen super-express way noise, and aircraft noise. In the discussion, however, it was pointed out that the standard for Shinkansen super-express way noise has two meanings. It is considered both as a required noise limit and as a "desirable" guideline goal, i.e., emission regulation and immission standard. The confusion has arisen from the initial process of standardization accomplished in 1975. The Shinkansen noise is measured and assessed only at a reference position of 1.2 m height with a distance of 25 m from the center of a rail track. The noise at such a reference position should be defined as the "emission level." The same confusion exists in other Japanese noise regulations that specify required limits for industrial noise and construction noise, where the noise levels are assessed at the boundary between a residential area and an industrial or a construction site. In these cases, there is no specification for the measurement distance between the noise source and the microphone. These noise regulations also have two meanings, i.e., a limit for noise emission and noise immission. The participants from local authorities, engineers and researchers wondered if there is some more clear definition for noise emission and noise immission when these are applied to noise regulations and standards. It was decided that some work should be done to see what definitions exist for terms and how much international consensus exists on these definitions.

Emission and Immission in Japan

KOREA

KAIST ME Department To Use OPTIMUS

The Department of Mechanical Engineering of KAIST (Korean Advanced Institute of Science and Technology) will use OPTIMUS in its design courses. OPTIMUS is a product for the process integration and multi-disciplinary design optimization market by Noesis Solutions. Professor Byung Man Kwak, currently Samsung Chair of the Department of Mechanical Engineering of KAIST, said that "Our main research interests are optimal design and its applications to real-life problems, contact mechanics, and design methodologies for development of practical systems. We are convinced that OPTIMUS will help our students to solve their own practical design optimization problems." Hans Wynendaele, CEO and president of Noesis Solutions said that "We are happy that our technology and software will be used throughout KAIST's engineering design courses".

Noise Awards by FHWA

USA

FHWA Recognizes Noise Control with 2005 Environmental Excellence Award

The Federal Highway Administration (FHWA) Environmental Excellence Awards highlight federally funded transportation projects, programs, and processes that surpass environmental compliance guidelines to achieve noteworthy natural resource preservation goals. Winners of the 2005 awards were presented during an Earth Day Ceremony in April. The 11 awards were selected from among 238 nominations from 38 states and the District of Columbia. The Award for Excellence in Eco-Systems, Habitat, and Wildlife was presented for fisheries-hydroacoustics mitigation for San Francisco Bay Bridges and the efforts of the Bioacoustics Workgroup. Unanticipated impacts to aquatic species from the underwater noise pulses generated by marine pile driving operations for the new East Span of the San Francisco-Oakland Bay Bridge were addressed by the California Department of Transportation (Caltrans) and its federal partners with the assistance of expert consultants. Underwater acoustic pulses were monitored, impacts to fish were observed, and the effectiveness of innovative noise mitigation technologies was evaluated. A highly effective bubble curtain system was developed that substantially attenuated pile driving noise, significantly reducing impacts to fish species. The successful results of this and other Bay Area projects led to the formation of the multi-agency Bioacoustics Workgroup who developed a report that establishes the current national scientific framework and common understanding of hydroacoustic effects on fish. Co-recipients include the governmental agencies of Caltrans, the FHWA, California Division, and NOAA Fisheries, Southwest Region. Additional co-recipients include Dr. Mardi C. Hastings and Dr. Arthur N. Popper, experts on the effects of sound on fish; the environmental consulting firm of Jones & Stones, Inc., and the acoustical consulting firm of Illingworth & Rodkin, Inc.

Quiet Asphalt 2005 Announced

The Asphalt Pavement Alliance and Purdue University will hold a symposium on quiet asphalt pavement technology at the Holiday Inn Select, City Center in Lafayette, Indiana on November 1-3, 2005. The symposium will concentrate on topics under the three major categories of Quiet Pavement, Noise Fundamentals, and Asphalt Pavement Design and Construction. Quiet Pavement discussions will cover recent programs in Arizona and California as well as surveys of U.S. and European quiet pavement technologies. Fundamentals will cover acoustics and noise control terminology, measurement methods, barrier performance, tire/pavement noise generation, and FHWA noise policies. Design and Construction will cover a full range of quieter asphalt surfaces including the European double porous layer and rubberized pavement construction. The symposium is intended for highway agency personnel, pavement design engineers and contractors, consulting and environmental engineers, and people wanting to learn more about role of pavement in reducing traffic noise. For more information, contact Virginia (Ginny) Freeman (herlconf@ecn.purdue.edu) or Robert Bernhard (bernhard@purdue.edu)

One-Day Short Course from FHWA

Transtec is developing a Noise 101 one-day short course for the FHWA to cover the fundamentals of pavement design and pavement noise control. The course will be offered at six locations across the U.S. over the next 12 months. Firm dates have been established in Kentucky on July 26, in Iowa on August 26, and in Colorado on December 8. Contact Rob Rasmussen for more details—robotto@thetranstecgroup.com.

Second Tire/Pavement Workshop to be Held at Purdue

The Institute for Safe, Quiet and Durable Highways at Purdue University and the FHWA have started planning for the second Tire/Pavement Noise Strategic Planning Workshop for March 2006. Results of the first Workshop can be found at http://tools.ecn.purdue.edu/~sqdh/wrkshp-9-04/index.htm or http://tools.ecn.purdue.edu/%7Esqdh/wrkshp-9-04/index.htm

Implementing Classroom Acoustics Standards: a Progress Report

In 1998, the U.S. Access Board joined with the Acoustical Society of America to support the development of a classroom acoustics standard. Stakeholders from both public and private sectors

were involved. Their work has now been approved as ANSI/ASA S12.60-2002, Acoustical Performance Criteria, Design Requirements and Guidelines for Schools. With this new standard, a number of states, local jurisdictions, and boards of education have taken action on classroom acoustics in addition to those set in place previously. Consistent with long-standing recommendations for good practice in educational settings, the new standard sets specific criteria for maximum background noise (35 decibels) and reverberation time (0.6 to 0.7 seconds) for unoccupied classrooms. Taken by itself, the standard is voluntary unless referenced by a state code, ordinance, or regulation. However, school systems may require compliance with the standard as part of their construction documents for new schools, thus making the design team responsible for addressing the issues. Parents may also find the standard useful as a guide to classroom accommodations under IDEA (the Individuals with Disabilities Education Act). Specific states that have taken action on classroom acoustics are listed below:

Adopted ANSI/ASA S12.60-2002 --New Hampshire State Board of Education

- New Jersey School Construction Board
- Ohio School Facility Commission

Legal/Legislative Proposals under Consideration

- Minnesota
- Connecticut

Other Classroom Acoustics Standards/ Directives in Use

- New York State Department of Education
- Los Angeles Unified School District
- Minneapolis Public Schools
- Washington State Board of Health
- Washington, DC Public Schools
- California Collaborative for High-Performance Schools (CHPS)

Standards/Guidelines in Development

- Maryland State Department of Education

Acoustical performance is an important consideration in the design of classrooms. Research indicates that levels of background noise and reverberation little noticed by adults, who are mature and skillful listeners, adversely affect learning environments for young children, who require optimal conditions for hearing and comprehension. Poor classroom acoustics are an additional educational barrier for children who have hearing loss and those who use cochlear implants, since assistive technologies amplify both wanted and unwanted sound. Children who have temporary hearing loss, who may comprise up to 15% of the school age population according to the Centers for Disease Control (CDC), are also significantly affected, as are children who have speech impairments or learning disabilities. Kids whose home language is different than the teaching language are also at additional risk of educational delay and failure.

The ANSI/ASA standard S12.60-2002 can be obtained from ASA online at https://asastore.aip.org/. The ASA has also published two manuals for architects on classroom acoustical design; see http://asa.aip.org/classroom.html. Volume 1 can be downloaded free at http://asa.aip.org/classroom/booklet.html.

The American Speech-Language-Hearing Association has just published two Technical Reports on Acoustics in Educational Settings; see http://www.asha.org/NR/rdonlyres/066CDD53-6052-405F-8CB7-3D603D5CCD0F/0/AcousticsTR.pdf and http://www.asha.org/NR/rdonlyres/4110318E-8F48-4DB4-8938-9BA15EB8BAAC/0/AcousticsGL.pdf.

A series of five technical assistance documents for teachers, educators, and designers, entitled "Listening for Learning" is posted at: http://www.quietclassrooms.org/ada/ada.htm.

Manufacturer Armstrong Industries has technical information for architects on its website at http://www.armstrong.com/commceilingsna/schoolzone.html.

A parent advocacy organization, the Hear to Learn Center, has useful information and links at http://www.heartolearncenter.org/.

Other information, including background, research, rulemaking notices, and links to stakeholders, can be viewed on the U.S. Access Board's website at http://www.access-board.gov/ publications/ acoustic-factsheet.htm. (Contributed by Lois L. Thibault, Coordinator of Research, U.S. Access Board)

S12.60 is Widely Adopted

Cost-Benefit Analysis for Noise

DENMARK

The Effects of Road Noise on House Prices

(The Danish Department of the Environment (Miljøstyrelsen) has recently published findings of its research into the effects of road noise on house prices.This article is an edited version from the web site http://www.bksv.com/2887.asp.—Ed.)

The Danish Department of the Environment (Miljøstyrelsen) has recently published findings of its research into the effects of road noise on house prices.

The Danish Government is evaluating different initiatives to reduce road noise, taking the cost and benefits into consideration. To be able to estimate the benefits (health and welfare) associated with reducing road noise, it is necessary not only to quantify these effects, but also to put a price on them.

Part of the nuisance effects from road noise can be evaluated by using the hedonic pricing method that makes use of the fact that the price of a house reflects several parameters (e.g. area, age, number of toilets and the position of the house). By estimating a model including these elements, it is possible to isolate the effect of one single parameter, in this case, road noise.

The study shows that houses affected by road noise are significantly cheaper than other houses. The price of houses affected by road noise above 55dB and situated near "ordinary" roads declines by 1.2% per dB. The price of houses near motorways declines by 1.6% per dB. If houses exposed to road noise below 55dB are also included in the model, the average effect on house prices is less — 0.9% for houses near "ordinary" roads and 1.5% for houses near motorways.

Looking in detail at the eight areas in Greater Copenhagen in the study, it can be seen that the effects on house prices vary from 0.75% to 1.01% for houses near "ordinary" roads and 1.06% to 2.29% for houses near motorways (including houses exposed to road noise below 55dB).

UNITED KINGDOM

Report on "Mapping Tranquillity"

The organization "Campaign to Protect Rural England" has published a report "Mapping Tranquillity." A description of the report is as follows: Defining and assessing a valuable resource — places that make us feel tranquil, take us away from the stresses and strains of everyday life, and help us to relax — but they face a multitude of threats and are shrinking. We have developed a new method of mapping tranquil areas which builds on our previous work. This methdology takes into account people's experiences of the countryside and what qualities contribute to a feeling of tranquillity, and what factors detract — people, landscape and noise are key themes. The resulting tranquillity maps can be used as an important indicator in helping to protect the countryside. This report explains the research, methodology and mapping techniques.

The report is A4 size, 56 pages, and was published in 2005 March. ISBN 1 902786 77 7 £10.00. More details can be found at http://www.cpre.org.uk/publications/landscapes/tranquillity.htm

Environmental Noise Directive Implementation

Consultation on proposals for transposition and implementation of Directive 2002/49/EC relating to the assessment and management of environmental noise (the Environmental Noise Directive [END]) were invited by the Department for Environment, Food and Rural Affairs (Defra).

Directive 2002/49/EC relating to the assessment and management of environmental noise is often referred to as the Environmental Noise Directive (END). The END was adopted by the European Parliament and the Council of the European Union, on 25 June 2002, and must be transposed into law by the Member States of the European Union.

The END will be implemented separately in England, Scotland, Wales and Northern Ireland. The consultation document is solely concerned with the transposition of the END in England. This consultation exercise focuses on what Defra proposes to include in the implementing regulations in order to meet all the obligations of the END. Separate consultations will be carried out in Scotland, Wales and Northern Ireland.

Comments were due on 2005 May 16. For more information, go to: http://www.defra.gov.uk/corporate/consult/end-two/index.htm.

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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.

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LMS

General Motors Selects LMS for Exterior Pass-by Noise Testing

LMS International has announced that General Motors Corporation (GM) has selected LMS to replace its exterior pass-by noise testing installation at the United States GM Proving Grounds in Mesa, AZ and Milford, MI. LMS will deliver a fully integrated testing and analysis system to perform pass-by noise certification of newly developed GM vehicles. General Motors selected the LMS solutions for its strong support of the upcoming revision of the ISO 362 standard. The LMS system was also valued for its efficient execution of exterior noise tests and related troubleshooting analyses. The strong integration of the new system in the extensive installation of LMS systems for noise and vibration engineering at General Motors will enable its engineers to easily reuse and leverage exterior noise test data throughout the vehicle development process.

Environmental regulations in terms of vehicle exterior noise emissions have become one of the most stringent requirements in vehicle development projects. Manufacturers have to certify that their vehicles comply with noise emission standards by measuring pass-by noise using internationally defined procedures. In addition, noise emission characteristics and the exterior sound impression of a vehicle have become strong competitive differentiators in the automotive industry. Vehicle manufacturers perform extensive tests throughout the development process to analyze the acoustic performance of components and subsystems that strongly contribute to exterior noise. Extensive analysis of test data helps engineers to gradually refine the exterior noise characteristics of the vehicle and to prepare for final certification tests.

In selecting a new system for exterior pass-by noise testing, General Motors looked for a solution with an integrated support of the ISO 362 standard and its upcoming successor and state-of-the-art capabilities to support the single-person operation of their pass-by-noise testing center. After an extensive evaluation, General Motors engineers selected the LMS solution as the best fit for these requirements. General Motors particularly valued the "driver's aid" functionality that provides the test technician with real-time information regarding weather conditions, engine speed, vehicle speed and vehicle position on the test track. This information is critical to the efficient execution of an exterior noise test sequence and has a direct impact on the productivity of the exterior noise test facility.

Aisin Seiki Selects LMS Virtual.Lab Motion to Optimize the Dynamic Performance of Automotive Components and Systems

LMS International has announced that Aisin Seiki, has selected LMS Virtual.Lab Motion to simulate and optimize the dynamic performance of vehicle components and systems. Aisin engineers use LMS Virtual.Lab Motion to virtually test the performance of their mechanical designs, and to make sure that the numerous components interact and move as planned under the influence of real-life conditions. Typical applications at Aisin Seiki include the design and engineering of active mechanisms used in door, roof and seating systems.

According to company representatives, Aisin Seiki selected LMS Virtual.Lab Motion for its modeling and simulation capabilities, which enable their engineering teams to accurately model complex mechanisms and to quickly recognize potential shortcomings early in the development process. The extensive analysis and visualization features of Virtual.Lab Motion allows them to literally step into the design, easily interact with Aisin colleagues and customers, and make the right engineering decisions. More specifically, Aisin Seiki strongly valued the extensive possibilities of Virtual.Lab Motion to detect possible collisions between the numerous components of complex and compact systems.

To respond to the stringent comfort and safety requirements of the automotive industry, Aisin Seiki makes increasing use of electronic steering systems in the development of components, such as door opening systems, retractable hard top systems, and seat components. Assessing the coupled behavior of electronic steering systems and mechanical components increases the complexity in meeting multiple design criteria. LMS Virtual.Lab Motion allows engineers to define and optimize the behavior of these electronic steering systems and their interaction with the complex mechanical assembly. Based on the specification

of the control design, LMS Virtual.Lab Motion tests the controller on the virtual prototype and thoroughly simulates the complete motion range of the controlled mechanism.

LMS Opens Representative Office in Russia

LMS

LMS has announced the opening of a representative office in Moscow, Russia. With the opening of the new office, LMS further strengthens its worldwide network of sales offices and establishes a local commercial and support contact for its customers and distributors in Russia, Ukraine and Belarus. Over the past decade, the LMS customer base in the Russian automotive, aerospace and other advanced manufacturing industries has grown substantially. Through the Russian office, LMS is well positioned to respond to the growing demand for virtual simulation software, advanced testing systems and engineering services In Russia.

Andrei Soldatkin, Ph.D., has been appointed Business Development Manager for LMS Russia. With over 20 years of experience in the Russian mechanical engineering industry, Mr. Soldatkin has gained extensive knowledge in the fields of virtual prototype simulation and physical prototype testing.

"Our LMS Russia representative office strongly compliments our extensive local distribution agreements and will strengthen our sales, marketing and customer services activities in the region. It reflects our long-term commitment towards the Russian market and will allow us to further develop extensive partnerships with the customer community in the region," stated Marc Boonen, Corporate Vice-President Sales at LMS.

The new LMS Russia Representative Office in Moscow can be reached at T + 7 095 937 84 93 or via andrei.soldatkin@lms.be. The address of the new office is: LMS Russia Representative Office, Smolensky Passage Smolenskaya Square, 3 Moscow, 121099 Russian Federation

Noise and Vibration Control White Paper for Engineers Now Available

E-A-R

Engineers seeking to build cost-effective noise and vibration controls into their designs can obtain a systematic and concise tutorial outlining the four principal tools for noise and vibration control (damping, isolation, absorption and barrier materials), authored by E-A-R Specialty Composites (E-A-R). E-A-R, a world leader in composite/elastomer engineering and product development for handling noise, vibration, comfort, thermal requirements and/or shock, hopes that the "The Four-Fold Method of Noise and Vibration Control" white paper will help engineers get a better understanding of how passive acoustical systems can best be used to improve designs at the lowest cost.

George Gabuzda, Senior Director of E-A-R comments, "Whether engineers are attempting to retrofit noise and vibration controls into existing products, or considering new designs, it pays to have a better handle on basic principles that affect choices of materials for noise or vibration controls. Because E-A-R manufactures the broadest selection of materials for noise and vibration controls available from a single source, we usually can offer engineers a wider selection of choices for noise and vibration controls than is expected. Choosing the right materials for a particular noise or vibration problem does not require magic, but can sometimes be tricky. Through many years of partnering with manufacturers to solve noise and vibration problems, E-A-R's engineers know both the usual noise sources in designs, and how to efficiently diagnose the specific acoustic signature of a particular model. E-A-R authored 'The Four-Fold Method of Noise and Vibration Control' to help engineers gain a better understanding of underlying design issues that impact noise and vibration control."

"The Four-Fold Method of Noise and Vibration Control" tutorial is eight pages in length and can be obtained at no charge at http://www.earsc.com/pdfs/engineering/4foldWP.pdf , or by writing to solutions@earsc.com, or phoning 877-327-4332. E-A-R Specialty Composites (www.earsc.com) manufactures proprietary, high performance plastics and foams-vinyls, urethanes and rubbers-for noise control, vibration isolation and damping, cushioning and ergonomics. E-A-R Specialty Composites maintains headquarters and a production facility in Indianapolis, Indiana, a plant in Newark, Delaware, near Philadelphia, and additional sales, engineering and design support in Asia.

Product inquiries can be called in to +1 877 327 4332 or sent to solutions@earsc.com, or via post to E-A-R Specialty Composites, 7911 Zionsville Road, Indianapolis, IN 46268, USA.

Noesis Solutions and KAIST Agree to Deploy OPTIMUS in Mechanical Engineering Department

Noesis Solutions has announced that the Department of Mechanical Engineering of KAIST (Korean Advanced Institute of Science and Technology) will use OPTIMUS in its design courses. OPTIMUS is Noesis Solutions' flagship product for the Process Integration and Multi-Disciplinary Design Optimization Market. "OPTIMUS is an ideal tool for students interested in design optimization and its application in mechanical analysis, including structural, thermal or fluid flow simulation. Students will now be able to automate their design process and link with any simulation program, to automatically launch a series of virtual experiments and quickly explore the design space and to identify better-performing designs with higher quality, faster than ever before. We are happy that our technology and software will be used throughout KAIST's engineering design courses," says Mr. Hans Wynendaele, CEO and President of Noesis Solutions.

Professor Byung Man Kwak, currently Samsung Chair Professor in the Department of Mechanical Engineering of KAIST, adds "Our main research interests are optimal design and its applications to real-life problems, contact mechanics, and design methodologies for development of practical systems. We are convinced that OPTIMUS will help our students in applying Noesis Solutions' world-class technology in multi-disciplinary optimization to solve their own practical design optimization problems. The OPTIMUS framework is also extremely suitable to incorporate internally developed optimization algorithms. Our students will benefit tremendously from the power OPTIMUS brings for design exploration, design optimization and robust design. It will make our students better prepared when they embark on their careers in industry."

For more information: Noesis Solutions NV, Peter van Vooren, + 32 16 38 43 78, info@noesissolutions.com, URL: www.noesissolutions.com

PCB Piezotronics

Thin Film Pressure Transducers

Series 1500 Thin-Film Pressure Transducers and Transmitters from the Pressure Division of PCB Piezotronics, Inc. feature all-welded construction and integral hermetic connector or molded integral cable options. Transducer design eliminates troublesome mechanical fasteners, washers, o-rings, or fluid fills, which is said to greatly enhance the reliability and long-term repeatability of the units. Rugged, stainless steel construction makes these sensors suitable for a wide variety of laboratory, factory, field, or submersible environments. Full-scale ranges are available from full vacuum to 6,000 psi (400 bar), with accuracies of 0.5%, 0.25%, and 0.1%. Versions with 0-5 VDC, 0-10 VDC, or loop-powered 4-20 mA output signals are offered, and a variety of pressure ports and electrical connections are available.

Signal Conditioners

Flexible dual mode signal conditioners from the Electronics Division of PCB Piezotronics, Inc. power ICP® and charge output piezoelectric pressure, force, strain, and vibration sensors, and condition their output signals for transmittal to readout and recording instruments. Single-, four-, and eight-channel configurations are available, with a choice of AC or DC coupled. AC and DC power options allow for both laboratory and field use. Factory-supplied external universal power supply connects to 115/230 VAC power outlet. Signal Conditioners can also be used with a 28 VDC power supply, a 12 VDC auto lighter power adapter, or a portable DC power source. Units feature keypad control, with an option for an RS-232 computer control setup, and utilize a vivid matrix display for enhanced readability. Optional features include fixed gain (x1, x10, x100) or incremental gain (0.0025 to 200), various low pass filters ranging from 100 Hz to 100 kHz, clamped output for repetitive pulses, integration, and switched auxiliary output.

Array Microphone Stand

The Vibration Division of PCB Piezotronics, Inc. has introduced Model 379A01 Array Microphone Stand that is capable of holding up to 64 microphones. This lightweight, precision-made test stand can be easily rotated radially and front-to-back, and can accommodate flexible pattern arrangements (1x16,

Noesis

PCB Piezotronics

The power to measure $20 \times \mathrm{Log}_{10}\left(\frac{\text{earthquake}}{\text{eyeblink}}\right)$

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- 2 output channels
- 1 tachometer channel
- 120 dB dynamic Range
- 93 Khz realtime bandwidth

SignalCalc Mobilyzer

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- 120 - 150 dB dynamic range
- 49 kHz analysis bandwidth 97 kHz optional

SignalCalc Savant

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2x8, 4x4, etc.). Fixed microphone spacing of 8 cm (3.15 inches) is also available in multiples of 4 cm (1.57 inches).

Pressure Sensors and Signal Conditioners

The Pressure Division of PCB Piezotronics, Inc. offers pressure sensors and signal conditioners that support the TEDS (Transducer Electronic Data Sheet) IEEE P1451.4 standard. TEDS sensors are self-identifying transducers that contain fields that fully describe the type, operation, and attributes of the transducer, and are typically used in large channel count testing such as acoustic array applications. The IEEE P1451.4 standard defines a mixed-mode interface that retains the traditional analog sensor signal, but adds a low-cost serial digital link to access a TEDS embedded in the sensor for self-identification and self-description. The embedded memory chip eliminates the need to manually input sensor parameters when configuring a system. Users will be able to simplify sensor set-up, use, and maintenance, obtain calibration data, and eliminate manual data entry and error when using TEDS pressure sensors. For further information on PCB products, contact Andrea Mohn, Marketing Coordinator, PCB Piezotronics, Inc., 3425 Walden Avenue, Depew, NY 14043-2495 USA. Telephone: +1 800 828 8840 ext. 2216; Fax: +1 716 684 0987; E-Mail: mktg@pcb.com.

Member Society Profile *continued from page 41*

studying/working in acoustics in Canada, with student travel subsidies available for CAA conferences and other acoustics conferences, student and young-professional paper and presentations awards, a major post-doctoral award (the Edgar and Millicent Shaw Postdoctoral Prize in Acoustics), graduate student awards in a number of specialized areas of acoustics, an undergraduate award, and a high-school award for science fair projects in acoustics. Christian Giguère is presently serving as the CAA Awards Coordinator.

The CAA currently has more than 350 members, a number that has grown steadily over the past few years. The Association is administered by a Board of Directors, with eight elected directors serving four-year terms, and an Executive Committee presently consisting of President (Stan Dosso), Past President (John Bradley), Executive Secretary (David Quirt), Treasurer (Dalila Giusti), and Editor-in-Chief (Ramani Ramakrishnan). More information on the CAA is available at website http://caa-aca.ca (maintained by David Stredulinsky).

Acknowledgements

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ACO Pacific, Inc. ..... Belmont, California
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USA ..... Graduate Program in Acoustics, The Pennsylvania State University, State College, Pennsylvania

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.

2005 June 27-29

International INCE Symposium

Managing Uncertainty in Noise Measurement and Prediction

Le Mans, France. For further information, fill in the form on the home page, www.uncertainty-noise.org. To ask a specific question, address an e-mail message to info@uncertainty-noise.org.

2005 August 06-10

INTER-NOISE 2005

The 2005 International Congress and Exposition on Noise Control Engineering

Rio De Janiero, Brazil. Contact: Prof. Samir N.Y. Gerges, Mechanical Engineering Department, Acoustics and Vibration Laboratory, University Campus - Trindade, Florianopolis, SC - CEP 88040-900, BRAZIL. Tel. +55 48 2344074; Fax: +55 48 2320826: e-mail: samir@emc.ufsc.br.

2005 October 17-19

NOISE-CON 2005

The 2005 National Conference and Exposition on Noise Control Engineering

Minneapolis, MN, USA. 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. Internet: http://www.inceusa.org.

2006 December 03-06

INTER-NOISE 2006

The 2006 International Congress and Exposition on Noise Control Engineering

Honolulu, Hawaii, USA. 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. Internet: http://www.inceusa.org.

2007

INTER-NOISE 2007

The 2007 International Congress and Exposition on Noise Control Engineering

This congress will be held in Istanbul, Turkey. For further information on the dates, please contact the I-INCE General Secretary, Robert J. Bernhard, Ray W. Herrick Laboratories, Purdue University, West Lafayette, IN 47907, USA. Tel. +1 765 494 2141; FAX: +1 765 494 0787; e-mail: bernhard@ecn.purdue.edu.

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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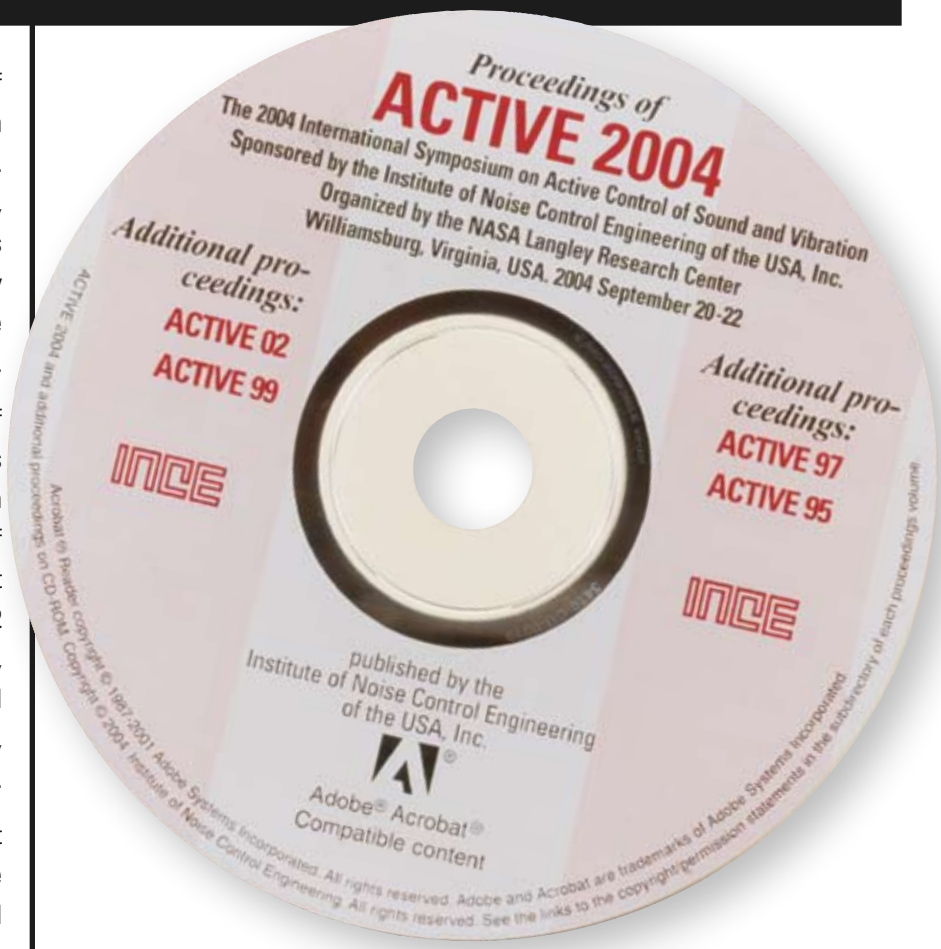
ACTIVE 04 CD-ROM

WITH ADDITIONAL PROCEEDINGS

This CD-ROM contains the Proceedings of ACTIVE 04, The 2004 International Symposium on Active Control of Sound and Vibration. ACTIVE 04 was held in Williamsburg, Virginia, USA on September 20-22. The Symposium was sponsored by INCE/USA, and was organized by the NASA Langley Research Center. There are 101 papers from ACTIVE 04 on the CD-ROM.

The CD-ROM also contains the proceedings of four other ACTIVE Symposia. ACTIVE 02 was held at the Institute of Sound and Vibration Research in the United Kingdom in July of 2002 (117 papers). ACTIVE 99 was held in Fort Lauderdale, Florida, USA in December, 1992 (115 papers), ACTIVE 97 was held in Budapest, Hungary in August, 1997 (103 papers), and ACTIVE 95 was held in Newport Beach, California in July of 1995 (125 papers).

Together, these 561 papers are the most extensive collection ever published on the technical aspects of active control of sound and vibration. The CD-ROM can be searched by any character string.



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