

NOISE/NEWS

Volume 24, Number 3
2016 September

INTERNATIONAL

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

Special Features: NOISE-CON 2016,
Executive Summaries

Aircraft/airport noise

The Acoustical Society of China

12th IC BEN Conference

Environmental noise and mental
health



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Volume 24, Number 3

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NOISE/NEWS

INTERNATIONAL

This PDF version of Noise/News International 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). This is the third volume that is being published in PDF format only. The PDF format means that the issues can be read by freely available software such as that published by Adobe and others. It reduces publication time, saves printing costs, and allows links to be inserted in the document for direct access to references and other material. Individuals can sign up for a free subscription to NNI by going to the web site <http://www.noisenewsinternational.net>.

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 fifty-one member societies in forty-six 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 and Its Internet Supplement

www.noisenewsinternational.net

The primary change in this PDF-only volume of *NNI* is the ability to have “hot links” to references, articles, abstracts, advertisers, and other sources of additional information. In some cases, the full URL will be given in the text. In other cases, a light blue highlight of the text will indicate the presence of a link. At the end of each feature or department, a light blue [back to toc](#) will take the reader back to the table of contents of the issue.

The Internet supplement contains additional information that will be of interest to readers of *NNI*. This includes:

- The current issue of *NNI* available for free download
- *NNI* archives in PDF format beginning in 1993
- A searchable PDF of annual index pages
- A PDF of the current *NNI* conference calendar and a link to conference calendars for worldwide meetings
- Links to I-INCE technical activities and I-INCE Technical Reports

After watching the national political party conventions in the USA, I am reminded of the need for all of us to participate in our respective governmental organizations to make them effective. The same is true for the International Institute of Noise Control Engineering (I-INCE) and the Institute of Noise Control Engineering of the United States (INCE-USA). Both of these organizations are only as good as the people participating in their activities and governance.

I would encourage all those reading this column to consider how you can participate; or, if you are already doing so, how you could contribute to a greater extent. Both organizations offer opportunities to participate as officers, members of the board of directors, conference chairs and technical chairs, and session organizers for conferences. In addition, there are frequently technical committees and ad hoc committees looking for participants.

INCE-USA elects five new members of the board of directors each year. This is just one example of the opportunities to participate. As a member of the board, you have the opportunity to attend the two board meetings each year and participate in setting the direction for future activities of the institute. Common topics of discussion with voting by the board include conference site and timing, new outreach programs, initiatives of cooperation with other professional organizations, new training courses and seminars, and multiple budget issues and decisions of resource allocation.

To get started with I-INCE, simply send an email to the secretary general, Paul Donavan, at pdonavan@illingworthrodkin.com. To seek greater involvement with INCE-USA, contact the INCE-USA business office at ibo@inceusa.org. In either case, the individuals involved will be happy to talk with you about how you might get involved and direct you to individuals that can discuss specific opportunities for involvement.

If you are not comfortable with using the above e-mail addresses, contact someone you know who is already working on a NOISE-CON or INTER-NOISE conference, or someone serving as an officer or on the board of either of these organizations. There is always a need for those interested in being an active member. Whomever you talk with will be happy to help you get involved.

So, it is up to you to take the first step. The next time you wonder why a topic was not covered at a conference or why there isn't a seminar covering a particular area of noise control of interest to you, remember that there is something you can do about it—you can participate in I-INCE or INCE-USA. They will be eager to get you involved, and the opportunities available to contribute to the profession of noise control engineering will be much greater than you anticipated.

I hope you will step up to the challenge and become actively involved in either or both of these outstanding organizations. 



Jim Thompson
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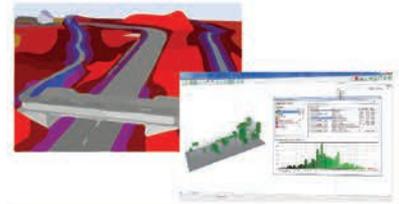
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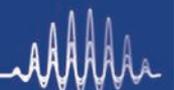
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The Acoustical Society of China

The Acoustical Society of China (ASC) is the only professional society in acoustics in China and is also a nongovernmental organization affiliated to the China Association for Science and Technology. As a union of acoustical scholars throughout China, ASC is dedicated to the development of science and technology in the field of acoustics, and to the promotion of popularization and exchange of relevant knowledge.

ASC was established in 1985, based on the Sub-Society of Acoustics, Chinese Physical Society, and the Applied Acoustical Society, Chinese Institute of Electronics. The membership is about forty-nine hundred at present. It has ten branch societies and fourteen provincial societies keeping abreast of developments and needs of the membership in their specialized fields or local areas. Those branches include physical acoustics, underwater acoustics, environmental acoustics, audio engineering, speech/hearing and music acoustics, biomedical ultrasonic engineering,

detection ultrasonics, sonoelectronics, nonlinear acoustics, and acoustic media and information. There are six working councils for different affairs of the society, including scientific communication, scientific popularization, organization, international affairs, technical consultancy, and youth members' affairs. The society publishes three academic journals, that is, *ACTA ACUSTICA* (both in Chinese and English), *Noise and Vibration Control* (in Chinese), and *Applied Acoustics* (in Chinese). The society has established two acoustical awards since 2008, that is, the Dah-You Maa Acoustical Award and the Best Paper Award for Chinese Youth Conference on Acoustics (CYCA).

ASC is also very active in the international professional affairs in acoustics. It has been a member society of the International Institute of Noise Control Engineering (I-INCE) since 1982, the Western Pacific Acoustics Conference (WESPAC) since 1988, the International Commission on Acoustics (ICA) and International Union of Pure and Applied Physics (IUPAP),

allied in UNESCO, since 1998, and the International Institute of Acoustics and Vibration (IIAV) since 2009. ASC successfully organized a series of international conferences, including the sixteenth and thirty-seventh International Congresses on Noise Control Engineering (INTER-NOISE 1987 and 2008), the Fourteenth International Congress on Acoustics (ICA 1992), the First Joint World Congress on Ultrasonics—Ultrasonics International (the WCU/the UI 2005), and many bilateral conferences on acoustics.

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Executive Summaries of 2014 and 2015 Reports of National Academy of Engineers-Hosted Workshops

On February 19–20, 2014, the National Academy of Engineers (NAE) hosted a workshop called “Reducing Employee Noise Exposure in Manufacturing: Best Practices, Innovative Techniques, and the Workplace of the Future.” On October 6–7, 2015, the NAE hosted a workshop called “Engineering a Quieter America: Progress on Consumer and Industrial Product Noise Reduction.” The reports from these workshops (along with noted appendixes) can be found on the INCE-USA website at <http://www.inceusa.org/node/346>. The executive summaries are provided below.

Executive Summary 2014

This report contains summaries of the papers presented at a workshop hosted by the National Academy of Engineering on February 19–20, 2014. The title of the workshop was “Reducing Employee Noise Exposure in Manufacturing: Best Practices, Innovative Techniques, and the Workplace of the Future.” Five major topics were addressed during the workshop:

1. Hearing Conservation Programs in Manufacturing Industries
2. Best Practices: Noise Control in Manufacturing Industries
3. Engineering for Noise Control in Manufacturing
4. Innovative Techniques for Engineering Noise Control
5. The Manufacturing Workplace of the Future

The papers in this report have, in some cases, been ordered differently than at the workshop. The workshop agenda

can be found in Appendix B of this report. Chapter 1 presents some general information on the scope and purpose of the workshop.

In Chapter 2, the workshop cochair, Lotz, first addressed the hearing conservation topic by presenting information on the programs of the National Institute for Occupational Safety and Health (NIOSH), in particular, the “Safe in Sound” award, which is given to companies with outstanding hearing conservation programs. Then Downey, Mulhausen, and Westrum described specific programs that have been implemented in their respective companies.

In Chapter 3, the topic “Best Practices: Noise Control in Manufacturing Industries” was addressed by five speakers. For new facilities, a key element of planning is the computer modeling of the workplace and the noise level of the equipment to be installed. Probst shows how the CADNA(R) program can be used to model the workplace once the dimensions of the space, the sound absorptive properties of the surfaces, and the noise emissions of the equipment to be installed are known. He gives several examples of successful modeling. Because of the importance of this topic, a long version of the work is presented in Appendix A, with a shorter version in the body of this report. The design of the equipment to go in the workplace is obviously an important factor for equipment manufacturers to consider. Herrin then presents information on the physics of low-noise product design. The next paper by Thompson includes information on the planning process used by NIOSH in the procurement of equipment in the mining industry where noise levels

must be controlled. In the planning process, the user and the purchaser must know the noise emission levels of equipment to be installed, and emission standards facilitate the communications between buyer and seller. Murphy describes the key American National Standards for noise emissions. Finally, Maling describes “Buy Quiet” programs such as those developed by the National Aeronautics and Space Administration (NASA) and others. It is well accepted that the cost of noise control is lower during the machine design process than the cost of add-on solutions at the end of the design stage, or especially after the equipment has been delivered and installed. So the question has been asked: “Why buy a noise problem?”

The “best practices” topic continues in Chapter 4 with a series of papers on “Engineering for Noise Control in Manufacturing.” This has some overlap with the next chapter, Chapter 5, on “Innovative Techniques for Engineering Noise Control” because the engineering solutions described here may very well have been innovative at the time they were implemented. Chapter 4 contains an overview paper by Bruce on what progress has (and has not) been made in the reduction of noise in America’s manufacturing sector, and is followed by a series of papers devoted to specific engineering solutions for several sources. Wood discusses noise control for a manufacturing environment containing many sources. Stewart has two papers, the first devoted to a history of noise control in the textile, tobacco, and woodworking industries, and the second devoted to noise

control of a shredding machine. Bruek discusses noise control at a metal conduit manufacturer, and Roberto and Tam cover several sources, including injector drills and vibratory feeders in a manufacturing plant.

“Innovative Techniques for Engineering Noise Control” is the title of Chapter 5. Lucas describes advanced aeroacoustic modeling techniques for the design of compressors, especially finite element techniques where the mesh “goes with the flow.” He continues with new techniques for pneumatic tools. Anderson has long experience in the automotive industry and describes manufacturing techniques in that industry. Barnes describes how a shift in process, from reciprocating equipment to rotary equipment, can lower noise levels. More describes techniques for the reduction of noise from power generator sets. Finally, Taylor describes an innovative method for removing rivets from airplanes using an electrodischarge machining method. The project is called Fastener Removal Improvement Technology Adoption (FRITA) and is said to result in a safer removal process with lower noise levels. In the final paper, Barnes describes a change from reciprocating to rotary equipment in a candy plant.

In Chapter 6, the authors give us a vision of the manufacturing workplace of the future. This topic was added to the workshop agenda because the National Academy of Engineering (NAE) initiated a broad study of future manufacturing, and the organizing committee felt that a glimpse of the future might give some direction to noise control engineering measures that might be needed in the future. Whitefoot presented an overview of the NAE program, Lilley gave a view from the National Institute for Standards and Technology (NIST), and Taylor gave her vision as seen by the National Center for Manufacturing Sciences (NCMS). In the final paper, Barnes describes what happens when sales and engineering personnel are on the factory floor.

Executive Summary 2015

This report documents two dozen noise control success stories during the past few decades. These were presented at a workshop attended by experienced engineers working for US manufacturers producing consumer products ranging from automobiles to yard-care leaf blowers, and industrial products ranging from air-moving devices to valves. Products ranged from small handheld devices to million-pound off-road trucks. The report addresses ongoing contributions by noise control engineers to improving both quality of life and the US economy by providing domestic manufacturers with the expertise to develop, produce, and sell the quieter products now demanded by global markets. Expected future noise control engineering technologies are also addressed.

The 2015 workshop was titled “Engineering a Quieter America: Progress on Consumer and Industrial Product Noise Reduction.” It was held on October 6–7, 2015, at the Keck Center of the National Academies in Washington, DC. Thirty-one people attended the workshop, and twenty-five technical presentations were made on a wide variety of associated topics. Adnan Akay, Eric Wood, Robert Hellweg, and George Maling served as cochairs of the workshop, and these four along with William Lang made up the organizing committee. NAE President Dan Mote and NAE Program Director Proctor Reid provided opening remarks.

Noise from consumer products was the subject of the first seven papers presented. Wayne Morris from the Association of Home Appliance Manufacturers (AHAM) said that the association has adopted a series of standards produced by the International Electrotechnical Commission (IEC) for the rating of home appliances. These standards, known as the IEC 60704 Series, cover a wide variety of home appliances and provide a consistent method of measuring the noise produced. When in use by all manufacturers, they will provide

a uniform way for consumers to include consideration of noise emission when selecting products. Another organization that connects with the public is Consumer Reports (CR), which has collected a database of product noise levels that probably ranks among the largest in the world. CR’s Mark Connelly presented their test methods for rating noise.

The next presentations addressed how noise control engineering is applied to a wide variety of consumer products, from dishwashers to food waste disposers to leaf blowers to information technology equipment. Significant progress has been made over the last two decades in the production of quiet products, and consumer demand for quiet products is high. Matthew Nobile of Hudson Valley Acoustics presented a method of rating product noise that closely resembles IEC methods used in the appliance industry, and removes the confusion associated with noise emission ratings based on sound pressure and sound power.

One paper was presented on progress made in the reduction of automobile interior noise. Quiet automobile interiors are highly prized by consumers, and great progress has been made in identifying how noise enters the cabin and how it can be reduced.

The next presentations addressed the workshop’s second topic: commercial and industrial products. Robert Putnam discussed the need for quiet products in industry. Then, two presenters—representing the Air Heating and Refrigeration Institute and Ingersoll Rand, and the American Society of Heating, Refrigerating and Air-Conditioning Engineers—addressed the considerable progress made in the air-moving industry. Next, Geoff Sheard, the chair of the board of the Air Moving and Conditioning Association, discussed his industry’s progress including the use of computational techniques to design low-noise fan blades.

Low-noise designs are needed as we move into the construction of high-performance buildings and green buildings. One finding in the “Technology for a Quieter America” report was that “There is wide dissatisfaction with noise in buildings in which business is conducted. Postoccupancy evaluations by the Center for the Built Environment at the University of California at Berkeley (2007) have shown that occupants are generally dissatisfied with noise and sound privacy.” Indications are that green buildings can be even worse.

Ten presentations were then devoted to progress in reducing noise from industrial products and components. Topics included:

- Industrial power generation equipment
- Electric power generator sets
- Industrial motors
- Compressors
- Transformers
- Valves and piping
- Gears

- Off-road machines
- Mining equipment
- Natural gas pipelines

Many of these products can be thought of as a system along the lines of the classic source-path-receiver model. But the current system model must include multiple sources, multiple paths, and in many cases, multiple receivers. Multiple sources include all of the components listed above.

Presenters consistently mentioned various drivers for noise control. While, in the context of consumer products, customer demand for quiet products and information on product noise is widespread, sources of demand for quiet commercial and industrial products include community requirements, community pressure, customer requirements, and government requirements.

There was little discussion about community requirements. Local noise

ordinances are known to be inconsistent and in some cases out of date.

Community pressure can be felt in many ways. For example, a company installing power transformers may be aware of a surrounding community’s concerns about unacceptable noise, and may establish specifications that a transformer manufacturer must meet. Direct customer demand may arise when a builder of a system such as a power plant places noise requirements on the components that make up the system. Finally, there may be government requirements; examples are European noise requirements on construction equipment and, in the United States, FERC noise requirements on gas compressor stations and large LNG compressor facilities.

Two additional papers were presented. Kurt Yankaskas presented noise control work by the US Navy, and Robert Hellweg summarized national and international noise standards. 

NOISE-CON 2016 Report

NOISE-CON 2016, the 2016 National Conference and Exposition on Noise Control Engineering, was held on June 13–15, 2016, in Providence, Rhode Island, USA. One hundred seventy-five technical presentations were given at the conference. The one hundred seventy-nine papers, along with other information about the conference, were distributed to the 293 attendees on a thumb drive. Michael Bahtiaran served as general chair, Herb Singleton served as vice chair, Eoin King served as the technical chair, Karl B. Washburn served as the technical vice chair, and Richard J. Peppin and Beth Levine served as the exposition managers. Gordon Ebbitt and Courtney Burroughs served as the proceedings editors. Dana Lodico served as the student activities chair.

Written papers were submitted in ten core-session topics and thirteen focused-session topics. The overall paper organization is shown below. Perhaps due to the location, there were a large number of papers focused on marine and architectural noise. The distribution of papers can also be seen in the list by major category shown below.

- HVAC and Building Systems Noise Control
- Workplace and Healthcare Acoustics
- Highway Noise
- FTA Model and Railway Noise
- Perception of Sound
- Modeling
- Element-Based Modeling Methods
- Education and Outreach
- Marine
- Measurements
- Automotive Noise
- Mufflers and Silencers
- Architectural Noise and Vibration Control
- Building Acoustics Measurement and Modeling

- Industrial Noise
- Mining Noise Control
- Product Noise
- IT Noise
- Community Noise
- Outdoor Sound Propagation
- Noise Policies, Legislation, and Regulations
- Active Control
- Wind Turbines
- Construction Noise
- Absorption Materials and Treatments
- Vibration of Structures and Structural Acoustics 10

In addition to the presentation of the technical papers at the conference, there were two special sessions held that provided meaningful information to those who attended:

- Special session honoring Richard Lyon, Eric E. Ungar, and István L. Vér. This special session provided a full historical perspective of the contributions of these outstanding contributors to the noise control profession.

- “Sound Choices: Empowering People and Protecting Nature” workshop. This workshop was open to the public and was focused on training educators about teaching the principals of acoustics and noise control at the elementary level. Each educator attending received a kit of materials and tools for providing engaging demonstrations.

There were also three short courses offered to those who attended the conference:

- “INCE Fundamentals Exam Prep Course”
- “Intensity Measurements,” taught by Steven Jorro, E-A-R Thermal Acoustic Systems
- “Marine Noise Simulations,” taught by Dr. Rabah Hadjit and Dr. Bryce Gardner, ESI-Group

The opening events for the conference were held on Monday, June 13. At this early morning session Mike Bahtiaran welcomed everyone to NOISE-CON 2016 and recognized the organizational team who put together the conference (Figure 1). Rick Kolano, INCE-USA president,



Figure 1. Mike Bahtiaran Opening NOISE-CON 2016



Figure 2. Rick Kolano, INCE-USA President, Welcoming Conference Participants



Figure 3. Dr. Robert Celmer Giving Opening Plenary Presentation

thanked Mike and the team and provided an overview of INCE-USA, and also encouraged members to participate in the institute and contribute to the noise control engineering profession (Figure 2). The opening plenary presentation was provided by Dr. Robert Celmer of the University of Hartford (Figure 3). This presentation on the University of Hartford Acoustics Program provided an excellent overview of educational and research programs at the university in acoustics and noise control.

Numerous undergraduate student programs were discussed. This program is innovative in actively involving students in solving industrial and community noise problems with realistic timelines and milestones. It provides an excellent educational experience for those entering into the noise control profession.

As has been done in recent NOISE-CON conferences, an app was used to provide attendees with a detailed schedule, session

information, maps, and timely updates on events and issues. This app was developed and maintained by Jeff Fullerton. Based on the guidebook platform, this app proved highly effective and useful to attendees.

Also, on Monday morning, the public outreach workshop on community noise began. This workshop was open to the public and focused on training educators about teaching the principals of acoustics and noise control at the elementary level. There were approximately fifty attendees. Each educator attending received a kit of materials and tools for providing engaging demonstrations. This workshop was sponsored by A Quieter Future (AQF), the Michiko So Finegold Memorial Trust, and INCE-USA. In the morning session, the National Oceanic and Atmospheric Administration (NOAA), Stellwagen Bank National Marine Sanctuary, National Park Service, and Dr. Jesse Barber from Boise State University discussed their research and the effects of noise on marine life, terrestrial wildlife, and plants. The afternoon session provided instruction for educators on how to use AQF STEM kits to teach children about the issues of noise in nature and our oceans.

The student luncheon was held at noon on Monday. This session was sponsored by the National Council of Acoustical Consultants (NCAC). There was an excellent turnout for this event with many useful discussions of careers in noise control engineering with representatives from industry, universities, and government.

The exposition opening reception was held Monday evening. With sixty-one exhibitors, there was much for the attendees to see in touring the exhibit space. The exhibit area was large and excellently arranged. There was good traffic flow and minimal congestion to impede people's ability to visit the displays.

On Tuesday morning, June 14, the sessions began with a few announcements by Mike Bahtiaran. This was followed by the introduction of the plenary speaker, Kurt Yankaskas (Figure 4), by Joe Cuschieri. Dr. Yankaskas's presentation, "Landing on the Roof," provided an interesting account of noise control issues on US Navy aircraft carriers and the measures taken by the navy to protect sailor's hearing. The use of modeling, innovative materials, and comprehensive audiometric testing was discussed in some detail.

Following this plenary, there was an interesting special session honoring Richard Lyon, Eric E. Ungar, and István L. Vér. This session, organized by Eric Wood, was an outstanding review of the numerous accomplishments of these pioneers in noise control engineering. With standing-room-only crowds, the session was well attended and widely praised. With presentations by colleagues, mentees, and family members, it was a moving session and a fitting tribute to these individuals and their contributions.

At noon on Tuesday, the women in noise control engineering lunch, sponsored by Scantek, Inc., was hosted by Patricia Davies. It was well attended with good discussions among those participating. This meeting provided a forum for women in the field to share their experiences with each other and talk about ways to increase the number of women participating in noise control engineering.

On Tuesday evening, a social event was held at the Rhode Island School of Design. All who attended had a wonderful evening enjoying the art and the opportunity to socialize with colleagues from around the world. This event was sponsored by Cambridge Sound Management.

On Wednesday morning, June 15, Karl Washburn introduced the plenary lecture



Figure 4. Tuesday's Plenary Speaker Kurt Yankaskas



Figure 5. Wednesday's Plenary Speaker Dr. James F. Miller

by Dr. James F. Miller of the University of Rhode Island (Figure 5). Dr. Miller's presentation, "Acoustic and Seismic Monitoring of Pile Driving for the First Offshore Wind Farm in the US," provided a detailed account of the experimental study of the acoustic emissions from the Block Island Wind Farm. The noise emitted by the pile driving process to anchor this wind farm was discussed in considerable detail. Although all the

data has not been analyzed, Dr. Miller's presentation provided some useful insights into the nature of the sound generated and the direction effects resulting from the angles of repose used for the various pilings.

This presentation was followed by the INCE-USA awards ceremony (Figure 6), where several student and professional awards were made. These included three



Figure 6. Jeff Fullerton and Yong-Joe Kim Introducing Award Winners



Figure 7. NOISE-CON 2016 Student Volunteers

travel awards, two presentation awards, and recognition of the 2014 Beranek Medalists. All funding for these awards was provided by the INCE Foundation, some of it from directed donations. Dana Lodico, the student coordinator, introduced the student volunteers who were essential to making the conference operate efficiently (Figure 7).

Professional Awards

- *Martin Hirschorn IAC Award—Best Paper Prize*
 - This prize is funded by the INCE Foundation to recognize the best published paper within the preceding two years on new and/or improved cost-effective

noise control and/or acoustical conditioning products.

- The winning entry for this award was “Noise Responses Before and After Noise Abatement Measures in a Residential Intervention Project.” The authors are Anita Gidlöf-Gunnarsson, Evy Öhrström, Tor Kihlman, and Jens Forssén.
- *Distinguished Noise Control Engineer Award*
 - This INCE-USA award recognizes individuals who have rendered conspicuous and consistently outstanding service to the institute and to the field of noise control engineering over a sustained period.
 - Awarded to Dr. Rajendra Singh for his long career as an outstanding researcher in the area of gear noise and an exemplary educator to so many individuals in the noise control industry, along with extensive contributions to INCE-USA and I-INCE that have enhanced the professional discussions and connections of our industry (Figure 8).
- *Laymon N. Miller Excellence in Acoustical Consulting Award*
 - This award is to be provided to an individual who has practiced acoustical consulting in an exemplary manner over a sustained period of time to improve acoustical environments in and around buildings, transportation systems, work places, and recreational and other occupied spaces such that the quality of life for citizens and communities is significantly enhanced.
 - Awarded to James D. Barnes for his dedication to his clients, noise control engineering, and promulgating our knowledge in and awareness of acoustics to others toward the advancement of our industry and the betterment of society (Figure 9).



Figure 8. Distinguished Noise Control Engineer Award Winner Dr. Rajendra Singh



Figure 9. Laymon N. Miller Excellence in Acoustical Consulting Award Winner James D. Barnes

Student Awards

• Student Paper Competition

- For NOISE-CON 2016, six entries, five awards were selected based on the peer reviews of their papers and presentations.

- \$1,000 was awarded to each winner, \$500 for subsequent publication in NCEJ with the recognition as a Student Paper Competition winner.

- Funding was provided by the INCE Foundation.

- 2016 was the twenty-eighth competition.

- 2016 INCE-USA Student Paper Competition winners are:

Gil Jun Lee, “Design of a Squeak Test Apparatus Based on a Modified Sprag-Slip Mechanism,” University of Cincinnati

Tongyang Shi, “The Use of Wideband Acoustical Holography for Noise Source Visualization,” Purdue University

Jiawei Liu, “Noise Source Identification Based on an Inverse Radiation Mode Procedure,” Purdue University

Kamil Kocak, “Analytical Modeling of a Single Hybrid Particle Impact Damper Under Periodic Impulse Excitation,” Georgia Tech

Shu Jiang, “High-Resolution Ultrasonic NDE Imaging Method with Virtually Expanded Circumferential Aperture in Small-Diameter Cylindrical Oil/Gas Pipes,” Texas A&M University

- “Classic Papers in Noise Control Engineering” Competition (formerly “Old Meets New”)
- For NOISE-CON 2016, six entries, one winner was selected with \$1000 prize (Figure 10).
- Funding was provided by the INCE Foundation.
- 2016 was the fifth competition.
- 2016 INCE-USA Classic Papers in Noise Control Engineering Presentation Competition winner is:

Daniel Carr, “Revisiting Applegate and Croker’s 1976 NCEJ paper: ‘Reducing the Noise of a Rotary Lawn Mower Blade,’” Purdue University

- *Leo Beranek Student Medal for Excellence in the Study of Noise Control*

- The Beranek Medal committee consisted of Bill Cavanaugh, Lily Wang, and Eric Wood.

- This award consists of an engraved medal and certificate of recognition to one undergraduate and one graduate student nominated by a North American institution. Funding was provided by the INCE Foundation.

- 2016 was the sixth year of the award.

- 2016 winners (three undergraduate and three graduate students) are:

Sean Hughes, University of Cincinnati, Undergraduate (Bronze)
Joel Bruns, Ohio State University, Undergraduate (Bronze)

Anna Catton, Michigan Tech University, Undergraduate (Bronze)
Tao Feng, University of Cincinnati, Graduate (Pewter)



Figure 10. Classic Papers in Noise Control Engineering Award Winner



Figure 11. Michiko So Finegold Award Recipients

Joseph Plattenburg, Ohio State University, Graduate (Pewter)
 Troy Bouman, Michigan Tech University, Graduate (Pewter)
 Peng Wang, University of Kentucky, Graduate (Pewter)

- *Michiko So Finegold Award*
- Larry Finegold made a generous donation to the INCE Foundation from the Michiko So Finegold Memorial Trust. It is open to graduate students and young

professionals studying noise effects research, development of noise policy, and related aspects of noise control engineering.

- 2016 was the fourth year of the award.
- Five awardees were selected for NOISE-CON 2016 (Figure 11).
- Each 2016 award was \$1,000.
- 2016 Michiko So Finegold Travel Award Winners are:

Mahsa Asgarisabet, Michigan Tech University, Graduate
 Philip Feurtado, Penn State University, Graduate
 Tao Feng, University of Cincinnati, Graduate
 Tongyang Shi, Purdue University, Graduate
 Peng Wang, University of Kentucky, Graduate

- *Hallberg Foundation Award*

• Doug Winker made a generous donation to the INCE Foundation from the Elizabeth L. and Russell F. Hallberg Foundation. This travel award is open to undergraduate and graduate students attending and presenting at NOISE-CON or INTER-NOISE.

- Four awardees were selected for NOISE-CON 2016 (Figure 12).
- Each 2016 award was \$1,000.
- 2016 Hallberg Foundation Travel Award winners are:

Seongil Hwang, Texas A&M University, Graduate
 Shu Jiang, Texas A&M University, Graduate
 Gil Jun Lee, University of Cincinnati, Graduate
 Hyunjun Shin, Purdue University, Graduate

INCE-USA, with INCE Foundation support, was able to make nineteen travel

Purdue University
University of Cincinnati
Texas A&M University



Figure 12. Hallberg Foundation Award Recipients

awards to students to support them in presentation of their work at NOISE-CON 2016.

An important event held on Wednesday right after the opening session was the young professionals and students workshop. This was a 140-minute block of time containing a meet/greet with INCE-USA directors and officers, presentations on a number of topics and open discussions, and one-on-one discussion opportunities. Mandy Kachur organized an outstanding session that was well attended and provided a great opportunity for young professionals to learn about INCE, get some guidance from seasoned professionals, and network with each other. 



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European News

From Science for Environment Policy: How Does Living with Aircraft Noise Affect Well-Being? A Study of UK Airports

Airports are associated with air and noise pollution and may, therefore, reduce the quality of life of local people.

This study assessed the link between aircraft noise and subjective well-being, using data from seventeen English airports. The authors conclude that living under flight paths has a negative effect on people's overall well-being, equivalent to around half of the effect of being a smoker for some indicators.

Air traffic in Europe is expected to increase between 1.4 and 2.2 times by 2030 due to increasing demand for air travel and trade links with emerging international markets. To cope with this increase in demand, proposals for airport expansion have been made. In the UK, for example, three airport expansions have been suggested and are currently being assessed in terms of economic, environmental, and human health impacts. Airport expansion is a contentious issue, with environmental groups and scientists citing the potential climate impacts and local residents fearing economic consequences, such as loss of property value.

This study focused on the impact of aircraft noise on subjective measures of well-being. Transportation noise has been linked to adverse effects on quality of life, well-being, and health due to factors such as stress, anxiety, and raised blood pressure. Noise is a leading environmental complaint in the EU, regulated by the Environmental Noise Directive. Although there are well-established links between noise and physical health, evidence on the link to

subjective measures of well-being, such as life satisfaction and happiness, is lacking.

The UK-based researchers assessed how living near airports (or underneath flight paths) explained variation in people's responses to questions on subjective measures of well-being in a large national survey. They combined household data on subjective well-being (measured by questions on happiness, life satisfaction, sense of worth/purpose in life, anxiety, and positive "affective balance"—based on happiness minus anxiety) with geographical data on airport proximity (within 5 km) and measures of aviation noise in decibels. This is the first time these datasets have been used to study household-level aviation impacts.

The major data source used for the study was the Annual Population Survey, an annual survey of around 155,000 households and 360,000 people in the UK. Using postcodes, data from the survey was matched to noise-measurement maps compiled by the Department for Environment Food and Rural Affairs (DEFRA) and provided by the Cabinet Office. Noise data included daytime and nighttime noise, measured between June and September 2012. In total, the data includes a two-year sample of almost 190,000 households (over twenty times that of previous similar studies) with information on noise and proximity for seventeen airports in England.

The researchers created models for airport proximity, presence of daytime aircraft noise, and presence of nighttime aircraft noise. Airport proximity was not significantly associated with any of the subjective well-being variables, suggesting that living close to an airport

alone (i.e., without noise pollution) does not have a noticeable impact on subjective well-being.

Living within a daytime aircraft noise path (with noise at or above 55 dB), however, was negatively associated with all measures of subjective well-being: lower life satisfaction, lower sense of worth, lower happiness, lower positive affective balance, and increased anxiety. The authors found consistently negative and significant results across all five variables. The researchers could also predict the effect on subjective well-being associated with each decibel increase in noise, which they say has potential for modeling the possible well-being impacts due to changes in aircraft noise.

Although there were consistent negative impacts from daytime noise across all measures of well-being, the magnitude of these associations was small compared to other common drivers of well-being, such as unemployment, poor health, and smoking (the negative effects of which are at least twice that of aviation noise).

The researchers found no evidence that nighttime noise affects subjective well-being. There is a possibility, however, not explored in the study, that the noise had a physiological effect on the individuals. Furthermore, the sample of residences affected by nighttime noise at or above 50 decibels was 50 percent lower than for daytime noise, which may affect the significance of the results.

This is the first study to merge national household-level data with geographic location data on airport proximity and objective measures of noise in England, enabling the authors to assess how aviation influences quality of life on a sample over

one hundred times bigger than the most prominent previous study. Based on their results, the researchers concluded that living under air-traffic flight paths may have a negative impact on subjective well-being. These findings support lower real-estate market demand in areas where there is aviation noise.

For more information see http://ec.europa.eu/environment/integration/research/newsalert/index_en.htm.

12th IC BEN Conference on Noise as a Public Health Problem to Be Held in Zurich June 18–22, 2017

ICBEN 2017 will take place on the campus of [ETH Zurich](#) (the Swiss Federal Institute of Technology), in the heart of the city itself. Zurich is the largest city in Switzerland and the most important cultural and economic center of the country. The city is also a science hotspot, home to two distinguished universities (one being ETH Zurich, where the congress takes place), and other higher education schools, research facilities, and high-tech start-ups. Zurich is the perfect jump-off place for the typical Swiss postcard landscapes, including mountains, rivers, and blue lakes, which can easily be reached within a short time using the dense Swiss railway network. Zurich’s international airport is a convenient fifteen-minute train ride away from the city center and has direct flights to all major European cities, as well as North and South American, African, Middle Eastern, and Asian destinations.

The chairpersons of IC BEN and the local organizing committee extend a warm welcome to all prospective participants and look forward to meeting you in Zurich in the summer of 2017 to discuss the latest advancements in noise effects research, environmental epidemiology, and noise policies.

Mark Brink, Congress Chairman
Mathias Basner, President of IC BEN
Kurt Eggenschwiler, President of the Swiss Acoustical Society SGA-SSA

From Science for Environment Policy: Does Environmental Noise Lead to Depression and Anxiety?

People who are annoyed by environmental noise are also more likely to suffer from depression and anxiety, a new, large-scale study from Germany suggests. The results do not prove that noise causes mental health issues but suggest a possible link, which the study’s authors are exploring further. Of all the types of noise considered in the study, aircraft noise was reported to be the most annoying.

Noise, such as traffic and industrial noise, is now recognized as a serious environmental problem and is regulated in Europe under the EU’s Environmental Noise Directive. It is associated with a number of cardiovascular health problems, including heart disease, heart failure, and stroke.

It is also well known that noise can cause annoyance, which can be accompanied by negative, stress-related emotions such as irritability, distress, and exhaustion. However, very little research has considered whether this annoyance and potential stress could lead to mental health

disorders. Therefore, this study investigated whether there is a link between noise annoyance and depression and anxiety. It also explored the annoyance levels caused by different sources of noise.

The researchers analyzed questionnaires completed by 14,635 residents, aged thirty-five to seventy-four, in and around the city of Mainz, Germany, between 2007 and 2012. Part of this area is in the flight path of the nearby Frankfurt Airport, one of the busiest airports in the world.

The questionnaires asked the residents how annoyed they had been in recent years (rated on a five-point scale, from “not annoyed” to “extremely annoyed”) by six different types of environmental noise: road-traffic noise, aircraft noise, rail-traffic noise, industrial/construction noise, neighborhood indoor noise, and neighborhood outdoor noise. The results show that 20.7 percent of participants reported no annoyance to the sources of environmental noise; 26.6 percent, slight annoyance; 25 percent, moderate annoyance; 17.3 percent, strong annoyance; and 10.5 percent, extreme annoyance. Of the six types of noise considered, aircraft noise was the most problematic. Nearly 60 percent of the population reported being annoyed by it to some degree, and 6.4 percent were extremely annoyed by it. Results in Table 1 show annoyance levels caused by the noise sources.

Table 1. Annoyance Caused by Six Sources of Environmental Noise Among Study Participants

Source of noise	Percentage of participants affected (slightly, moderately, strongly or extremely annoyed) (%)	Percentage of participants extremely annoyed (%)
Aircraft	59.9	6.4
Road traffic	43.5	1.9
Neighborhood outdoor	31.8	1.2
Neighborhood indoor	19.6	0.9
Industrial/construction	19.6	0.9

Note: The study does not relate these figures to noise exposure levels.

The researchers asked the participants to indicate whether they suffered symptoms of depression and anxiety, and then assigned a score for each condition. Participants were also asked if they had ever received medical diagnoses of depression or anxiety. The researchers found that indicators of depression and anxiety increased steadily with levels of annoyance to the noise.

Average *depression* scores increased from 3.5 (out of a possible total of 27) among the “no annoyance” group to 5.1 for the “extreme annoyance” group.

The percentage of each group with a depression score of 10 or more (a “clinically significant” level of depression) increased from 6.1 percent of the “no annoyance” group through to 12 percent of the “extremely annoyed” group. The percentage

of the population with medical diagnoses of depression was also higher with each level of annoyance, for instance, 10.1 percent of the “no annoyance” group and 14.8 percent of the “extremely annoyed” group had been diagnosed with depression by a doctor.

Average *anxiety* scores steadily increased from 0.7 (out of a possible total of 6) in the “no annoyance” group to 1.1 among the “extreme annoyance” group.

The percentage of each group with a clinically significant anxiety score of 3 or more increased from 4.5 percent of the “no annoyance” group through to 10 percent of the “extreme annoyance” group. 6.3 percent of the “no annoyance” group had been diagnosed with anxiety disorders, but the figure was 9.9 percent for the “extreme annoyance” group.

The study did not assess actual noise levels, just personal responses to noise. It also points out the possibility that people who are already depressed or anxious may be more sensitive to noise and, therefore, report higher annoyance; it is not necessarily the case that noise annoyance leads to mental health issues.

However, the association between annoyance and mental health disorders in these data is very strong, and the researchers say their results are “compatible” with the hypothesis that annoyance leads to stress, which in turn can lead to depression and anxiety or worsen existing symptoms. They are, therefore, conducting regular follow-up assessments with the participants to explore the possible relationship between noise and mental health further. 

Pan-American News

The Pan American I-INCE member societies are:

- Asociación de Acústicos Argentinos (AdAA) (observer only)
- Acoustical Society of America (ASA)
- Acoustical Society of Chile (SOCHA)
- ASME Noise Control and Acoustics Division (NCAD)
- Brazilian Acoustical Society (SOBRAC)
- Brazilian Association for Acoustical Quality (ProAcústica)
- Canadian Acoustical Association (CAA)
- INCE-USA

Acoustical Society of America (ASA)

The purpose of ASA (acousticalsociety.org) is to generate, disseminate, and promote the knowledge and practical applications of acoustics. The ASA publishes the *Journal of the Acoustical Society of America* and holds biyearly meetings.

ASA Meetings

ASA will meet with the Acoustical Society of Japan (ASJ) for the fifth joint meeting of ASA and ASJ, November 28–December 2, 2016, in Honolulu, HI. Over eighty special sessions have been planned.

ASA will meet with the European Acoustics Association (EAA) for Acoustics '17 Boston (the third joint meeting of ASA and EAA), to be held at the Hynes Convention Center in Boston, MA, June 25–29, 2017.

ASA Awards

ASA awards given at the spring 2016 meeting included the Gold Medal to Whitlow Au, University of Hawaii (for contributions to understanding underwater biosonar, and for service to ASA), the Helmholtz-Rayleigh Interdisciplinary

Silver Medal to Armen Sarvazyan, Artan Labs (for contributions to ultrasound imaging and its applications), the R. Bruce Lindsay Award to Megan S. Ballard, University of Texas at Austin (for contributions to underwater acoustic propagation modeling and inversion techniques in acoustical oceanography), and the Distinguished Service Citation to Susan B. Blaeser, ASA Standards Secretariat (for dedicated management of the Acoustical Society of America standards program).

ASA will award its Trent-Crede medal to Earl G. Williams, Naval Research Lab., in fall 2016 (for development and application of near-field acoustical holography).

The first Leo and Gabriella Beranek Scholarship in Acoustics and Noise Control was awarded in 2016 to Andrew Hulva of Duke University. The purpose of the scholarship is to support graduate study in the fields of architectural acoustics and noise control. One scholarship will be awarded each year to a student who is a US citizen enrolled in any university that offers a graduate degree program in architectural acoustics or noise control.

ASA Leadership

Michael Stinson, National Research Council of Canada, took office as president and Ronald Roy, University of Oxford, took office as vice president on May 27, 2016.

ASA elected new officers and members of the executive in spring 2016. Marcia Isakson, University of Texas at Austin, is the new president-elect; Michael J. Buckingham, University of California, San Diego, is the new vice president-elect; and Tessa Bent, Indiana University, and Preston S. Wilson, University of Texas at Austin, are the new members of the executive council. Their terms began on May 27, 2016.

ASA Other News

Standards Manager Change

ASA Standards Manager Susan Blaeser retired in May 2016. Her successor is Neil Stremmel, who joined ASA from the United States Bowling Congress where he was managing director.

Education Coordinator Hired

ASA has hired Laquitha Jones as its education coordinator. She will be responsible for developing new activities and programs in acoustics education, as well as to strengthen, improve, and maintain the society's present endeavors. These include ASA's new program in K-12 educational outreach and hosting demonstrations for high school students at ASA meetings.

JASA Special Issue on Wind Turbines

A special issue on wind turbines was published as part 2 to the May 2016 issue (volume 139, issue 5) of the *Journal of the Acoustical Society of America*. This special issue presents findings of a thorough cross-sectional field study of community response to wind turbines conducted by Health Canada.

ASA Strategic Leadership for the Future

A two-and-a-half-day ASA "Strategic Leadership for the Future Summit" was held in Austin, TX, in January 2015. The summit brought together a cross section of the society to discuss the issues facing the ASA, including publications, finances, membership, and technology. The group created a shared vision for our future from 2015 to 2025. The ASA executive council distilled the summit outcome into four outcome-focused goals and corresponding high-priority objectives. The goals are (1) awareness of acoustics, (2) member engagement and diversity,

(3) dissemination of information and knowledge, and (4) financial stewardship.

Significant progress has been made on these strategic goals and the results can be followed on the ASA [web page](#).

ASME Noise Control and Acoustics Division (NCAD)

The ASME Noise Control and Acoustics Division (NCAD) (https://community.asme.org/noise_control_acoustics_division/default.aspx) is a new member organization to I-INCE and we look forward to this new opportunity to connect with acoustics and noise societies around the world.

ASME NCAD Meetings

Over the past year we participated in two conferences. Annually, we participate in the ASME International Mechanical Engineering Congress and Exposition (IMECE), which will be held November 11–17, 2016, in Phoenix, AZ. Every three years, we also participate in the congress sponsored by I-INCE and hosted by INCE-USA. NCAD sponsored and organized technical sessions at INTER-NOISE 2015 in San Francisco, CA.

We hope to see you at this year's IMECE in Phoenix, AZ.

ASME NCAD Awards

NCAD acknowledges exceptional achievements by awarding the ASME Per Bruel Gold Medal for Noise Control and Acoustics. This year's recipient is Dr. David T. Blackstock of The University of Texas at Austin. NCAD also honors annually the Rayleigh plenary lecture, student best paper award, special tutorial lecture, and special achievement for phononic crystals and metamaterials.

ASME NCAD Leadership

The current chair of the group leadership team is Kristin Cody of Naval Nuclear Laboratory, and the vice-chair is Noah Schiller of NASA Langley Research

Center. In November, these terms will end and Charlie Zheng of the University of Kansas will be the new chair, with Kristin Cody serving as vice-chair.

ASME NCAD Other News

Peer-reviewed publications are sponsored through conference proceedings and the *ASME Journal of Vibration and Acoustics* for which NCAD provides associate editors.

Special thanks go to all of our volunteer members, especially Sue Sung of General Motors (retired) who is chairing the acoustics, vibration, and wave propagation track at IMECE, Ab Kirwan of Electric Boat who is also on our leadership team, and Brent Paul of Alion Science and Technology who provides editorial and administration support.

For more information, please see our annual newsletter and website at https://community.asme.org/noise_control_acoustics_division/m/default.aspx and like us on Facebook at [NCAD \(Noise Control and Acoustics Division\)](#).

Brazil—ProAcústica

The Brazilian Association for Acoustical Quality (ProAcústica) (www.proacustica.org.br/)—a member society of I-INCE since 2013—is a nonprofit civil entity with the purpose of congregating companies and professionals looking to develop applied acoustics in Brazil, a field that also covers the science of vibrations. The ProAcústica Association was born from the initiative of companies and professionals that identified the opportunity to disclose to all of society the importance of acoustic quality in buildings and the environment, and as a factor of well-being and public health.

Currently, 63 companies are members:

- 34 manufacturers of acoustic products (54%)
- 19 acoustic project and consulting firms (30%)

- 7 installation and distribution companies (11%)
- 3 laboratories (5%)

ProAcústica Meetings

The third annual city council conference on noise, vibration, and sound disturbance was held in São Paulo, Brazil, April 27–28, 2016. Over three hundred participants attended. A key result of the conference was a law that will require urban noise mapping of targets and timetables for noise reduction in the city.

ProAcústica Leadership

- Edison Claro de Moraes (AtenuaSom), Executive Chairman
- Alberto Safra (Aubicon), Vice President Administrative Financial
- Davi Akkerman (Harmonia Acústica), Vice President of Technical Activities
- Luciano Nakad Marcolino (Owa Brasil), Vice President of Communications and Marketing
- Fernando Neves Caffaro (Isover Brasil), Vice President of Investor Relations
- Cláudio Benevides Soares (Knauf Brasil), Vice President of Associative Resources

There are also technical committees on environmental acoustics (coordinated by Marcos Holtz), acoustics in buildings (coordinated by Juan Frias Pierrard), and floating subfloors (coordinated by Rafael Schmitt). An ethics committee has been formed recently to prepare a compliance manual for ProAcústica members.

Canadian Acoustical Association (CAA)

The Canadian Acoustical Association (CAA) (caa-aca.ca) is a professional, interdisciplinary organization that:

- fosters communication among people working in all areas of acoustics in Canada
- promotes the growth and practical application of knowledge in acoustics

- encourages education, research, protection of the environment, and employment in acoustics
- is an umbrella organization through which general issues in education, employment, and research can be addressed at a national and multidisciplinary level

CAA Meetings

Acoustics Week in Canada 2016 (AWC16) will be chaired by Kathy Pichora-Fuller and Clair Wakefield, and will be held at the Sutton Place Hotel Vancouver in downtown Vancouver (BC), September 21–23, 2016.

CAA Awards

The winner of the 2016 ICA Early Career award is Frank Russo. Professor Russo works in the Department of Psychology at Ryerson University in Toronto, Canada, and is the current president of the Canadian Acoustical Association.

CAA Leadership

Frank Russo is currently CAA president, and Christian Giguere is past president.

CAA Other News

After several years of service, our colleague Professor Linda Polka has decided to leave her position as associate editor in speech sciences for Canadian acoustics. The entire editorial board is thankful for her dedicated work. The position is now open, and an editor with expertise in speech production would be very welcome! See the CAA website for details.

INCE-USA

INCE-USA (www.inceusa.org) is a nonprofit professional organization incorporated in Washington, DC. The primary purpose of the institute is to promote, through its members, noise control solutions to environmental, product, machinery, industrial, and other noise problems.

INCE-USA Meetings

In August 2015, INCE-USA hosted INTER-NOISE 2015, which was held in San Francisco, CA. This was a very successful congress, and was very well attended with a large number of delegates with a strong noise control materials and instrumentation exposition. Great thanks to Paul Donavan for his superb job as congress president. Paul had the invaluable help of Yang Hann Kim from the Korean Society for Noise and Vibration Engineering (KSNVE), co-president of INTER-NOISE 2015. This year, INCE-USA held its annual noise control engineering conference—NOISE-CON 2016—in Providence, RI. Mike Bahtiarian of Noise Control Engineering LLC was the conference general chair. NOISE-CON 2016 was another successful event for INCE-USA with three exciting plenaries and a good number of technical presentations.

INCE-USA Awards

Thanks to the INCE Foundation, led by Eric Wood, several awards were given during the INTER-NOISE 2015 conference. Dr. Marehalli Prasad received the INCE-USA Outstanding Educator award, and Bill Cavanaugh received the Laymon Miller Award for Excellence in Acoustical Consulting. Several student paper awards were also given at the

conference, as well as during NOISE-CON 2016. To learn more about the INCE Foundation or to make a donation, see www.inceusa.org/about/foundation.

INCE-USA Leadership

This year saw the change of the INCE-USA president, which happens every two years. Richard A. Kolano (Rick) of Saha and Kolano Engineers Inc. took over from Gordon Ebbitt at the end of the annual general meeting, which was held January 2016 in Chicago. Other leadership changes include Gabriella Cerrato taking over as vice president of technical activities.

INCE-USA Other News

After many years of having Courtney Burroughs provide support as proceedings editor, Gordon Ebbitt took over the proceedings editor duties this year for NOISE-CON 2016. Gordon will be handling the coordination for the NOISE-CON and INTER-NOISE proceedings digital library into the future.

Another change of note is *Noise News International* (NNI). After many years of publishing NNI in the form of a journal, first in print and then as an online PDF, the format will be changing to a more modern, user-friendly format. Look for the new format on the NNI website (<http://noiseneewsinternational.net>).

Finally, INCE-USA has just adopted a new logo. The new logo maintains the traditional INCE letter formatting but introduces a digital waveform that represents INCE-USA is keeping up with the digital age. 

Asia-Pacific News

Australia

Aircraft Noise Information Handbook, SA HB 149:2016

Australian Standard, AS 2021, *Acoustics—Aircraft Noise Intrusion—Building Siting and Construction* has been the primary reference since 1997 when dealing with planning and aircraft noise impact. This standard provides the guidance for land use based on Australian Noise Exposure Forecast (ANEF) contours around an airport. A revised version was introduced in 2015 that still has the planning guidance on the basis of ANEF contours. It is now well acknowledged that such contour maps do not provide sufficient information for the community to understand the potential impact from future operations of the airport or for future airport expansion.

To supplement the AS 2021, the Standards Australia EV-011 committee worked on providing a handbook to provide guidance on the preparation of information on aircraft noise for dissemination to the public.

This resulted in the production of SA HB 149:2016 Handbook *Acoustics—Guidance on Producing Information on Aircraft Noise*, which was released in June 2016. In contrast to AS 2021, it is not a land-use planning tool, but is intended to improve the availability of information about aircraft noise in a form that will allow individuals to make personal judgements about the impact of that noise on themselves.

The guidance provided in this handbook is intended for use by airport owners and operators, government agencies, and other organizations when producing and promulgating information on the distribution of aircraft noise around an airport. Provision of information in a format that is meaningful to the public will assist both the agencies presenting the

information and the public for whom that information is provided. The handbook identifies the key features of that noise as it might affect the public, as follows:

- a) Where aircraft fly
- b) How often aircraft fly
- c) How much noise aircraft make
- d) When aircraft fly
- e) How widely noise will be heard
- f) Current and projected future noise impacts, and
- g) Other factors

They may not all be required for every airport, but they should be regarded as the key elements of noise information dissemination and should only be discarded if there is a sound basis for doing so.

Copies of the handbook are available from the SAI Global store: <https://infostore.saiglobal.com/store/Details.aspx?productID=1865417>

Good Music Neighbours

The Good Music Neighbours funding program has been created in Victoria, Australia and aims to invest in the cohabitation of venues and residences in our cities and the peaceful and amicable sharing of our great live music culture. The Good Music Neighbours grants help venues be proactive about sound management and offers up to AU\$25,000 (approximately US\$19,000) per venue in matched funding for responsible design and management of live music sound to achieve best practice to minimize noise impact on those outside the venue.

Grants must be used to pay for expenses for buildings or works for soundproofing/noise attenuation measures to minimize noise emissions from live music entertainment

venues, including obtaining soundproofing advice, and a portion can be spent in capital investment in sound equipment.

More information: <http://www.musicvictoria.com.au/gmn/aims-and-guidelines>

Taking Listening to a New Level

Your hearing is like your fingerprint—unique to you—a fact that has inspired a Melbourne-based start-up company to develop headphones that take personalization to a whole new level.

Designed by a team that has experience across both engineering and hearing science, Nura plans to produce headphones that will deliver a completely custom listening experience. They feature innovative technology that takes the signals—or otoacoustic emissions—produced by your ear when you are listening, and uses this information to tailor what you hear.

The headphones are a hybrid of in-the-ear and over-the-ear headphones that deliver an immersive sound experience that the outside world can't listen in on.

More information: <http://www.australiaplus.com/international/study-and-innovation/melbourne-startup-plans-to-change-the-way-you-hear-sounds/7626644>

(News source) Marion Burgess

China

27th National High-Tech Application of Vibration and Noise Conference

This conference was held July 27–29, 2016 at the International Communication Center for Conference of Harbin Engineering

University. It is the annual conference in the area of vibration engineering organized by the Sound and Vibration Control Committee of the Chinese Society of Vibration Engineering, and sponsored by Harbin Engineering University and China Orient Institute of Noise and Vibration. The papers of the conference will be published in Volume 12 of the Proceedings for Modern Technology in Noise and Vibration.

2016 China International Rail Transit Noise and Vibration Control Technology Summit

This summit will be held September 27–28, 2016 in Hefei, China. The symposium is set up to promote extensive technical exchanges at home and abroad related to the field of rail transportation professionals, and the theme is “Focus on the track vibration and noise reduction comprehensive technological progress and promote harmonious urban rail transit quiet operation.” The background to the symposium is that as continued development and urbanization continue to expand economic construction, urban rail transport with large volume that is fast, safe, reliable, punctual, and comfortable, and with efficient environmental protection and other technical advantages, easing traffic pressure on the ground has played an increasingly important role. It has become the focus of development and construction of large and medium hot urban transport systems. By the end of 2015, there were forty cities in Mainland China that approved the construction of urban rail transit, including twenty-six cities that launched operation 112/116 (above) lines, the total length of operational lines 3293/3612 km, including Beijing and Shanghai, operating lines then respectively 18, 16, and the length of 554.69 km, 627.15 km, the highest in the world. At the same time, in the country there are hundreds of lines under construction. By 2020, it is expected that urban rail transit will reach fifty in the country, operating

line length will reach 6,000 km scale, and construction of rail transit investment will reach 4 trillion RMB.

TB 10501-2016, Environmental Protection of Railway Engineering Design Specifications

TB 10501-2016 was published on June 26, 2016 by the National Railway Administration of China. It sets out the technical standards of environmental protection in railway construction project design, and defines the general requirements of the railway construction project environmental protection in terms of railway line selection and location, ecological and environmental protection, as well as noise, vibration, water, air, solid waste, electromagnetic pollution prevention and control. The standard is mainly used to guide new construction, renovation of railway engineering design of environmental protection.

(News source) Jun Yang

Korea

2016 Spring Conference of the KSNVE

The 2016 Spring Conference of the KSNVE (Chair: Moon Kyu Kwak/Dongguk University) was held Wednesday through Saturday, April 20–23, 2016 in Gyeongju, Korea, with the theme “Noise and Vibration—the Past, the Present, and the Future.” The technical program included thirty-seven sessions with 240 papers presented by more than 600 participants. It was an opportunity to reflect back on the past and the present, and to chart the future course of the society.

The keynote speech was given by Su Hyun Baek (Chair) of the Korean Standards Association on the recent trend in global standardization. A tutorial lecture on presentation skills and a short course on vibration basics were offered to the conference participants. On the

first day, Yang-Hann Kim (KAIST) presented a reception lecture titled “Art in Engineering, Engineering in Art.” The KSNVE Prize was awarded to Weui Bong Jeong (Pusan National University), who delivered a prize lecture entitled “Modeling and Vibration Analysis of Damped Structures.”

Titles of the technical sessions included energy, acoustics/noise theory, architecture/civil engineering, automobiles/transportation vehicles, vibration/dynamics theory, vibration control, community noise, vibration diagnosis of rotating machinery in nuclear power plants, environment/health, rotor vibration, underwater acoustic imaging, field examples, measurements and monitoring, elastic waves, young investigators, home appliance/mobile devices, construction equipment, and control theory and evaluation. Of particular interest to participants were noise studies in high-density housing, presented in the community noise session. SM Instruments Inc., a sustaining member of the KSNVE, showcased its noise/vibration products and services in the industry session celebrating its tenth anniversary. Case studies of noise and vibration in industries were also presented in a special competition, intended to promote cooperation between the society and its industrial partners. The exhibition was also held where attendees could visit the booths to browse the latest noise and vibration-related products.

15th International Conference on Electrorheological Fluids and Magnetorheological Suspensions (ERM 2016)

ERM 2016 (Chair: Seung-Bok Choi/Inha Univ.) was held July 4–8, 2016 in Incheon, Korea with more than 250 participants from twenty-one countries. The conference was a venue to share the latest developments on electro- and magnetorheological fluids among

researchers around the world. The technical program included twelve plenary lectures, twenty-eight oral sessions, and eight poster sessions with the total of 197 papers. Apart from the technical program, a tour of downtown Seoul was conducted to introduce international attendees to the sights and sounds of Korea, which featured visits to such Korean landmarks as Gyeongbok Palace, Insa-dong, and Namsan Hanok Village. More information: <http://ermr2016.org>

Program TOPIC

- Electrorheological (ER) fluids: materials and physical properties
- Electrorheological gels and elastomers
- Ferrofluids: materials and applications
- Magnetorheological (MR) suspensions: materials and characteristics
- MR elastomers and gels: materials and physical properties
- Stimuli-responsive bio-materials and colloids
- Emerging stimuli-responsive materials including graphene, graphene oxide, LC, Pickering, new type of magnetic particles, etc.
- Smart fluid based energy saving and harvest
- ER and MR polishing
- Engineering applications of ER and MR materials
- Medical and pharmaceutical applications of ER and MR materials
- Functional Materials or External-sensitive Materials
- Other related field-responsive systems

15th Machine Condition of Diagnosis Technique Lecture

Korea Certification Institute for Machine Diagnostics (KCI-MD, Chair: Oh Sung Jun/JeonJu University) is an affiliate organization of the KSNVE with the national mandate to oversee the certification of machine diagnostics technicians in Korea. A short course on the theory and applications of machine diagnostics was

offered by the KCI-MD, June 30–July 1, 2016 in Pusan, Korea. More than one hundred experts around the country attended the course, featuring nine technical lectures, sixteen case studies, and an exhibition.

(News source) Yeon-June Kang

Japan

INCE/J Social-Contribution Activities

INCE/J took part in a special event of “Children’s Visit-Kasumigaseki Day,” which was an experiential tour of the central government ministries and agencies for elementary and junior high school students, held on July 27–28, 2016. INCE/J provided an exhibition booth named “What is Sound?—Let’s Experience Various Sounds” in the zone of the Ministry of the Environment. At the booth, one could have various experiences concerning sound; for example, playing with handmade toys that make sound and making whistles out of straws. A lot of children and their parents visited the booth and had much fun with an extreme interest in sound.

2016 Autumn Meetings of INCE/J and ASJ

INCE/J will hold the 2016 autumn technical meeting at Meijo University in Nagoya, November 19–20. The meeting will consist of fourteen sessions, including three organized sessions: “Prediction of road traffic vibration at viaducts,” “Information disclosure and harmony with local community in the field of noise and vibration,” and “Revision of the verification and inspection rules of the Measurement Act.” In addition, a special ceremony, commemorative lectures, and a special award are planned to celebrate INCE/J’s fortieth anniversary.

The Acoustical Society of Japan will hold the 2016 autumn research meeting at Toyama University in Toyama Prefecture

(<http://www3.u-toyama.ac.jp/csslab/ASJ/index.html>) September 14–16. The meeting is planned to have the following nine structured sessions: (1) basic acoustics 2—physiological and psychological acoustics, (2) the role of noise and vibration research field toward the 2020 Tokyo Olympic Games, (3) education in sound design, (4) recent development in non-contact acoustic technologies, (5) speech signal processing in noisy environment, (6) current and future perspectives for research on physiology of hearing: from bioacoustics point of view, (7) current research topics on outdoor emergency sound system, (8) forefront of developing international standards on acoustics: to know social needs is to find research seeds, and (9) are the sound technologies useful for acoustical assists? A workshop of Technical Trend Reviewing will take place in the afternoon of September 14 and feature wind turbine noise: noise impact evaluation, as well as measurement, analysis, and monitoring technologies. The Beginners Seminar, taking place in the evening of September 14, will give an introductory lecture on tools and books helpful for acoustical measurements. The special ceremony to celebrate the tenth anniversary of Hokuriku Chapter of the ASJ will be held soon after the research meeting, in the morning of September 17, which follows a memorial lecture meeting with three presentations: “What is the ASJ?,” “Soundscape in Toyama,” and “Sound of Takaoka: Temple Bell.” More information: [http://www.asj.gr.jp/annualmeeting/ASJ2016springCFP\(E\).html](http://www.asj.gr.jp/annualmeeting/ASJ2016springCFP(E).html)

Recent Special Editions of the INCE/J Journal

The INCE/J Journal Vol. 40, No. 3, published this August, focused on the compatibility of acoustical performance and other required for materials. It contained a general account of “Acoustical performance and others: change of thinking from trade-off to value addition,” and six technical data reports: (1) performance of glass

wool sound absorbing material as a fire protection material, (2) sound absorption and design property of the interior finish, (3) performance required for the acoustic material to be used in the nursery, (4) safety and acoustic performance required for the ceiling, (5) floor impact sound insulation performance and walking feeling required for lightweight floor material, and (6) acoustical and other performance characteristics required for soundproofing wall.

The latest issue of the INCE/J Journal Vol. 40, No. 4, being published in November, will focus on the measurement and evaluation of small sound, fluctuating sound, and impulsive sound. It contains five review accounts: (1) measurement method for small and impulsive sounds—precautions for instruments and use, (2) psychological evaluation of low level noise, (3) evaluation of fluctuating sound, (4) acoustic characteristics of heavy weapon noise and evaluation for noise mitigation

measures around maneuvering ground, and (5) measurement and evaluation of explosion sound, and three technical reports: (1) low level noise generated by construction facilities, (2) outline of “strange sound”—small structure-borne sounds from unidentified sound sources, and (3) evaluation of impulsive noise emitted from office equipment.

(News sources) Kiyoshi Nagakura, Shinichi Sakamoto and Ichiro Yamada 



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Book Reviews

Building Acoustics

Marc Asselineau

CRC Press, Boca Raton, FL, (2015)

248 pp., softbound, 46.76 USD, ISBN:

978-1-4665-8244-6

eBook, 34.97 USD

This is an interesting book, but I am not sure if I should pan it or praise it.

The first chapter, “Introduction,” states that the book is “devoted to the field of building acoustics,” and as such, one would expect something that is very focused. However, as soon as we get into the second chapter, “Acoustics,” the author starts to move in many directions, including history, levels, weighting, dB operations, propagation over a wide range of surfaces, source directivity, indoor and outdoor sound propagation, barriers, insulation (both airborne and structural), reverberation time, intelligibility, annoyance and disturbance, standards, law, and, let us not forget, active noise control. All of which happens in only 32 pages with two extra pages dedicated to listing 79 references. Let us not forget that this “primer section” includes a total of 43 examples (short case studies) that cover all of the aforementioned topics and range from “HVAC Large Building” to “The Longest Propagation” to “The Noise from a Cock” (Watch it! He means “rooster”), as well as another case study titled “Barking Noise and Other Animal Noise” (The rooster does not qualify as an animal?). There are some equations (neither properly formatted nor numbered) as well as some figures, which are numbered but which could be greatly improved in terms of content.

After reading the first two chapters, the questions that popped into my mind were: “Did this book ever get edited? Who is it written for?” Do not misunderstand me: all

of the topics are of relevance to the field of building acoustics, but there is no focus as to who the intended audience is, nor to the direction that the book is following. As an example of the lack of editing, in the third chapter, “Building Acoustics,” Figure 3.1 showing “Direct and flanking transmission between rooms” is a simplified version of Figure 2.2 “Acoustic transmission paths between spaces.” Similarly, Figure 2.7, “Spatial sound level decay,” reappears exactly as Figure 3.3 (same title). And if the book is called *Building Acoustics*, why is there a need for a chapter with the same name?

Here is another example of the lack of editing in this book: Chapter 9, “Other Spaces used by the Public,” starts with the following sentence: “As implied by their denomination, other spaces used by the public are public spaces that do not have the glamour of performance halls or the functionality of offices.” Thus, any logical-thinking reader will question the fact that “Theatres and Cinemas” and “Music and Concert Facilities” appear as Chapters 12 and 13, respectively, that is, *after* the chapter dedicated to “the other spaces”!

This is disappointing as the author tried to structure almost all of the chapters into simple and organized sections that always follow the same order: (1) introduction, (2) requirements, (3) acoustic targets, and (4) a few basic rules. Each chapter then has one or two specific sections (if needed); and finally, examples/case studies. Furthermore, almost all of the information presented in the chapters ranges from useful to very useful, so it is a disappointment to see how it was arranged.

My suggestion to the publisher for a future edition would be to allow for some major “cut-and-paste” by someone who

knows the topic and who can focus the direction toward a specific audience. Start by shortening the “Acoustics” chapter, and transfer the materials in the “Introduction” to more dedicated chapters. Just rearrange the materials (no need to delete much), and then follow the simple organized structure for the sections (maybe highlight the examples/case studies to make them easy to locate). Finally, order the chapters in a logical fashion.

All of the components for a great book are in place.

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Acoustics in Moving Inhomogeneous Media, Second Edition

Vladimir E. Ostashev and D. Keith Wilson

CRC Press, Boca Raton, FL, (2016)

xix+521 pp., hardbound, 195 USD, ISBN:

978-0-415-564

eBook, 136 USD

Ostashev and Wilson’s second edition of *Acoustics in Moving Inhomogeneous Media* is an obviously well-prepared reference for those working to understand, model, and predict real-world acoustics. The book is divided into three logical parts—Part I: Theory, Part II: Propagation and Scattering, and Part III: Numerical Propagation Methods—and ends with a generous reference list.

Part I: Theory

Chapter 1 traces the historical development of spatial and temporal coherence mathematics through published treatises but is thin on relating the practical motivations behind each step. The few

applications that are included fail to mention the vast contributions from underwater acoustics studies. Chapter 2 develops the wave equations and includes an excellent flowchart, mapping the relationships between equations and noting their limitations. Chapter 3 develops geometric acoustics and concludes with examples of atmospheric acoustic tomography. Chapter 4 develops wave theory and concludes with an example of an atmospheric waveguide. Part I ends with Chapter 5 covering the development of equations for moving sources and receivers.

Part II: Propagation and Scattering

Chapter 6 introduces turbulence spectra, fluctuation of sound speed, media density, and scattering. Chapter 7 develops models for line-of-sight propagation and Chapter 8 carries the analysis to multipath transmission. Obvious underwater absences here include volume reverberation and scattering due to biologics, bubbles, and rough sea surfaces. Statistical models concentrate on Von Karman, Kolmogorov, and Gaussian turbulence regimes, which are commonly used to model temperature, concentration, and velocity profiles in boundary-layer meteorology but which are not particularly useful in describing those same profiles in the ocean. Parameter values given for the sea are given as ranges with no dependence on boundary layer height.

Part III: Numerical Propagation Methods

Chapter 9 introduces computational fluid dynamics, spectral kinematic modeling, and eddy-based kinematic modeling and then develops spectral and eddy models to describe variations due to atmospheric turbulence. The chapter's development of the quasi-wavelet method is an interesting way of using fuzzy fractals to describe randomly dispersed eddies. Chapter 10 reviews ray tracing and ground interaction.

Chapter 11 reviews wavenumber integration, the parabolic equation, and boundary-element methods. Chapter 12 introduces finite difference, time-domain methods. The book ends with Chapter 13's excellent study on the uncertainties encountered when attempting to model acoustics in the real world.

Army vs. Navy

Although the book attempts to present generalized in moving inhomogeneous media acoustics, atmospheric acoustics seems to be its main subject, with ocean acoustics being relegated to a few short paragraphs at the end of some of the chapters to highlight differences. Some important ocean acoustic phenomena are left out altogether. This observation should not be a surprise as Ostashev and Wilson point out that their choices of references and examples have been shaped by their work with the army and experience in atmospheric acoustics. Only 6 percent of the book's 445 references are underwater studies. The one reference listed for Vern Knudsen (who served as the founding director of the Naval Undersea Research and Development Center) is not even an underwater paper. A more balanced list would include the U.S. Navy 1946 Division 6 Technical Report (Physics of Sound in the Sea), Eckart and Carhart's 1950 "Fluctuations of Sound in the Sea," papers by G. Gaunard, P. G. Bergmann, D. Mintzer, E. Skudrzyk, R. J. Urick, and R. F. Shvachko and scores of others who have contributed from the subsea surface side of the problem.

Maybe it is just an army-navy rivalry thing, but for the book to be an appropriate text for use in both atmospheric and oceanic graduate-level programs, I suggest the third edition be split into two volumes with simple titles such as *Acoustics of Turbulent Atmospheres* and *Acoustics of Fluctuating Oceans*. This would allow equal attention to underwater acoustics and

provide each volume with enough room to include practical applications.

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Advances in Performance-Based Earthquake Engineering

Michael N. Fardis, Editor
Springer, New York (2010)
486 pp., hardcover, 259 USD,
ISBN: 978-90-481-8745-4
eBook, 199 USD

Conventional structural design emphasizes the means to the end, that is, a prescriptive approach with rules that, if followed, suffice to call it a good design, even though the consequences may result in structural failure and significant losses. Now *Advances in Performance-Based Earthquake Engineering* focuses on the end results: the engineered structure must meet its intended purpose(s) and consequences. Thus, it is based on designing to the end results.

Advances in Performance-Based Earthquake Engineering, specifically for motion and displacement of the ground, tries to maximize the utility by minimizing expected total cost (work on structure, repairs, utility, and casualties). This approach has been introduced somewhat in codes detailing with seismic assessment. The tools to do this are what is discussed in this book, based on a workshop held in Greece in 2009.

With 107 contributors (authors and coauthors) you can bet there are a lot of chapters. I will briefly review the four distinct parts, and comment on the essence of the chapters.

Part 1: Ground Motions for Performance-Based Earthquake Engineering (with nine chapters). This series of chapters contains case studies of ground motion (and displacements) in order to help determine

the consequences of any given earthquake. A single-degree-of-freedom (SDOF) analysis is used by several authors.

Part 2: Performance-Based Seismic Design and Retrofitting Methodologies (with fourteen chapters). Topics here include the methodologies using probabilistic design to help determine effects of earthquakes on structures and on ground motion (displacement). Discussions are on structures and their expected structural and visual damages and failures. Further, there is a treatment using nonlinear (inelastic) behaviors of structures when they are subject to seismic excitation.

Part 3: Performance-Based Seismic Design and Retrofitting Implementation (with fourteen chapters). The focus of this part is the implementation of the methodologies presented in the previous chapters and several others comparing laboratory testing to field testing. Some of the specific topics discussed include seismic isolation, modal analysis of bridges, and cost-benefit analysis. Most interesting was the chapter titled “Recent Advances in Seismic Isolation: Methods and Tools” by P. Tsopelas and S. Kunnath, which showed some unique approaches using a friction-pendulum isolator.

Part 4: Advanced Seismic Testing for Performance-Based Earthquake Engineering (with seven chapters). This set of chapters deals with testing—most chapters using models of structures on shakers but one using large-scale (about 15 m high) specimens.

Even though the book has many authors and coauthors, it is extremely well edited with easy-to-read chapters. However, reading them and understanding all of the materials supplied is another issue. Most of the papers are highly technical, with very sophisticated mathematics. Further, this book is mostly concerned with effects of earthquakes on structures

and the ramifications of failure or damage. It does not deal with say, seismic activity on laboratory test benches or on isolated machinery that might fall or fail because of a seismic event.

The ACES workshop, for which the title of this book was named, was held in July 2009 in Greece. Clearly the book is meant for engineers dealing with earthquakes, but could be of real interest to noise control (acoustical) and vibration engineers who need to know about earthquake response.

Recommended.
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Fundamentals of Sound and Vibration, Second Edition

Frank Fahy and David Thompson, Editors
CRC Press, Boca Raton, FL, (2015)
516 pp., hardbound, 89.95 USD, ISBN 9780415562102
eBook, 62.97 USD

This book is directed toward graduate students in engineering, physics, or mathematics, as well as practitioners with no formal training in the field of acoustics. This is the second edition of the book originally titled *Fundamentals of Noise and Vibration*. The current edition, titled *Fundamentals of Sound and Vibration*, adds two chapters on sound measurement and testing, and substantially revises the previous chapters.

Chapter 1, “Introduction,” is written by editor Frank Fahy, former professor of engineering acoustics at the Institute of Sound and Vibration Research (ISVR) of the University of Southampton in the UK. It provides a concise description of sound, noise, signal processing, noise control, and challenges facing the field of noise and acoustics. This provides a glimpse to come in the following chapters, which

provide comprehensive information on each topic.

Chapter 2, “Fundamentals of Acoustics,” is written by David Thompson, professor of railway noise and vibration, and Philip Nelson, professor of acoustics, both at University of Southampton’s ISVR. This chapter delves into sound pressure, one- and three-dimensional wave propagation, acoustic energy density and intensity, enclosed sound fields, and room acoustics.

Chapter 3, “Fundamentals of Vibration,” is written by Brian Mace, professor of mechatronics in the Department of Mechanical Engineering, University of Auckland. This chapter provides an in-depth introduction to harmonic motion, exponential notation, and frequency-response functions, followed by single-degree-of-freedom (SDOF) system details of time-harmonic forced vibration and response. This leads the reader to multi-degree-of-freedom (MDOF) systems and details forced response and continuous systems, specifically highlighting vibration of rods and beams and waves in structures.

Chapter 4, “Fundamentals of Signal Processing,” is written by Joe Hammond, professor emeritus and former dean of the Faculty of Engineering, Science, and Mathematics, University of Southampton, and Paul White, professor of statistical signal processing at the University of Southampton’s ISVR. It discusses graduate-level instruction in Fourier analysis of continuous time signals, signal and system analysis, effects of sampling, input–output relationships, and random processes and estimation including estimator errors, estimators for stochastic processes, power-spectral density; and cross spectra, coherence, and transfer functions.

Chapter 5, “Noise Control,” written by David Thompson (author of Chapter 2),

is useful as a practitioner's guide for sound sources, noise source quantification, principles of noise control, sound radiation from vibrating structures, and noise and vibration abatement techniques. Thompson provides an excellent and extensive reference section for the principles and techniques discussed in this chapter.

Chapter 6, "Human Response to Sound," is written by Ian Flindell, independent European acoustics consultant and retired part-time teacher and researcher at ISVR, and explores the auditory anatomy and function of the human head and ear, auditory capabilities, and acoustic metrics, with updated versions of the well-known and oft-used frequency and loudness curves, and provides a discussion on the range of noise effects on people.

Chapter 7, "Human Responses to Vibration," is written by Michael J. Griffin, professor of human factors and lead researcher on human responses to vibration for the past forty years at ISVR. The chapter takes an in-depth look at whole-body vibration, including biodynamics, discomfort, activity interference, health effects, as well as motion sickness and hand-transmitted vibration. Griffin draws on a plethora of literature-supported evidence provided in his reference section.

Chapter 8, "Measurement of Audio-Frequency Sound in Air," written by Frank Fahy (author of Chapter 1), is a new section included in the second edition text and discusses microphones and specialized applications, preamplifiers and transducer electronic data systems (TEDS), calibration, sound level meters and proper usage, sound intensity, and applications of sound intensity measurement. Although a relatively short section, it may be useful to the acoustic practitioner in sound measurement instrumentation, setup, calibration, and data collection.

Chapter 9, "Vibration Testing," written by Tim Waters, senior lecturer in vibration engineering at ISVR, is also a new section to the second edition and again provides good practitioner-level details on general test setup, sensors, using an electrodynamic shaker, and using an instrumented hammer. This chapter provides excellent free-body diagrams, acoustic graphics, and useful formulas and frequency response functions.

The text includes many functions, formulas, graphs, and charts which are modern, crisp, and tied directly to the detailed text on each subject. The more math-centric chapters include problems for self-study, which may be beneficial to both student and practitioner alike. Also, each chapter provides excellent references to recent technical publications for the benefit of readers who wish to further explore each topic and extend their knowledge and understanding of acoustic and vibration technology.

In summary, the chapters are written by different authors and focus on related but independent areas of sound and vibration. The authors have attempted to maintain coherence and consistency of presentation by cross-referencing between chapters and by complimenting the interdependency of the material. However, readers will quickly discover that this text has discrete, individually written chapters that delve into connected but uniquely identifiable topics. Each chapter is well adapted as a stand-alone reference for each particular topic area, for example, fundamentals of acoustics, vibration and signal processing, noise control, human response to sound and vibration, and finally, measurements of sound in air and vibration testing.

This book, therefore, provides a comprehensive, coherent narrative of the fundamentals of sound and vibration and the associated practitioner-level

components, while allowing the reader to delve into each unique topic area in greater detail. It is a well-written text that can serve the graduate-level student as well as provide the practitioner with a relevant and timely reference manual to better understand and deal with the often complicated sound and vibration issues encountered in the real world.

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Soundscape and the Built Environment

Jian Kang and Brigitte Schulte-Fortkamp,
Editors
CRC Press, Boca Raton, (2015)
310 pp., hardbound, 143.96 USD, ISBN:
9781482226317
eBook, 111.97 USD

This book is an excellent addition to the literature on soundscape studies. The book contains ten chapters and has twenty-six authors. The two editors have done excellent work in putting together the book.

Generally, the term soundscape indicates a study of environmental acoustics. However, this work is the first book that presents systematic discussions of various aspects of soundscape in built-up environments.

In Chapter 1, a general discussion of acoustic environment and soundscapes including a classification scheme for categorizing sound sources is given. Also it is emphasized that soundscape as a part of the living environment can partly be measured and described by physical quantities. Chapter 2 explains important roles of various aspects such as auditory scene analysis, listening modes, and attention focusing along with attribution of meaning to individual

sounds. A deeper understanding of soundscape through interaction schemes and models is presented. Chapter 3 discusses the impacts of soundscape on health benefits such as human well-being, quality of life, and restoration, along with economic perspectives.

Chapter 4 deals with important topics such as human perception as guidance for soundscape, the soundscape approach, approaching people's mind, soundscape analysis, and the perception of sound quality.

Analysis of large-scale data on perceived soundscapes from several Dutch and Austrian surveys is described in Chapter 5. Also included in this chapter is the study of intercorrelations between acoustic dimensions, perceived soundscapes, and nonacoustical factors.

Chapter 6 describes the necessary roles of binaural measurement technology and psychoacoustics in soundscape investigations.

Chapter 7 presents interesting, informative, and new mapping techniques for soundscape that can be used to aid the design and planning process. The various techniques in this chapter include soundscape mapping based on human perception of sound sources, soundscape-perception mapping developed using artificial neural networks, psychoacoustic mapping and mind mapping, and mapping of noticed sounds.

Chapter 8 explores approaches to urban soundscape management, planning, and design. It focuses on soundscape planning and presents soundscape design guidelines. In Chapter 9, another interesting topic, namely "soundscape as part of the cultural and natural heritage," is explored. Importance of soundscape in addition to visualscape of a cultural heritage is discussed. Also recognition techniques and

applications of soundscape as an intangible trademark are presented.

Finally, exemplary case studies of applied soundscape practices are outlined in Chapter 10. It is from these case studies that conclusions can be listed and discussed, which further can be used to draw guidelines for better soundscape practice in future projects. Each chapter of this book in its beginning has listed clearly the contents with subtopics. The figures, tables, and photographs in all the chapters throughout the book are very clear and highly readable. Each chapter provides an exhaustive list of references.

In summary, this is an excellent book highly recommended for professionals, consultants, researchers, students, and administrators in a variety of fields such as acoustics, architecture, landscape design, building science and technology, urban planning, transportation engineering, and environmental science

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Acoustics of Multi-Use Performing Arts Centers

Mark Holden
CRC Press, Boca Raton, FL, (2016)
380 pp., hardbound, 107.96 USD, ISBN:
9780415517195
eBook, 83.97 USD

Multiuse halls are a North American phenomenon. This contrasts with Europe, where most cities have performance halls dedicated to specific genres: symphony, opera, chamber music, dance, and popular music. In these halls, the acoustics can be optimized for the intended program type.

Designing a new multiuse hall, or adapting an existing hall to this

function, requires physical changes at the stage and audience chamber. These changes may include stage ceiling and sidewall panels, adjustable forestage ceiling sound reflectors, stage alterations using lift systems, stage pits, variable sound absorption materials such as moveable draperies and banners, special considerations for low-frequency reverberation control, acoustically transparent surfaces to couple nearby room volumes, and finally, electronic-acoustic system (electronic architecture) enhancements. All of these features necessary to make a successful multiuse hall are described in this practical volume.

The book is written by a practicing acoustic consultant with thirty-seven years of experience whose firm, Jaffe Holden Acoustics, has designed over twelve hundred halls of different types. A profusely illustrated book, it is divided into five sections covering:

1. Building blocks (history of multiuse halls and acoustic criteria)
2. Creating the building (planning concepts for existing and new buildings and preliminary acoustic design)
3. Detailed architectural design (stage and orchestra pit, floor and balcony seating, wall and ceiling shaping, and seats and acoustic finishes)
4. Acoustic variability (adjustable acoustic finishes, electronic architecture systems, and tuning the adjustable acoustic elements for best results), and
5. Eleven case studies describing halls and their unique acoustic challenges and programming requirements.

Written in a highly accessible style, with little mathematics to enhance its readability, this book will appeal to a wide audience. Specialists, such as acoustic consultants, theater planners, and

architects, will find much to learn about this complex building type. Generalists such as performing arts administrators, building design committees, and music directors will benefit from the author's narrative style on technical matters.

This book, which is primarily a book on room acoustics, briefly discusses aspects of HVAC noise control, architectural sound isolation, building vibration, and sound reinforcement systems, where these apply to the specific case study examples.

For the reader, this book is like having an assistant, ready to guide one through the complex and interrelated design decisions that must be considered for a successful multiuse hall.

As much as I like and can recommend this book, it is not without faults. There is some repetition on topics in the main body and the case study examples. The index is fairly complete, although I did find several missing topics that were contained in the book. Typographical errors are few.

The main problem is many of the figures, which are tied to the text, are poorly edited with missing graphic line leaders and incomplete figure narratives. This makes the reader's understanding of the design concepts less thorough and complete. Hopefully, a later printing will correct these problems.

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June 12-14, 2017

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Papers due by: **March 1, 2017**
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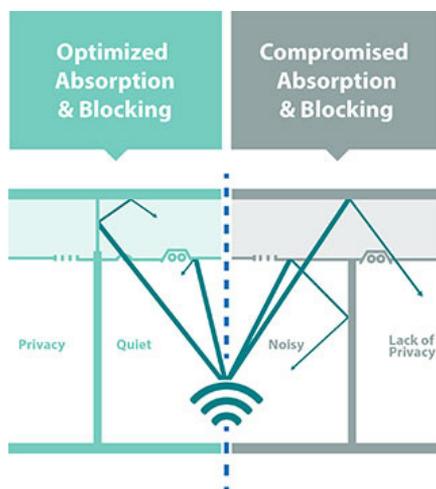
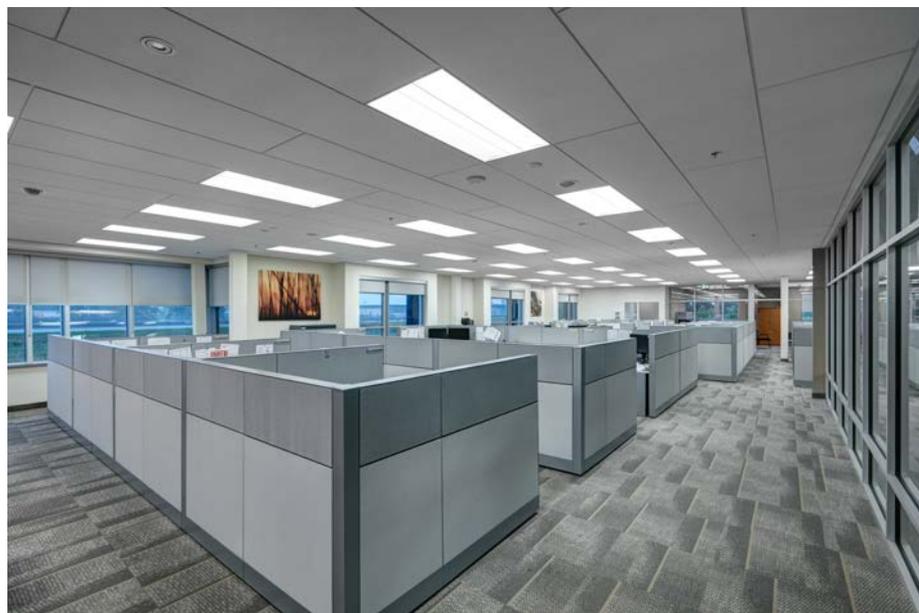
ROCKFON Ceiling Panels with High NRC Achieve Optimized Acoustics

Chicago—Helping optimize acoustics for today's commercial interiors, the ROCKFON Group offers an extensive portfolio of sound-absorbing, acoustic stone-wool ceiling systems. These include baffles, islands, and ceiling panels that can achieve noise reduction coefficients (NRC) as high as 0.95. Sound-absorbing ROCKFON ceiling products shorten reverberation time, improve speech intelligibility, decrease noise levels, and promote privacy.

"ROCKFON **Optimized Acoustics™** provides a simple, straightforward approach to meet current acoustic standards, guidelines and criteria, while keeping on budget. With ROCKFON ceilings you can optimize the ideal acoustic environment without compromising style or performance," says Gary Madaras, PhD, ASA, INCE, Assoc. AIA, acoustics specialist at the ROCKFON Group.

"High-performing absorptive ceiling panels of NRC 0.90 can improve the acoustic experience in open-plan offices, classrooms, retail shops, health care patient recovery areas, as well as in multifunctional rooms, corridors, meeting rooms, lobbies and reception areas." Madaras explains, "NRC indicates the amount of noise absorbed by a ceiling material. Typically, the higher the NRC the better. Ceilings lower than NRC 0.70 often require additional absorption on the walls. Look to your ceiling panels to meet the high absorption requirements you need and to your walls for blocking, when it's needed."

ROCKFON sound-absorbing acoustic stone-wool ceiling products include:



- **ROCKFON Alaska®**, with an NRC of 0.90, provides sound absorption for open-plan offices, classrooms, retail, and reception areas.
- **ROCKFON Medical Plus™**, with an NRC of 0.90, provides sound absorption and superior hygienic properties for medical office buildings, acute care hospitals, and elder care residences.
- **ROCKFON Sonar®**, with an NRC of up to 0.95, provides sound absorption for health care, education, and open-plan offices.

Available in a wide range of standard sizes, styles, and formats, ROCKFON acoustic ceiling products contribute to commercial projects' creative designs, industry-leading performance, and sustainability goals. The panels' lightly textured white surface delivers high light reflectance (0.85 LR) to maximize daylighting and dimensional stability at up to 100 percent relative humidity. Contributing to buildings' environmental goals, ROCKFON acoustic stone wool ceiling products have earned UL® Environment's GREENGUARD Gold Certification for low-emitting products.

Providing low maintenance and long-term durability, ROCKFON products supplied in North America are supported by a thirty-year warranty.

To learn more about ROCKFON Optimized Acoustics, please visit OptimizedAcoustics.com. The website serves as a digital hub of educational resources and tools on acoustical performance and ceiling systems. Visitors explore paths highlighting acoustic considerations that benefit occupants and owners.

Aquatic Center Relies on ROCKFON Ceiling Systems to Create Attractive, Functional, Sustainable Facility

Chicago—Located forty minutes from Vancouver, British Columbia, the [City of Surrey](#)'s Guildford Recreation Centre features a new 112,000-square-foot aquatic center. Helping create an attractive, functional, and sustainable facility, [ROCKFON](#) Sonar® acoustic stone wool ceiling systems were installed throughout the new space.

Ceiling panel selection was a critical part in meeting the overall performance specification and the building team's approval. "We must have looked at 10 different ceiling manufacturers before [ROCKFON](#) was chosen," remembered

Woudstra. "Although [ROCKFON](#)'s products were new to us in North America, we reviewed its demonstrated history and precedents on other pool projects in Europe. [ROCKFON](#)'s ceiling panels met the project's acoustic, light reflectance and atmospheric requirements, and the budget target."

Based on all the advantages of stone wool ceiling panels, [ROCKFON](#) Sonar Activity direct mount and Sonar CDX concealed panels were approved.

Guildford Aquatic Centre, 15105 105 Ave., Surrey, BC V3R 7G8, Canada

<http://www.surrey.ca/culture-recreation/12672.aspx>

• Owner: City of Surrey; Surrey, British Columbia; <http://www.surrey.ca>

- Architect of record—exterior and interior: Bing Thom Architects; Vancouver, British Columbia; <http://bingthomarchitects.com>
- Architect—pool areas: SHAPE Architecture; Vancouver, British Columbia; <http://shapearchitecture.ca>
- Acousticians: BKL Consultants; North Vancouver, British Columbia; <http://bkl.ca>
- General contractor: Heatherbrae Builders; Richmond, British Columbia; <http://heatherbrae.com>
- Truss fabricator-erector and acoustic ceiling installer: StructureCraft Builders Inc.; Delta, British Columbia; <http://www.structurecraft.com>

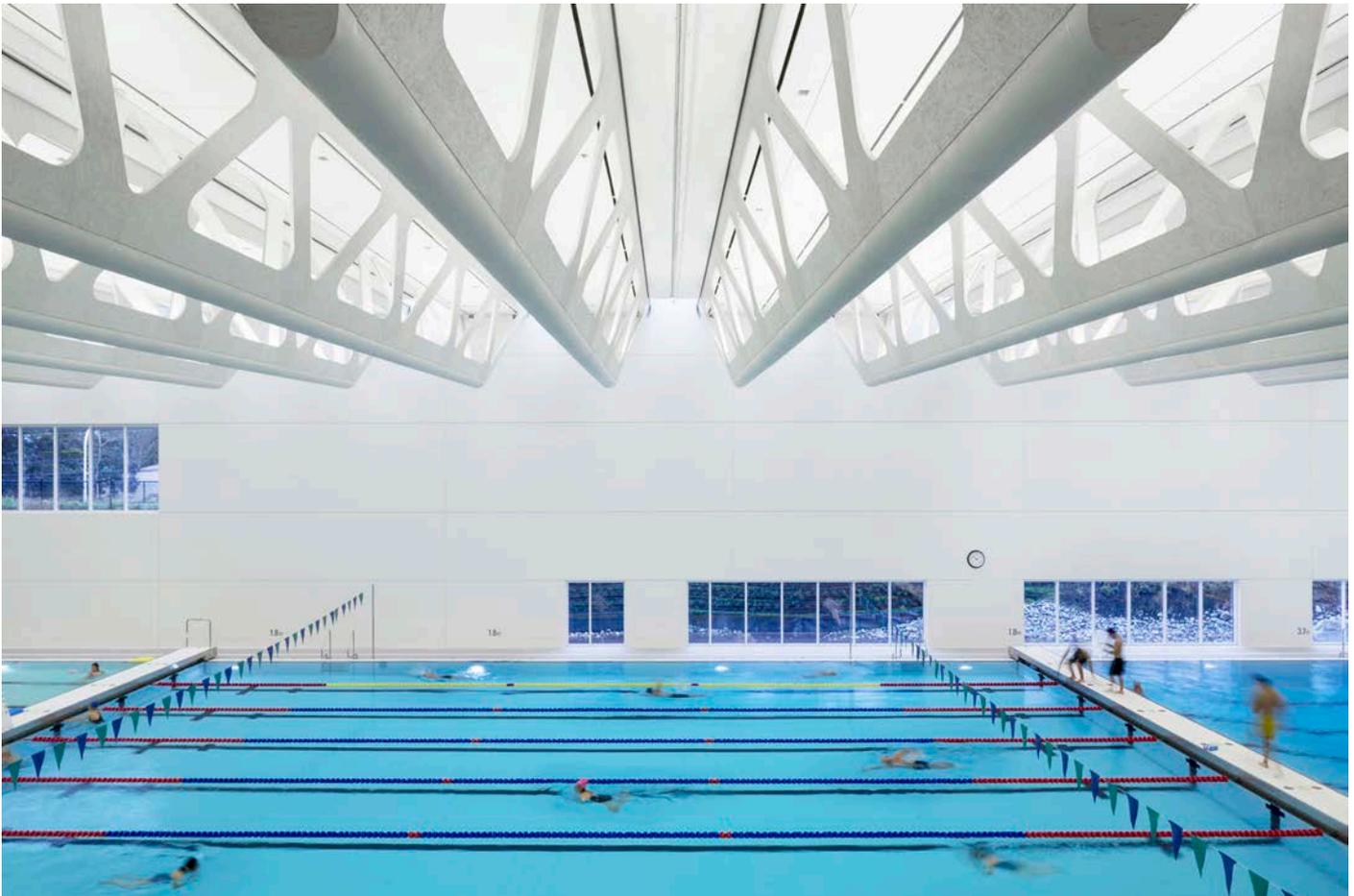


Photo courtesy of We See Design Inc. Raef Grohne Architectural Photographer, courtesy of [ROCKFON](#).

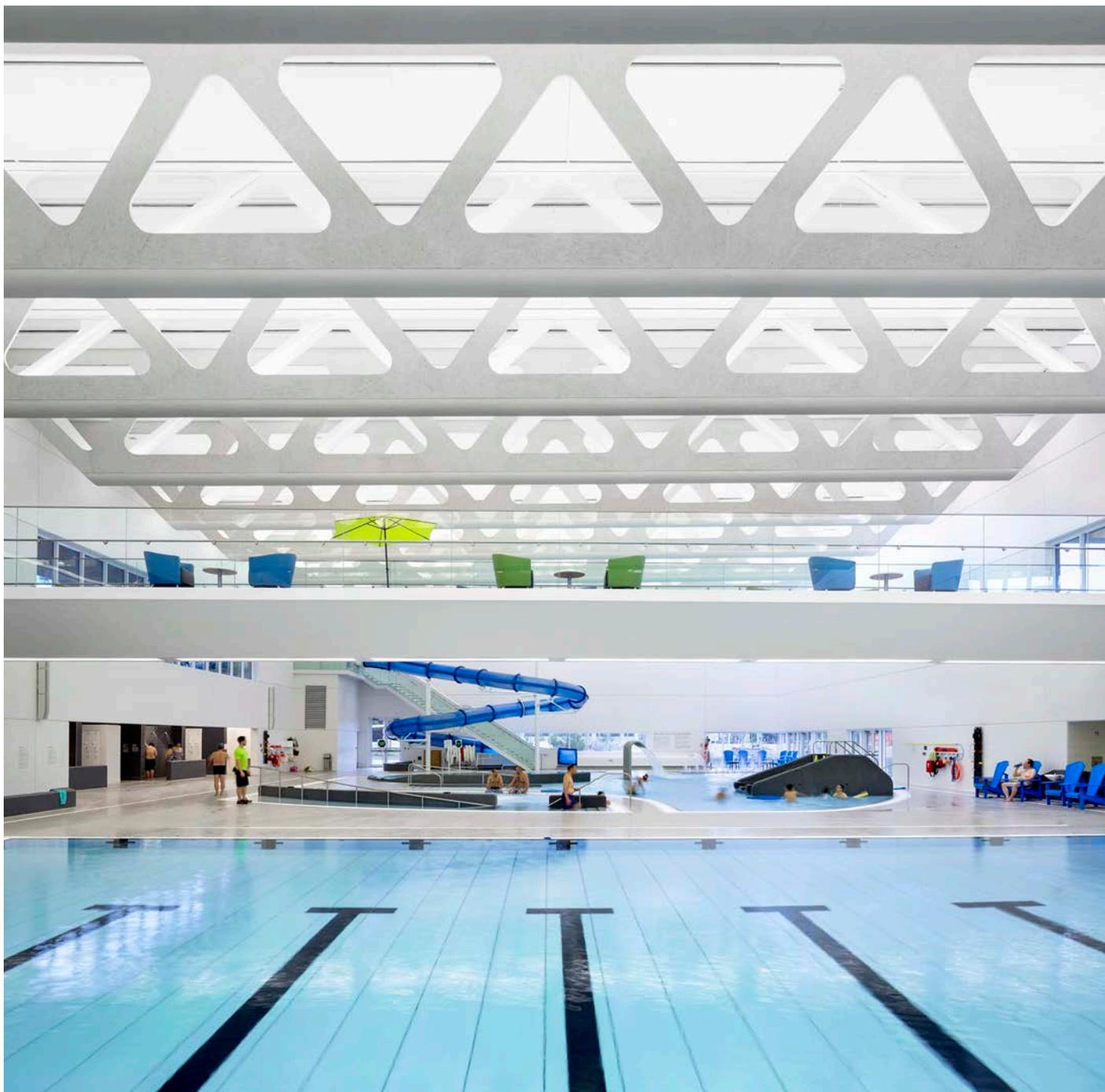


Photo courtesy of We See Design Inc. Raef Grohne Architectural Photographer, courtesy of ROCKFON.

- ROCKFON ceiling systems: ROCKFON Sonar Activity and Sonar CDX stone wool ceiling panels, <http://www.rockfon.com>
- Photographer: We See Design Inc. Raef Grohne Architectural Photographer
- Video: <https://www.youtube.com/watch?v=B13FyPRF2g0&feature=youtu.be>

About ROCKFON

The ROCKFON Group is a leading provider of acoustic stone wool and metallic ceiling solutions and suspension systems.

With the acquisition of Chicago Metallic Corporation Inc., The ROCKFON Group

provides customers a complete ceiling system offering combining stone wool and specialty metal ceiling panels with Chicago Metallic suspension systems.

The ROCKFON Group complete ceiling systems are a fast and simple way to create beautiful, comfortable spaces. Easy

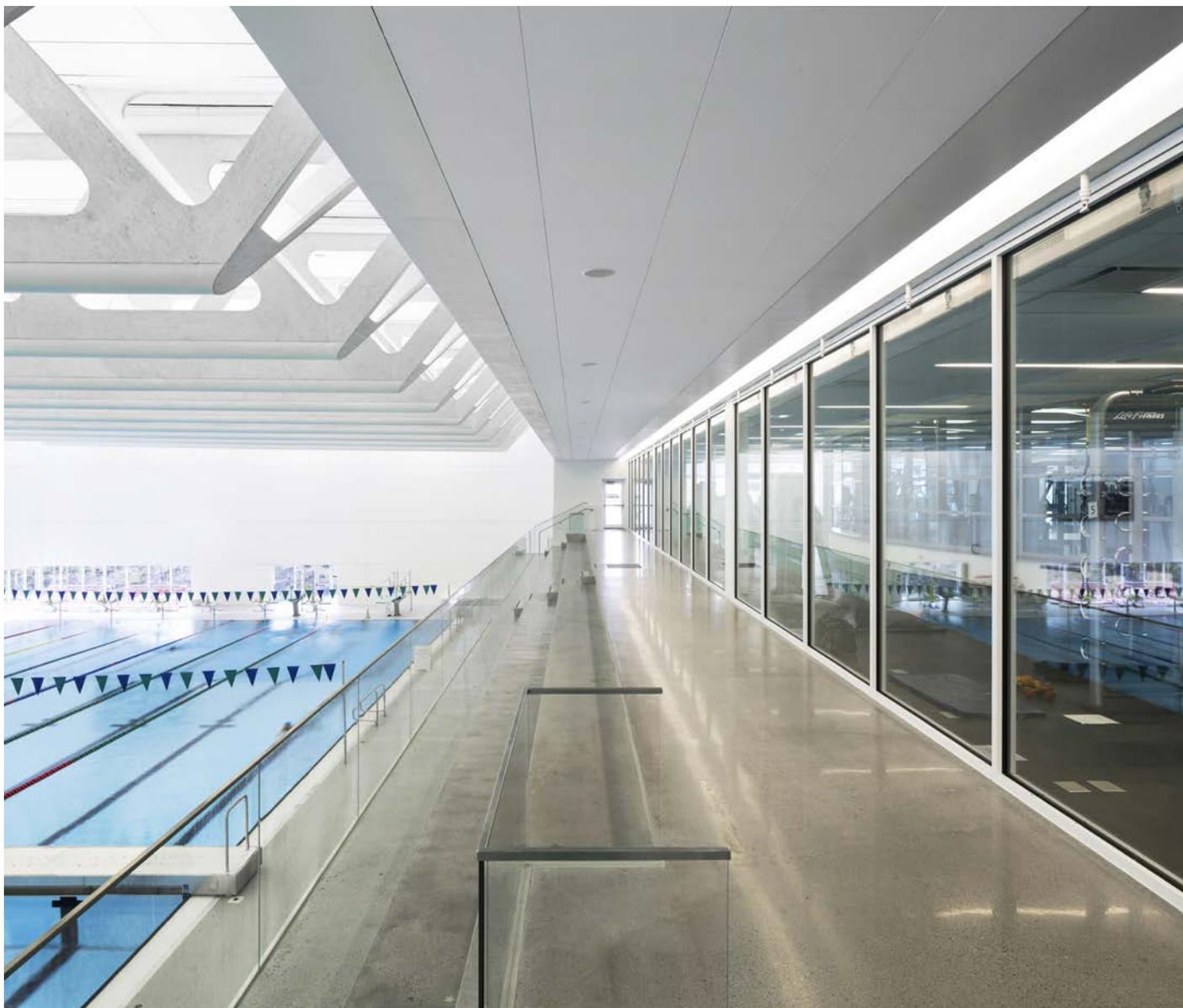


Photo courtesy of We See Design Inc. Raef Grohne Architectural Photographer, courtesy of ROCKFON.

to install and durable, they protect people from noise and the spread of fire, while making a constructive contribution toward a sustainable future.

The ROCKFON Company is a subsidiary of Denmark-based ROCKWOOL International A/S, the world's largest producer of stone

wool products. ROCKWOOL International A/S is listed on the NASDAQ OMX Nordic Exchange Copenhagen. More than 11,000 people in 35 countries are employed within the ROCKWOOL Group.

In North America, the ROCKWOOL Group operates under the name ROXUL.

ROCKWOOL®, ROXUL® and ROCKFON® are all registered trademarks of ROCKWOOL International A/S.

For more information, visit www.rockfon.com.
Media Contact: Heather West, 612-724-8760,
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INCE-USA Is Seeking an Editor for *Noise Control Engineering Journal (NCEJ)*

In 2017, INCE-USA will have an open position for the editor of the Noise Control Engineering Journal. INCE-USA is seeking to fill this position with an individual who will continue the tradition of excellence that NCEJ has enjoyed in the past years and will continue to meet the challenges facing the journal as it moves into the twenty-first century. NCEJ has recently transitioned to electronic format and has continued to expand in content while maintaining quality. The next major challenge is increasing circulation of the journal within the international noise control engineering community.

NCEJ, the archival journal of INCE-USA, is an international journal serving the noise control community. It covers such aspects of noise control engineering as product noise and sound quality, community noise, industrial noise, and noise policy. It serves as the premier channel for the dissemination of data from leading-edge research, practice, and experiences in all aspects of noise control engineering (NCE). The primary objectives of *NCEJ* are to publish high-quality papers in NCE and to stimulate and track advances in NCE and present these advances in a form that can be useful to a broad cross-section of the professional community, ranging from academic researchers to noise control engineers and acoustical consultants. *NCEJ* serves a broad readership by providing a unique combination of technical papers, research articles, reviews, case histories, technical notes, tutorials, and good-practice approaches.

Dr. Courtney Burroughs, editor since 2005, has asked that INCE-USA search for a successor. Dr. Burroughs oversaw several innovations to the journal, including the transition to digital format and the establishment of a new Asia-Pacific *NCEJ* editor position. He provided exceptional organizational skills, leadership, and dedicated stewardship to the journal. It is important for INCE-USA to fill the position with an individual who will continue this tradition of excellence and strong leadership.

The editor of *NCEJ* is expected to play a leading role in shaping the future of *NCEJ* and to have a significant impact and interest in INCE-USA, International INCE (I-INCE), and the field of noise control engineering. The budget available from INCE-USA for the editor will cover the cost of the editor attending meetings, conferences, and expositions sponsored by INCE-USA and I-INCE. The *NCEJ* editor determines the content of each issue and is responsible for the maintenance of high scientific standards.

The four major responsibilities of the editor include:

1. Manuscript Management
 - a. Manage and oversee the activities of manuscript receipt, processing, peer reviews, and disposition. This also may involve periodic review and enhancement of editorial structure.
 - b. Select reviewers who will respond in a timely fashion.
 - c. Communicate with the authors and peer reviewers.
 - d. Manage the manuscript-review process, and guide the authors in ensuring publications that maintain our high standards.
 - e. Coordinate with the publisher and the digital library provider.
 - f. Support the year-end volume publication.
2. Solicitation of Papers and Articles for Publication
 - a. Actively solicit high-quality manuscripts from potential authors.
 - b. Seek opportunities for review articles and other special initiatives.
 - c. Solicit papers for publication based on the presentations at the annual meeting of INCE-USA and I-INCE.
 - d. Generate ideas for special issues, and solicit guest editors to develop special issues.
3. Interaction with INCE-USA and Other Organizations
 - a. Coordinate the activities and interests of the journal with those of INCE-USA.
 - b. Attend INCE-USA board-of-directors meetings (two per year) to report on *NCEJ* activities.
 - c. Maintain contact with other journals and with authors and reviewers.
 - d. Represent *NCEJ* at professional meetings and conferences, as appropriate.
 - e. Oversee efforts of the Asia-Pacific editor of *NCEJ*.

4. Other Duties

- a. Work closely with the publications advisory board and publications committee chair.
- b. Provide a clear focus through promotion of a personal vision where appropriate. This task may involve development of new initiatives to increase the appeal of *NCEJ*.
- c. Develop annual reports.
- d. Resolve conflicts or problems as necessary and perform other related duties incidental to the work described herein.

The *NCEJ* editor provides regular reports on journal and editorial activities to the INCE-USA Publications Advisory Board. The *NCEJ* editor is also an ex-officio member of the Board of Directors (BoD) and is required to attend the two meetings of the BoD of INCE-USA each year.

Key qualities of the *NCEJ* editor include a good understanding of the current and emerging technologies and familiarity with the needs of industry, academia, and government for noise control engineering. Candidates for the *NCEJ* editor should be successful investigators with a strong publication record, should have broad knowledge of the field of NCE, and should be internationally recognized experts. The applicant should have a vision of how to continue to improve the journal with successful innovation. Previous editorial and management experience, as well as past efforts on behalf of *NCEJ* and INCE-USA, will be given consideration in the selection process. Strong organizational and communication skills are essential.

If you are interested in this position, please contact the chair of the search committee by submitting your application. Alternatively, if you know of someone who might be or could be interested in filling this position, please send your nomination to the chair of the search committee by e-mail, including a brief biography of the potential candidate's qualifications. (Unless requested, the identity of the nominator will not be revealed to the candidate.) Review of applications will begin as soon as possible until the position is filled. INCE-USA is planning to fill this position by or before April 1, 2017. There will be a transition period prior to the April 1 starting date. The *NCEJ* editor is normally appointed for a three-year term based on the INCE-USA fiscal year.

The application package should at a minimum consist of:

- A full curriculum vitae highlighting qualifications, research publications, past editorial experience, other professional experience, and organizational and management skills.
- A one-page statement of interest outlining the approach that will be taken as the *NCEJ* editor, including goals for content, target readership, review acceptance criteria, and editorial policy.
- A one-page statement of the applicant's long-range vision for the journal, to include but not be limited to the present status of the journal, the vision for the journal's structure and organization, opportunities for growth and enhancement, plans for special issues, plans to attract high-quality papers and to publicize *NCEJ* in the professional community, and plans and resources to achieve these goals.

A budget for the services to be provided can be negotiated. A letter from the applicant's employer may be required to indicate the employer's agreement to support the applicant in carrying out the duties described previously. This letter is particularly important for applicants from academic and nonacademic organizations.

The search committee will review all applicants beginning February 28, 2016. Selected candidates may be contacted after the initial review and asked to provide more details about goals and new initiatives for the journal and a draft budget covering a three-year period, including reimbursement for the labor of the editor and any support staff as well as estimated costs for anticipated travel and office expenses. The search committee will interview finalists before making a recommendation to the INCE-USA BoD; the INCE-USA BoD will make the final decision.

The search committee requires all curricula vitae and letters of application be submitted by email as PDF attachments to the chair of the search committee:

Teik C. Lim
Chair, *NCEJ* Editor Search Committee
INCE-USA Business Office
12100 Sunset Hills Road, Suite 130
Reston, VA 20190
[E-mail: ibo@inceusa.org](mailto:ibo@inceusa.org)

The search committee consists of:

- Teik C. Lim, Chair
- Joe Cuschieri
- Jim Thompson
- Gordon Ebbitt
- Rick Kolano
- Dave Herrin
- Steve Conlon
- Yang-Hann Kim 

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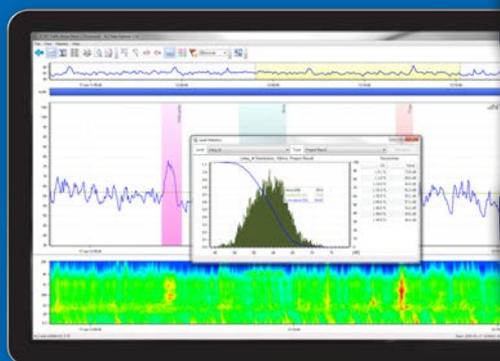
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June 12-14, 2017

NOISE-CON 2017

Noise Control Engineering Conference
(with SAE Noise and Vibration Conference)
Grand Rapids, Michigan, USA
www.inceusa.org

August 27-30, 2017

INTER-NOISE 2017

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