THE BULLETIN

OF THE

AUSTRALIAN ACOUSTIC SOCIETY

Volume 5, Numbers 3 & 4, September/December 1977

REGISTERED FOR POSTING AS A PERIODICAL – CATEGORY B

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VOLUME 5, NUMBERS 3 and 4
SEPTEMBER/DECEMBER 1977

GUEST EDITORIAL

COMMUNICATIONS

Of the many diverse facets of the subject of acoustics, the two which most directly affect the health and welfare of the community are the fields of occupational noise and environmental noise. Increasing awareness of the need for control measures in these two areas has been reflected by the rapid growth of noise control sections in health and environmental agencies around the world and by the increasing volume of noise control legislation appearing on the statute books. It is unfortunate that so many of our activities these days need to be covered by legislation but until each individual, from rock musician to industrial manager, voluntarily exhibits sufficient concern for the well being of his neighbours or employees, it seems that regulatory authorities are needed to guide the way.

Much can be achieved by the regulatory authorities through public education, particularly in the areas of domestic noise and noise from in-service motor vehicles. However in areas such as industrial noise, both occupational and environmental, the availability of competent consultancy services is as important as the administration of legislation and is in fact an integral part of an overall noise control programme. For such a programme to be fully effective it is vital that the consultants in the field keep up to date not only with the legislation itself but also with the philosophy behind the legislation. It is also essential that the regulatory authorities should draw on the very valuable field experience of the consultants as input to the policy making process.

It appears that in Victoria this interchange of information has not flowed as freely as it might, due perhaps to reservations and a lack of initiative on both sides. I am informed that a similar situation exists in some other States. Whilst the regulatory authorities must shoulder the major responsibility for promoting this communication, the Acoustical Society could play a valuable role by providing a forum for an information exchange. At the national level an annual workshop or seminar involving consultants, officers of the regulatory authorities and any other Society members who are able to make an active contribution, might be one way of providing such a forum. Similar functions could also be held at more frequent intervals at the state level.

The greater the understanding that each group in noise control has of the activities and philosophy of other groups, the more the interests of the community will be served. In this way, as was foreshadowed in the editorial of the March 1976 edition of the Bulletin, the Society can take another step towards entering a new era of community involvement and service.

BOB SNOW

Chief Noise Control Officer
Environment Protection Authority of Victoria.

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Volume 5, Numbers 3 & 4, September/December 1977

– *The Bulletin is published quarterly by the Australian Acoustical Society, Science House, 157 Gloucester Street, Sydney, NSW, 2000*

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OF THE AUSTRALIAN ACOUSTICAL SOCIETY

The Society values greatly the support given by the Sustaining Members listed below and invites enquiries regarding Sustaining Membership from other individuals or corporations who are interested in the welfare of the Society. Any person or corporation contributing $160.00 or more annually may be elected a Sustaining Member of the Society. Enquiries regarding membership may be made to The Secretary, Australian Acoustical Society, Science House, 35-43 Clarence Street, Sydney. NSW, 2000.

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FROM THE PRESIDENT

As I retire as President of the Australian Acoustical Society, I would like to take this opportunity to express my appreciation for the support that has been given to me by all our members and, in particular, by the members of Council. I would especially like to express my appreciation to the retiring General Secretary, Bill Davern, and to the retiring Treasurer, Richard Heggie, for all that they have done. Both have made significant contributions to the administration of the Society's business, and towards the achievement of a number of the Society's objectives. I am sure that all of you will join with me in thanking them very much for their work.

In my first column, I wrote of the honour that had been extended to the Society by its selection as host for the Tenth International Congress on Acoustics in 1980. This, as you now know, was formalised by the International Commission on Acoustics at its meeting in Madrid last July. The members of the Tenth I.C.A. Executive Committee and, in particular, Jack Rose are to be congratulated on their diligence in so successfully working towards this honour. A great deal of work now lies ahead of the Society, as all who attended the Ninth I.C.A. in Madrid will agree. However, I feel confident that all of our members will contribute as required to achieve a successful and a memorable I.C.A. in Sydney in 1980.

In conclusion I should like to thank the Australian Acoustical Society for the opportunity to serve as its President for two most interesting years, during which the Society has taken a number of steps towards establishing its position in the community and its services to the profession of acoustics. It is now my pleasure to welcome our incoming President, Gerald Riley, whom I am sure will fill this position with distinction.

Carolyn Mather
PRESIDENT

NEWS & NOTES

DIGITAL FACILITY AT MONASH UNIVERSITY

R. J. Alfredson

The Department of Mechanical Engineering at Monash University has now had more than one years experience in the use of its mini-computer for the collection and processing of data. The facility has proved to be highly successful, very reliable and extremely versatile. This is now a strong commitment to the digital handling of data for research programs.

The two major components of the facility are the Hewlett Packard 21MX computer and the Hewlett Packard Analogue to Digital Converter. The HP21MX currently has 56K of memory together with a 15 megabyte disc subsystem. The latter includes a removable disc for storing data. The Real Time Executive III operating system allows multi-user capability with programs written in Assembler, Fortran and Algol. A fast Fortran processor has significantly improved running times for the majority of programs.

The HP Analogue to Digital Converter was specifically designed for the Department. Its maximum sampling rate is 100 kHz and at that speed it would take almost 50 seconds to completely fill the removable disc, i.e. 4,915,200 words each of 16 bits. Other sampling speeds are available internally, eg. 10 kHz, 1 kHz, 100 kHz, 10 Hz and 1 Hz as well as any externally triggered rate up to a maximum of 100 kHz. Of course, only one track of data – 6144 words – need be stored if so desired. Up to 8 channels of data can be sampled continuously and each 16 bit word stored contains its channel number (4 bits) and its voltage value (12 bits). Maximum voltage is 10 and the resolution is 0.005 volts. Permanent lines have been run to several laboratories so that data collection and processing can be controlled from the experiment site.

The other major items associated with the installation are a teletype complete with cassettes, two video display units and a hard copy unit. Orders have recently been placed for a further video display unit, a plotter, and a high speed printer.

Fortran programs have been developed within the Department for processing data. The basis for most of the acoustical work has been the fast Fourier transform which has led in turn to programs for evaluating Fourier spectra, auto and cross power spectra, power spectral density, frequency response functions and the various coherence functions. Other programs are available for auto and cross correlations, probabilities, analysis of transient signals (see Figs. 1 and 2) and the direct evaluation of acoustic intensity (in the near field). The facility is also being used for research in other areas in the Department such as fluid power, dynamics and solid mechanics.

As well as providing one of the finest facilities in the country to aid in acoustics research, the installation has also significantly influenced the graduate teaching programs at Monash. The digital processing of data is a whole new area for those accustomed to the more traditional analogue techniques. It is considered that students should be made aware of the versatility, and the many hazards, in the numerical processing of data.

The decision to move into the area of digital collection and processing of data was taken some 2 years ago. The experience to date is that it was the right decision and the only regret was that it wasn't made sooner.

VIC DIVISION WORKSHOP MEETINGS

Richard Schurmann

The Americans have kidnapped the good old English work "Workshop" and forced it to have a second meaning "a group of people who meet for a period of intensive study, work etc.".

Under sufferance it thus appears to describe a new meeting format which the Victoria Division has introduced. Bad for the language perhaps, but good for Acoustics. Five Workshop sessions were scheduled for 1977 interspersed between ordinary technical meetings. Four Workshop sessions have already been held and judged a great success by participants.

FIRST WORKSHOP MEETING
Flow Noise in Duct Systems

Held at C.S.I.R.O. Division of Mechanical Engineering Conference Room, Highett, on the 21st of Apirl, with Don Gibson in the chair. Those present introduced themselves and indicated particular subjects of interest, which were listed. The three subjects which appeared on the list most often were "breakout", "production mechanisms" and "flow through intersections", and discussion centred around these three. Jim Watson described a common lack of appreciation in the air conditioning industry of the distinction between two mechanisms which give rise to noise radiated from ductwork. The first he described as noise which is transmitted down the duct from some remote source and is then transmitted through the duct wall. This noise is amenable to treatment such as placement of a silencer in the duct between the source and the part of the duct where the problem occurs. The second is noise radiated from a duct wall which is excited by pressure fluctuations due to air flow turbulence. In this case, the fitting of a silencer might well increase the noise level due to the effect of the silencer on the flow pattern.

This second mechanism is a problem not only in that it is commonly mistaken for the first but that even when recognized by an astute duct designer, there are considerable problems in dealing with it.

Data from theoretical and laboratory testing work is

helpful for predicting noise generated in simple duct geometries but is inadequate for the many complex geometries met in ductwork practice. Don Gibson described a case in his laboratory where he found that the ratio of the flows in the two outlet streams of a divison ("T") has a surprising and unexpected effect on turbulence noise. Some experimentally derived published data on turbulence noise may be of doubtful value if the experimental workers didn't realize the importance of some factor such as this. Furthermore it is seldom possible for sufficient straight duct to be inserted between irregularities (changes of shape, junctions, etc.) to allow "fully developed flow" to be the actual inlet condition for the irregularities.

Two general approaches to minimizing noise problems due to in-duct turbulence were put to the meeting. One is to reduce the severity of the irregularities (e.g. increase the radius of a bend) which will minimize the turbulence and the other is to reduce the scale of the turbulence (e.g. put turning vanes in a mitre-bend) and shift its frequency spectrum into an area where the duct wall can be made less susceptible to the problem.

In either case it is difficult to predict the magnitude of the improvement obtainable which means uncertainty in meeting design criteria.

The meeting agreed that in general duct layout and design in Australia is far below a standard attainable with the present state of the art. The two possible reasons put forward for this are constraints such as space and cost on the one hand and a general lack of care, or ignorance, on the part of ductwork designers.

Several of the participants cited cases where a noise problem had been eliminated by re-arranging the sheet-metal work in such a way that architectural (space) requirements had not been transgressed and that the client had been happy to spend the money to solve the problem. This means that economy would have been better served had sufficient consideration been given to noise in the first place.

The meeting was judged to be a success with a good balance of theoreticians and practitioners.

Participants were —

Don Gibson (in chair) . . . . . C.S.I.R.O.
Tom Hamilton . . . . . Dept. of Construction
Ian Charity . . . . . S.E.C.
Murray Mason . . . . . Dept. of Construction
David Rennison . . . . . VIPAC
Michael Smith . . . . . VIPAC
Allan Wallis . . . . . C.S.R.I.O (retired)
Jim Watson . . . . . Ron Carr & Co.
Graeme Harding . . . . . Sound Attenuators (Aust.) Ltd.
Dave Tuck
Doug Growcott . . . . . Ron Carr & Co.

Except where specific credit is given no comment in this report should be attributed to any particular participant.

Other Workshop Meetings held this year were:

— "Electro acoustics" — mainly loudspeakers
— "Listening Rooms for Music"
— "Noise from large Sources"

SOUTH AUSTRALIA — NOISE CONTROL ACT

S.A. DEPARTMENT FOR THE ENVIRONMENT
S.A. DEPARTMENT OF LABOUR AND INDUSTRY

The Noise Control Act

An Act to control excessive noise, the Noise Control Act, 1976-1977, came into official force on 5 May, 1977. Parts 1, 2, 5 and 6 of the Act were brought into operation on 18 August, 1977.

It is anticipated that the remaining Parts of the Act, and the Regulations, will be brought into operation by December 1977.

The Act and Regulations will enable the control of domestic noise (air conditioners, stereo amplifiers, swimming pool pumps and filters, barking dogs, etc.), noise emanating from industry, licensed premises, places of public entertainment, construction and demolition sites, and other non-domestic premises.

Maximum limits for employee noise exposure will also be included in the Regulations.

Department for the Environment

The Minister for the Environment, Mr. Don Simmons, is responsible for the administration of this Act, and a Noise Control Section has been established within the Environment Division of this Department.

The role of the Noise Control Section goes beyond simply receiving and investigating noise complaints. It includes:

- Providing a centre of technical expertise and research on noise to assist with administration of the Noise Control Act.
- Monitoring noise levels and assessing community response to noise, and maintaining a basic noise inventory.
- Advising on noise reduction programmes, working in association with equipment manufacturers.
- Developing and directing a public information and education programme to inform the community of the need for noise control and the techniques that will accomplish it.
- Liaising with other State Government Departments on matters related to noise control.

The Noise Control Section, now located at 32-34 West Beach Road, Keswick, is headed by Mr. Garry Stafford, B.Sc., formerly Scientific Officer (Physics) with the Occupational Health Branch of the Department of Public Health. He has wide experience in the field of noise measurement and assessment.

Other staff members who have commenced duties are:

Dr. Tom Stubbs (Environmental Officer) formerly a lecturer with the Physics Department, University of Adelaide.

Mr. Vic Neave (Senior Technical Officer) and Ken Rix (Senior Clerk), both former officers of the Department of Public Health.

Ms. Kaye Buckendahl, Receptionist/Office Assistant.

Provision has been made for the appointment of four Noise Inspectors. Appointments to these positions will be made before the end of the year.

Department of Labour and Industry

Responsibility for control of noise exposure in industry in South Australia is invested with the Dept. of Labour & Industry which has an Engineering Noise Control Section operating under the provisions of the Industrial Safety Code Regulations. These Regulations became operative on the 1st September, 1976 and are designed to reduce noise exposure within industry by either Engineering Noise Reduction or Administrative Noise Control. The exposure of a worker is determined as a Daily Noise Dose derived from the measurement of noise levels and the actual duration of exposure of a worker to these noise levels. The maximum permitted noise level per day is 90 dB(A) and the daily noise dose shall not exceed 1.0. It is proposed to incorporate Regulation 49 into the Noise Control Act Regulations relative to Industrial and other Non-Domestic Noise.

Personnel of the Noise Control Section DL1 are R W Boyce, M Ciccozzi, K J Martin and Map Lane.

SOUTH AUSTRALIA DIVISION OF THE AAS

8TH TECHNICAL MEETING – 4TH MAY, 1977 DEPT. OF PUBLIC HEALTH EDUCATION CENTRE, NORWOOD (SA)

The Vice-Chairman (Mr. R. W. Boyce) opened the meeting and welcomed the Guest Speaker, Mr. R. McCarthy Solicitor, and visitors.

Apologies were tendered from Messrs. Bogan, Pope, Tonin, King, Woolford and Mrs. Stratford – Attendance figures were 45.

The Guest Speakers' subject "Noise and the Law" incorporated the topics of Common Law (Nuisance), Statutory Legislation, the Workers' Compensation Act, Regulation 49 Industrial Safety, Health & Welfare Act and the Noise Control Act.

It was explained that Common Law was not applicable to Australia as a whole, due to each State functioning independently. The history of Law from Grecian, Roman and thence to English Law in 1100 A.D. was traced, as was the system of Statutes which through Parliament, grant the power of modification or alteration to Common Law.

In explaining the Fort of Trespass through personal injury or negligence, the Speaker dealt with Noise as a Nuisance but explained that although this had been effective for the past 500 years, it only covered "interference with property". Cases of the "Proof of Property" and the consequences were cited in explanation. In these instances, the remedy was either Damage claims on loss of enjoyment or the issue of an Injunction to Cease.

On the subject ot Statutory Legislation, the Speaker covered the areas of Penal, Remedial and Enabling or Restraint and itemised the relevant sections of South Australian Acts and their Penalties.

In discussing the proposed Noise Bill of this State, Mr. McCarthy assessed the content in respect of the legal aspect and stressed the need for a public review of any restraining Regulations formulated under the Noise Control Bill.

The Chairman invited the gathering to participate in a Question and Discussion Period and members used this to full advantage, particularly in regard to Noise Induced Hearing Loss and Compensation.

The Meeting closed with a Vote of Thanks to the Guest Speaker for his most illuminating address and again members obtained further advice during the informal refreshment period which followed.

CONFERENCE & SYMPOSIUM ANNOUNCEMENTS

THIRD INTERNATIONAL CONGRESS COMMISSION ON BIOLOGICAL EFFECTS OF NOISE

The International Commission on Biological Effects of Noise is pleased to announce the Third International Congress on Noise as a Public Health Problem: Biological and Behavioral Effects. The Congress is scheduled to be held during the week of September 25-29, 1978, in Freiburg, Federal Republic of Germany (West Germany). The official language of the Congress is English; simultaneous German translations will be provided. In addition to the invited and contributed papers on scientific research and applications, major discussions are planned on governmental and industrial needs and problems. Other discussions will be held on ways to develop procedures that will permit practical solutions both for governments and for industries.

Inquiries should be addressed to
International Commission on Biological Effects of Noise
Institut für Arbeits -und Sozialmedizin
Universitätsklinikum
Johannes Gutenberg Universität
Obere Zahlbacher Strasse 67
D-6500 Mainz
Federal Republic of Germany

The major topics that will be treated during the Congress are Community Response to Noise, Effects of Interactions between Noise and Physical or Chemical Agents, Influence of Noise on Performance and Behavior, Noise and Animals, Noise and Communication, Noise-Disturbed Sleep, Noise-Induced Hearing Loss, and Non-auditory Physiological Effects Induced by Noise.

AAS ANNUAL CONFERENCE

The Annual Conference of the Australian Acoustical Society will be held on September 1-3, 1978, at the University of Sydney. Occupational Hearing Loss will be the general theme of the Conference and the papers to be presented will raise and discuss issues of interest to all people involved in hearing conservation and compensation for hearing loss. A session on industrial audiometry will be held jointly with the Audiological Society of Australia on the afternoon of September 2. Further information can be obtained by contacting the Conference Convenor, Dick Waugh, or John Macrae at the National Acoustic Laboratories, 5 Hickson Road, Millers Point, N.S.W., 2000, phone 20537.

LETTERS

MYTHS IN ACOUSTICS

Dear Sir,

Maybe the use of stretched wire as described by Caleb Smith obtained its 'credibility' from a very common myth namely:—

"It must be a good acoustic material — look at all the holes in it."

This often used statement brings to mind the response of a client to an acoustic consultant's report on reducing noise transmission from a factory to a residential neighbour, viz:—

"I'm not going to the 'B[illegible]' expense of insulating the roof, walls and ventilators. I'm going to hang one of our famous Australian made 85% sound absorbing tiles over each of the six noisy machines and so reduce the amount of sound by 85% that would otherwise be transmitted."

Finally, to help the collection, but not, I hope, the proliferation of myths, I submit that:

"Water hammer noise is directly proportional to the softness of the water."

Yours faithfully,

RONALD J. CARR

19th July, 1977

REPORT ON 9TH ICA, MADRID
AAS ANNUAL GENERAL MEETING, AUGUST 1977

J. A. Rose, Secretary/Convenor,
AAS/ICA Executive Committee.

The most important information is that the Australian Acoustical Society has been accorded the honour of hosting the 10th International Congress on Acoustics in Sydney in July 1980. This was announced at the final session, attended by about 600 delegates and circulars, previously prepared in Sydney, were distributed by Australian and New Zealand delegates.

The announcement followed a meeting with the International Commission on Acoustics at which the A.A.S. was represented by the President, Caroline Mather, Tibor Vass, Anita Lawrence and Jack Rose. The Commissioners were extremely helpful, giving good advice and agreeing to proposals we put forward in respect of our own satellite symposia and the associated meeting to be held by the New Zealand Acoustical Society.

They raised no objections to our present plans but emphasised that, because travel to Australia would involve both greater expense and longer times away from home than a European ICA, we must concentrate on arranging as many associated meetings as possible and, on cheap yet convenient travel itineraries. We informed them that informal approaches had been made already to the Audiological Society of Australia, the Australian Society for Ultrasound in Medicine and Biology and that, once our success with ICA was confirmed, these approaches would be followed up formally. Suggestions were made that if International Standards Organisation meetings and International Electro-technical Commission meetings in fields related to acoustics could also be held in Australia at a time which permitted attendance at ISO, IEC and ICA, this would probably draw up to 30 extra people who were high-level representatives of their respective countries.

The Commissioners approved our budget, themes, dates and venues, as well as the preliminary pamphlet, the logo, and our proposal to revert to the old format for the main ICA, i.e., Wednesday to Wednesday as everyone attending the 9th ICA was tired after five hectic days and nights without a break. They were disappointed with the poor record of compliance with requests for those presenting contributed papers to lodge their full paper for photocopying (less than 10% did) and said perhaps we should revert to the previous arrangement whereby all papers were printed though this would add greatly to both costs and problems of printing. The possibility of changing the whole concept of the meeting to avoid problems was canvassed and we were told they would listen to any suggestions we might have along these lines at their next meeting in May 1978 but that the format must be finalised then.

The subject of mail delays, which caused problems in Spain was raised and we were advised to allow 2 months extra time for such delays between Australia and Europe, America or Japan. They also stressed the importance of selection and finalisation of the invited speakers list at the earliest possible date so that they could be confirmed and announced at least one year before the meeting and said they would advise us as to the most appropriate persons to be invited.

The subject of registration fees as fixed by the I.U.P.A.P. (presently $70 U.S.) was discussed at length and the difficulties this caused by having to charge for extra items such as proceedings, social events, etc., were enumerated but little hope was held out for our being authorised to charge the $100 Aust. required by oru budget and we were advised to take this up with Professor Street who is the Australian representative on IUPAP and to raise as much money as possible prior to the meeting to permit some flexibility in fee setting.

Both within this meeting and prior to it suggestions were made of possible co-operation between ourselves and the International Institute of Noise Control Engineering, of

which the AAS is a member, for the timing of their 1980 meeting to either encourage travel to ICA or avoid clashing of dates and this has and will be pursued further.

Many offers of assistance in publicising our events were given and these will be actively followed up.

We informed the Commissioners that we would not be able to match Spain in pageantry, history or entertainments and this can be understood since King Carlos I performed the official opening, palace grounds were used for various cultural activities and we were treated to an exhibition of Flamenco dancing by the leading exponent of that art in Spain. We were assured that we should try to be fully Australian even to the extent of arranging visits to observe Australian fauna and flora and to include excursions to remote installations of scientific interest (outside acoustics) if these could combine both sightseeing and unique or high-level local research.

The 9th ICA itself was a great success in that the attendance was greater than expected and the venue was first-class but with such a complicated programme, it was inevitable that things beyond the control of the organisers went wrong and Australian delegates were all enrolled in a corps to observe problems and suggest ways of overcoming them. It will be of great advantage to the AAS/ICA Executive Committee if all who attended forward their notes to the Committee and this will help us to avoid some of the pitfalls involved in running such a complex series of meetings.

During the Congress the Australian Ambassador to Spain, gave a reception to the dignitaries, officials and Australian delegates associated with the 9th ICA and this was a marked success and certainly created the right atmosphere since two of the Commissioners later stated that they were looking forward to similar friendly informality when the ICA is held in Australia.

The Spanish Acoustical Society were excellent hosts showing a degree of amiability and politeness which is traditional for Spain often under conditions which would have tried the patience of the most easy-going Australian.

There is no doubt that the running of a successful ICA at such a distance from the main centres of acoustical activity will require extraordinary efforts on our part but the benefits which will accrue will be enormous not only during the Congress but also in the preceding and following years.

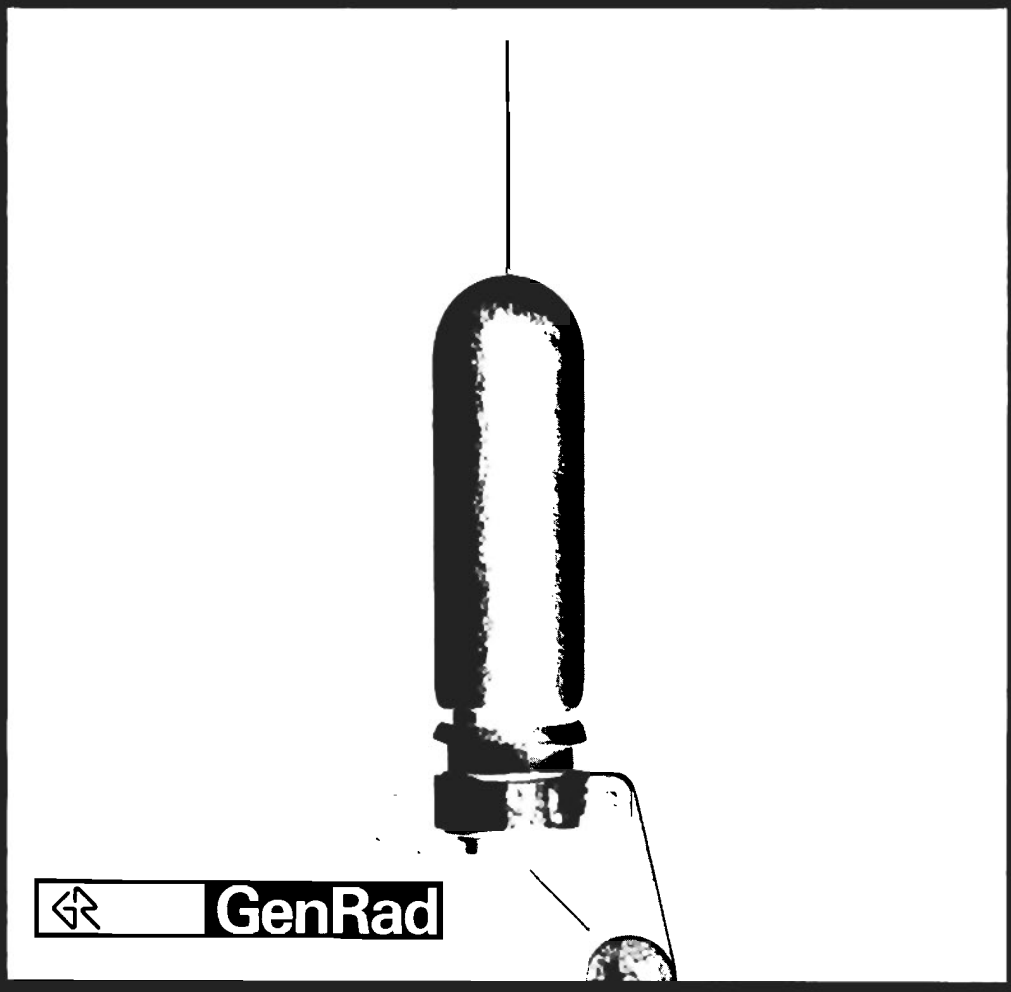
The advent of the 10th ICA should be used by members for:

1. Publicising acoustics in Australia.
2. A membership drive, covering all grades including Sustaining.
3. Spreading advance publicity regarding the event in all correspondence overseas (photocopies of our initial pamphlet can be included with letters, etc.).
4. Fund raising on behalf of the Society.

It cannot be stressed too highly that the maximum benefit will be derived only if the whole series of meetings associated with the ICA are successful and this will require the full co-operation of all involved. Each member has a direct interest in this success and, as 1980 approaches, more and more members will be asked to join in the work needed to achieve this end.

The friendly assistance we have received from overseas authorities, especially the ICA Commissioners and the Spanish Acoustical Society augers well for such a result, its fruition rests with us.

AAS President, Carolyn Mather, about to address delegates at closing ceremony of 9th ICA. L to R, Mr. J. A. Ross, Dr. F. Ingerslev, Dr. C. E. Mather, Dr. E. Shaw (President ICA Commission), Prof. Lara-Saenz (President, Spanish Acoustical Society), Mr. A. Perez-Lopez (Gen. Secretary, Spanish Acoustical Society) and Dr. R. Beyer (Commissioner, from U.S.A.).



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Engineer-Secretary
Standards Association of Australia

In this report an attempt has been made to review briefly the progress of work of the 9 Acoustics Standards Committees, which have been active during the year July 1976 to June 1977. This report is also intended not only to provide information about the standards published, but also provide information on the progress on various Standards projects in a summary form.

During the period under review 22 meetings of the various Acoustics Standards Committees were held, 7 new standards published, and two draft standards were issued for comment. The following is the details of standards published and progress of work on various standards projects in a summary form:

STANDARDS PUBLISHED

1191 Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.

1269 SAA Hearing Conservation Code.

1935 Method for Measurement of Normal Incidence Sound Absorption Coefficient and Specific Normal Acoustic Impedance of Acoustic Materials by the Tube Method.

1948 Method for Measurement of Airborne Noise on Board Vessels

1949 Method for Measurement of Airborne Noise Emitted by Vessels on Waterways and in Ports and Harbours.

2012 Method for Measurement of Airborne Noise from Agricultural Tractors and Earthmoving Machinery.

2021 Code of Practice for Building Siting and Construction Against Aircraft Noise Intrusion

WORK IN HAND	Stage
*Glossary of acoustic terms (revision of AS 1633)	2
Pressure calibration of microphones by the reciprocity techniques (to be AS 1232)	6
Pur tone audiometer for advanced audiological use	2
Guidance for the use of sound level meters	4
Speech audiometers (to be AS 1591, Part 6)	6
Background noise levels for audiometer rooms	2
Methods of measurement of airborne sound emitted by machines (revision of AS 1217)	2
Sound level meters (revision and consolidation of AS 1259, Parts 1, 2 and 3)	1
*Personal noise dosemeters	2
*Amendments to AS 1269, SAA Hearing Conservation Code	2
*Amendment to AS 1270, Hearing Protection Devices	2
Test methods for airduct sound attenuators	5
Field measurement for the reduction of airborne sound transmission in buildings	5
Ambient sound levels for areas of occupancy within buildings	6
Measurement and rating of sound insulating of building envelopes	1
Plumbing and drainage noise	2
Measurement of reverberation and absorption in rooms	1
Measurement of airborne sound attenuation of ceilings between two rooms	2
Method of rating of sound insulating of buildings	2
Determination of motor vehicle noise emission	4
Noise annoyance in commercial areas	2
Noise annoyance in industrial areas	2
Noise assessment in residential areas (revision of AS 1055)	6
Measurement of sound power level of compressors	2
Measurement of sound power level in pneumatic tools and machines	1
Maximum permissible sound power levels (and rating) of pneumatic tools and air compressors	1
*Engineering method for measurement of airborne sound emitted by compressor/primemover units intended for outdoor use	2
*Engineering method for measurement of airborne sound emitted by pneumatic tools and machines	2
Recommended noise levels on board vessels	3
Recommended noise levels emitted by vessels on waterways, in ports and harbours	1

NOTE: The numbers used to indicate the stage of projects have the significance indicated hereunder –

1. Investigation and preliminary work
2. Committee drafting
3. Draft issued for public review
4. Review of comment
5. Postal ballot and final stages
6. In course of publication

Asterisks indicate new activities during the year.

The following three new draft standards have been issued for public comment:

DR 77096 – Personal noise dosemeters

This draft specifies the characteristics of an instrument for monitoring noise environments by automatically integrating the sound energy received to give a direct reading corresponding to the daily noise dose suffered by a person exposed to a specific environment.

DR 77097-8 — Methods for measurement of airborne sound emitted by compressor units including primemovers and by pheumatic tools and machines

77097 Part 1 — Engineering method for measurement of airborne sound emitted by compressor/primemover units intended for outdoor use

77098 Part 2 — Engineering method for measurement of airborne sound emitted by pneumatic tools and machines.

DR 77097 describes a method based on ISO 2151—1972. DR 77098 describes a method based on the CAGI-PNEUROP Test Code for the Measurement of Sound from Pneumatic Equipment, published by the Compressed Air and Gas Institute, New York, 1969.

REPORT ON ISO TC 108 ACTIVITIES

ISO/TC 108 work has continued on the implementation of decisions resulting from the meetings held in September 1976. ISO 3945-1977: "Measurement and Evaluation of Vibration Severity of Large Rotating Machines in Situ, Operating at Speeds from 10—200 rps" (prepared by TC 108/SC2) was published by the ISO in February 1977; copies are available from ANSI. Consideration is now being given to the submission of this ISO standard as a proposed NASI standard. TC 108 letter ballots have been issued on various new work items proposed at the 1976 (London) meetings. A document on description and evaluation of scales for measuring centers of gravity for free aerospace bodies has been received for circulation to SC1/WG4. Work is continuing on the preparation of other documents for circulation at various stages.

In September 1976, the ISO Central Secretariat communicated with TC 108 with respect to a proposal by the European Shock Absorber Manufacturers' Association to enter the following items into the work of ISO:

(a) Recommendation for a performance test specification for an "on-car" vehicle suspension testing system, and

(b) Dimensional standards for shock absorbers.

The ISO Central Secretariat stated that it would like the opinion of TC 108 since although TC 22 (Road Vehicles) is interested in this work, it also concerns TC 108. The TC 108 Secretariat responded in December 1976 to the effect that (provided it met with the approval of TC 22 and all others concerned), TC 108 would propose that this item of work be assigned to SC2/WG4: Measurement and Evaluation of Vibration and Shock in Land Vehicles, with close liaison with TC 22. There is a good deal of interest within the U.S. (notably within SAE) in this subject. The Central Secretariat informed the TC 108 Secretariat that it favoured the setting up of a working group within TC 108 and hoped its initiation could take place soon. Therefore, as soon as the formal agreement of TC 22 to this proposal is received, the TC 108 Secretariat will circulate a letter ballot on the proposed new item of work and its assignation.

Responsibility for the Secretariat of ISO/TC 108/SC3 has been officially accepted by Denmark and the first meeting of TC 108/SC3 since November 1974 is expected to be held in Copenhagen at the end of September 1977.

The next meeting of ISO/TC 108/SC4 will be held during September 1977 in Vienna. The next meeting of TC 103, together with SC1 and SC2 and their respective working groups, is scheduled to take place in September 1978 in Berlin.

TECHNICAL REPORTS
BOOK REVIEWS

INTER-NOISE 77

Edited by: Eric J. Rathe
Published by: International Institute of Noise Control Engineering
Price: US$45.00 (post paid)
Avaulable from: The Editor, Noise/News, P.O. Box 1758, Pough Keepsie, New York, 12601, U.S.A.

Inter-noise 77, the Proceedings of the 1977 International Conference on Noise Control Engineering, organized by the International Institute of Noise Control Engineering in Zurich earlier this year, is a challenging publication to review. (Just naming the authors would generate a review of unprecedented length.)

About all I can do therefore is to mention that there were nearly 140 papers presented (none of which were from Australia) of which about a quarter were invited and the rest contributed. The invited papers have been classified under the headings; Legislation, Community Noise, Economic Aspects of Noise Control, Units to Describe Noise, Traffic Noise, Industrial Noise and Instrumentation. The contributed papers are classified under; University Education in Acoustics, Land Use Planning, Noise in Closed Spaces, Noise Measurements, Flow Noise, Economy and Policy, Noise Control for Machine Tools, Impulsive Noise, Air moving Devices, Railway Noise, Noise in Industry, Acoustic Modelling, Outdoor Noise Propagation, Airport and Aircraft, Ship Noise (Walls and Partitions) and Subjective Response to Noise.

That lot fills 986 pages, which at US$45 gives a cost per page of about 4 cents Australian. (You couldn't fill a bookshelf at a cheaper rate than that.) I give the cost per page because I can't possibly assess its worth in other respects as I have only read about 10% of the papers and a number of these were beyond my comprehension. Based

on what I have read and understood I would suggest that Inter-noise 77 is an important publication for Noise Control Engineers.

FERGUS FRICKE

DOCTORAL THESES, JASA

In order to give JASA readers more information about the research activities of acousticians outside the USA, the Journal of the Acoustical Society of America has recently begun to publish abstracts of doctoral theses in acoustics prepared abroad.

These abstracts, printed in the Acoustical News from Abroad section of the Journal, include title and date, name and university address of the author, and name(2) of thesis supervisor(s). Abstracts of no more than 200 words may be submitted to W. G. Mayer, Associate Editor JASA, Physics Department, Georgetown University, Washington, D.C. 20057, USA.

ACOUSTIC DESIGN AND NOISE CONTROL, VOL. 1, ACOUSTIC DESIGN,

Rettinger. Chemical Publishing Company, New York, 1977. 280 pp., ill., index. Price US$19.50.

This is one of the few reference books, on Architectural Acoustics, that does not include a section on the fundamental physics of sound, so that its 280 pages do not indicate the depth to which the book goes. The inclusion of the basic physics is unnecessary in many text books and so its omission in this volume is commendable. Nevertheless, on reading the book it leaves one with the feeling that one has missed out on the first act.

The book is in three sections, Room Acoustics, Room Design and Sound Amplification System. Two of these sections, Room Acoustics and Room Design are almost identical to those in the author's 1973 edition of Acoustic Design and Noise Control, there being minor additions in the present edition, like the section on 'Grandstands'. The section on 'Sound Amplification System' has been enlarged considerably and now contains far more useful design information.

The book should provide a useful basis for Architects and Acoustical Consultants who have a knowledge of fundamentals and who are faced with the acoustical design of a specialised room. Unfortunately the book contains very few references, which is a pity because it is not possible to adequately treat auditorium design in 17 pages or church design in 4 pages, and so the reader is left to his own devices to obtain more detailed information.

Fergus Fricke

NOISE CONTROL IN INDUSTRY

J. D. Webb, Ed., Sound Research Laboratories Ltd., Suffolk (Distributed by E. & F. N. Spon Ltd.), 1976. 421 pp., ill., index. Price: not stated.

There are 14 co-authors of this book, which could be expected to produce an incoherent jumble of information, or more likely, no book at all, but like the Beranek series of books it works surprisingly well. It is a pragmatic version of Beranek's 'Noise and Vibration Control'.

This book would be a useful starter for an engineer who knows nothing about noise control and has a noise control problem. The chances of such an engineer ever finding the book and reading it must be remote, however. Alternatively the book could be used as a text for a short-course on industrial noise control. This has already been done by Sound Research Laboratories Ltd., but most short-course organizers like to publish their own text. So, while the book adequately fulfills its stated aim (... to provide a basic understanding of noise control), it is doubtful whether it will be a best seller.

The information contained in this book would bring a person to the stage where he realised he didn't know much about noise control and really should call in a consultant. There is a lot of feet wetting, hand dirtying and ear piercing to be done before the reader becomes a successful noise control engineer, and no text book, however pragmatic, can teach this effectively.

The first eight chapters of the book deal with fundamentals, the next seven with principles of noise control and the last nine with specific noise control problems. The text is clear, precise and accurate and the diagrams are excellent.

Fergus Fricke

TECHNICAL NOTES

ATTENUATION OF COUGHS

FERGUS FRICKE

I'm sure that if ever an audience managed to sit through a concert, without coughing, the orchestra would give them a standing ovation at the end. On several occasions I, and other people I have spoken to, have had the performance spoilt by persistent coughing from members of the audience. The effect on the ABC's personnel, who record the concerts, must be even worse.

If people with coughs cannot be dissuaded from going to concerts or if suitable medication cannot be found to prevent coughs, is it possible attenuate coughs? Programme

notes at the Royal Festival Hall used to carry a message that unmuffled coughs were as loud as a trumpet playing fortissimo. The implication from this message was that coughs could be muffled. On the basis of some experiments carried out by two Architecture students at Sydney University, Gary Fiddler and Simon Chan, it seems that coughs can be attenuated but the attenuation is small and depends on the muffling method used and the position of the cougher in relation to the rest of the audience.

The coughs of several subjects were frequency analysed and it was found that the average octave band sound level spectrum was flat, to within ±3 dB, between 125 Hz and 8 kHz. In order that the cough levels and spectra could be accurately reproduced a plaster head was made and a horn drive unit fitted into it. Octave bands of white noise were then fed to the drive unit and sound pressure levels and sound power levels measured for a number of methods of attenuating the sound. (The methods were restricted to the use of hands, handkerchief and programme.) The methods used always had a gap of at least 10 mm, between the hands and face, to allow for expelled air, though of course there was no air movement in the test.

Sound power and sound pressure measurements were made because it was felt that both the effect on the audience in the immediate vicinity of the cougher and the audience in general should be considered. Some methods of attenuation, such as a programme held in front of the face may be effective in attenuating the sound reaching the person directly in front of the cougher, while it may be ineffectual as far as other members of the audience are concerned.

Although the attenuation of high frequencies (above 4 kHz) was very marked, in the direct field, there was little difference at frequencies below 1 kHz; the best overall sound level reduction being about 5 dB(A). This was achieved with a programme held directly in front of the face. The sound power was also reduced at high frequencies by all methods (cupped hands with handkerchief gave the best results) though at 1 kHz and below all methods gave zero or slightly negative (up to 4 dB) attenuation of the sound power. This was due, presumably, to either the improved impedance matching or to altered cavity resonances.

These results seem to indicate that such attempt to attenuate coughs will have little success* but the gap of 10 mm between the hands and face is thought to be far too liberal for the air flow rates encountered during coughing. Some tests with smaller gaps showed attenuations of more than 10 dB(A) (equivalent to a trumpet playing mezzo-forte). A further study is to be made to determine the open area necessary for air expulsion, after which further attenuation experiments will be tried. In the meantime, should you need to cough during a concert, use a programme held close to your face, or a handkerchief inside cupped hands, to minimise the disturbance to the person whose neck you are coughing down: it might save you a glare or two.

*This does not mean that the day of the ducted cough extractor/attenuator, to every seat, is nigh though I would suggest it as a possibility, if its function was combined with the air return of the air conditioning system.

'NOT ALL AS IT SOUNDS'

Caleb Smith

The name Helmholtz referred to in "People and Places" in the previous issue of the Bulletin reminds me of the Roman potter of the same name who lived in the 1st Century BC.

Barry (short for Barytone) Vitruvius Helmholtz was a regular visitor to the Bath House, particularly during hot summer afternoons when the enervating weather sapped his enthusiasm for work. There he would soak in his bath of milk and wash away the stains of potter's clay and sing away the cares of the day.

It was during this period of apparent idleness that Barry made two important acoustical discoveries which have influenced architects in the design of Bath Houses and Theatres through the following centuries.

The first of these discoveries made Barytone Vitruvius Helmholtz the Roman potter, a very rich man. Being of good voice at the time, he noted that when the maid servants had completed filling his bath, leaving the large milk jars standing neatly along the wall of the room, a certain richness of sound had developed and the room now responded to some of the more resonant tones of his voice.

At first, Barry wasn't sure what was the cause of the phenomenon. Day after day he studied the change in his voice. Initially, thinking that the change was biological, he put it down to his maturing age, for he was still a young man. Sometimes he even thought the presence of the maids attending him were having some effect on his voice, though he couldn't think how. He did conclude however that the presence of the maids in the room had an effect on him.

His concentration on the presence of the maid servants, and occasionally on the sound of his voice when they were present, led him to the second of his discoveries, though it required the astuteness of his bathing colleague, Laurentius Hegvoldus, owner of the Forum's most exclusive Toga Salon, to capitalise on the acoustical significance of women's apparel.

The change in the sound of his voice was beginning to fascinate him. Could it be the aroma of the goats milk? Perhaps some of the milk had been a bit off – causing slight intoxication and the feeling of well being – believing his voice to sound better when in fact the illusion was due to his insobriety.

He spoke to the Bath House manager about it and although his doubts about the freshness of the milk persisted, the manager assured him the milk was fresh every day – taking a cup of it from Barry's Bath, he downed it in one gulp.

On the following days, Barry contemplated the matter while at his potter's wheel, but it wasn't until unloading the kiln one morning, and giving vent to his lungs with one of the latest tunes he had heard at the tavern, he thought he

heard the resonance again. A similar sound to that he had noted at the Bath House sang back to him.

Barry was on to something.

He practised the many notes in his repertoire of scales, paying close attention to the note which gave the resonant sound. It was a low C. He tried the note several times to be sure.

Yes, it was the newly fired clay pots or jars which sang with his own voice, particularly out in the open yard as he stacked the vitreous pots – where previously – his voice had sounded flat. Near the kiln, and, as he reached inside for several of the furthermost pots, he sang the range of notes again and was thrilled with the clarity of the sound he heard.

It was several days before Barry could go to the Bath House to experiment with his new found phenomenon. Stepping into his bath he sang all of the notes of the scale several times and carefully noted the resulting sound. He then called on the maids to fill his bath and leave the empty pots by the wall. Barry continued to sing his repertoire of scales, particularly the low C, and sure enough the pots began to resonate to the sound of his voice.

As the days passed into weeks, Barry continued at his trade, taking frequent baths and singing the popular tunes of the day. The discovery of the resonating characteristic of his pots gave him endless pleasure.

Now was the time to experiment further. Using pots of various sizes, together with his excellent voice he was able to classify and catalogue his pots according to the note it responded to. He gave them a special name, echeia (sounding vases) which he used extensively in his marketing promotions.

As time went on, so the name of Barry Vitruvius Helmholtz became known throughout the architectural world and his sounding vases were used extensively to enliven the acoustics of the theatre, church and sports arena.

HEARING CONSERVATION REGULATIONS

HOW CAN THEY BE APPLIED?

HORRIE WESTON

The following paper outlines an address presented by the author to members of the NSW Division of the AAS at its Technical Meeting held at the Crows Nest Club on Tuesday, 26th July, 1977.

Introduction

Hearing Conservation is an area where control by Regulation is most difficult. As there are many different points of view, opinions from the audience are welcomed.

The speculation on Regulations over many years has achieved a lot by providing an incentive to some industries to act on noise reduction and to initiate hearing conservation programmes.

Progress has been slow owing to problems in arriving at something which will achieve the objective of preventing noise-induced deafness, meeting the requirements and overcoming the objections of all sectional interests, while being fair to all concerned.

Interested parties include occupiers (employers), employees, regulating authorities and their advisers, consulting engineers, manufacturers of mechanical equipment, manufacturers of hearing protective equipment, firms conducting hearing protection and audiometry services. Planning cannot be carried out unless requirements are clear.

There has been obvious lobbying by various bodies to protect their own interests; employers have fears regarding the meeting of requirements, costs, etc.; regulating authorities, aware of difficulties in administration, are likely to favour established routines and be reluctant to accept new concepts.

The question arises as to whether a regulation should be tailored to suit existing organisations and practices, or should the authorities be prepared to revise their ideas and their established practices. No doubt, experiences with other regulations provide valuable guidance, but, in a different field, those concerned must be prepared to make changes.

Revised Draft Regulations, N.S.W.

When asked to give this talk I was not aware that the N.S.W. Draft Hearing Conservation Regulations, dated August 1976, had been revised. Approximately one week before the talk I was shown the revised draft dated March 1977.

I understand that the revision represents recommendations made by many organisations to delete certain provisions included in the earlier draft and, to my surprise, that in spite of major significant deletions, the revised draft was not circulated generally. Further comment will be made later on the changes.

Communications

In line with good management principles, managers and efficient technical people in a business organisation want, as far as possible, to deal only with exceptions and otherwise allow the organisation to proceed on a routine basis. Can this principle be applied to Hearing Conservation?

If the human factor could be eliminated it might be easy, but it cannot.

Perhaps the most important factor in a successful Hearing Conservation Programme, and one which, unfortunately, is usually overlooked, is the requirement of two-way communications between management and employees. Generally, a little more patience on the part of management would ultimately save time. Hearing Conservation concerns employees and their hearing; their co-operation is needed, so they must understand the reason for the programme. If the employees are involved, or if they feel they are involved, in decisions there will be better co-operation. Consequently, effective regulations must, in my opinion, go further than simple arithmetic and stereotyped rules; they must endeavour to achieve communications between employer and employees, and agreed Codes of Practice.

It has been suggested that there are legal reasons why regulations cannot achieve joint consultation between employer and employees. I cannot believe this is an insurmountable problem. Maybe a good legal person should be taken into consultation with a drafting committee. Perhaps there is a need for revised legal thinking on this particular problem.

In drafting the regulations, consideration should be given as to how an employer might be compelled to set up a consultative committee of employer/employees to discuss and, hopefully, to agree on Codes of Practice. For example, in the application for exemption (which will be discussed later) the provision that an employee, or his representative, shall receive a copy of such a statement will indirectly at least encourage joint consultation. I suggest that consultation would be further assisted by requiring appropriate information on the application for exemption form such as particulars of the committee that has been set up.

Exemptions

The ideal solution to hearing conservation is to reduce noise, so, in my opinion, there must be a requirement to reduce noise exposure where practical.

As there will be many cases where it is neither practical nor economical to meet the prescribed figure immediately, provision for exemption from noise reduction is essential, but only on the understanding that a suitable alternative hearing protection programme shall be implemented *immediately.*

However, such provision should be drafted so that the regulation emphasises noise reduction, if practicable, and so that the regulating authority has sufficient control to ensure that a reasonable attempt has been made to control the noise before exemption is granted. This will, of course, require that the regulating authority, or its advisers, have the competence and establishment to make it feasible to assess applications for exemption.

In addition to providing information on the reason, period, action proposed and intended alternative hearing conservation programme, the application for exemption should state what consultative committee has been set up and if a Code of Practice has been agreed upon. Such a requirement will move further towards the desired communications.

If, after examination, the employer's engineer considers the noise cannot be reduced, or if the employer considers there is a valid objection such as excessive cost, he would use this as a basis for an exemption submission. This would involve the employer in very little more than he should be doing anyway if seriously seeking the best practical means for preventing noise-induced deafness.

Noise Exposure Determination

The proposed regulation requires that no employee shall be exposed in excess of a prescribed figure, that the employer shall determine if an employee is exposed to a noise level, or a noise exposure (daily noise index) in excess of that prescribed, and that the measurement of noise and calculation of noise exposure shall be carried out in accordance with the method set out in the schedule of the regulation. Thus it is the employer's responsibility not to expose, so he must first determine the noise exposure.

The determination of noise exposure is a normal part of a hearing conservation programme, so it is reasonable for the employer to do this under the regulation. Being aware of day to day variations and irregularities, the employer should be able to make meaningful determinations.

Owing to the large number of factories involved, it would be cumbersome for a regulating authority to undertake the determination of noise exposures in industry generally, other than "spot checks", or following specific requests from employees.

I consider that a requirement that the employer shall give and explain the results of noise exposure determinations to employees would further assist in achieving joint consultation.

Noise Emission Rating

Noise exposure depends on duration as well as level. However, once a machine is installed it is usually likely to operate a substantial part of the work shift. Consequently the regulations should provide for prescribing maximum

Noise Emission Ratings on new machines, as per schedule.

A requirement that manufacturers of machines which produce excessive noise levels provide a warning for users would be an additional incentive to design for 'quiet', as well as give useful education for users.

Specific Noise Exposure Figure

The proposed regulation requires that:

No person shall be exposed –

(a) at any time to a noise level exceeding 115 dBA, slow response, unless he is wearing a suitable hearing protective device

(b) to a daily noise index which exceeds 1.0 (L_{eq} 90 dBA).

The only complete solution for the prevention of noise-induced deafness is to reduce noise to suitable limits. Usually, significant noise reductions cannot be made immediately; the only effective and economical way to achieve lower levels of noise is by design and planning of machinery, processes, plant and buildings. It is reasonable to expect improvement in the future, but it must be initiated now.

I am of the firm opinion that regulations should provide an incentive for the progressive reduction of noise. Apart from eventually reducing the risk of noise-induced deafness, such a requirement will assist manufacturers of mechanical equipment, manufacturers of hearing protectors, and industry in general to plan for the future, a fundamental principle of good management. On the other hand, delays in improved designs and quieter equipment will increase the cost for employers and cause higher amounts to be paid in Workers Compensation.

In a recent revision of the N.S.W. Draft Regulation, a most important part was deleted, viz. provision for lower levels of noise exposure, i.e. 85 dBA (0.33 daily noise index) for new factories or extensions, and for existing factories after a period of 10 years. I consider that this deletion will make the document rather negative and will, in the long term, be disastrous for both employers and employees.

Lobbying by a section of industrial interests to eliminate the progressive reduction requirement is ill-advised, and will undo some of the good work already done. Some industries, aware of the possible regulations and knowing that there is a significant risk at continuous levels over 85 dBA, have for years used a figure of 85 dBA as a goal in noise specifications for new equipment. There is evidence that such policies have provided a significant incentive to manufacturers of equipment to produce quieter machines.

A provision for reduction over a periof of 10 years, as in the earlier draft regulation, would provide a reasonable 'lead-in' period for industry, and it should be kept in mind that an exemption provision would still apply if reduction to the lower level were not feasible.

I am appalled that such a significant part of the draft has been deleted, and I am most concerned that the revised draft was not generally circulated.

Personal Protective Equipment

In general, the draft regulation requires that in work situations where the noise exposure exceeds that prescribed the employer shall supply (from a reasonable selection) and adequately instruct employees in the use of, suitable protectors, and that the employee shall wear the protector that has been supplied.

A further requirement, that the employer shall advise the regulating authority when the wearing of protectors presents serious difficulties, or where an employee raises an objection, is reasonable because in the enormous variety of industrial conditions circumstances might well arise, such as comfort in hot conditions, resonant tones, directional interference with the hearing of signals, or over-protection. Such information is of value to regulating authorities and, in addition, this requirement will help to ensure that the employer does, in fact, investigate objections.

As mentioned earlier, a provision for joint consultation and agreed Codes of Practice before granting exemption from noise control would considerably assist in gaining employee acceptance for hearing protection.

Audiometric and Medical Examination

In the recent revised draft a major change has been made. The occupier "may" be required to arrange audiometry, and the draft has retained a requirement for notification when an employee develops acute aural damage which resulted, or is likely to have resulted, from occupational exposure to noise, and when an employee has lodged a claim for Workers Compensation. However, the schedule of testing procedure, the keeping of audiometric records, the criteria for action to be taken following a decline in hearing, and the requirement that employees be notified of results, have been deleted. As there are many variables, I am of the opinion that audiometry and the above requirements should be retained in the regulations, because it is an essential part of a hearing conservation programme to evaluate the success of the programme. Audiometry is particularly important in situations where there are difficulties with noise exposure determinations or the use of hearing protection.

Owing to the considerable difficulties for many industries, there is a need for flexibility, and liberal exemptions could be granted initially until difficulties have been overcome or hearing conservation services established to meet their needs.

Conclusion

Finally, I firmly believe that if a regulation for hearing conservation is to be applied successfully it must emphasise noise reduction as a first priority, with a provision for exemption only when that is not practical, and then with the immediate introduction of a hearing protection programme. It must provide an incentive for planned progressive reduction of noise, and it must provide an incentive for the production and use of quieter equipment, and above all it must ensure satisfactory communications between management and employees.

We can no doubt learn from experiences of the regulating authorities with other regulations, but industry, regulating authorities, and their advisers must be prepared to make changes if necessary to cope with the particular problem.

I believe that it is a difficult field which might not be solved by stereotype regulations. However, I am of the firm opinion that the simplification of regulations merely for the benefit of employers or regulating authorities will achieve nothing. It would be far better to have model regulations which emphasise noise reduction, encourage progressive reduction and purchase of quiet new equipment, which provide for exemptions, liberal in the initial stages

and which, above all, are drafted to achieve satisfactory communications.

A concept of self regulation, with simplified employer/employee consultation and voluntary codes of practice, might well provide a practical means of control in future.

LABORATORY EVALUATION OF HEARING PROTECTION DEVICES

Olga Kasansky, B.Sc.(Hons.)
Scientific Officer
Division of Occupational Health and Radiation Control
Health Commission of New South Wales

With the introduction, or proposed introduction, of noise regulations for industry in many States, hearing protectors are becoming more widely used than ever before. Over many years, the National Acoustic Laboratories have carried out attenuation tests on a large number of hearing protectors (1). These results are used in selection of suitable protection against noise(2), where direct control at the source is not practicable.

Prior to 1972 attenuation testing was carried out on new hearing protectors. With the advent of a public review draft of a standard on Hearing Protection Devices, DR 72085, tests of robustness were carried out on earmuffs and earplugs by the Division of Occupational Health and Radiation Control. Now similar physical tests are carried out to Section 3 of AS 1270-1975, prior to attenuation testing. Most of the hearing protectors are tested at the request of the N.S.W. Department of Labour and Industry, which issues approvals for their use under the Factories, Shops and Industries Act, 1962.

The aims of physical testing of hearing protectors are to ensure soundness of construction and, hopefully, ensure that attenuation will not alter with wear, right up to the time the protector is discarded, or a part replaced. The physical tests of AS 1270-1975 have mostly been based on the Canadian Standard for Hearing Protectors CSA Z94.2, with a few modifications.

Briefly, earmuffs, canal caps and earplugs are subjected to periods of dry heat (16 hours at 50°C), warm humidity (16 hours at 30°C, over 95% relative humidity) and cold (16 hours at −7°C), each time starting off at room temperature and being brought back again to room temperature before being examined. Their external surfaces are not wetted with "kerosene" and they are heated for 48 hours (at 50°C). After being brought back to room temperature, the hearing protectors are thoroughly cleaned according to the manufacturer's instructions. No further tests are done on earplugs and ear canal caps apart from attenuation tests. Earmuffs are next cooled to −7°C and maintained at that temperature for four hours. They are then dropped 1.5 m, three times onto a steel plate.

In the final test, earmuffs are placed on a vibrating table for two hours.

At present, the standard does not contain any robustness tests for disposable type earplugs. Their attenuation is tested in new condition.

How have the items examined by the Division of Occupational Health and Radiation Control stood up to these physical tests?

For the one hundred and four types of earmuffs tested over the past five years, the following results were obtained:

Passed all physical tests*	59	(57%)
Failed kerosene contamination test (Clause 3.2.8)	4	(4%)
Failed cold temperature drop test (Clause 3.2.10)	41	(39%)
		100%

*It should be noted that included in this figure are five pairs of earmuffs with microphones on which the cold drop test was not carried out.

The results for thirteen different types of earplugs and ear canal caps were:

Passed all physical tests	11	(85%)
Failed kerosene contamination (Clause 3.2.8)	2	(15%)
		100%

From these figures it can be seen that the "kerosene" contamination test (Clause 3.2.8) and the low temperature drop test (3.2.10) were the only clauses as AS 1270 that hearing protectors failed. Both these tests have been questioned by manufacturers as being too stringent, and unrealistic.

Considering firstly the contamination procedure (Clause 3.2.8), it is seen that most earmuffs (96%) and earplugs (85%) complied with it. Of those earmuffs that originally failed, two types were modified by the manufacturers to comply with this clause. It had been found (prior to 1975) that the high aromatic content of some grades of "kerosene" badly deteriorated some earmuffs and plugs, so a specification for the use of "kerosene" of low aromatic hydrocarbon content was included in the published standard. (Earmuffs and earplugs failing the test using a high aromatic content "kerosene" are not included in the above figures).

The aim of the test is to indicate the effect of contact with organic materials on the hearing protection device. Contact with sweat, machine oil and grease, 2-stroke fuel, harsh detergents and so on could occur over a period of time in normal industrial use. Such conditions sometimes cause a hardening or stiffening of the sealing cushions of

earmuffs resulting in a poorer fit and poorer attenuation than a new pair of ear muffs. Absorption of solvents into the plastic of the caps can detect stresses due to poor moulding techniques which then show up as a failure on the cold drop test (Clause 3.2.10), the plastic being more brittle. Earplugs and ear canal caps on exposure to solvent may become hard or deform and so give poorer attenuation of noise.

The drawback of the test, is whether in all cases, non-compliance with Clause 3.1 is a real criterion as to whether the device is still effective as a means of acoustical protection. For example, a foam insert may stick to an earmuff cup, a case of visible deterioration that possibly may not affect the earmuff's attenuation properties. Such deterioration may be only an anomaly of the test, and may never be encountered in industrial use.

It could also be argued that sealing cushions on earmuffs are designed to be replaced once worn, so deterioration should not be a problem. Deciding on what constitutes a "reasonable" life for such items is difficult, and in practice the consumer may decide not to buy a given pair of earmuffs "because they wear out too quickly".

The cold temperature drop test (Clause 3.2.10) is the biggest source of failure for earmuffs tested to Section 3 of AS 1270—1975.

The failures can be summarised as follows:

Split seals (only)	29 pairs
Split seals & cracked cups	5 pairs
Cups (only) cracked	1 pair
Cup attachment broken	6 pairs

Temperatures as low as $-7^{\circ}C$ are rarely encountered in Australia, but this test is designed to check sturdiness of construction and good choice of materials. For manufacturers it may ensure batch quality, since some plastics are brittle at $-7^{\circ}C$ and the grade of plastic used may affect attenuation. It should be noted here that originally the test was copied from Canadian Standard CSA Z94.2 but the drop height was changed from 3 feet (0.9 m) to 1.5 m.

It is of interest to note that of those earmuffs that originally failed this test through their sealing cushions splitting, eight models (by three manufacturers) have since been modified and complied on retesting.

As with the kerosene test, the difficulty exists that strict interpretation of Clause 3.1 results in a failure of an item which may have not been altered in its acoustical characteristics by the testing in comparison to those it had originally. For example, if, as happened recently, five pairs of earmuffs of one brand were tested and some were found to have a small, 10 mm, split on a sealing cushion, all the earmuffs were deemed to have failed, yet such a defect could be very rare in industrial use and may not affect attenuation to any extent.

On the other hand, in considering whether either or both Clauses 3.2.8 and 3.2.10 should be radically changed, it should be borne in mind that most hearing protectors tested pass these Clauses. Considering that all major Australian manufacturers have already submitted their earmuffs and earplugs for test, as well as many importers, the tests done may be considered to have covered most items on the market at the moment, and probably, in the next few years. Therefore, the tests cannot be considered to be unduly harsh, if the majority of protectors pass all tests.

The present vibration test (Clause 3.2.11) is so gentle as not to even loosen a nut or a bolt on an earmuff suspension system, let alone cause any damage to even the most flimsy of earmuffs. It has been proposed that this clause be deleted entirely, as a waste of time.

At present no physical tests are carried out on disposable or individually moulded earplugs. There exists a danger that such material if not specified could actually damage the ear, especially during insertion or removal. Tests should be developed to evaluate the suitability of earplugs with this in view.

The aim of physical testing in a laboratory is to simulate conditions of use. Without feedback by users and manufacturers such tests may become arbitrary and unrealistic. Accordingly, comments about the life of earmuffs, or earplugs, would be appreciated from users to aid in the further development of tests and test criteria.

References

(1) Piesse, R. A., "Commonwealth Acoustic Laboratories Report", 21 December 1962.

(2) Waugh, R., Ann. Occ. Hyg., Vol. 19, pp. 193-202, 1976.

SOUND POWER:

Now it can be read directly from a meter!

Sound Power Source Type 4205

The 4205 is a compact, battery operated, calibrated sound source suitable for field and laboratory measurements of sound power using either wide band or octave band noise.

The 4205 is versatile too. In conjunction with the Level Recorder Type 2306 and a sound level meter, it forms a portable kit for measurements in architectural acoustics, such as reverberation time, sound absorption, sound transmission and sound distribution. The 4205 can also be used to measure the efficiency of loudspeakers.

77-200

Brüel & Kjaer Australia PTY. LTD.

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P.O. Box 120, Concord, N.S.W., 2137
Telephone: 736 - 1755 Telex: 26246

MELBOURNE OFFICE:
8/12 Pascoe Vale Road, Moonee Ponds, Vic., 3039
P.O. Box 233 Moonee Ponds, Vic., 3039
Telephone: 378169, - 378160 Telex: 33728

PERTH OFFICE:
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Telephone: 951658

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P.O. Box 446, Blackwood, 5051
Telephone: 278 3351

NEW PRODUCTS

SOUND LEVEL METER AND OCTAVE ANALYZER TYPE 2215

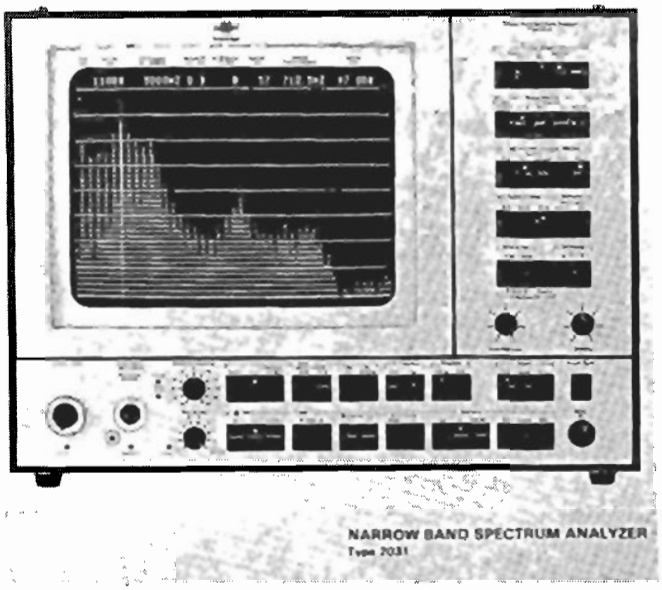
An Analyzing Precision Sound Level Meter featuring a set of ten built-in octave filters to the most exacting standards has been developed by Bruel & Kjaer.

An RMS detector with 50 dB dynamic range gives an instrument with only one attenuator control. Weighing-in at a lightweight 1 kg (2.5 lb), it has been designed to permit virtual one-handed operation, with controls so straight forward that inexperienced people are soon able to operate it.

The Condenser Microphone Type 4165 gives a frequency range from 20 Hz to 20 kHz, and dynamic range from 28 to 140 dB(A). Filter centre frequencies are from 31.5 Hz to 16 kHz. The true RMS meter has a linear 30 dB scale, and the output is switchable to AC or DC with a 64 dB linear range. There is Linear, A- and C-weighting, with the ability to use A-weighting and octave filters together.

The Type 2215 conforms to IEC R 179 (1973), DIN 45 633 part 1, and ANSI S1.4-1971 Type S1 for precision sound level meters. The ten octave filters fulfil IEC R 255 (1966), DIN 45 651 and ANSI S1.11-1966 Class II, which are the most rigorous standards.

Further details are available from Bruel & Kjaer Australia Pty. Ltd. Telephones: Sydney — 736-1755, Melbourne — 37-8169, Adelaide — 278-3351, Perth — 95-1658.



NARROW BAND SPECTRUM ANALYZER
Type 2031

NARROW BAND SPECTRUM ANALYZER

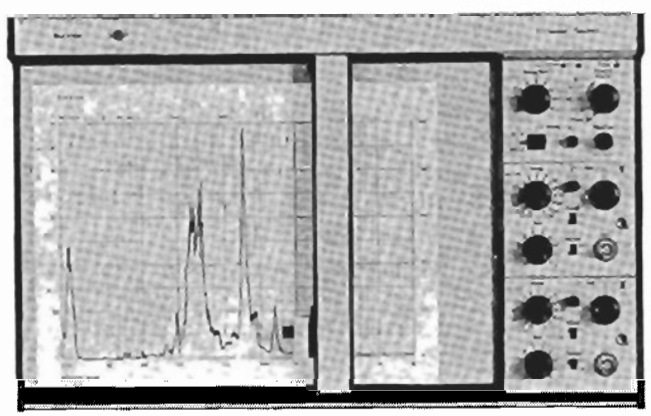
400 channels of constant bandwidth analysis of continuous or transient signals displayed with high resolution on an 11" screen are available from the new analyzer type 2031 developed by Brüel & Kjær.

Having a unique trigger facility which enables the instrument to extract transient shock or noise events from information-less background signals, a frequency range selectable in a 1, 2, 5 sequence from 0.1 Hz to 10 Hz up to 0.1 Hz to 20 kHz (real time up to 2 kHz) and a dynamic range of 75 dB makes the analyzer a powerful instrument for numerous applications in vibration and acoustics studies. The instrument can display time function, instantaneous spectrum and averaged spectra over an 80 dB range, any 40 or 20 dB of which may be expanded to fill the screen, which also displays major control settings and the frequency and level of any particular channel selected by the electronic cursor.

A memory enables the spectrum display to be compared with a stored reference spectrum by "double display" on the screen. This and other human engineered aspects make the instrument easy to operate.

Analogue output of the displayed data may be made to level recorder or X-Y recorder and the analyzer is equipped with the IEC/IEEE-488 digital interface as standard.

Contact Brüel & Kjær Australia Pty. Ltd., 33 Majors Bay Road, Concord, NSW, 2137, (02) 736 1755, for further details.



X-Y RECORDER
Type 2308

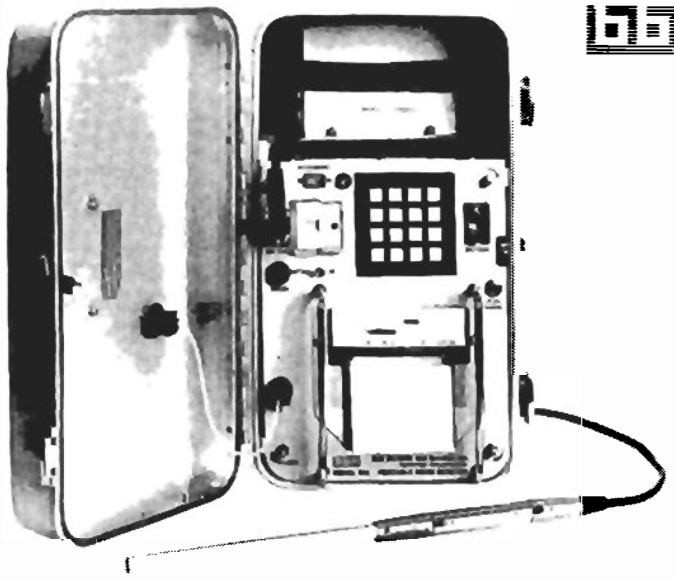
X-Y RECORDER

An X-Y Recorder with outstanding dynamic performance for plotting of slow and rapidly changing voltage levels, waveforms, frequency responses and analyses has been developed by Brüel & Kjær.

The 2308's writing system has a maximum slewing speed of 1000 mm/s and is equipped with electrostatic paper hold that firmly grips most kinds of paper up to A4 (8.5 by 11 in.) DIN size. It's calibrated input sensitivity settings from 0.02 to 1000 mV/mm may be selected, which with separate range and zero set adjustments, permit the X-Y recorder axis to be continuously adjusted to suit more or less any DC signal, whatever dynamic range it represents.

The 2308 also has its own sweep generator built-in. This may be used to control the X or Y sweep of the recorder, giving 9 calibrated sweep rates from 0.2 to 100 mm/s. It may also be used for remote voltage controlled tuning of signal generators and frequency analyzers, thus permitting automatic recording of frequency responses and analyses with the 2308.

Contact Brüel & Kjær Australia Pty. Ltd., 33 Mayors Bay Road, Concord, NSW, 2137, (02) 736 1755, for further details.



PORTABLE NOISE MONITOR SYSTEM 614

BBN INSTRUMENTS COMPANY

The Model 614 is the only self-contained portable noise monitor with automatic on-site calculation and print-out of airport, community, traffic and industrial noise levels and relevant time of day information.

It is a sound level meter that measures, calculates and prints out A-weighted sound pressure levels.

Salient features include:

- Automatic, unattended on-site calculations with hard copy printout.
- Printout of hourly, daily, L percentiles and Single Event noise levels.
- Each printout includes the time in hours, minutes and seconds.
- 7 day operation with two removable, rechargeable battery packs.
- 3 ½-day operation with one battery pack.
- Portable, self-contained weather sealed instrument.
- Dynamic range of 100 dB, plus 10 dB peak factor.

For further information, please contact John Morris Pty. Ltd., PO Box 80, Chatswood, NSW 2067. Telephones: Sydney – 407-0206, Melbourne – 873-2711, Brisbane – 52-4072 and Adelaide – 42,5809.

Announcements relating to the release of *new* acoustical products should be forwarded to The Bulletin of the Australian Acoustical Society, The Science Centre, 35 Clarence Street, Sydney, 2000. Publication will be at the discretion of the Editorial Committee.

The announcements should not exceed approximately 200 words in length and should preferably be accompanied by a suitable photograph illustrating the new product. Photographs are not normally returned.

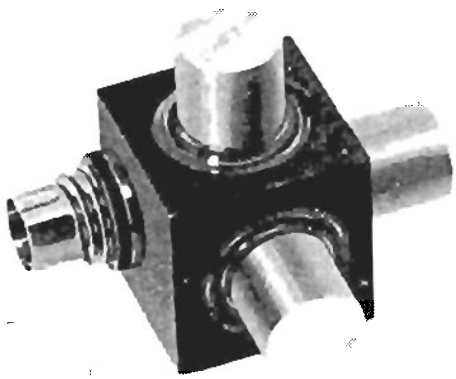
GR 1982 RECEIVES MESA APPROVAL

The United States Department of the Interior, Mining Enforcement and Safety Administration (MESA), has granted Approval Number 2G-3044 to the Genrad 1982 Precision Sound-Level Meter and Analyzer.

This approval means that the 1982 is intrinsically safe for use in the methane-air mixture found in gassy coal mines. This approval was formerly called U.S. Bureau of Mines Approval. It should be noted that this approval means that the 1982 is safe to use only in a methane mixture and not necessarily in any other type of gas. There is no agency to our knowledge which tests instruments for safety in other gaseous atmospheres.

This MESA approval applies to all 1982's and the MESA approval label will start appearing on 1982's in about two months. For those instruments already in the field, a special label will be available in about two months for any customer who requires one.

Further information, please contact Warburton Franki in any Australian capital city.



LOW MASS TRIAX ACCELEROMETER MODEL 505

Bolt Beranek and Newman Inc., has introduced the Model 505 low mass triax piezoelectric accelerometer with internal preamplifier. Weighing less than 10 grams, the Model 505 triaxial accelerometer with three internal preamplifiers is ideally suited for vibration measurements on lightweight structures or in confined spaces. Noise floor is an exceptionally low 15 uV broadband and frequency response is linear to 15 kHz.

A unique 500V overvoltage protection feature guards the preamplifiers from self-generated transients caused by mishandling, dropping etc. Normal sensitivity 8mV/g per axis, frequency response 3Hz to 15kHz ± 5%; 1 Hz to 25 kHz ± 3 dB. Resonant frequency greater than 80 kHz (mounted), shock resistant to 10,000 g's.

An internal-IC preamplifier lowers output impedance to less than 1000 ohms and eliminates table noise and the need for a separate preamplifier. The sensor comes complete with 2-ft. coaxial cable, microdot S-50 connector, calibration sheet and case. A mating power supply (0.5 mA, 6 to 20 V dc) is available from BBN.

Contact John Morris Pty. Ltd., P.O. Box 80, Chatswood, NSW, 2067, (02) 407 0206 for further details.

SONIC OFFERS GUIDE TO TRANSDUCERS

Sonic Instruments, Inc., is now making available a new 24-page catalogue, Bulletin 900, which offers descriptive data and product information for Sonic's line of ultrasonic transducers. Complete theory, design and function information is supplied as an introduction to the Selection Guide.

This guide lists Sonic's range of transducers by frequency, dimension, and model number. The model number designation indicates the basic type of transducer, its mode of tuning and type of housing and connector for easy referral.

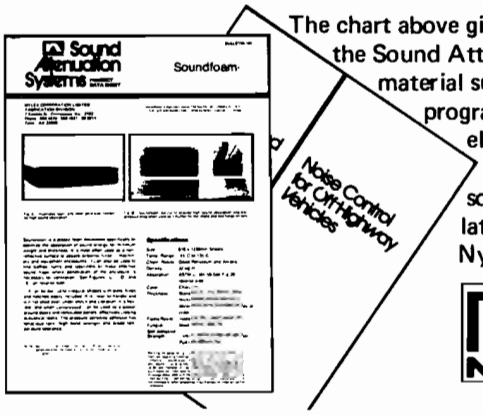
A description of the certification data offered by Sonic with all of their transducers is also included in the catalogue. The certification data indicates the results of tests performed on the products, with special emphasis on critical immersion transducer applications. Brief descriptions of the ultrasonic test systems manufactured by Sonic are also included in the catalogue.

For further information, please contact John Morris Pty. Ltd., P.O. Box 80, Chatswood, N.S.W. 2067. (02) 407 0206.

Nylex® Sound Attenuation Systems

...the problem solver!

PROBLEM	EXAMPLE	NYLEX PRODUCTS	BULLETIN
Absorption	business machines; enclosures; pipe wrapping; lining sound trapping labyrinths; anechoic chambers.	Soundfoam/Embossed Soundfoam	No. 101 No. 102
Absorption with special surface treatments	near liquid spray equipment; cleanable surface applications; marine applications.	Soundfoam Tedlar Soundfoam/metalized Mylar	No. 103 No. 103
Absorption and Barriers	machinery enclosures; business machines; yacht and recreational vehicle generators; appliances.	Soundmat LF	No. 110
Damping and Absorption	machinery housings; in-plant enclosures	Foam Damping Sheet	No. 109
Absorption for vehicle cabs	headliners and side panels for cabs for off-highway vehicles and similar applications	Cabfoam Soundfoam/perforated vinyl	No. 104 No. 103
Barriers	vehicle floors; pipe wrapping curtain walls; enclosure access	Soundmat FV Soundfab	No. 111 No. 112
Damping sheet metal	machinery housings; business machines	GP-1 GP-2 Damping Sheet Epoxy 10 (for severe env. cond.)	No. 105 No. 106 No. 107
Damping thick metal plates	subway wheels; transformers; bridges; gears; ship bulkheads; and decks; machine tools	DYAD	No. 108



The chart above gives some idea of the wide variety of noise control products available from the Sound Attenuation Systems section of Nylex Corporation Limited. In addition to material supply, Nylex sales engineers are available to participate in noise control programmes. This can be on existing plant and equipment or new product development with original equipment. If you have a noise problem, Nylex can help you solve it in the most economical way. If you need damping, absorption or barrier materials, Nylex can supply them. For copies of the latest Technical Bulletins, write to the Manager, Sound Attenuation Systems, Nylex Corporation Limited, Nepean Highway, Mentone, Victoria. 3194.

NYLEX

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NYLEX CORPORATION LIMITED

ABB101

REPORT OF COUNCIL TO

7 TH AGM OF THE AAS

Carolyn Mather, President

This report covers the major developments and activities since the sixth Annual General Meeting in September, 1976.

1. COUNCIL MEETINGS

1.1 **Number of Meetings.** There have been three Council meetings, the last two of which were of two days duration.

1.2 **Fare Assitance.** To assist those Councillors who have to pay their own air fares to aeend Council meetings, Council now allocates a lump sum of money that will be available towards the costs of air fares to the next Council meeting, and has determined a method for equitably distributing this money between the claimants.

1.3 **Council Business.** In the past, Divisions have generally given the other Divisions insufficient notice of their business that requires referral to Council. This prevents Council from dealing with its business efficiently, and hence all Divisions are requested to remedy this situation by allowing adequate time for the circulation of, and receipt of comment on their Council business.

2. MEMBERSHIP

2.1 **General Membership.** There have been the following increases in membership:
Members – 27, four having been elevated from other grades;
Affiliates – 7, one having been elevated from another grade;
Subscribers – 10;
Students – 7; and
Sustaining – 2.

2.2 **Fellows.** The Society presently has only one Fellow, and it has been considered for some time that there are additional Members who are eligible for elevation to this grade. Although the Divisions have had some problems in formulating and agreeing the criteria to assess eligibility, it is hoped that these problems will be solved shortly and that the "first batch" of Fellows can then be appointed.

2.3 **Grading Applicants.** It has become apparent that, in the past, applicants for membership have not always been evaluated on the same criteria and hence some membership grading anomalies have occurred. To overcome this situation, Council is currently drafting detailed guidelines for, and procedures to be followed in assessing all applicants for membership.

3. REGISTRATION

As its incorporated under the New South Wales' Companies Act, the Society was registered in all States except Queensland, and in the Australian Capital Territory and the Northern Territory. In those States and in the Territories that as yet have no Divisions, the registered offices are provided by firms of solicitors, for an annual fee, and the Society has now approached two Members, one resident in the A.C.T. and the other in Tasmania, to take over this function.

Over the last three years, there has been a concerted effort to establish the Society's obligations regarding returns to the Corporate Affairs Commissions of those States and Territories where the Society has a registered office. These obligations vary considerably from State to State to Territory; the Society is exempt from such returns in New South Wales, and is probably exempt in Victoria, South Australia, Western Australia and Tasmania, but must lodge returns in the A.C.T. and N.T.

4. BUDGET

As soon as possible after the end of the financial year, each Division is now required to furnish the Society's Treasurer with its budget so that an integrated, national budget can be prepared annually.

5. MEMBERSHIP OF I/INCE

The Society became a member body of the International Institute of Noise Control Engineering in May, 1976. This is an organisation formed to foster international co-operation and the exchange of information on noise control engineering. It also organises the annual Internoise conference and publishes a newsletter, extracts from which are printed in the Bulletin.

6. PRACTICE AND ETHICS

The Society has now begun to meet its obligations regarding practice matters by proceeding to set up a register of firms and individuals that offer their services to the community.

The Code of Ethics of the Institution of Engineers, Australia, that was adopted by Council as an interim measure in June 1966 has been editorially modified to make it more applicable to acousticians and will be further modified in the future to meet the needs of members of a Society which embraces a variety of disciplines.

7. MEMORANDUM AND ARTICLES OF ASSOCIATION

7.1 **Alterations.** From time to time, it has been suggested that alterations and additions are required to our Memorandum and Articles of Association. It is most desirable to make all of these simultaneously, and the Divisions have been asked to provide lists of all such alterations and additions by the 20th Council Meeting so that steps may be

taken to amend the Memorandum and Articles in accordance with the approved recommendations.

7.2 **Aims and Objects.** Council has set up a standing committee to investigate, and make recommendations regarding the most efficient and effective methods of implementing the Society's stated aims and objects.

8. REPRESENTATIVES ON THE STANDARDS ASSOCIATION OF AUSTRALIA

For some time, the Society has had representatives on some of the acoustics standards committees of the S.A.A. and these representatives are now required to report annually to Council on the committees' activities. In addition, the Standards Association has been requested to invite Society representation on all of its acoustic standards committees.

9. EMPLOYMENT

Letters have been sent to the National and all State Public Service Boards and to the State departments for Health, Environment, and Works or Buildings giving details about the Society and requesting that the qualifications for advertised vacancies in the field of acoustics be broadened to include membership to the Australian Acoustical Society. Some replies have been received but, so far, only that from the Australian P.S.B. has been favourable.

10. I.C.A.

The Ninth International Congress of Acoustics was, overall, very successful and the Spanish Acoustical Society did an excellent job in organising and running it. There were four Australian delegates, headed by the President, to the meeting of the Commissioners and Mr. Rose, as a member of the delegation and Chairman of the A.A.S. I.C.A. Executive Committee, reported on the detail planning that has taken place so far for the 10th I.C.A. The Commission formally endorsed its previous decision for the Australian Acoustical Society to host the 10th I.C.A., and discussed with the Australian delegation some of the details regarding its format and the satellite symposia.

AUSTRALIAN ACOUSTICAL SOCIETY

INCOME AND EXPENDITURE ACCOUNT FOR YEAR ENDED 30th JUNE 1977

EXPENDITURE		INCOME	
To Transfer of Levies to ICA	1,405.00	By Sustaining Members	1,520.00
NSNW Division – Reimbursement of Bulletin Expenses	1,742.76	ICA Levies on Divisions	1,405.00
Legal Fees	206.00	General Levy for 1976 on Divisions	1,270.00
Subscription International INCE	110.83	**Deficit for Year**	185.02
Postages, Stationery, Typing	112.57		
Travelling and Accommodation	740.36		
Bank Fees	17.50		
Audit Fee	45.00		
	4,380.02		4,380.02

BALANCE SHEET AS AT 30th JUNE 1977

LIABILITIES			ASSETS	
Accumulated Funds			Commercial Banking Co. of Sydney	
Balance as at 30th June 1976	846.36		Crows Nest	
Less Deficit for year	185.02	661.34		661.34

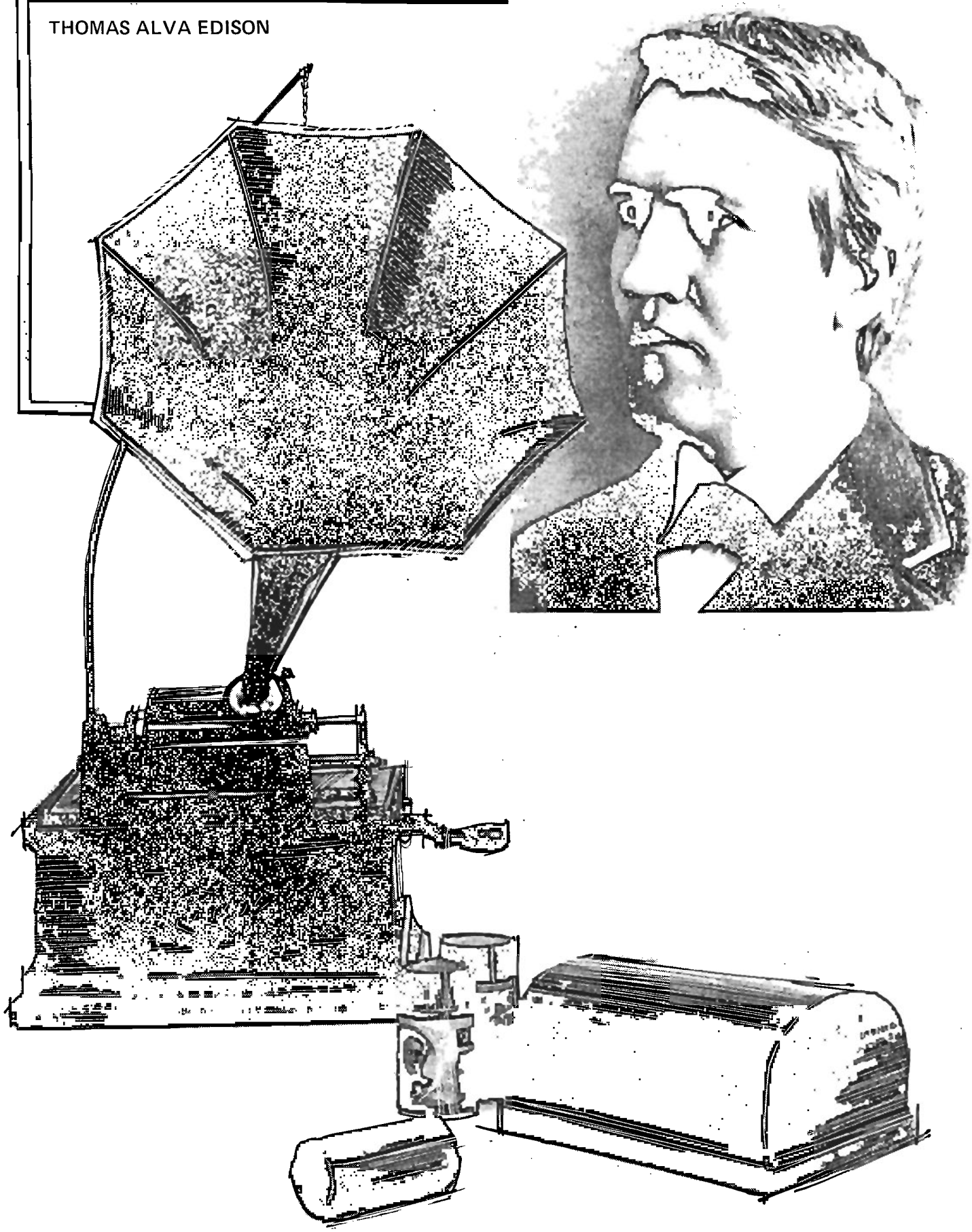
AUDITORS REPORT

I report that I have examined the records of the Australian Acoustical Society for the year ended 30th June 1977, and in my opinion the above Balance Sheet and Income and Expenditure account are properly drawn up so as to give a true and fair view of the state of affairs of the Society.

F. J. Morton
Registered under the Public Accountants Registration Act, 1945, as amended.

Dated 15th August 1977

THOMAS ALVA EDISON



PEOPLE AND PLACES

EDISON, THOMAS ALVA (1847-1931), American inventor born at Milan, O., Feb. 11, 1847, of Dutch ancestry on his father's side and Scottish on his mother's. His education was limited to three months in the public school of Port Huron, Mich. At 12 he became a railroad newsboy and after 15 earned his living as a telegraph operator in various cities, always studying and experimenting in his spare time. In 1868 he took out his first patent for an electrical vote recorder. During the next few years he devised stock tickers, duplex, quadruplex and automatic telegraph systems, and incidentally the electric pen, which developed into the mimeograph, for the multiplication of typewriting. His invention (1877-78) of the carbon transmitter, in which compressed lamp-black buttons were used to obtain the necessary variable resistance in the circuit, marked a real advance in the art of telephony and aided materially in bringing the Bell telephone into practical use.

Most modern inventions result from the contributions of many minds, and it is often difficult for the courts to determine priority, but when Edison made application in 1877 for a "phonograph or speaking machine," the U.S. patent office could discover no previous record of this sort. The original model, costing $18, was a cylinder covered with tinfoil and turned with a hand crank. Ten years afterwards he developed a motor-driven machine with cylindrical wax records which speedily became popular. Later he invented a disk form reproducing with a diamond point for music, and the "Ediphone" for office dictation.

On Oct. 21, 1879, after expending more than $40,000 in fruitless experiments, he succeeded in making an incandescent lamp in which a loop of carbonized cotton thread glowed in a vacuum for over 40 hrs. The following decade was devoted to the invention and exploitation of methods for the generation and distribution of electric light, heat and power, including three-wire system, underground mains, improved dynamos and motors, and an electric railway for carrying freight and passengers. From 1891 to 1900 he was chiefly engaged on a magnetic method of concentrating iron ores, and from 1900 to 1910 in the development of a new kind of storage battery, using an alkaline solution with nickel hydrate as the positive and iron oxide as the negative material. In 1891 he applied for a patent on a "kinetescopic camera" for taking motion pictures on a band of film to be viewed by peeping into a box, and later for projecting them on a screen.

In the *Scientific American,* Dec. 25, 1875, he described an unknown "etheric force," which manifested itself by sparks passing between carbon points at a distance from an interrupted current. In 1883 he patented what became known as "the Edison effect," the passage of electricity from a filament to a plate of metal inside an incandescent lamp globe (a forerunner of the radio tube), and in 1885 a method of transmitting telegraphic signals from moving trains or between ships by induction. During World War I he worked on naval problems for the government and on the production of phenol and other chemicals. In 1927 he was admitted to the National Academy of Sciences.

In his combined workshop and laboratory at Menlo Park and later at Orange, N.J., Edison had been incessantly engaged in various forms of invention for more than 50 years and had taken out 1,033 patents up to April 1928. He died Oct. 18, 1931.

See Frank L. Dyer and Thomas C. Martin, *Edison, His Life and Inventions* (1910, authorized biography with list of patents); W. H. Meadowcroft, *The Boy's Life of Edison,* Harper (1921); *A Popular History of American Invention,* edited by Waldemar Kaempffert, Scribners (1924).

(E.E.SL.)

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SOCIETY LIBRARY

All documents and publications received by the Australian Acoustical Society are held in a section of the Library of the National Acoustic Laboratories, 5 Hickson Road, Millers Point, NSW, 2000 (telephone: (02) 20537).

The NAL Library also holds a number of films on aspects of acoustics and noise, and these are available for loan to institutions, associations and private individuals. Long term loans are possible in certain circumstances. Enquiries regarding a catalogue of films available should be directed to The Librarian, National Acoustic Laboratories, at the above address.