ASME International

Noise Control and Acoustics

message from the chair

BY Rick Marboe

"The Winds of Change are Blowin'." This is a message to all of the Technical Divisions from the Council On Engineering. And I don't mean just the natural change in divisional leadership. As I have been advancing up the learning curve for the Division Chair, I've come to appreciate much more the significant behind the scenes efforts of prior leaders of Noise Control & Acoustics Division (NCAD). Marty Pollack continued that tradition and we owe him a debt of gratitude as outgoing chair.

The change I refer to is really in its third year at ASME. Recognizing trends of declining attendance at conferences, reduced income to cover general ASME expenses, shrinking division custodial funds, and increasing competition from other societies and continuing education groups, COE has embarked on a self inspection and commitment to a, hopefully, more sustainable business paradigm.

At the 2002 ASME Technology Executives Conference, Board of Governors member Amos Holt presented some interesting perspectives. Of the powers of force, wealth, and knowledge, knowledge amplifies the effects of force and wealth, but is the one that is infinitely expandable. Therefore, COE needs to focus on the knowledge part of the business: knowledge generation, knowledge packaging, knowledge holding, and knowledge dissemination. He also shared some wisdoms from the "Cowboy's Guide to Life" that have lot's of meaning for us:

"I ain't what I ought to be, I ain't what I'm going to be, but I ain't what I was." (We are entering our 25th year as a division. Are we serving our member's needs as well as we could?)

"Good judgment comes from experience, and a lot of that comes from bad judgment." (We must be emphatic in trying new ideas, and equally willing stop what is not working.)

"If you find yourself in a hole, the first thing to do is stop digging." (Our custodial account funds are dropping quickly. Soon we may not be able to afford a Rayleigh Lecture.)

"A body can pretend to care, but they can't pretend to be there." (NCAD needs your involvement. We are a volunteer run organization.)

"If you are going to go, really have to go, then go like hell. If your mind is not made up, then don't use your spurs." (It is now time for NCAD to make up its mind on our goals and operations for the future. Our existence depends upon it.)

"No matter where you ride to, that's where you are." (This is certain.)

The NCAD executive committee has been discussing this at length since the last TEC and we had very good discussions at the NCAD General Membership meeting last November in New Orleans. In order to provide a consistent voice for NCAD at this critical time, the executive committee voted to extend my term another year. So, I will devote the next few columns to status reports on the evolution of COE and NCAD. But, I truly hope it will be "old news" for many of you since you will be contributing to the process. We need YOUR answer to the question, "What do I seek from my membership in ASME and NCAD?" (I'll gladly accept it at rcm4@psu.edu)

In closing, I want to extend my heartfelt thanks to everyone who is providing the time and talent to make our IMECE sessions successful and operating this technical and social experience we call Noise Control and Acoustics Division. ▲

SPRING NEWS 2003

BY Ilene Busch-Vishniac Are we asking the right questions?

Editor's note: At 2002 ASME IMECE, Dr. Busch-Vishniac of Johns Hopkins University gave the 2002 Rayleigh Lecture "The Big Problems Remaining in Transduction," which was very thought provoking. For those who missed this wonderful talk, here is the essence of this Rayleigh Lecture summarized by Dr. Busch-Vishniac. This lecture now seems more appropriate than ever before, given the current unstable situations in the Middle East, East Asia, and elsewhere. I hope this summary will shed some light on our decision making in the future.

After decades involved in engineering research, I have come to wonder if we are asking the right questions. I find myself thinking we should redirect significant effort in order to make the world a better place through technological advancements.

The norm in research is to press beyond what is currently feasible – to make a tangible contribution by enhancing some performance measure. This obsession with a faster and better performance has produced marvelous gains, but we tend only to expand what is available to those already in possession of the best that can be bought. The neediest populations have technologies that have not changed for decades or centuries.

If we truly want to make the world a better place, shouldn't we be seeking to minimize the gap between the "haves" and the "have-nots?" For starters, we might think about how best to ensure clean water is available in parts of the world without reliable electricity. We could also consider how to introduce reliable sources of power in remote locations at a reasonable cost.

This work might not be as glamorous as producing a next generation MRI or airplane, or finding a way to make integrated circuits even smaller, but bringing power and clean water

to every inhabited part of the earth might be far more important in the long run, for universal access of resources might be the only way of preventing war on a global scale. I can't think of a more important set of goals for the engineering community than lowering the barriers to life-sustaining technology for everyone. ▲

Congratulations!

- The 2002 NCAD Best Paper Award went to: "An Active Flow Distortion Control System for Serpentine Inlets," by Jason M. Anderson, Dr. Ricardo Burdisso, and Dr. Wing Ng, Vibration and Acoustics Laboratories, Department of Mechanical Engineering, Virginia Polytechnic Institute.
- Dr. Richard F. Keltie was appointed as an Associate Editor effective June 30, 2002 and as Associate Dean for Academic Affairs of the College of Engineering, North Carolina State University.

(Editor's Note: Please let me know if you have news that you want to share with others.) ▲

Rick Marboe, 2002 IMECE Program Chair IMECE 2002

The 2002 ASME IMECE was a great success for NCAD members. At this congress NCAD sponsored a total of 14 sessions that included 11 symposium sessions and 3 special sessions. These symposia contained 45 papers by 90 different authors.

We were pleased to have Dr. Ilene Busch-Vishniac, Dean of the Whiting School of Engineering, Johns Hopkins University present the Rayleigh Lecture: "The Big Problems Remaining in Transduction." Her presentation and discussion were very thought provoking.

This year's tutorial lecture was presented by Dr. John Fahnline from Penn State University. He provided an excellent background on boundary element techniques and radiated power computation.

This was the second year that we devoted a panel session to issues in noise control. Each of the technical committee chairs made a presentation on the emergent issues and developments in their specific technical areas. This was also an opportunity for the mechanical engineering community at large to provide topics of interest to the technical committees prior to their planning sessions for the future IMECEs.

While I found these special sessions worth the price of admission alone, NCAD members benefited from a breadth of technical papers in our 5 symposia. Dr. Lisa Grega did an outstanding job of coordinating 5 sessions with 22 papers in flow-induced acoustic phenomena and fluid-structure-sound interactions within the Fifth International Symposium on Fluid-Structure Interaction, Aeroelasticity, and Flow-Induced Vibration and Noise. Dr. Ken Frampton organized a session on Recent Advances in Active Noise Control. Dr. Jeff Vipperman organized a session on Active Noise Control in Transportation Systems. Dr. Lonny Thompson oganized two sessions on Methods for Inverse Acoustic Problems. Dr. Steve Hambric organized two sessions on Vibrations in Piping Systems.

On behalf of the NCAD Executive Committee, I thank the many session organizers, authors, anonymous reviewers, and editors for their hard work and dedication to meeting our goal of dissemination of knowledge to our engineering community. ▲

BY Elio A. Manes, ASME Staff

ASME Council On Engineering Responding to Strategic Challenge Barriers

The practice of engineering is constantly changing and reinventing itself, and so should ASME to continue to improve. Nanotechnology, Risk Management, and Homeland Security are current examples of issues facing the engineering profession that cut horizontally across traditional vertical disciplines. It is ASME's organizational challenge to transform itself to accommodate both the vertical areas of knowledge and the horizontal thrusts that slice through them.

The ASME Council On Engineering (COE) is poised to be the technical heart and soul of ASME and of the mechanical engineering community. Currently, the COE is comprised of eight Technical Groups representing 39 Technical Divisions, Subdivisions and Institutes that span a vast array of disciplines, technologies and industries.

These Technical Divisions and Institutes disseminate information about their technical interests through the publication of peer-reviewed papers and by sponsoring conferences and workshops. Technical committees made up of ASME members who volunteer their time to the Society do much of this work. Divisions and Institutes also recognize outstanding individual technical contributions to the profession by means of honors and awards programs. Some also sponsor scholarships and student paper competitions. Many divisions also provide expert opinion to State and Federal governments through public policy statements to help influence technology innovation in their respective area of interest. From a Member's perspective, you can say that "belonging" to Technical Divisions is a way of affiliating themselves with communities of technical interests. Typically, Members choose as their "primary" division that covers technical areas most relevant to their current job situation.

The operational disadvantages of this "division" of focus, however, are that they can:

- form barriers between functional groups that tend to work in isolation;
- create duplication of efforts and overlap of areas common to many divisions;
- deny the (professional) Society sufficient depth in certain areas of expertise;
- overemphasize division objectives to detriment of the whole Society; and
- produce competition among divisions to acquire scarce society resources and meet performance targets.

The purpose of the COE leadership is to represent and foster the development of technical initiatives of the Society, and to support the Divisions and Institutes in the identification, creation, and dissemination/exchange of technical knowledge. The COE leadership must ensure that its programs produce added value to ASME membership. As part of our planning process, the COE leadership has been tasked by ASME's Board of Governors to determine if there are any organizational barriers that prevent it from operating as a knowledge-based organization and fostering and providing a home for multidisciplinary activities.

Realizing that change to the current divisional structure is necessary, the COE set a goal for the next three years to become a knowledge-based organization centered on a matrix of technology-based institutes and groups of discipline-based divisions. Institutes would be characterized by a vertically integrated technical field of interest and activity ranging from research and professional practice to conferences and continuing education, with dedicated staff funded by institute resources to achieve their goals.

This change will turn the COE into a more cohesive, responsive, and agile organization that addresses the needs not only of technical disciplines but also of markets. It will cut across boundaries of other ASME Departments,

Divisions, and Councils to identify knowledge-based products and services that can be more effectively brought to our customers and ensure that the ASME brand continues to gain stature, both domestically and internationally.

To this end, Technical Group Vice Presidents, in partnership with staff, have developed Strategic Plans in support of the COE charge. The foundation for change has been the commitment of key volunteers and staff that recognizes the strategic and organizational changes essential for COE and ASME to thrive in the future.

Technical Divisions are being challenged to justify their existence, as well as what are its plans to form an Institute and how is the model going to be satisfied. This requires an assessment of the viability of a technology or industry in which Divisions operate. Is it growing? Where are the key applications? What are the drivers? What international efforts are taking place? What types of products and services are particularly valued?

One would be hard pressed to find ways to improve most of ASME's knowledge-based products. Our quality is very high. But is it always appropriate or relevant? We must also recognize that we have several categories of customers and each must be served differently. For membership alone, we have three groups to satisfy: (1) academic members, (2) industry and government members and (3) student

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ASME Council on Engineering

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members. Each has different needs and we must have products to serve each accordingly. As a nonprofit association, our stated purpose is to improve the Society.

So what does this mean for the Noise Control & Acoustics Division (NCAD)? The NCAD is one of five Divisions under the Environment & Transportation Technical Group (E&TG) of the COE. The other four Divisions are Aerospace (AERO), Environmental Engineering (EED), Rail Transportation (RTD) and Solid Waste Processing (SWPD). Historically, there has been a lack of synergy in technical interests among Divisions under the E&TG. While advantages for operating under this Group exist, such as sharing best practices and gaining sessions at the annual ASME International Mechanical Engineering Congress, a question can be raised as to whether the current collection of Divisions under the E&TG makes sense. Divisions such as AERO, RTD and SWPD each competes in specific industries and has different customers. On the other hand, Divisions such as EED and NCAD address similar technologies/functions that engineers may use/perform in many industries.

The E&TG's vision is to function more like a "holding company" with a diversified portfolio of Divisions having interests in various sectors of the transportation and waste management industries, as well as the cross-marketing of noise control and environmental technologies. By collaborating with other COE Divisions on "common interest" noise control/environmental technologies, the E&TG will create an integrated service for key ASME members where a demonstrated market need and industry support exists. An underlying goal of the E&TG strategic plan is to recover the portion of expenses associated with the operation of the Divisions. In this way, Divisions will contribute to the COE goal of covering its operating expenses and getting to a cost-neutral position.

This is a great opportunity to address needed changes to build on ASME's and COE's strengths and ultimately better serve our shareholders, Members like you. We look forward to seeing the volunteer leadership and staff work in partnership as high performance teams toward a common goal of transforming COE and embracing a knowledge-based culture with shared passion. ▲

BY Miguel C. Junger

Gaps in Airborne Noise Pollution Control

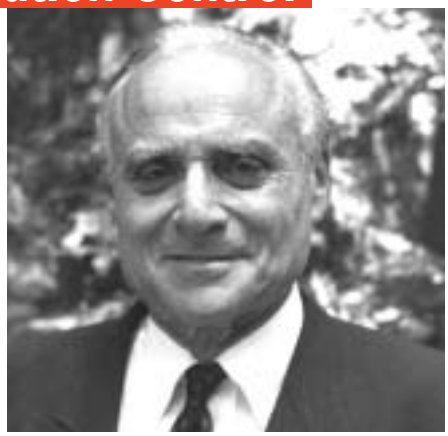
Editor's Note: This is the second of the series of articles written by Dr. Miguel C. Junger, who received the ASME Per Bruel Gold Medal in 1992. Each of these articles presents a unique point of view on acoustics and noise control problems that deserves special attention.

The atmosphere's chemical pollution by fossil fuel combustion is the subject of international meetings and legal restrictions. The concern is the release of carbon dioxide that results in global warming, oceans' thermal expansion, and arctic ice thawing. Consequently over the past half century, scientists and engineers have developed nuclear reactors, solar panels, wind and tidal turbines, and hybrid automobile engines.

These initiatives are in contrast with the neglect of noise pollution problems even though their solutions mostly do not require comparable technical efforts. This neglect is partly due to a localized impact of most airborne noise. One exception is the aircraft generated nose such as sonic boom. The itinerary of supersonic passenger planes and generally the selection of airport locations are therefore carefully controlled.

Internal combustion engines contribute to both chemical and noise pollution. The latter can be significantly reduced by efficient mufflers. This approach is neglected in motorcycles whose roar apparently pleases its driver. In our telephone conservation, Professor Sean Wu pointed out that the lawnmowers, leaf blowers and chain saws disturb the peaceful suburban environment. The former two problems can be solved by using electrical rather than internal combustion engine power. Electric motors require either a long extension cord or the use of a battery. In contrast, avoiding chain saw noise requires an engineering initiative. The writer sees no obvious solution to chain saw noise problem. An acetylene torch which solves the noise problem is dangerous in almost all situations.

A major deliberate noise exposure is found in restaurants where background music is amplified to a level interfering with conversation, a social damage comparable to TV watching during family dinners. Amplified live music can result in musician's hearing loss. Even in the absence of background music, restaurants may be objectionably reverberant, a situation remediable by coating the ceiling with sound absorptive tiles.



In summary, except for aircraft generated noise, airborne noise pollution is widely neglected, even though it can mostly be drastically reduced without major engineering effort. This is in contrast with waterborne ship-generated noise. The long range of underwater sound is not easy to reduce and has military implication as being harmful to marine mammals. This is one reason why the writer has a passion for sail boats. ▲

BY Maurice Sevik A Science Where Learning Never Stops

Editor's Note: This is the third of the series of articles written by Dr. Maurice Sevik who received the ASME Per Bruel Gold Medal in 1996. It is fair to say that the most significant progresses in structural acoustics and underwater acoustics over the last half century were made in the David Taylor Model Basin, which would not have been possible without the vision and strong leadership from Dr. Sevik.

Acoustics is defined as "The science of the production, control, transmission, reception and effects of sound and of the phenomenon of hearing." As scientists, we aim at understanding the physics of these phenomena and transmit our knowledge to others. As engineers, we aim at applying the science of acoustics for the benefit of mankind – admittedly with varying degrees of success. An example of an application of acoustic technology, which has been of great benefit to mankind, consists of the numerous uses of ultrasound in medicine. On the other hand, the widespread application of jet propulsion to commercial aircraft is still the cause of annoyance and complaints, in spite of significant scientific and technical progress in noise control made during the past decades. However, all areas of acoustics – applied or purely theoretical – thrive as a result of scientific progress at Universities and research laboratories. Much still remains to be done.

It is regrettable that some University Physics Departments consider acoustics as a "mature" science and no longer offer courses in this field. Few academics have the vision of Professor John Johnson of the Pennsylvania State University who was the driving force for establishing "Acoustics" as a multi-disciplinary curriculum in the College of Engineering in the mid-sixties. This Department has since grown and attracted many talented professors and gifted students.

I left Penn State in 1972 to head the Acoustics Directorate at the David Taylor Model Basin, near Washington, D.C. I considered it essential to encourage engineering staff to undertake research and publish those results that did not compromise national security. Books and scientific papers on acoustics were published and attendance at meetings of the ASME and ASA was encouraged. Although these activities were considered by some to be an unnecessary expense, I firmly believe that the Navy has benefited very significantly from the insight and knowledge gained by those who performed some of the Navy's R&D during the critical years of the Cold War. ▲

BY Sean F. Wu, Newsletter Editor Editor's Comments

NCAD Needs You!

Like many non-profit organizations, success of our Noise Control and Acoustics Division (NCAD) rests to a large extent with unselfish contributions in terms of time and efforts from volunteers and members like you. Your ideas, suggestions, and above all your time and effort are the key to keep NCAD up and running smoothly and effectively. The more you are involved, the better NCAD can serve its members and the more value we can add to the ASME membership. Currently, the Council On Engineering (COE) is examining if there are organizational barriers that hinder ASME from being operated as a knowledge-based organization that fosters and provides a home for multidisciplinary activities. Each division is challenged to justify its existence and answer several specific questions (see "ASME Council On Engineering Responding to Strategic Challenge Barriers" by Elio Manes on page 3. These questions cannot be answered prudently without inputs from our members. Please tell us what you think of NCAD, and what we can do to make it a knowledge-based organization. Also, we want to see more volunteers to take leadership roles in organizing sessions for the ASME IMECE and other activities. The following are just a few areas that you can start to get involved with NCAD.

- Organizing NCAD sessions at future ASME conferences: Those who are interested please contact Dr. Sheryl M. Grace at **sgrace@bu.edu**.
- Reviewing papers for future ASME conferences sponsored by NCAD: Those who are interested please contact Dr. Sheryl M. Grace at **sgrace@bu.edu**.
- Speaking at a Student Chapter Meeting in their area: Undergraduate students don't often get exposed to noise control and acoustics topics in their regular curriculum. Those who are interested please contact Dr. Sheryl M. Grace at **sgrace@bu.edu**.
- Ideas and suggestions for NCAD: Those who would like to share their ideas or make suggestions in respond to strategic challenges please contact Dr. Sean Wu at **sean_wu@wayne.edu**.
- Selecting NCAD: In renewing your membership, please make sure to select NCAD as your primary division. ▲

Noise Control and Acoustics

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Announcement:

- The ASME IMECE 2003 will be held in Washington, D. C. from November 16 – 21.
- The 2003 Rayleigh Lecture will be given by Dr. Earl G. Williams of Naval Research Laboratory on "Fourier Acoustics: Uncovering the origins of sound."
- In our last Newsletter, we posed three questions regarding how NCAD should be run. The responses are evenly divided for all three questions, so no consensus is reached.
- Question #1: Do you think that you can benefit more from attending (a) the ASME IMECE, (b) International Design Engineer-ing Technical Conference, (c) Fluids Engineering Division International Summer Meeting, or (d) other conference (please specify)?
- Question #2: Do you prefer that the Noise Control and Acoustics (NCA) Division sponsors symposia at (a) the ASME IMECE, (b) International Design Engineering Technical Conference, (c) Fluids Engineering Division International Summer Meeting, or (d) other conference (please specify)?
- Question #3: If there are symposia on noise control and acoustics related topics in the ASME IMECE, International Design Engineering Technical Conference, and Fluids Engineer-ing Division International Summer Meeting, which conference will you most likely attend? ▲

Dr. John Fahnline from Penn State University is presented a certificate of appreciation from Dr. Rick Marboe.

Dr. Ilene Busch-Vishniac receives a plaque for giving the 2002 Rayleigh Lecture from Dr. Rick Marboe.

Dr. Rick Marboe, Chair of the NCAD, presides the Rayleigh Lecture at the 2002 ASME IMECE.

Dr. Martin Pollack, outgoing Chair of the NCAD, is appreciated by Dr. Rick Marboe, Chair-elect of the NCAD.