Volume 9, Number 4
2001 December

NOISE/NEWS INTERNATIONAL

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

inter-noise 2001
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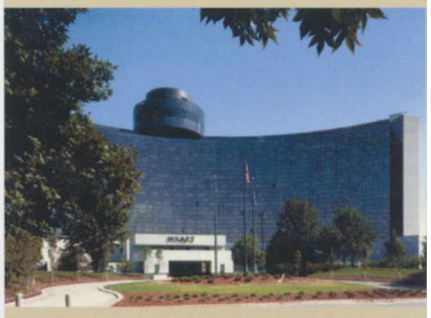
Koyasu
Japanese Industrial Standards for the Determination, Declaration, and Verification of Noise Emitted by Machinery and Equipment—State of the Art



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DEPARTMENTS

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I-INCE

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

INCE/USA

The Institute of Noise Control Engineering of the USA (INCE/USA) is a non-profit professional organization incorporated in Washington, DC, USA. A 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 person interested in noise control may become an Associate of INCE/USA and receive both this magazine and *Noise Control Engineering Journal*.

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- Links to the home pages of I-INCE and INCE/USA
- Abstracts of the feature articles in the printed version.
- Directory of the Member Societies of I-INCE with links, where available, to the Member Society Profiles and home pages.
- Links to I-INCE Technical Initiatives.
- Calendar of meetings related to noise—worldwide
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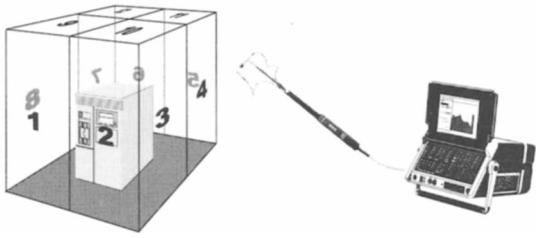

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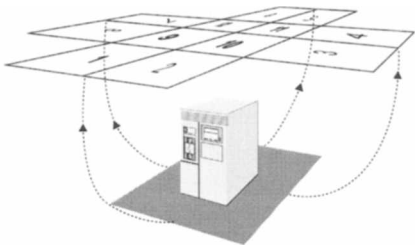

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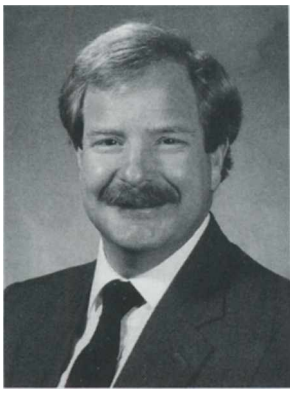
President's Column



The Life & Death of Environmental Noise in America

After returning from the excellent INTER-NOISE Congress in The Hague last August, I had to wonder about the status of environmental noise in America. If it is reflected by the number of papers and technical activity, then there is clearly much more interest in quiet environments in Europe than in America. The new draft European Union Environmental Noise Directive, and the *Green Paper* before it, seem to be spawning a great deal of technical activity among noise control engineering professionals in much the same manner as the Noise Control Act of 1972 did in the United States in the early 1970s.

One could argue that much of the technical foundation to support environmental noise reduction in America was actually completed in the 1970s. As a result, we do not see the work on the technical infrastructure being done here today. As an example, "new" traffic noise sound propagation algorithms are updated based, in part, on work done 25 years ago. Many of the criteria used today go back to the EPA *Levels Document* of 1974 or other reports of similar vintage. For motor vehicle noise, the national and local regulations in place, again, all date back to the 1970s. Similarly, the regulations on aircraft noise emissions and methods of assessing aircraft noise exposure date back to this same period. As a result, one might conclude that this earlier work was sufficiently well done that it has carried America into the 21st century with little need for improvement.

If one accepts these arguments, then is there any need for improvement of the infrastructure relative to environmental noise in the U.S. today? With the slowdown of national work, the front lines of environmental noise in America have moved to the local level—if not the states, then individual counties or cities. Even more so, it has moved to individuals themselves. As a result, the issues become more legal than technical. What noise environment is someone moving to the countryside entitled to? What is the noise level that one should accept on their patio? In the U.S., these questions naturally go to the court system. But, do the courts have sufficient information to resolve these issues consistently? Do local administrators and noise consultants have sufficient guidelines and accepted criteria to guide local adjudication? The answers may not be entirely "no," but they are certainly not "yes."

Other technical and political questions remain for America. Do we have sufficient understanding of noise impact to "roll up" requirements from the individual level to the local, state, and Federal level? Do we have the mechanisms in place to remove excessively noisy offenders from operating in our communities? Can we bring Federal limits in line with local ordinances? Do we have needed standards and measurement procedures in place? Given the amount of individual dissatisfaction at the local level, the answers to these questions are certainly not "yes."

To begin to answer such questions positively, U.S. environmental noise goals need to be articulated and a framework established to address them such as our European colleagues are doing today. Until this is done, Amer-

ica's lifeless appearance in environmental noise will continue its slumber and our infrastructure will rely on technology that is 25 years old.

Please send your comments, issues, or ideas to me at pdonavan@illingworthrodkin.com.

—Paul R. Donavan
2001 INCE/USA President

The 64-Billion Euro Question

The title of this "*Editor's View*" is taken from the opening presentation at the Workshop on Costs and Benefits of Noise Control, which was held on 2001 August 29 at INTER-NOISE 2001 in The Hague, The Netherlands. The session organizer and opening speaker was Matti Vainio of the Environment Directorate General of the European Union. The question is simply, "How much should we pay for noise control, and what is it worth?" My question is, "Can cost-benefit analysis be reasonably applied to noise issues?" An economist would probably say "of course." You merely determine the costs, determine the monetary value of the benefits, choose a reasonable discount rate to reflect the fact that benefits come over a period of time, calculate the present value of the benefits, and compare that value with the cost.

Noise, like most other forms of pollution, is usually an external factor in the sense that the costs are borne by party A whereas the benefits accrue to party B. I don't see that this affects a cost-benefit analysis, but it does complicate the issue because it is not a single entity weighing costs vs. benefits.

Although the way things are done in setting public policy are, I am sure, quite different from the way private industry operates, it is interesting to reflect on how decisions related to noise are made in industry. One approach is the "best of breed" philosophy. A competitive analysis department looks at a large number of competitive products and compares the noise emissions, among other things, with the noise emissions of the company's products. Money gets spent to be equal to or better than the competition. When noise reduction comes from good engineering and teamwork between different design disciplines, it can be very difficult to estimate the additional product cost for noise control, even after a project is completed.

In other cases, serious customer complaints lead to noise control measures, and a rudimentary cost benefit analysis is done along the lines of "we can't afford to lose a major customer." Another situation can arise because of noise emissions inside or outside an industrial facility. A threat to "shut the plant down" by the authorities is a very strong incentive to reduce noise emissions, and I know of cases where management has not spent a lot of time trying to assess the cost of an idle plant verses noise control solutions.

The public sector, it seems to me, has a difficult time with both costs and benefits. Costs vary greatly depending on when noise control measures are introduced. Tor Kihlman, president of International INCE, has argued this point many times.

Should we always try to monetize benefits? There is an article in the *European News* department in this issue about the human right to be free from aircraft noise exposure between 4.30 and 6.00 in the morning near Heathrow in the United Kingdom. What is the present value of a human right?

What should the discount rate be? When benefits occur over a long period of time, the discount rate chosen for the analysis is critical.

I am sure that over time the methods for cost-benefit analysis related to environmental noise will be improved, but let's not delay the introduction of noise reduction measures that most surveys say is needed now.

—George Maling
Pan-American News Editor

ACTIVE 2002

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Institute of Sound and Vibration Research

Southampton, United Kingdom

The ACTIVE 2002 Announcement and Call for Papers appeared in the June issue of this magazine on pages 208-209.

The Swedish Acoustical Society

Svenska Akustiska Sallskapet, or the Swedish Acoustical Society (SAS), was established as a focal point of interest in the field of acoustics within Sweden. The founding of SAS in Stockholm on 1945 March 21 was at the initiative of Stellan Dahlstedt, later of Akustik-Konsult, and Per Brüel, later co-founder of Brüel and Kjær. The current president of the society is Leif Åkerlöf, Ingemansson Technology AB, Stockholm. SAS publishes a journal three times each year. The editor-in-chief is Lena van Evelingen, Ingemansson Technology AB, Stockholm. Today, SAS has about 275 members.

Over the years, SAS has broadened the scope of its activities to encompass all areas of acoustics as well as several related disciplines—such as physiology and audiology. Initially, the activities of the Society were concentrated in Stockholm at the Royal Institute of Technology. A topic was chosen for an SAS meeting, a paper was presented, and a lengthy discussion followed. Later, the activities were expanded to include Gothenburg and Malmo, and indeed the whole of Sweden. It has now become a tradition of SAS to hold an annual meeting with several lectures and a social function. In 1954, SAS played an active role in the formation of the Scandinavian Acoustical Society (NAS), and the first meeting was held in Copenhagen, Denmark, with Paavo Arni from Finland as president. Members of NAS (today NAM) are the four acoustical societies of the Scandinavian countries. The societies take turns hosting the Scandinavian Acoustical Meetings. For example, SAS hosted the Scandinavian Acoustical Meeting (NAM '98) in Stockholm during three days of September in 1998 with Leif Åkerlöf as chairman.

SAS is an active member society of International INCE. In 1990, SAS hosted INTER-NOISE 90 at the Chalmers University of Technology in Gothenburg. The number of registered delegates at that congress exceeded 800 with participants coming from 39 countries. The largest delegation was, of course, from Sweden with over 200 participants. With the theme *Science for Silence*, the congress was focused on the need for applied science to support future improvements in environmental noise levels.

Testimony to the continuing interest in noise in Sweden was presented in 2000 when SAS participated in INTER-NOISE 2000 in Nice, France. About 5 percent of the lecturers were from Sweden. SAS continues its involvement as a society dedicated to spread knowledge in the field of applied acoustics, particularly as related to the noise problems in the world. Beginning in 1989, SAS organized sessions on noise at the world ecology congresses held in Gothenburg. At Ecology '89, an overview was given of noise control measures and strategies to control environmental noise problems. The focus of the session at Ecology 91 was on external industrial noise. In 1992 at a congress on working environments, the session dealt with noise at the workplace. At Ecology '93, the special session organized by SAS described a special action plan to reduce community noise. SAS is today a link between all parts of the acoustical field in Sweden.

This is the 36th in a series of articles on the Member Societies of International INCE. This is an update of the profile that appeared in the 1993 December issue of this magazine.—Ed.

Feature

Japanese Industrial Standards for the Determination, Declaration, and Verification of Noise Emitted by Machinery and Equipment—State of the Art

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Introduction

In Japan, progress has been made in establishment of national standards for the determination of noise emitted from machinery and equipment, especially during the past several years. These standards are divided into two groups: basic standards and individual standards. Basic standards for the determination of sound power levels and emission sound pressure levels are essentially in conformity with corresponding international standards. This is not necessarily true for individual standards for specific machinery and equipment. In this article, the status of these standards, basic standards, and individual standards, are described in detail.

In Japan, methods for measurement and evaluation of noise have been standardized in Japanese Industrial Standards (abbreviated JIS). These standards are divided into three parts: (1) standards on the methods for measurement of noise emitted by machinery, equipment, and other sound sources; (2) standards on the methods for measurement of environmental noise; and (3) standards on measurement instruments. The first group of standards is further divided into two groups—basic standards and specific standards that specify test codes to be adopted for specific sound sources.

The Standardization Office for Industrial Infrastructure, Ministry of Economy, Trade and Industry (METI), usually leaves the preparation of new standards and/or the revision of existing standards to appropriate organizations. As to the basic standards on noise, the Acoustical Society of Japan or INCE/Japan is required to prepare the draft documents of standards. *Ad hoc* technical committees are established in the respective societies, and experts in these committees prepare the draft standards.

Until recently, these national standards have not necessarily been in harmony with the corresponding international standards. Due to firm requirements from the World Trade Organization (WTO), the Japanese government made a basic policy decision in 1995—that all Japanese Industrial Standards shall have complete conformity to the corresponding international standards, such as those published by the International Organization for Standardization (ISO), the International Electrotechnical Commission (IEC), etc. The target date was the end of 1998 March. By this date, the revision of existing standards and the preparation of new standards was almost completed.

In this article, the state of the art for the Japanese Industrial Standards in the field of the methods for measurements of noise emitted from machinery and equipment and of the relevant standards will be described.

Basic Construction of Standards

The Japanese Industrial Standards for measurement of noise emitted from machinery and equipment are classified into the following three categories:

- Standards that specify the methods for measurements of noise. In these standards, the title includes words such as *measurement* or *determination*,
- standards that define the specifications for products such as machinery and equipment. Among various specifications, a clause concerning noise is included, and
- standards which define the specifications on measurement instruments.

The first category of standards above is divided further into two subgroups:

- The so-called basic standards. They prescribe the general rules for the measurement of emitted noise without any description of the specific type of machinery and equipment. Another group of standards describes the method for measurement of specific type of machinery and equipment.
- Product standards. The titles of standards show only the names of products. As one of the perfor-

mance specifications, the noise limit is prescribed. Most of these standards have specifications on the method for measurement of noise.

The third category of standards above is standards for various kinds of noise measurement instruments. In the following sections, details of standards are described for respective categories.

Basic Standards for the Determination of Sound Power Levels and the Measurement of Emission Sound Pressure Levels

Background for Standardization

So far, A-weighted sound pressure levels or octave-band sound pressure levels have been used in Japan primarily for the description and evaluation of noise emitted from various kinds of sound sources. As is well known, A-weighted sound pressure levels or band sound pressure levels depend on the conditions of the measurement environment and the relative positions between the source and the microphone. It is necessary to take into account the measuring conditions for the practical applications of the measured data on the sound sources.

In Europe and America, sound power levels have been adopted as the basic quantities for the description of noises emitted from sound sources. Most of the basic ISO standard series for the determination of sound power levels using sound pressure were published in the 1980s. Also, standardization of the determination of sound power levels using sound intensity began in the mid-1980s.

With this background, the importance of sound power levels has been gradually understood in Japan and the standardization of methods for the determination of sound power levels have been required by industry, especially by those industries that export various kinds of machinery.

With the publication of EEC directive 89/392 on "machinery safety," standardization of the method for measurement of A-weighted sound pressure levels emitted from machinery and equipment (emission sound pressure levels) was required, and the preparation of International Standards, the ISO 11200 series, began in the early 1990s in ISO/TC 43/SC 1 (Noise).

Because of these events, basic Japanese standards on the determination of noise emitted from machinery and equipment were completed both for sound power levels and emission sound pressure levels.

Determination of Sound Power Levels

Basic Japanese Industrial Standards for the determination of sound power levels of noise sources are summarized in Table 1.

Three standards related to the sound pressure method, JIS Z 8732, Z 8733, and Z 8734, were published during 1986 and 1988, respectively. Revised standards have been prepared as the translation of the corresponding ISO 3740 series standards. The ISO 3740 series consists of seven standards for different measurement environments and precision grade. Among them, only three standards have been adopted in Japanese Standards. They were published in 2000.

Two standards for the determination of sound power levels by the sound intensity method, JIS Z 8736-1 and Z 8736-2, were first published in 1999. They have been translated from the corresponding ISO standards. Only the terms and definitions between the two standards were revised carefully to have essential conformity with each other.

Table 1. JIS for the determination of sound power levels

JIS number	Measured quantity	Measurement environment	Accuracy grade	Corresponding ISO standard
Z 8732—2000	Sound pressure	Free-field & hemi free-field	precision	ISO/DIS 3745
Z 8733—2000	Sound pressure	Approximately hemi free-field	engineering	ISO 3744:94
Z 8734—2000	Sound pressure	Reverberant field	precision	ISO 3741:99
Z 8736-1—1999	Sound intensity	any	Precision, engineering, survey	ISO 9614-1:93
Z 8736-2—1999	Sound intensity	any	Engineering, survey	ISO 9614-2:96
Z 8739—2001*				ISO 6926:99

* NOTE: JIS Z 8739 is the standard for performance characteristics and calibration of reference sound source.

Measurement of Emission Sound Pressure Level

The older standard JIS Z 8731, which was originally published in 1957, specified the method for measurement of A-weighted sound pressure level of noise emitted from machinery and equipment. However, during the overall revision of JIS Z 8731 in 1983, the scope of this standard was restricted to the measurement of environmental noise and the provision concerning the measurement of machinery noise was completely deleted. Until recently, there has not been a basic standard in Japan on the method for measurement of emission sound pressure level of machinery and equipment.

Two new standards were prepared which correspond to the ISO 11200 series. Table 2 shows the characteristics of these standards, which are complete translation standards, respectively. Similar to the case of ISO 3740 series, only two standards, ISO 11201 and 11202, have been adopted in Japanese standards. These standards were published in 2000.

Standards for Specific Machinery and Equipment

Measurement Standards

There are a number of standards that prescribe the method for measurement of noise emitted from a specific family of machinery and equipment. The titles of these standards include the term *method for measurement of noise* or similar expressions. In general, Japanese Industrial Standards are classified according to the machinery group. At present, standards for measurement of machinery noise belong to the following standard categories:

A. Civil Engineering and Building Engineering
B. Machinery
C. Electronic Equipment and Electric Machinery
D. Automobile
E. Railway
F. Ship
W. Aircraft
X. Information Technology

The titles of standards included in the above categories are listed below.

A. Civil Engineering and Building Engineering

A 1424-1:98 Method for laboratory tests on noise emission from appliances and equipment used in water supply installations—Part 1: Measurement method

A 1424-2:98 Method for laboratory tests on noise emission from appliances and equipment used in water supply installations—Part 2 :Mounting and operating conditions for draw-off taps and mixing valves

A 1708:94 Method of test for noise of equipment units for dwellings

A 8305:88 Method for the measurement of airborne noise emitted by construction equipment intended for outdoor use

B. Machinery

B 1548:95 Rolling bearing—Measuring methods of A-weighted sound pressure level

B 1753:99 Acceptance code for gears—Determination of airborne sound power levels emitted by gear units

B 6004:80 Method of sound level measurement for machine tools

B 6406:91 Mechanical press—Method of measurement of A-weighted sound pressure level

B 6521:78 Method of measurement for noise emitted by woodworking machinery

B 8005:98 Reciprocating internal combustion engines—Measurement of emitted airborne noise—Engineering method and survey method

B 8310:85 Methods of A-weighted sound pressure level measurement for pumps

B 8346:91 Fans, blowers and compressors—Determination of A-weighted sound pressure level

B 8350:89 Methods of noise level measurement for oil hydraulic pumps and motors

B 9064:98 Method of sound level measurement for industrial sewing machines

D. Automobile

D 1024:99 Acoustics—Measurement of noise emitted by accelerating road vehicles—Engineering method

D 1026:87 Measurement of noise emitted by stationary road vehicles

D 1041:87 Method of acoustic test of horns for motorcycles

D 1616:95 Road vehicles—Measurement methods of noise emitted by exhaust systems

D 8301:93 Acoustics—Specification of test tracks for the purpose of measuring noise emitted by road vehicles

Table 2. JIS for the measurement of emission sound pressure level

JIS number	Measurement environment	Accuracy grade	Corresponding ISO standard
Z 8737-1—2000	Essentially hemi free-field	engineering	ISO 11201—95
Z 8737-2—2000	*In situ*	survey	ISO 11202—95

E. Railway
E 4041:94 Railway rolling stock—Test methods inside noise

F. Ship
F 0904:81 Measurement of noise level on board vessels (Machinery part)
F 0905:98 Measurement of noise level on board vessels (Hull part)

W. Aircraft
W 0851:93 Acoustics—Measurement of noise inside aircraft

X. Information Technology
X 7779:01 Acoustics—Measurement of airborne noise emitted by information technology and telecommunications equipment

In these standards, the quantities to be derived are sound power levels and/or sound pressure levels. For the evaluation of noise emitted from machinery and equipment, A-weighted sound pressure levels at specified positions, usually one meter from the surface of the source, have been used extensively in Japan. Therefore, most of the above standards prescribe the method for measurements of sound pressure levels. In recent years, some industries which are heavily involved with exports of their products have had special interests on the determination of sound power levels of sound sources.

Table 3 shows Japanese Industrial Standards which specify the method for determination of sound power levels on the specific type of machinery and equipment.

Product Standards

In product standards, the titles express mainly the name of machinery and equipment. Among some of these standards, performance specifications on noise are included. The following are the titles of these product standards. Here, quantities specified in respective standards for the evaluation of noise are also shown in parenthesis following the title of the standard.

A. Civil Engineering and Building Engineering
A 4003:95 Warm air furnaces (L_{pA})

B. Machinery
B 8609:81 Performance tests of mechanical draft cooling tower (L_{pAS})

C. Electronic Equipment & Electric Machinery
C 8106:99 Fluorescent lamp luminaries for commercial, industrial and public lighting (L_{pA})
C 8108:91 Ballasts for fluorescent lamps (L_{pA})
C 8112:99 Table study lamps for fluorescent lamps (L_{pA})
C 8115:99 Fluorescent lamp luminaries for residential lighting (L_{pA})
C 9108:92 Electric vacuum cleaners (L_{pA})
C 9603:88 Ventilating fans (L_{pA})
C 9606:93 Electric washing machine (L_{pA})
C 9609:90 Electric blenders and electric juicers for household use (L_{pA})
C 9610:76 Portable electric grinders (L_{pAS})
C 9611:90 Electric disc grinders (L_{pAS})
C 9612:99 Room air conditioners (L_{pA})
C 9614:95 Electric shavers (L_{pA})
C 9615:95 Air cleaners (L_W)
C 9625:76 Portable electric planers (L_{pAS})
C 9626:92 Portable electric circular saws (L_{pAS})

Here, L_{pA} is the A-weighted sound pressure level, L_{pAS} is the A-weighted sound pressure level with time weighting S, and L_W is the sound power level.

As shown above, most of these standards specify the measurement of sound pressure levels, espe-

Table 3. JIS which include the sound power level determination of noise emitted from specific machinery and equipment

JIS number	Test environment	Corresponding ISO	remarks
JIS A 1708	Laboratory, field		
JIS A 8305	field	ISO 4872	
JIS B 1753	laboratory	ISO 8579-1	
JIS B 6406	laboratory		Annex (informative)
JIS B 8005	laboratory	ISO 6798	
JIS B 8310	laboratory		Annex (informative)
JIS B 8346	laboratory		Annex (informative)
JIS B 8350	laboratory	ISO 4412-1 ISO 4412-2	Annex (informative)
ISO 4412-2	laboratory		Annex (informative)
JIS B 9064	laboratory	ISO 7779-9295	

cially A-weighted sound pressure levels for respective products. The positions of the microphone depend on the kind of product.

Recently in Japan, standardization of the method for determination of sound power levels of noise emitted from household appliances in parallel with the measurement of emission sound pressure level was required. The IEC Standard to be used is IEC 60704-1: Household and similar electric appliances—Test code for the determination of airborne acoustical noise—Part 1: General requirements.

Standards for Measuring Instruments

Sound Level Meters

Sound level meters have been used primarily for the measurement of A-weighted sound pressure levels, which are used as the basic quantities in various kinds of noise regulation. They are also used as measuring amplifiers for the frequency analysis of noise.

In Japan, the Japanese Industrial Standard on sound level meters was originally published in 1952 as JIS B 7201. This standard has been revised several times to conform with technical progress. Recently, two standards, JIS C 1502 (Sound level meters) and JIS C 1505 (Precision sound level meters), have been adopted. These standards have essential conformity to IEC 651, published in 1979, and to IEC 804, published in 1985. However, there still remain some minor portions of the documents that do not conform.

Now, in IEC/TC 29, overall revision of IEC 651 and 804 and drafting of the new IEC 61672 are in progress. In view of this situation, draft standard JIS C 61672-1 has already been prepared and will be published in near future. This JIS standard is the complete translation of Draft IEC 61672-1 and so the title is the same as the IEC document, JIS C 61672-1 Electroacoustics—Sound level meters—Part 1: Specifications.

Sound Calibrators

For the calibration of sound level meters, sound calibrators specified in JIS C 1515 (Electroacoustics—Sound calibrators) are used. This standard is completely identical with the corresponding IEC 60942, that is, the complete translation standard.

Frequency Analyzers

Various kinds of frequency analyzers have been developed and used. The most widely used frequency analyzers for noise measurements are octave-band and 1/N octave-band frequency analyzers. Rapid advances in digital signal processing have contributed significantly to the design of filters.

In Japan, JIS C 1513 (Octave and third-octave band analyzers for sounds and vibrations) was published in 1983. This standard specified not only the characteristics of filters but also those of amplifier and indicator. Characteristics of filters were based on IEC 225:1966 and ANSI S1.11:1966. Soon after the publication of IEC 225, revision of this standard was started by considering the remarkable progress in the design of filters.

In addition to JIS C 1513, a new draft standard JIS C 1514 was prepared recently and will be published in the near future. The title of this standard is JIS C 1514 Octave and 1/N octave-band filters.

This standard is the complete translation standard of IEC 61250, Electroacoustics—Octave-band and fractional-octave-band filters.

Future Trends

Future trends of our standardization work are summarized in the following two areas:

International Conformity

An international conformity of Japanese Industrial Standards on the method for measurement of noise emitted from machinery and equipment is now in progress as shown above. In case of product standards, conformity with basic standards shown in Tables 1 and 2 has scarcely been considered. This is due to the long experience in the respective industries. It may be expected that the existing standards for various products will be revised in order to be in conformity with international standards.

Declaration and Verification of Noise Emission

Another important problem for Japanese Industrial Standards in the field of machinery noise is the preparation of standards on declaration and verification of noise emission.

In 2001, JIS X 7778: Acoustics—Declared noise emission values of computer and business equipment, was published. This is the complete translation of ISO 9296: 1988.

In several industries, the standardization of the method for noise labeling of machinery and equipment is required. In near future, preparation will begin on a Japanese Industrial Standard corresponding to the ISO basic standard ISO 4871: Acoustics—Declaration and verification of noise emission values of machinery and equipment.

Through the publications of these standards, the international harmonization of Japanese Industrial Standards on machinery noise will be complete.

Reference

Recent Activities in Noise and Vibration Control Engineering in Japan, Masaru Koyasu, *Noise/News International*, pp. 138-144, 1997 September.

INTER-NOISE 2001 Report

In the afternoon of Monday, 2001 August 27, Congress President Tjeert ten Wolde chaired the opening session of INTER-NOISE 2001, The 2001 International Congress and Exposition on Noise Control Engineering. He pointed out several features of the 2001 Congress—the poster sessions to be held, the tutorial papers (double-length papers) that were to be featured, and a special costs-and-benefits workshop scheduled for August 29. He also gave some statistics: Some 950 participants (later to go over 1000) and 110 accompanying persons, 44 exposition booths, 453 papers in technical sessions, and 105 poster papers, and, of course, the daily plenary session.

He then introduced Jan W. Verheij, President of the Acoustical Society of the Netherlands, who welcomed participants on behalf of the Society. He said that the Society, numbering more than 500 persons, regularly held 4 scientific meetings, and was committed to education in acoustics in partnership with the Belgian Acoustical Association (ABAV). Tjeert tenWolde then introduced Tor Kihlman, President of the International Institute of Noise Control Engineering (I-INCE) who reminded the delegates that the mission of I-INCE is both to have an environment free from noise and to develop methods to fulfill that mission. He said that exposure to noise is still increasing, and that one serious problem is that those who are most affected by noise have little influence on decisions made to control it. Noise is not only a local problem, he said; it must be considered on regional, national, and international levels. Most environmental pollution problems, he said, can be controlled at the source, but noise is different because it is generally a by-product of other processes. Typically, he said, only about one- millionth of the energy of a process is converted to noise. If a day-night sound level, L_{dn}, of 40-45 dB is a good acoustical environment, and we compromise by accepting a level of 55-60 dB, we immediately lose the opportunity to set the proper goal, and even this level can be very difficult to meet. The result is that we may need 20 to 30 dB of noise reduction at the source, and for most noise-making products, we do not know how to do that. This means that it will take a very long time and a very strong demand from the public to solve the noise problem on the emission (source) side. To make progress, he said, all links in the noise chain must be considered, and this makes noise control engineering a vast area that involves noise control at the source, noise control on the path to the receiver, and careful consideration of the receiver.

Tjeert ten Wolde, Congress President, opens the 2001 Congress.

Jan Verheij, President of the Acoustical Society of the Netherlands, welcomes delegates on behalf of the Society.

He said that we must set a good acoustical environment as our goal, and not merely an acceptable environment. Costs and benefits, the theme of the

Congress, are a vital issue, and costs will be high when the problem is recognized late. We must improve our understanding of costs and benefits, he said, and that is one of the objectives of this INTER-NOISE Congress.

Tjeert ten Wolde then introduced Nick Boes who gave the audience very interesting insight into the capabilities of the human voice in his performance *The Art of Voice*. His ability to mimic the sounds of machines was amazing. Two that come to mind are the sound of a Ferrari shifting gears, and airplane flyovers.

Following the plenary session, there were nine parallel sessions for the rest of the day. In the evening, there was a reception at the *Madurodam*, which featured outdoor gardens depicting a miniature Holland. The food and drink was much appreciated by the attendees.

The first plenary speaker on Tuesday morning was Henk Miedema of TNO-PG Leiden, The Netherlands, who spoke on *Noise & Health: How does noise affect us?* He began by presenting an overview of how the noise problem will grow, annoyance being the first indication. A few years ago, he said, about 22% (or 77 million persons) in the European Union are annoyed by noise, and there are driving forces that will increase this number in the future—population growth, and increase in the number of "instruments" (noise makers), and the noise emission per "instrument." World population growth and especially trends towards urbanization will make the noise problem more serious as will the growth in the number of "instruments" per person, especially automobiles. Increasing wealth is one of the driving forces, and the number of motorcycles is growing rapidly. Aircraft noise is a serious problem. The result he said is that by 2020, more than one billion persons will be annoyed by noise.

He then turned to technical issues with a discussion of metrics and the work of persons concerned with community noise—Kryter, Fidell, Fields, among others—and continued with recent work sponsored by the European Union that related the day-evening-night sound level (L_{den}) to community reactions, highly annoyed, annoyed, and little annoyed. He said that among transportation sources, aircraft noise ranks first, road traffic noise second, and railway noise third.

He went on do discuss noise exposure mapping, and said that when one ends up with information on the number of persons highly annoyed per neighborhood, it leads to cost-effective noise abatement methods at the local level.

He continued with a technical discussion of annoyance versus age and other effects of noise such as sleep disturbance and disruption of communications and the various complex routes from noise exposure to long-term health effects. He concluded by saying that in terms of global policy, noise was not on the list in the 2000 Global Environmental Outlook, but it must be on the next one because noise effects are increasing and a global inventory of the problems must be made.

Tor Kihlman, President of I-INCE, presents some key issues in noise control and welcomes delegates on behalf of the organization

Henk Miedema presents the first plenary lecture.

On Tuesday evening attendees broke into small groups for tours to a number of cities and dinner.

Professor Jiri Tichy of the Pennsylvania State University was the plenary speaker on the second day of the Congress. His title was *Applications of Active Noise Control*. He opened by contrasting active and passive noise control. Passive noise control, he said, has disadvantages because the measures are inefficient, bulky, and expensive. There are also other environmental problems in ar-

Jiri Tichy presents the second plenary lecture.

Tjeert ten Wolde thanks all of those who worked to make the Congress a success.

Ulf Sandberg presents the third plenary lecture.

Tor Kihlman thanks the INTER-NOISE organizers on behalf of International INCE.

eas such as clean rooms. Active control at low frequencies is an excellent solution, he said, and therefore the best solution is to combine active and passive control. Active control, he said, has the disadvantage that it requires maintenance.

He then discussed the various ways that the destructive interference principle of active control can be used—acoustical coupling (changing a monopole to a higher order source), field cancellation in a limited area, and modal control where individual modes are controlled (for low modal density). There are few papers published on applications, he said, but that is probably because researchers tend to publish more than system developers. He cautioned about making fair comparisons between active and passive control because, although the cost may be high for active control, passive control in some situations may not be possible—meaning that the cost issue may not be relevant.

He discussed the availability of hardware such as loudspeakers and actuators, and pointed out that successful application of the technology requires a team approach because it is necessary to integrate acoustics and signal processing in any application.

He then started with the classic ideal of Olson, and progressed through many applications such in concert halls, clean rooms, hospitals, exhaust stacks, valve controls, locomotive silencer, magnetic resonance imaging, etc. He contrasted global control versus modal control, and described a new technique that uses energy density—sensing both particle velocity and sound pressure to achieve active control. Energy density, he said is more or less uniform in space.

He concluded by urging noise control engineers to have better communications with those interested in signal processing so that applications of active control can be increased.

As on Tuesday, parallel sessions continued throughout the day, One special workshop on the costs and benefits of noise control was held in the afternoon. Matti Vainio from the European Commis-

sion Environment Directorate General led the discussion on how much should we pay for noise control, and what is it worth? The discussion featured a number of speakers and covered noise around airports, porous surfaces for highways, and other topics.

The congress banquet was held in the convention center in the evening, and those in attendance enjoyed the variety of foods, the drinks, and the entertainment that followed dinner.

Ulf Sandberg of the Swedish National Road and Transport Research Institute was the plenary speaker on Thursday. His presentation was titled *Tire Road Noise—myths and realities.* He said that at this Congress, the subject of tire/road noise is on the agenda to a greater extent than ever before. He explored the past, present, and future of tire/road noise emission by introducing 13 myths and realities, and then discussed each in terms of present knowledge. The 13 myths are:

1. *Tire/road noise has become a concern only during the last decades, say from the 1970s.* It is shown that long ago tire/road noise was an important issue. It was an issue in Roman times.

2. *Tire/road noise is an important part of vehicle noise at speeds above 50 km/h (70 for trucks).* The truth is that nowadays tire/road noise dominates during almost all types of driving for cars and down to about 40 km/h for trucks (vehicles meeting EU requirements). Tire noise always dominates except at high rpm in lower gears.

3. *Manufacturers have done a lot to reduce vehicle and tire/road noise.* Yes, in some respects; but yet it seems that vehicle noise sometimes has increased rather than decreased. There is perhaps some but not much change in tire/road noise.

4. *The speed influence is large but not very interesting.* It is shown that there are unexpected relations between speed-related factors and that these can be useful in data presentation.

5. *Different road surfaces may give a large variation in noise levels.* True, the variation is very large, albeit the most common and useful surfaces are close together on the noise scale. Paving stones, for example, result in high noise levels.

6. *Tires do not differ very much in noise emission.* This is not true, the variation is large if sufficiently many tire types are included in the data set. He showed a variation of 10 dB for all tires and a variation of about 6 dB for summer tires.

7. *Winter tires are much more noisy than summer tires.* This is a myth based on the past. Currently, winter tires may be the "quiet' tires. He gave examples of low noise winter tires.

8. *The width of the tire is a very influential factor.* Essentially true: A noise-width relation covering the range from "tiny" bicycle tires to large truck tires was presented. He gave an example of noise from tires of various widths at 80 km/hr on the same road surface.

9. *Tire/road noise from a heavy truck is far above that of a typical car.* Not true, one may find heavy trucks that emit lower tire/road noise than some cars.

10. *Tire/road noise is very broadband nowadays.* True and not true—current tires emit noise very much concentrated within the I kHz octave. Tone correction may be considered. He showed data on 50 types of tires.

11. *Quiet tires are possible only by sacrificing safety.* Recent results show that there is no tradeoff between low noise emission and high safety; neither with rolling resistance.

12. *We cannot afford to reduce tire/road noise.* Calculation exercises are presented that suggest that low-noise tires as well as low-noise road surfaces may be very cost efficient. He compared the costs of low-noise surfaces with barriers and concluded that barriers are not economical. It pays to use low-noise road surfaces even when repaving costs are included.

13. *Tire/road noise will be substantially reduced by the introduction of noise emission limits.* Not true the new EU emission tire noise limits will be almost totally ineffective. Retreads are not subject to the noise limits and therefore many tires are not subject to the regulations.

He concluded that over the past 27 years there have been small steps forward in vehicle noise reduction but that does not apply to tire/road noise.

Parallel sessions continued during the day until the closing plenary session on Thursday afternoon. The session began with a performance by a double quintet, Wind Force 10. The group played a series of eight Russian folk songs by Antonin Liadov—a very enjoyable performance. Congress President Tjeert ten Wolde thanked all of the persons who worked so hard to make INTER-NOISE 2001 a great success. I-INCE President Tor Kihlman thanked Tjeert ten Wolde on behalf of International INCE, and introduced Rajendra Singh who is the

Wind Force 10, a double quintet, performs at the closing ceremony of INTER-NOISE2001.

president of the next INTER-NOISE Congress in Dearborn, Michigan, USA. The congress will be held at the Hyatt Regency Dearborn on 2002 August 19-21. He invited all of the INTER-NOISE 2001 delegates to come to Dearborn, and showed a specially produced video of Dearborn and the attractions in many parts of Michigan. The congress concluded with a farewell drink sponsored by the host of INTER-NOISE 2002, the Institute of Noise Control Engineering of the USA.

Copies of the Congress Proceedings are available as a 5-volume set of printed books or on CD-ROM. Orders may be placed at the congress web site at http://www.internoise2001.tudelf.nl.

inter-noise 2002

Dearborn, Michigan, USA
2002 August 19-21

www.internoise2002.org

INTER-NOISE 2002, the 31st International Congress and Exposition on Noise Control Engineering, will be held at the Hyatt Regency Dearborn Hotel in Dearborn, Michigan, USA on 2002 August 19-21. The theme is *Transportation Noise* as it relates to automobiles, trucks, motorcycles, off-road vehicles, trains, subways, aircraft, helicopters, ships, and recreational vehicles.

Sponsored by the International Institute of Noise Control Engineering, it is being organized by the Institute of Noise Control Engineering of the USA (INCE/USA) and The Ohio State University's Center for Automotive Research (CAR) in cooperation with SAE International and the Canadian Acoustical Association. Professors Rajendra Singh and Ahmet Selamet of The Ohio State University are the Congress' President and Technical Program Chair, respectively. The INTER-NOISE 2002 secretariat is at The Ohio State University.

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A major equipment exposition will be held at INTER-NOISE 2002. The exhibits will include computer-based instrumentation, multi-channel analyzers, sound quality systems, software for noise & vibration control analyses, acoustical materials, passive noise control devices, active control systems, and other products. Richard Peppin of Scantek, Inc. will serve as the Exposition Manager.

Dearborn is in the Detroit (Michigan) metropolitan area that is well recognized for its automotive industry. As the heart of American automotive manufacturing, it offers the perfect opportunity for discussion of current issues in the area of noise control engineering. In fact, this industry has become a world leader in contemporary noise control engineering, and some unmatched experimental facilities are now located in the Detroit area. Therefore, this congress should provide business opportunities and contacts.

The congress will be held at the Hyatt Regency Dearborn <http://www.dearborn.hyatt.com/>. This luxury hotel is the ideal place for conference activities as well as social events for attendees and their guests. Tours of the area are being planned by Action Tours <www.actiontoursinc.com> These include trips to Niagara Falls, Windsor (Canada), the Henry Ford Museum Estate, Greenfield Village, and golf outings. As well a Grand Reception will be held at the Henry Ford Museum.

Over 40 special sessions will cover:	Plenary Lectures
• Noise Sources • Noise Control Methods & Materials • Building Acoustics • Modeling & Simulation Techniques • Measurement Techniques • Community & Environmental Noise	• Recreational Noise Issues (Nick Miller) • Active Vibration and Noise Control (Chris Fuller & Steve Elliot) • Aircraft Noise (Dominique Collin)

Calendar of Events, Summer 2002

ACTIVE 2002	July 15-17	ISVR, UK	www.isvr.soton.ac.uk/ACTIVE2002
INCE Seminar on Noise Control Materials	August 15-16	Dearborn, MI, USA	www.internoise2002.org
INTER-NOISE 2002*	August 19-21	Dearborn, MI, USA	www.internoise2002.org
SQS 02*	August 22	Dearborn, MI, USA	www.SQS2002.org

* Manuscripts due 2002 March 15. See website <www.internoise2002.org> for other deadlines.

The Sound Quality Symposium (SQS 02) will be held on the day after INTER-NOISE 02 ends. The General and Technical Program Co-Chairs are Gordon Ebbitt of Lear Corporation and Patricia Davies of Purdue University. Topics include appliance and automotive sound quality; the integration of sound quality, acoustic modeling and optimization; perceptions of sounds with (multiple) modulations; spectral balance issues and response to low frequency noise; influence of tones; and quantification of binaural effects. An exhibition of sound quality software and hardware vendors is also planned, along with a poster area for sample projects and case studies. The SQS 02 secretariat will be at the Ray W. Herrick Laboratory, Purdue University, West Lafayette, Indiana, USA. Their web site is <www.SQS2002.org>

See Contact Information - Page 237

INCE Update

INCE/USA

Paul Schomer is Named INCE/USA Executive Director. Paul Schomer, Principal of Schomer and Associates, Inc., has been named executive director of INCE/USA by the organization's Board of Directors. His duties began on 2001 October 01. He will take over the duties of George Maling, who had held two posts, Managing Director of INCE/USA and Managing Editor of this magazine. He will continue as Managing Editor and will continue to maintain the Institute's web page at http://ince.org.

Dr. Schomer received the B.S. in Electrical Engineering from the University of Illinois in 1965, the M.S. in Electrical Engineering-Acoustics from the University of California in 1966, and the Ph.D. in Electrical Engineering-Acoustics from the University of Illinois in 1971.

He has extensive experience in publications and patents in the areas of environmental noise and its assessment, human and community response to noise, instrumentation and methodology for the measurement and monitoring of noise, architectural acoustics, and acoustical measurements of building parameters. He is a consultant to industry and government, an adjunct Professor of Electrical and Computer Engineering (Acoustics) and member of the graduate faculty of the University of Illinois, and a research leader in acoustics for the Construction Engineering Research Laboratory.

As an international leader in the area of environmental noise, Dr. Schomer is chair of the United States delegation to the International Organization for Standardization (ISO) Acoustics and Noise committees; chair of the American National Standards Committee dealing with noise; chair of the ISO working groups that deal with environmental noise and with impulsive noise measurement; chair of the American National Standards Institute working group, which deals with environmental noise; and he is the United States representative to the International Organization for Standardization in the areas of aircraft noise and impulsive sources. He is vice-chair of the Acoustical Society of America Committee on Standards, a member of the Society of Automotive Engineers Aircraft Noise Committee, and a principal contributor to current efforts in the area of standardizing airport noise monitoring.

He has 30 years of experience dealing with noise measurement and effects of noise on people and communities. This experience includes blast and mining noise, gunfire noise, airport, aircraft, helicopter, construction and traffic noise, and general industrial and urban noise.

He has served two terms as a member of the INCE/USA Board of Directors, and has served as Vice-President—Membership of the Institute.

Steve Marshall Becomes INCE Treasurer. James G. Seebold had more than 20 years of dedicated service to INCE/USA as treasurer, and earlier this year turned the position over the Steven E. Marshall, who will now, as the fourth treasurer of the organization, assist with INCE/USA financial management.

Marshall received the B.S. in Mechanical Engineering from the University of Cincinnati in 1979, where he focused on the study of vibration control and experimental modal analysis. In July 1979, Steve joined the Sound and Vibrations Group at the Delco Products Division of GMC. He worked in design analysis and product development for noise and vibration control of automotive power and chassis systems. In 1982, Steve pursued graduate studies at Purdue University. He studied low-frequency noise propagation in aircraft cabins while working under a NASA contract at the Ray W. Herrick Laboratories. He was awarded the M.S. in Mechanical Engineering from Purdue University in 1984. From 1986 to 1999, he was employed by the Boeing Commercial Airplane Company in Seattle, WA. He worked in product development for cabin noise control on the 7J7 unducted fan airplane, the 777 airplane, and the Next Generation 737 airplane. He also supported production programs in noise control on the 737, 757, 747, and 767 airplanes. In 1996, Steve was promoted to Manager of the Dynamic Data Systems and Methods Group at the Boeing Aero/Noise/Propulsion Laboratory. In March 1996, Steve received an MBA from Seattle Pacific University and was inducted into *Sigma Beta Delta*, the National Honor Society in Business, Management, and Administration.

In 1999, he accepted a position with Bristol Compressors, subsidiary of York International. Steve's current assignment is to bolster laboratory capability in sound, vibration, and dynamic pressure measurement and to reduce noise levels across the product line. Steve also represents Bristol Compressors while serving on the Air Conditioning and Refrigeration Institute's Technical Committee on Sound.

Steve is a Board Certified Member of INCE, has participated on the INCE Structureborne Noise Technical Subcommittee, served as General Chairman for NOISE-CON 96, and served on the INCE Board of Directors from 1996-1999. Steve is a registered professional engineer in the State of Virginia.

International INCE and INCE/USA

Marion Burgess and Bernard Berry are Appointed *NNI* Editors. After serving as editors of this magazine from its launch in 1993, André Cops, European News Editor, and Anita Lawrence, Asia-Pacific News Editor, have retired. The Managing Editor is very grateful for their assistance during the last nine years and for all of the interesting news items that appeared in the two *NNI* departments.

Bernard Berry has volunteered to be the European News Editor, and Marion Burgess has volunteered to be the Asia-Pacific News Editor. Readers of *NNI* can expect to receive timely news items from these parts of the world.

Bernard Berry received the MSC degree from the Institute of Sound and Vibration Research ISVR, University of

Southampton. In 1970 he joined the National Physical Laboratory—the U.K. national standards laboratory, to work with the late Professor Douglas Robinson, and dedicated 30 years there to an extensive portfolio of activities in research, standardization, consultancy, and policy advice in the field of environmental noise and its effects on people. This ranged, for example, from compiling the first "L_{eq} Guide" for the Government's Noise Advisory Council in the 70s, through directing a long-term consultancy project with the Royal Air Force through the 80s and early 90s, to more recent joint EC-funded team projects on the effects of noise on health. He has been a consultant to industry, U.K. Government, the EU, and other national governments.

On July 1st 2001 he left NPL to form a new company, Berry Environmental Ltd.—BEL. Current projects include the EC project on Road Traffic and Aircraft Noise and Children's Health, and consultancy to the World Health Organization's European Centre for Environment and Health in Rome on another EC project on Health Effects and Risks of Road Transport Systems.

He is a past president of the Institute of Acoustics in the United Kingdom, and a member of the Board of Directors of International INCE.

Marion Burgess earned the BSC degree and the MSc degree in Acoustics. She is currently a Research Officer for the Acoustics and Vibration Unit at the Australian Defense Force Academy in Canberra, Australia since 1987, and work responsibilities include noise measurement and analysis, organization and participation in continuing education activities of the Unit, sponsored projects and consulting in acoustics and vibration. Projects for the Acoustics and Vibration Unit have included occupational and environmental noise measurements and assessments, noise and vibration control, building acoustics and transportation noise prediction. Prior to joining the Unit she undertook testing performance of building materials while at the Experimental Building Station then did work in building acoustics and environmental noise (in particular road traffic noise) while at the School of Architecture, University of NSW.

She has been actively involved with the Australian Acoustical Society for almost 30 years. She is currently one of the editors of the journal, *Acoustics Australia*, the coordinator of the local Group of the Society and responsible for the organization of the 2001 annual conference of the Society which was held in Canberra, Australia on 2001 November 21-23. The theme of the conference was *Noise and Vibration Policy—The Way Forward?*

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USA

ASA Publishes Two New Standards. A new American National Standard, American National Standard Quantities and Procedures for Description and Measurement of Environmental Sound—Part 6: Methods for Estimation of Awakenings Associated With Aircraft Noise Events Heard in the Home, has been published by the Acoustical Society of America. The document was developed by Accredited Standards Committee S12, Noise.

This Standard provides a method to predict sleep disturbance in terms of percent awakenings associated with the noise level of events in terms of sound exposure level (SEL). The Standard was developed using field studies of behavioral awakening primarily in homes near areas of routine aircraft takeoff and landing operations. The database used in derivation of the dose-response relationship consists of more than 5,000 subject-nights of observations in a variety of communities in the United States. ANSI S12.9-2000/Part 6 is available for 90 USD.

A second standard has been developed by Accredited Standards Committee S2, Mechanical Shock and Vibration, and published by the Society. American National Standard S2.24-2001, Graphical Presentation of the Complex Modulus of Viscoelastic Materials, specifies the procedure for generating a graphical presentation of the frequency and temperature dependence of the complex modulus of viscoelastic materials. This Standard is the National counterpart of ISO 10112, Damping materials—Graphical presentation of the complex modulus. The price of the standard is 90 USD.

For more information on both of these standards, contact the Acoustical Society of America Standards Secretariat, Suite 1N01, 2 Huntington Quadrangle, Mellville, NY 11747-4502, E-mail: asastds@aip.org.

SAE Noise and Vibration Conference Proceedings on CD-ROM. SAE International has announced that the proceed-

In Memory of Harold K. Mull

Harold K. Mull died suddenly in Stuart, Florida on June 12, 2001. He was 83 years of age, and will surely be remembered as a pioneer and founding father of the acoustical consulting field. His contributions, dedication, and friendship will be sadly missed.

Harold graduated from Kent State University in 1939 and began his professional career as a project engineer for Bird Electronic. In 1947, he joined NACA in Cleveland, Ohio as an instrumentation engineer and was soon promoted to Aeronautical Research Scientist. In this position, he specialized in aerodynamics and aero-acoustics, and became chief of the instrumentation group for rocket and high-energy fuels research. In the early 1950s, NACA became NASA, and he was assigned to the newly formed aero-acoustics group, focusing on jet engine noise control, test cell acoustical treatment, wind tunnel design, and flight research. While at NASA, he formed the consulting firm of Hunter & Mull, along with Dr. Joseph Hunter, to provide the acoustical design for the Cleveland Public Auditorium.

With this aerodynamic/acoustic background, Harold became a full-time acoustical consultant in 1959, a very small fraternity in those days. He later founded Harold R. Mull, Bell and Associates and, under his leadership, the firm grew rapidly and was recognized as a leading consulting/engineering firm in all phases of industrial, aerospace, and architectural acoustics.

Harold authored many papers. contributed to several technical textbooks, conducted numerous seminars, and lectured extensively. Some major architectural achievements include the prize-winning Morris Mechanic theater in Baltimore and the Miami Airport Satellite Terminal.

He was a two-term president of the National Council of Acoustical Consultants, a Boner Medal Recipient, vice-chairman of E-33 (Environmental Acoustics) committee of the American Society for Testing Materials, and chairman of the Technical Committee on Architectural Acoustics of the Acoustical Society of America. He was also a Fellow of the Acoustical Society of America, founding member of the Institute of Noise Control Engineering, and was a senior member of the Institute of Electrical and Electronics Engineers.

Submitted by Lewis H. Bell.—Ed.

ings of the 2001 SAE Noise and Vibration Conference are available on CD-ROM. The Proceedings address the latest worldwide developments in vehicle and component noise and vibration control, analysis, subjective evaluation, acoustical materials, and measurements. The CD-ROM includes over 200 papers covering topics such as the solutions and experimental approaches to seal system problems, reverberations, pressure fluctuations, engine component noises, on-road data acquisition, and more. The price of the Proceedings is 225 USD, and the order number is NOISE2001CD. It can be ordered online at http://www. sae.org.

Salter Hires New Consultant. Charles M. Salter Associates, Inc. has hired Troy Gimbel as Consultant in the Audio/Visual System Design Department. Mr. Gimbel joined GSA as an Audio/Visual System Design Consultant. He is primarily responsible for the upgrade and renovation of the firm's award-winning Presentation Studio. Mr. Gimbel has 15 years of experience in theater and sound/design. He previously worked as an audio engineer at the War Memorial Opera House in San Francisco as part of the International Affiance of Theatrical Stage Employees.

European News

Bernard Berry, *European Editor*

GERMANY

Occupational Exposure to Noise—Evaluation, Prevention, and Control. An international meeting of experts in the field of acoustics was organized by the Office of Occupational Health, World Health Organization, Geneva, Switzerland on 1995 September 25-27, with the objective of producing a document on the occupational aspects of noise. The meeting was attended by 19 specialists from 16 countries, and several other specialists collaborated by correspondence. The document was recently published by the Federal Institute for Occupational Safety and Health, Germany on behalf of the World Health Organization.

The editors—Berenice Goelzer, WHO; Colin H. Hansen, Australia; and Gustav A. Sehrndt, Germany—have met the objectives of the meeting: A book with CD-ROM for occupational hygienists and other occupational health and safety personnel as an introduction to the subject, for use as a handbook, reference, and textbook.

It provides an overview of the evaluation, prevention, and control of exposure to noise at the workplace. Besides chapters on fundamentals of acoustics, physiology, and pathophysiology of the ear and hearing, exposure criteria, strategy for noise surveys and details on the instruments, their use and calibration, audiometry and hearing protection, emphasize other chapters the noise reduction at source as the first choice for preventing hearing loss. Sources of information and a list of relevant case studies are given in the last chapter, emphasizing the importance of standards for noise control at the design stage.

The book including CD-ROM is available from the Wirtschaftsverlag NW, Verlag für neue Wissenschaft GmbH, Bürgermeister-Smidt-Str. 74-76, DE-27568 Bremerhaven, Germany or info@nw-verlag.de, the price is DM 54.— plus postage.

POLAND

XII International Conference on Noise Control. The XII International Conference Noise Control '01, which took place in Kielce on 24 – 26 September 2001, was organized by: Committee on Acoustics of the Polish Committee of Sciences, Polish Acoustics Society, Department of Mechanics and Vibroacoustics of the University of Mining and Metallurgy, Building Research Institute and Central Institute for Labour Protection.

The patrons of the conference were: Minister of Labour and Social Policy, Chairman of the State Committee for Scientific Research, Minister of Economy, Chief Labour Inspector. The Scientific Committee was chaired by Professor Jerzy Engel and Professor Ignacy Malecki as the honorary chair.

Over 100 participants attended the Conference; nine of them were from Australia, The Netherlands, Germany, Slovakia, USA, and Great Britain.

Plenary sessions focused on the following problems: new legal regulations and standards related to the protection against noise and vibration, progress in the field of adjusting Polish law to the European Union regulations, active methods of noise reduction, database on materials and products intended for the elimination of noise and vibration, acoustic monitoring of the environment and the determination of acoustic maps in the light of new regulations.

Papers presented in two parallel sections concerned, among others: bases for standardization in the field of maximum admissible values of vibration at the workplace, methods for the measurement of vibration perception threshold, methods for the assessment of mechanical vibration, new methods for the assessment of noise in habitats, the system for assessing air traffic noise in Poland.

Moreover, solutions in specific areas were presented, among others, prototypes of instruments, conforming to the European standards and requirements, for the control of hearing of persons exposed to noise, new complex methods for the selection of hearing protectors, active hearing protectors with integrated speech communication, ways of impact noise limitation in presses, models of selected protectors against low frequency and infrasonic noise, software for determining noise zones in industrial halls, methods for selecting gloves. Modern solutions of materials and systems used in vibroacoustic safety devices were also evaluated. Much attention was devoted to the acoustic assessment of machines and equipment, which is extremely important in the process of conformity assessment of products with basic requirements set in the regulations.

An unquestionable success of the conference was the fact that it provided an opportunity to exchange experience as well as personal contacts of persons conducting research and technical work in the field of noise and vibration control in different research and implementation centers. Of great importance is also the fact that the Conference showed what joining the EU means for Poland from the viewpoint of harmonization of regulations relating to working conditions; it also indicated the directions and possibilities of future research.

All materials are accessible in a publication, a large part of which is in English. The publication can be ordered in the Central Institute for Labour Protection (email: jofra@ciop.pl).

THE NETHERLANDS

A New Book Is Available. *Computational Atmospheric Acoustics* by Erik M. Salomons, TNO Institute of Applied Physics, Delft, The Netherlands, is available.

Noise from cars, trains, and airplanes can be heard at large distances from the source. Accurate predictions of the loudness of the noise require accurate computations of sound propagation in the atmosphere. This book describes models that can be used for these computations. The models take into account complex effects of the atmosphere and the ground surface on sound waves, including the effects of wind and temperature distribu-

tions, atmospheric turbulence, irregular terrain, and noise barriers.

The main text of the book focuses on physical effects in atmospheric acoustics. The effects are illustrated by many numerical examples. The main text requires a very limited mathematical background from the reader; detailed mathematical descriptions of the models, developed from the basic principles of acoustics, are presented in appendices. Models for moving media are compared with models that are based on the effective sound speed approach. Both two-dimensional models and three-dimensional models are presented. As meteorological effects play an important role in atmospheric acoustics, selected topics from boundary layer meteorology and the theory of turbulence are also presented. The ISBN number is 0-7923-7161-5, and the price is 125 EUR or 109 USD. For more information, visit the Kluwer Academic Publishers web site at http://www. wkap.nl.

UNITED KINGDOM

Relief From Noise as a Human Right. Eight British citizens who live near London's Heathrow Airport brought a complaint about nighttime aircraft noise before the European Court of Human Rights, and on 2001 October 02 were awarded judgments of 4000 GBP each. The Court voted that there had been a violation of Article 8 (right to respect for private and family life and home) of the European Convention on Human Rights. A special problem was noise from night flights that arrive at Heathrow early in the morning. About 16 aircraft, mostly British Airways flights, arrive between 4.30 a.m. and 6.00 a.m. According to the facts presented, noise caused by night flying at Heathrow had, before 1993, been controlled by restrictions on the number of takeoffs and landings. In 1993, a noise quota system was introduced, but was later found to be contrary to the Civil Aviation Act of 1982, which required that a precise number of aircraft be specified as opposed to a noise quota. Flight operations then reverted to the pre-1993 rules, which are evidently the source of the problem.

The Court observed that since Heathrow is under government control, the State "had a positive duty to take reasonable and appropriate measures to secure the applicant's rights under Article 8 and to strike a fair balance between the competing interests of the individual and the community as a whole." Should night flights be abolished, there would be a considerable financial impact on the airlines. At this writing, the position of the British Government is not known.

The judgment follows a resolution of the European Parliament on 2000 April 14 concerning aircraft noise which, among other things, declared that "...the residential public should not be deprived of sleep by the pressure on commercial operators at airports in the vicinity." The Parliament called upon the European Commission to establish a package of noise abatement measures that would include a system of slot allocation that takes into consideration environmental criteria such as noise levels at night.

Neighborhood Noise Study is Launched. The UK Department of Environment, Food and Rural Affairs (DEFRA) has commissioned a research study to review European legislation and practice on the management of neighbor and neighborhood noise, in order to understand how other EU states deal with noise complaints and nuisance assessments. The study is being lead by Steve Mitchell of Environmental Resources Management (ERM) with assistance from Bernard Berry of Berry Environmental Ltd. The team will be researching all 15 Member States to identify the various approaches to legislation and enforcement used in different cultural settings. A report on the study is planned for February 2002. For further information contact Steve Mitchell, email SCM@ERMUK.COM.

EUROMET Collaborative Project on Measurement Uncertainties. In 2000, the national measurement institutes of 15 countries in the EUROMET region volunteered to participate in a collaborative project, proposed and piloted by the UK National Physical Laboratory (NPL), to compare the measurement uncertainties for calibration of sound calibrators. The participants are required to submit a full statement of their uncertainty budgets for the calibration of sound pressure level of sound calibrators, calculated according to the ISO Publication *Guide to the Expression of Uncertainty in Measurement.*

The work stems from a recent EA interlaboratory comparison between primary and secondary laboratories on measurement of sound calibrators, in which the estimated measurement uncertainties varied widely, even between laboratories that used similar measurement techniques. The project is not intended to act as an audit of the services provided by the participants but rather to provide a forum for shared information, and will assist in obtaining better agreement between laboratories and enhance mutual confidence in the services provided by the laboratories.

The results will also inform IEC/TC29/WG17 in its revision of IEC 60942: 1997. At the time of writing, contributions from 13 countries had been received. A draft report on the project will be published by NPL later in 2001.

NPL Establishes Low-Cost Calibration Service. NPL has introduced a new, low-cost calibration service for sound calibrators that are used as accessories to their other equipment (for example, artificial ears for audiometer calibration, or sound level meters and other measurement systems) The new service, accredited by UKAS*, is based on the technique of sequential comparison with a previously calibrated calibrator and offers a best measurement uncertainty of ±0.07 dB. The most common models of sound calibrator are covered by the service, and the calibrations are performed using a wide range of microphones of IEC types LS1, WS1, LS2, or WS2 to suit requirements. For more information, contact Peter Hanes, NPL, Teddington, Middlesex TW11 0LW, United Kingdom.

Environmental Effects Studied for Different Transportation Modes. *On 2001 September 12, the UK Commission for Integrated Transport issued a report titled* "A Comparative Study of the Environmental Effects of Rail and Short-Haul Air Travel." *The portion of the Executive*

Summary related to noise is reproduced below.—Ed.

Aircraft and railway noise are usually measured using slightly different noise metrics, though both use some form of equivalent continuous sound level (L_{eq}) during a defined time period. A number of difficulties arise when using L_{eq} to compare noise from one mode of transport with another. To get around these, the approach taken in this study has been to look at the number of people exposed to a given sound exposure level (SEL) per passenger carried. The study has used this approach to compare the noise burden for all the specific routes (London to the five cities), comparing high-speed trains and domestic aircraft. For London, trips from Heathrow, Gatwick, and Stansted airports were considered. The study has also investigated the specific noise burden for additional trains or planes along one route (from London to Manchester), taking into account the existing noise levels from all other transport activity, to assess the marginal noise burden from the two modes. The conclusions are:

- The SEL evaluation shows that high-speed rail generally has a higher population weighted noise burden than domestic air, per passenger carried (assuming average occupancy factors), when no screening effects of buildings adjacent to the track are taken into account. The relative burdens between domestic aircraft and high-speed rail are closer if screening effects from buildings are added for the rail analysis.
- The noise burden from the five different high-speed rail trips do not show a strong correlation with journey length, which is contrary to what might be expected, showing the very site-specific nature of noise for individual routes.
- The aircraft noise burden is independent of distance and depends on site-specific factors at each airport. The results show that the same aircraft may have significantly different noise burdens (measured in terms of the number of people affected by a certain noise level) for take-off/landing at different airports or even from different runways at the same airport.
- Older aircraft (e.g., 737-200) have much a higher noise burden. The removal of these aircraft from the fleet will reduce the noise burden in future years (i.e., for the period 2006-2020). Nonetheless, there will remain large differences (up to an order of magnitude) in the noise burdens of different aircraft in the remaining fleet.
- Smaller aircraft generally have a lower noise burden (per passenger carried), due to the smaller size of their noise footprint.

The analysis of future noise levels indicates that changes will occur in the relative comparison between high-speed rail and domestic air. In general, the noise burdens on high-speed rail routes will increase slightly as trains travel at higher speeds after line upgrades (with the exception of the London-Manchester-route, which sees very large reductions due to the phasing out of older vehicles). These changes do not take account of possible changes in passenger occupancy. In contrast, the future noise burdens from domestic aircraft will decrease (per journey) at most airports, as older aircraft are retired. For some airports—e.g., Glasgow and Gatwick—these decreases will be significant and will dramatically reduce the future noise burden for domestic aircraft (per journey).

Although the SEL analysis provides an indication of the sound exposure from a single high-speed rail or domestic aircraft journey, it is also important to evaluate the burden in the context of other noise sources for each route. This involves taking into account all train activity along a rail route or all international and domestic landings/take-offs at any airport. This is a more involved analysis and has been undertaken for one route (London to Manchester) for both modes. The analysis has looked at the increase in noise burdens from additional journeys for a thousand additional seats for both modes. For high-speed rail this involved two additional trains. For domestic air, the study assessed the difference for additional capacity provided by additional planes and by using larger aircraft.

The comparison between domestic aircraft and high-speed rail shows that, in both cases, the additional noise burden is similar per available seat and, after adjustments, per actual passenger carried. This is in sharp contrast to the SEL analysis (which showed much higher noise burdens for high-speed rail for the same route) and shows that marginal noise burdens from the two modes will be determined by prevailing levels and site characteristics for each route. It is not possible to make a clear statement as to whether one mode has a noise advantage without a more detailed analysis of all routes.

A closer analysis of domestic aircraft shows that the marginal noise burden changes according to the way capacity is added (or removed), so that there are different changes in noise burdens from adding capacity by running more services compared to increasing aircraft size. For example, increasing the number of movements leads to lower increased noise burdens than increasing aircraft size. This reflects the fact that smaller aircraft have smaller noise footprints. Similarly, decreasing the size of aircraft leads to a greater reduction in noise exposure than decreasing the number of movements. When expressed in terms of the additional noise burden per passenger carried, it is also clear that marginal noise burdens will be strongly nonlinear (i.e., the burden per additional passenger varies nonlinearly according to the overall change in movements or aircraft). This is very important with respect to potential substitution between modes.

Overall, the noise burden, for both existing and additional journeys, is extremely site and route specific. The results here indicate that aircraft in use on domestic routes may have a small advantage in terms of the absolute noise burden. We stress, however, that this does not translate to a lower noise impact because background noise levels determine the relative burden of a regional journey (due to the logarithmic nature of noise). Our conclusion is that without more detailed analysis, on a route-by-route basis, it is not possible to say categorically that one mode has a lower noise burden than the other. A number of research areas have also been identified.

Asia-Pacific News

Marion Burgess, *Asia-Pacific Editor*

AUSTRALIA

WESTPAC8 in 2003. Planning is underway for the 8th Western Pacific Acoustics Conference, Westpac8, to be held on 2003 April 7 – 9 in Melbourne, Australia. This will be the 8th in a series of international conferences held by the Western Pacific Acoustics Commission with the support of the International Commission of Acoustics (ICA).

The theme for Westpac8 is *Acoustics on the Move*, which emphasizes the advances currently being made in acoustics. Abstracts on any topic in acoustics may be submitted for consideration. The option of full review of the paper, a necessary requirement of some institutions to support participation, will be available. All accepted papers will be published in the conference proceedings, with the fully refereed papers being clearly indicated. Authors should carefully note the submission dates available on the web.

The conference venue is only minutes from the heart of Melbourne by tram and is near the botanical gardens, a lake, golf course, and bayside beaches. An exciting social program includes an Australian barbecue with boomerang throwing and "Billy Tea," as well as the conference banquet. There will be opportunities for overseas delegates to see the unique Australian wildlife. Information and contact details for WESPAC 8 are available from http://www.wespac8.com.

Science Meets Parliament. The Federation of Australian Scientific and Technical Associations (FASTS), of which the Australian Acoustical Society is a member, is a peak lobby group that promotes actions to foster greater government support for science and technology in Australia. For the last few years it has organized a "Science meets Parliament" Day when over 200 scientists converge on the Federal Government to have personal meetings with the politicians. This year it was strategically timed not long before a federal election. The scientists were briefed before the meetings to focus on the concerns of the whole scientific community and not just their own personal issues.

This is a landmark event at Parliament House as no other group in Australia has ever commanded the attention of two thirds of all Parliamentarians by organizing individual meetings in one day like this. Participants rated the event overall at 8.2 on a scale of 1 to 10, particularly as the majority of the politicians were considered to be listening carefully to the discussion points. Over time, it is hoped this event will change perceptions about science and technology in Parliament.

JAPAN

The 18th International Congress on Acoustics (ICA) will be held in Kyoto, Japan on 2004 April 4-9. The congress will be held in Kyoto International Conference Hall in Kyoto city. In the Kyoto area there are a large number of hotels offering a variety of facilities and a wide range of room charges for the congress participants. The Conference Hall has convenient access from Kansai International Airport with airport express bus or JR train and subway.

The technical program will consist of plenary lectures, invited papers in structured sessions, contributed papers, and exhibition from industries. The Congress will cover all the fields of acoustics: acoustical oceanography, acoustic signal processing, animal bioacoustics, architectural acoustics, ultrasound, engineering acoustics, measurements and standards, musical acoustics, noise and vibration control, psychological and physiological acoustics, speech and speech communication and underwater acoustics. The official language of the Congress is English. The deadline for receipt of abstracts has been tentatively set for 2003 July 15. For more information, contact the Congress Secretariat, Department of Environmental Psychology, Graduate School of Human Sciences, Osaka University, 1-2 Yamadaoka Suita, Osaka 565-0871, Japan.

The 25th Annual Meeting of INCE/Japan. It has been 25 years since the Institute of Noise Control Engineering was established in Japan. The 25th annual meeting was held at the Department of Acoustical Engineering, Kyushu Institute of Design in Fukuoka city on 2001 September 13-14. As one of the special events, a symposium was arranged by the organizing committee and it was titled "Is it possible to realize a quiet country in the 21st century?." Five panelists gave special lectures and 200 audiences participated in discussion. The discussion concentrated their attention on the present situation of environmental noises and the future hopeful technologies to reduce noise. Finally, the discussion was extended to the basic questions, that is, "What should be the quality of our life with quiteness?", and "Do we really need only quietness that may lead us to loneliness?"

Autumn Meeting of ASJ. The autumn meeting of Acoustical Society of Japan was held at Oita University on 2001 October 2-4. More than one thousand members participated in the meeting. A special lecture and a classical music concert were held at a hall in "OASIS 21" in the evening one day before the meeting. T. Fukuchi of Nagata Acoustics Inc., who was involved in the acoustic design of this hall, explained the basic concept of specific design for reverberation time of classical music. Participants who are members of the Acoustical Society as well as the citizens of Oita city enjoyed the harmony of the hall acoustics and the classical music after the lecture. During this autumn meeting, a session regarding Sonochemistry was held and the applicability of ultrasound was discussed to the decomposition of chemical substances that contaminate the present global environment.

Product News

SoundPLAN LLC Announces the Appointment of Two New Distributors. SoundPLAN LLC is pleased to announce the appointment of two new SoundPLAN distributors, Dr. David Winterbottom of Technical Developments & Investigation in the U.K., and Andreas Gustafson of Swedish National Testing & Research Institute in Sweden. These two join the team of 25 SoundPLAN representatives worldwide

SoundPLAN is an international suite of software for evaluating and mapping noise and air pollution from roads, railways, aircraft, industrial complexes, amusement parks, and inside factory buildings. SoundPLAN is said to be the only integrated software system that models interior noise levels, sound transmission through building walls and sound propagation into the environment in one suite of software. If you would like more information on SoundPLAN, these representatives are available to demonstrate the software and answer questions. They can also provide a free demonstration CD. Contact information is: Dr. David Winterbottom, 7 Pownall Crescent, Colchester, Essex C02 7RG. U.K., Telephone: +44 1206 762617, e-mail: Drwint@btopenworld.com; and Andreas Gustafson, Box 857, S-501 15 Boras, Sweden, e-mail: Telephone: +46 33 165 420, Andreas.Gustafson@se.

L. B. Foster Company Announces Licensing Agreement with Concrete Solutions, Inc. L. B. Foster Company has announced that it has entered into a licensing agreement with Concrete Solutions, Inc (CSI) to manufacture and market CSI's patented SoundSorb® acoustical material as part of Foster's line of engineered concrete products in North America.

SoundSorb® is an acoustical cementitious material designed for various noise abatement purposes. It is a flowable, sound-absorbing material that can be produced in a variety of aesthetic textures and colors. SoundSorb, combined with structural concrete, is utilized in the construction of walls erected adjacent to roads, highways, and rail lines with the primary purpose of reducing traffic and rail noise, particularly in densely populated areas. There are a variety of additional applications for industrial, commercial, and residential uses. The product is readily combined with structural concrete, producing an effective sound-absorbing material at relatively little additional cost, while achieving significantly improved sound reduction properties than is possible with more conventional systems.

Production of the new product will be undertaken at Foster locations across the country, including the new concrete products manufacturing facility in Hillsboro, Texas.

Concrete Solutions, Inc. (CSI), based in Austin, Texas, licenses and markets a technology to produce SoundSorb®. CSI promotes SoundSorb on a national and international basis.

Polytec PI Introduces New Laser Doppler Vibrometer. Polytec PI, Inc. has introduced what is said to be the world's first portable laser Doppler vibrometer with digital signal processing.

The entire vibrometer, including five-hour battery pack, charger, and carrying case, weighs less than 10 lbs. Digital processing in the PDV-100 ensures high resolution and a direct digital connection with a PC sound blaster board enables ultra-low cost FFT processing. Analog output via a 24-bit DAC is also provided. A single enclosure houses the entire vibrometer—laser, interferometer optics, and electronics.

Features include:

- Laser Doppler accuracy and reliability
- Digital processing battery or 110 V operation
- Vibration velocities to 500 mm/s and frequencies to 23 kHz
- Ruggedized, industrial IP-64 rated housing
- Compact—only 66 x 129 x 290 mm
- Eye-safe visible low power laser
- Simple to operate
- Variable operating distance
- Affordable Selectable high- and low-pass filters

Applications include:

- General purpose industrial vibration measurements
- Predictive maintenance Civil engineering (buildings, bridges)
- Health monitoring

For further information please contact David E. Oliver at Polytec PI, Inc., Auburn, MA, USA. E-mail: davido @polytecpi.com, Internet: http://www.polytecpi.com

News from Scantek, Inc. *New Color Brochure Describing Sound Level Meters from RION.* Scantek, Inc. has announced a new four-page color brochure describing the two new sound level sound level meters from RION. The NL-21 and NL-31 are identical meters except for the Type classification.

The meters are said to provide increasing sophistication and accuracy and meet the new IEC CDV 61672-1 requirements for Type 2 or Type 1 instruments. With a 100-dB dynamic range and capabilities to measure Peak, A, and C simultaneously with F, S, and I response and statistics, with 1.3 days of storage recorded every 100 ms using an 16 Mb flash card, and up to 32 hours of battery life without external batteries, the meters are said to allow flexible and complete measurements. The NL-21 and NL-31 provide optional 1/3rd octave band and octave band serial filters with both preferred frequencies and usable selectable cutoff frequencies, which makes the units useful for noise control and building acoustics.

New Machinery Fault Checker from RION. Scantek, Inc. has also announced what is said to be a revolutionary new product from RION. The VA-20 Machinery Fault Checker is said to use new technology for predictive or preventive maintenance and fault detection. The meter can provide immediate results as "Normal," "Warning," or "Fault Found."

These indicators do not require the user to develop a catalog of signatures. The smart instrument uses the amplitude probability density functions to evaluate wear and a fault spectrum density function to evaluate structural problems. Fault diagnosis no longer requires the knowledge of specific machine characteristics. To check a machine, one needs only to press the VA-20 against the bearing housing.

New Advanced Sound Level Meter and Frequency Analyzer is Announced. Scantek has also announced the introduction of the new Norsonic sound level meter N-118. The meter has a 120-dB dynamic range in all real-time octave and third-octave band filters as well as A- and C- or Z-weighting networks. Following the Norsonic tradition of modular expansion, the N-118 can be fitted with an electronic level recorder feature, allowing time profile recording with a resolution as fine as 100 ms. Measurements can be made with all three time constants (F, S, and I) employed simultaneously and measurements for sound power can be made in octaves or one-third octaves.

For further information, contact Richard J. Peppin, Scantek, Inc., 7060 Oakland Mills Road, Columbia, MD 21046, USA. E-mail: Rpeppin@asme.org.

New Digital Sensor System. Consumer technology has provided an enabling step for networked microphones and accelerometers in the Larson Davis Digital Sensor System (DSS™). Traditional dynamic sensing has long been limited by cabling problems, custom power supplies, and the prohibitive cost of precision data acquisition. However, the implementation of proven communication technology in the DSS™ high-resolution, 24-bit analog/digital converters and sensors in a multi-drop broadband net work greatly simplifies the overall cabling requirements for high channel count testing. Dynamic "smart" sensing is now said to have become a reality.

An individual DSS™ system receiver provides data storage and PC interface for up to 64 channels. Each channel is composed of a sensor and a compatible Dynamic Sensor Interface Transceiver (DSIT™), which handle sensor specific signal conditioning, application specific ADC range, and signal modulation. More than 16 sensors can communicate on a single inexpensive cable.

In a pilot application, array microphones were integrated with the DSS™ for multi-channel techniques, such as near field acoustic holography and sound power determination. This system incorporated cylindrical DSIT™ as digital preamplifiers that directly accepted the array microphones. The DSIT™ was then generalized for ICP® transducers, such as triaxial accelerometers and multi-axis force sensors. This generalized DSS™ signal conditioning allows distributed time data recording for applications such as automotive NVH, civil infrastructure vibration monitoring, and industrial monitoring/predictive maintenance of mills.

Further information can be obtained from Larson Davis. Contact Guillaume Bock by e-mail at Marketing@Larson Davis.com. Larson Davis is a member of The.Alliance.

New Release of DSPdeveloper from SDL. SDL, a systems dynamics research and consulting company, has announced the release of DSPdeveloper, the latest addition to its suite of DSP software. This new release is said to offer an array of capabilities, including graphical programming, data logging, plotting, debugging, and monitoring. Because DSPdeveloper requires no prior DSP programming skills, engineers can more efficiently implement DSP solutions. Also, research and development engineers both in industry and academia can create next-generation products and processes using this new tool.

The Modal Shop's SDC003 LanSharc hardware has been developed as a highly programmable and configurable platform for advanced machine process vibration and acoustic monitoring and control. This Smart Digital Controller is said to have proven successful in a large array of applications as varied as spindle health monitoring, acoustic resonance testing for quality assurance of powdered metal parts, injection molded plastic part crack detection, steel mill roll grinder monitoring, electric motor monitoring and environmental monitoring of railway noise. Additional information is currently available at http://www.modalshop.com.

A demonstration version of DSPdeveloper is currently available at http://www.sdltd.com/DSPdeveloper. The demo package includes 30-day free trials of DSPdeveloper and selected MathWorks products. For more information about DSPdeveloper or pricing information contact SDL at info@sdltd. com.

Eckel Acoustic Control Systems for Industrial Applications. Two sound-absorbing systems are detailed in the illustrated Bulletin # 01032, issued by Eckel Industries, Inc., Cambridge, Massachusetts. The systems are designed to improve acoustic environment in control stations, compressor rooms, blower rooms, pump rooms, operator rooms, administrative areas, and other sections in wastewater treatment facilities, hydroelectric plants, water purification complexes, and similar industrial operations These panel systems—Eckoustic® Modular Panels (EMPs) and Eckoustic® Functional Panels (EFPs)—are engineered to reliably and economically solve noise control problems in the workplace. They offer industrial and municipal organizations what is said to be a quick, cost-effective method of providing personnel with a less fatiguing, safer environment, as well as help companies meet OSHA requirements.

The Eckoustic Modular Panels system is specially designed for constructing free-standing full enclosures, partial enclosures, and walls of all configurations and sizes. The unusually flexible EMP system, available with 4" thick STC 41 or STC 44 panels, enables personnel to be isolated from noisy equipment and machinery. Other advantages of the EMPs discussed in the data sheet are: a full range of panel components offered, including door, window, hatch, and ventilation panels in addition to the standard panels; quick and hassle-free installation, without needing any special tools; truly demountable for ease of maintenance of enclosed machinery; and readily dissassembled/reassembled, without loss

of acoustic integrity, if the structure needs to be expanded or relocated.

The Eckoustic Functional Panel system allows needed sound absorption to be added to any area of a facility, without the need for relocation of existing utilities. That is, these unit panels can be spot located on walls and/or ceilings, requiring only a relatively small portion of these surfaces to be treated to achieve the desired noise reduction. The Eckel EFP system, as is the EMP system, is said to be simple to install and easy to maintain.

For a free copy of Bulletin #01032, contact Eckel Industries, Inc., Acoustic Division, 155 Fawcett Street, Cambridge, MA 02138. E-mail: eckel @eckelacoustic.com.

Eiger International Offers Adhesive System for Flooring. Eiger International, Inc. of Telluride, Colorado, is now importing and distributing the Sika® AcouBond adhesive system for solid wood and engineered wood flooring. The system is a combination of a flexible adhesive and a 3 mm acoustic mat. The system has been recently tested at the Riverbank Acoustic Laboratory. The test was conducted on 13/16" thick engineered floor over a 6" concrete slab and a suspended ceiling. The results of the test, IIC 59 and STC 60, are said to compare favorably with competitive synthetic products and cork underlayments.

Sika® AG, the manufacturer, has been selling this product in Europe for a number of years. It is now being marketed in the United States as an acoustical solution for architects and designers wishing to use wood flooring and to control the sound transfer to lower floors and within the room.

For more information or a sample, contact Eiger International, Inc., P0 Box 3990, Telluride, CO 81435; Telephone: 970 369 0659; E-mail: eigerc@independence.net; Internet: http://www.eigerinternational.com.

New Brochure from illbruck. A new eight-page brochure from illbruck, Inc. explains how ceiling and wall treatments reduce background noise and reverberation. The full-color brochure describes how SONEX® Panels and Baffles, CONTOUR™ Ceiling Tiles, FABRITEC™ Wall Panels, and other illbruck products help improve communication and comfort in classrooms, offices, restaurants, auditoriums, gymnasiums, and many other interior spaces. The brochure summarizes acoustic test data and physical properties.

illbruck, inc. manufactures SONEX acoustical control products for a variety of sound control solutions. For more information on SONEX products contact: illbruck, inc., 3800 Washington Ave. N., Minneapolis, MN 55412; Telephone: 1 800 662 0032 or 612 520 3620; Fax: 612 521 5639; Internet: http://www.illbruck-sonex.com.

Computer Server Fan. Nidec has developed a fan for a computer server that is said to be quiet. The fan housing was made from a material supplied by LATI USA, A PBT (polybutylene terephthalate) fan housing prototype was evaluated in Nidec's hemi-anechoic sound chamber at its test facility in Torrington. Nidec measured sound power and pressure levels, life, reliability, shock, vibration, and air-flow characteristics.

Nidec developed the fan's impeller out of LATI's Latilon (polycarbonate) material grade 30D G/1O VO, which is said to provide good mechanical characteristics and excellent toughness and dimensional stability. The fan housing incorporates the necessary strength of LATI's Later 4 G/30 VO PBT material grade, which Nidec needed for high-impact resistance, strong rigidity, and superior sound absorption. Computer users are very concerned with the noise their computers emit. The quiet fan, the Nidec TA500, was developed for large computer room servers. However, due to the success of creating a low-noise cooling fan, the company is now developing a series of TA500 fans for personal computers. In very quiet conditions such as office environments with numerous computers running simultaneously, a noisy computer can be disturbing.

For more information, write LATI USA, 1470 Ben Sawyer Boulevard, Suite 8, Mount Pleasant, SC 29464; Telephone: 888 USA LATI.

OROS Introduces New Noise and Vibration Analyzer. The OR38 PowerPC-Pack™ is the latest product in OROS' expanding range of PC-based noise and vibration signal analyzers. The OR38 PowerPC-Pack complements the existing OROS analyzers by offering an all-in-one unit:

- Multimode Analyzer
- DAT Recorder
- Data Acquisition Front-end

With the OR38 PowerPC-Pack it is now possible to simultaneously process signals for different analyses (FFT, 1/n Octave, Order Tracking) and record the time-domain signals in parallel. For more information, contact OROS, Inc., 502 Shaw Road, Dulles, VA 20166-9435; E-mail:info@IROSInc.com; Internet: http://www.OROSInc.com.

News From the Lord Corporation. *Production Contract for NH-90 Helicopter.* The Lord Corporation has announced that it has been awarded a major production contract for the NH90 military helicopter. Lord was selected for the design and development contract to manufacture main rotor elastomeric spherical bearings and FIuidlastic™ lead-lag, inter-blade dampers, both highly critical rotor head parts for the military helicopter The overall contract is for 243 aircraft plus 55 options (298 machines) with first deliveries expected in 2002.

Engine Isolation System. Lord Corporation's Mechanical Products Division, in concert with an international team of companies assembled by Dassault Aviation to create its new Falcon 2000EX aircraft, has provided an engine isolation system solution for the aircraft during the planning phase to meet vibration and noise reduction goals. "The Team recognized from the outset that a collaborative design effort would be required to design and integrate a systems solution to meet cabin noise and vibration specifications of the aircraft," said Jim Mitchell, Lord Account Manager. Lord is a leader in engine isolation mounts and is said to be a vital part of the team seeking to set new standards for cabin noise and vibration.

Active Vibration Control for the Bell/Agusta 609. Lord Corporation was recently selected to supply an Active Vibration Control (AVC) System for the Bell/Agusta 609 tiltrotor. The BA609 is being developed by the Bell/Agusta Aerospace Company, a joint venture between Bell Helicopter Textron and Agusta.

The AVC System is Lord's latest development in vibration control technology for rotary-wing aircraft. The system uses a computer to read vibration levels that are relayed by sensors positioned throughout the aircraft. The single processor then reacts in real time to counteract the vibration by sending signals to actuators strategically located in an aircraft. The AVC System offers significant weight reduction and provides improved performance over traditional passive vibration absorbers. The system is based on noise and vibration control technology that has been in service on fixed-wing aircraft since 1995. The Bell/Agusta 609 is a six- to nine-passenger transport aircraft that combines the speed and range of a turboprop airplane with the vertical take-off and landing capability of a helicopter. The BA609 will offer operators highly cost-effective, point-to-point transportation at cruise speeds up to 275 knots and at ranges up to 750 nautical miles.

For more information about Lord Corporation products, contact the Mechanical Products Division at 111 Lord Drive, Cary, NC 27511, USA; Internet: http://lordmpd.com.

New Barrier Absorber from E-A-R. E-A-R Specialty Composites has added a new standard material to the company's line of TUFCOTE® acoustical composites. With a product number of E-25-16-5OSM, the foam-barrier-foam composite is said to provide excellent noise transmission loss and sound absorption—the composite both blocks and absorbs noise—with the installation convenience of a single product. Typical applications include engine compartments of diesel-driven vehicles, generators, and other power-generation equipment housed in metal cases.

The new TUFCOTE composite features a 1.6 pcf flexible, non-lead noise barrier sandwiched between layers of 1/4-inch decoupling foam and 1/2-inch sound-absorbing foam. For added soil and grease resistance, the composite is faced with aluminized polyester. It also comes standard with pressure-sensitive adhesive, for peel-and-stick installation.

Installed with the 1/4-inch foam adhering to the equipment compartment's interior and the 1/2-inch foam facing the noise source, the barrier-absorber composite thus forms an acoustically decoupled mass that is said to significantly outperform barrier-only treatment at frequencies above 500 Hz. The barrier effectively blocks airborne noise and the top layer of foam absorbs any reflected sound.

International Advertising Contacts

Below is a list of international contacts for the advertisers in this issue. The telephone number is given first, and is followed by the FAX number where available. In cases where there are several telephone numbers per location, or several locations within a country, a colon (:) separates the telephone number(s) from its respective FAX number. Advertisers, please e-mail updates to Lynn Guarente at lguarente@ieee.org.

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I-INCE and INCE/USA Conference Calendar

Below is a list of congresses and conferences sponsored by International INCE and INCE/USA. A list of all known conferences related to noise is maintained on the Internet in the Internet supplement to this magazine and can be obtained by accessing

http://noisenewsinternational.net

2002 August 19-21
INTER-NOISE 02, The 2002 International Congress and Exposition on Noise Control Engineering, Dearborn, Michigan, USA. Contact: Institute of Noise Control Engineering, P.O. Box 3206 Arlington Branch, Poughkeepsie, NY 12603, USA. Telephone: +1 914 462 4006: FAX: +1 914 463 0201. *e-mail: hq@ince.org.*

2003 June 23-25
NOISE-CON 03, The 2003 National Conference and Exposition on Noise Control Engineering, Cleveland, Ohio, USA. Contact: Institute of Noise Control Engineering, P.O. Box 3206 Arlington Branch, Poughkeepsie, NY 12603, USA. Telephone: +1 914 462 4006: FAX: +1 914 463 0201. *e-mail: hq@ince.org.*

Acknowledgments

The Board of Directors of INCE/USA expresses its sincere appreciation to the **Acoustical Society of America** for its support and cooperation in the publication of *Noise/News* (1972-92), and *Noise/News International* since its inception in 1993. The Board also gratefully acknowledges the financial assistance given by the members of the INCE/USA Liaison Program: The Board of Directors of International INCE gratefully acknowledges the support being given by the following Sustaining Members and Institutional Members of International INCE.

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Department of Applied Acoustics, Chalmers University of Technology, Gothenburg
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Graduate Program in Acoustics, The Pennsylvania State University, State College, Pennsylvania

What can INCE/USA do for you?

- INCE/USA strives to identify its member's needs for professional development, through recognition as a professional in the field of noise control engineering, and publication of technical information related to noise control.

- INCE/USA offers Board Certification to its members. This certification is used to authenticate technical competence and is issued to those who demonstrate high technical competence in noise control engineering through rigorous testing or alternative equivalent methods, and who maintain this technical competence through relevant technical activities.

- INCE/USA publishes the bimonthly international technical journal *Noise Control Engineering Journal*, and, with International INCE, publishes the internationally-distributed *Noise/News International*. Both publications are included in your member dues. Each issue of *Noise/News International* contains a feature article on a subject of broad interest in noise control engineering.

- INCE/USA Technical Activity Groups are one of the best methods of information exchange among members with common technical interests. Members of Technical Activity Groups have an opportunity to assist with the arrangement of special sessions at NOISE-CON and INTER-NOISE meetings.

- INCE/USA sponsors the NOISE-CON series of national conferences on noise control engineering in the United States, and has organized the INTER-NOISE series of international congresses on noise control engineering when they are held in North America.

- Through its membership requirements, its demanding board certification program, and its requirements for maintenance of board certification, INCE/USA promotes and ensures professionalism in the field of noise control engineering. More than 1000 individuals participate in INCE/USA activities as Members or Associates of the Institute.

- INCE/USA publishes an annual Membership Directory, which contains, in addition to the membership list, information on membership qualifications, policies, and other useful information.

- INCE/USA sponsors equipment exhibitions at its national and international meetings that keep members up-to-date on developments in measuring instrumentation, computer software for solving noise control problems, and materials for noise control.

- INCE/USA maintains a home page on the Internet that contains up-to-date information on conferences, available books on noise control engineering, standards information, links to other organizations involved in noise and vibration control, and a wealth of other information. You can link to the home page at:

  http://ince.org

- INCE/USA sponsors a Liaison Program that allows companies with an interest in noise control to participate as Sustaining Members. Sustaining Members are listed in INCE publications, and obtain complimentary copies of proceedings books and periodicals.

- INCE/USA has produced two CD-ROMs which, in total, contain the proceedings of INTER-NOISE 94, INTER-NOISE 95, INTER-NOISE 99 and other information. This year INCE produced a third CD-ROM with the Proceedings of NOISE-CON 01 together with four past NOISE-CON conferences, the 1998 Sound Quality Symposium, and other reports of interest. More than 600 papers on noise are on this new CD-ROM.

See the membership application on the two following pages.

INSTITUTE OF NOISE CONTROL ENGINEERING

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Applicants for INCE Associate Status should complete this page only. Applicants for INCE Membership must complete the facing page as well.

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EXPERIENCE

Describe briefly your interests and/or professional experience in the field of noise and its control. Include any special interests, number of publications, patents, etc.

_____

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Annual fee (2002) for INCE Associates and Members

Domestic USA	USD 95.00
Canada/Mexico	USD 120.00
Overseas (international airlift mailings)	USD 120.00

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Please mail this Application Form and check for the annual fee to: Institute of Noise Control Engineering, P.O. Box 220, Saddle River, NJ 07458, U.S.A.

THIS PAGE TO BE COMPLETED ONLY BY APPLICANTS FOR INCE MEMBERSHIP

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- be enrolled as an INCE Associate;
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- have demonstrated academic or professional experience in acoustics and noise control; and
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College/university	Location	Degree	Major	Year received

ACOUSTICS COURSE(S)

List at least one, but not more than two, courses in the fundamentals of acoustics taught or taken for credit [identify college/university, department, course title and number, year, credits; include grade received and name of instructor (if not taught)]:

EXPERIENCE (continued from facing page)

Use this space to describe any additional professional experience in noise control engineering that is not listed on the reverse side of this form.

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The endorser, an INCE Member whose signature appears below, verifies that the information supplied by the applicant is accurate to the best of the endorser's knowledge.

Endorser's name (please print)_____

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I hereby make application for INCE membership. I certify that the statements made in this application are true, complete, and correct. If elected to membership, I will be governed by the articles of incorporation, bylaws, and policies of INCE/USA.

Full signature of applicant _____ Date_____

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Information on listings in the Directory of Noise Control Services is available from INCE/USA, P.O. Box 3206, Arlington Branch, Poughkeepsie, NY 12603, USA. The price is USD 325 for four insertions.

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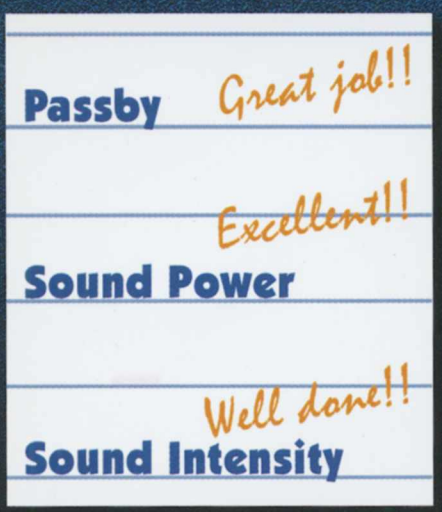

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