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Noise Control and Acoustics Division Newsletter

Summer 1987

Sevik Reflects on Progress Made by NCAD During 1986-87

It is with regret that I note that my tenure as Chairman of NCAD is rapidly coming to a close. I will be handing my responsibilities to Prof. Gary Koopmann whose abilities and dedication inspire confidence in all who know him. However, now it is time for me to submit my annual report on the Division's accomplishments, on its new initiatives and its problem areas.



Maurice Sevik

The Division's technical program at WAM 86 was outstanding in terms of the number of sessions, the quality of the presentations, the stature of the speakers and the large attendance. Eighteen sessions were assigned to NCAD, three of which were jointly sponsored with the Fluids Engineering Division. The broad

range of subjects covered were of interest not only to members of the ASME but also to the many scientists and engineers who were in Anaheim for the Acoustical Society meeting. The Technical Committee chairmen, the session organizers, as well as all those who participated in making the WAM 86 technical program so successful, deserve our gratitude and appreciation.

As usual, the Rayleigh Lecture was a major event. With his usual brilliance and mastery, Prof. J. E. Ffowcs Williams of Cambridge University, England, described the effects of active sound emissions on a number of flow phenomena. His talk, entitled "Computer-Aided Silence," was attended by several hundred people from both ASA and ASME. An equally large group was also present at the Wine and Cheese Party. On that occasion the NCAD's Dedicated Service Award was given to C. D. Mote, Jr. for his invaluable initiatives and contributions during the formative stages of the Division. The best paper award at WAM 85 went to Profs. Ingard and Akay who deserve our congratulations.

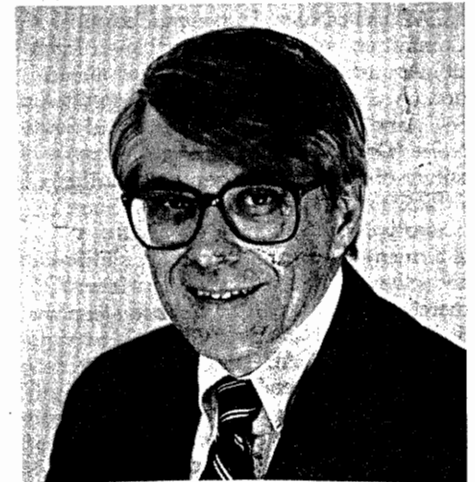
A gratifying development has occurred in the Division's Honors program. A Gold Medal is awarded by the ASME to a few engineers and scientists of extraordinary merit and distinction whose work is deemed to have provided significant new scientific insights or which led to major engineering achievements. A well-known pioneer in the field of acoustic instrumentation and processing systems, Dr. Per Bruel, has accepted the Division's offer to name its Gold Medal after him. It is anticipated that the ASME's Committee on Honors will approve NCAD's proposal for this Medal and include this prestigious award in the Society's Honors Manual.

The Executive Committee has discussed and is acting upon a number of new in-

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Koopmann New Leader in '87-88, Outlines Goals for NCAD

From its inception in 1980, The Noise Control and Acoustics Division has continued to provide scientists and engineers interested in noise control and acoustics with the benefits of a professional society. Already, we have one thing in common with many other successful Divisions within the ASME: a membership of dedicated professionals willing to share their time, talents and



Gary Koopmann

ideas with colleagues they enjoy. Our Division brings together a community of scientists and engineers on a regular basis to exchange ideas and, in so doing promotes the understanding and advancement of our technology.

It is this "bringing together and ex-

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Sevik Reflects

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initiatives. The most significant one involves the establishment of a Journal which more closely matches the technical interests and scope of NCAD and would provide more visibility to prospective authors. Needless to say, the number of publications that are available each year must be adequate to justify this initiative. Currently, this requirement presents a problem. A question that comes to mind involves the publication policy of the Society. Currently, a large number of papers dealing with vibrations, dynamic response, noise and vibration control, acoustics and related subjects appear in various ASME Journals. There is a lack of focus and cohesiveness in contrast with publications of other Societies such as those of the ASA and INCE. A possible approach might, therefore, consist in negotiating an agreement with other Divisions—such as Fluids Engineering and Applied Mechanics—in order to achieve a "critical mass" for the new Journal. Other alternatives are also being examined.

A second initiative is the establishment of a fund in support of the Rayleigh Lecture. It is essential that NCAD be able to pay travel expenses and provide an honorarium to the distinguished scientists and engineers who are invited to address the Society. In order to achieve this goal an endowment of approximately \$25,000 to \$30,000 is required. Letters soliciting donations of about \$5000 are being sent to a number of potential sponsors and it is hoped that the Rayleigh Fund will be established within the coming year.

A third initiative is due to members of NCAD themselves. Four new Technical Committees are being formed: High Intensity Acoustics (G. Reethof), Instrumentation (A. Pate), Structural Acoustics (D. Feit), and Machinery Vibrations and Noise (D. Goldsmith). The success or failure of a Division depends upon the willingness of its members—and particularly of its Technical Committee chairmen—to organize sessions, symposia and other appropriate meetings. It is therefore gratifying to note once again the dedication of NCAD's membership.

However, NCAD is not devoid of problems. The membership growth is slow and appears to be reaching a plateau. New initiatives are needed if a significant increase is to occur. The establishment of a Journal will certainly help. A new NCAD brochure would also assist a membership drive. In order to initially finance its printing, the sum of \$1000 has been requested from the Endowment Fund. Another persistent problem is the scheduling of NCAD sessions. The current schedule, which is held on Thursday and Friday afternoons, is inconvenient and late after-

noon sessions. Another attempt to negotiate more favorable times is necessary.

My report is far longer than intended. It is now time for me to thank all those who have so effectively and willingly helped me in fulfilling my duties as your Chairman. NCAD is a dynamic organization. I look forward to its future successes with confidence.

Maurice Sevik

New TC on Instrumentation Plans Session at WAM '87

A Technical Committee on instrumentation and experimental acoustics has been formed within NCAD. The Committee is sponsoring a session during WAM '87 in which several recent developments in experimental acoustics and vibrations will be discussed. The topics include advanced signal processing, source imaging (based on holography and boundary element methods), and sound intensity and active vibration control.

The objectives of the Committee, along with a plan of activities, are under development. These topics will be discussed during the Committee's first meeting which will be scheduled in conjunction with the Winter Annual Meeting in Boston, in December 1987.

Anyone interested in becoming a member of the Technical Committee and/or submitting a technical paper should contact: Prof. Anna L. Pate, Department of Engineering Science and Mechanics, Iowa State University, Ames, Iowa 50011, Telephone: (515) 294-0094.

Anna Pate

Call for Papers

Numerical Techniques in Acoustics

The Numerical Methods in Acoustics Committee of the Noise Control and Acoustics Division will sponsor several sessions at the 1988 Winter Annual Meeting. Contributions are solicited in all applications of numerical techniques in acoustics. Areas of interest include, but are not limited to, finite element, finite difference, and boundary element methods in source modelling; radiation, propagation, and structural-acoustic interaction; statistical energy analysis; ray acoustics; nonlinear acoustics; wave propagation; and vibrations.

Prospective authors are requested to

submit three copies of an abstract (approximately 100 words) to Prof. W. Eversman, Department of Mechanical and Aerospace Engineering, University of Missouri-Rolla, Rolla, Missouri 65401 by January 15, 1988. Abstracts which are accepted should then result in a manuscript submitted by March 1, 1988 to Dr. Adnan Akay, Mechanical Engineering Department, Wayne State University, Detroit, Michigan 48202.

Walter Eversman

Miguel Junger to be Rayleigh Lecturer at WAM '87

Dr. Miguel Junger will deliver the Third Rayleigh Lecture on Thursday morning, December 17 at the 1987 Winter Annual Meeting in Boston, Massachusetts. Junger's address will continue the tradition of having international authorities on various aspects of acoustics speak to NCAD. The general area on which Junger will speak is sound and structural interaction. Further details of the lecture will appear in the fall newsletter.

Prof. Ffowcs Williams Delivers Second Rayleigh Lecture

The Rayleigh Lecture sponsored by NCAD has become a significant annual event. The second lecture in this series was given at WAM 86 by a most distinguished scientist and engineer, namely Prof. John E. Ffowcs Williams. The title of his presentation was "Computer-Aided Silence". The lecture was attended by a very large audience and was presented by Prof. Ffowcs Williams with his usual brilliance.

A few notes on his background are of interest. He obtained his Ph.D. at the University of Southampton in 1959 and soon gained a reputation as an innovative and highly promising scientist. His work provided new insights in many aspects of acoustics and principally in the physics of flow noise. As a result of numerous publications which were of fundamental importance, he was appointed to the Rolls-Royce Chair of Theoretical Acoustics in the Mathematics Department of Imperial College, London. In 1972 he was selected for a prestigious position at the University of Cambridge where he holds the title of Rank Professor of Engineering (Acoustics). He is also a Fellow of Emmanuel College.

Prof. Ffowcs Williams is highly respected not only as a scientist but also as a very practically-minded engineer. During the design of the Concorde aircraft—the only supersonic jetliner in commercial operation—it became essential to control the noise generated by its powerful engines. A research team was established and successfully led by Prof. Ffowcs Williams. During the past few years he has acted as Consultant to the U.S. Navy and the British Admiralty and has clarified numerous physical phenomena associated with turbulent flow at low speeds.

In addition, Prof. Ffowcs Williams is a respected and popular teacher. He jointly published a book with A. P. Dowling entitled "Sound and Sources of Sound" which is studied by students in Engineering, Physics and Mathematics alike. His graduate students are known for having conducted research on challenging problems under his guidance and many of them have reached highly prominent positions.

Prof. Ffowcs Williams also served the Aeronautical Research Council in the United Kingdom as Chairman of the Noise Research Committee. Amongst the many honors bestowed on him is the "Aeroacoustics Medal" of the American Institute of Aeronautics and Astronautics.
Maurice Sevik

Call for Papers

ASME International Symposium on Flow-Induced Vibration and Noise

The Divisions of (i) Applied Mechanics, (ii) Fluids Engineering (iii) Heat Transfer, (iv) Noise Control & Acoustics, (v) Nuclear Engineering, and (vi) Pressure Vessels & Piping of the American Society of Mechanical Engineers are sponsoring a major joint Symposium on Flow-Induced Vibration and Noise at the 1988 ASME Winter Annual Meeting, to be held in Chicago, Illinois, in December 1988.

The symposium will consist of more than 15 sessions, with over 70 papers in total. This Symposium is a sequel to the successful 1984 Symposium on Flow-Induced Vibration, involving 70 papers and six volumes of Proceedings.

Papers in the general area of flow excitation and flow-induced vibrations are invited. Special emphasis will be placed on Flow-Induced vibrations of structural components (e.g., in heat exchangers, offshore applications, nuclear reactors and piping), ranging from turbulence-induced

vibrations (buffeting), vortex-and wave induced vibrations, fluidelastic instabilities and acoustical effects—both theoretical and experimental; however, interesting papers on fluid-structure interaction in other structural configurations are also solicited. There will be a special session on chaotic motions.

Interested authors are invited to submit a 200- to 400-word abstract, in triplicate, by October 15, 1987 to: Michael P. Paidoussis, Department of Mechanical Engineering, McGill University, 817 Sherbrooke St. West, Montreal, Quebec, Canada H3A 2K6, Tel. (514) 392-5477, Telex 5268510, Fax 283-7897.

The authors will be notified of tentative acceptance by November 15, 1987. The deadline for the first draft of the full paper is February 15, 1988. The final submission deadline on camera-ready mats (to be supplied by ASME) is August 1, 1988—for inclusion in a major ASME special publication. Authors can also submit their papers for subsequent publication in the ASME Transactions, or elsewhere.

Michael Paidoussis

Koopman

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changing ideas" activity of our Division that we must maintain at a high level to meet the ever changing educational needs of our membership. This activity in particular will be given high priority during the coming year and the following goals have been identified:

- Study the formats of both our technical paper sessions and technical committee meetings to see how the quality of information exchanges could be improved
- Establish an interest-bearing fund which will support the Rayleigh Lecture on an annual basis
- Petition the ASME Board on Communications to publish a Journal that is more oriented to the disciplines of NCAD

Our first goal will be to improve the format of our technical sessions and committees. For advice on this topic, we will be polling our members. From those who have been regularly attending our technical meetings, we would like to hear ideas on how we can improve the exchange of technical ideas during our formal sessions which now cover 2 to 3 days. Should we allow more time for informal sessions? Should we plan more tutorials on advances in related technologies that will have a direct impact on ours? Should we consider teleconferencing as way of complementing our winter annual meetings?

From our members who are not regularly attending our technical meetings we ask the question "why not"? Are the technical sessions too esoteric? Are there technical areas that interest you that are not represented by the Technical Committees? What could we do, as a Division, to encourage you to become more active in our Technical Committees.

Technical Committees are the building blocks of our Division and their informal technical sessions should rank equally with their more formal technical sessions where papers are presented. Ideally the informal sessions should be timed to follow the formal ones.

A second project which we have started and plan to have completed by the Winter Annual Meeting is the establishment of an annuity fund to support the Rayleigh Lecture on a regular basis. Thus far our Rayleigh Lectures have been outstanding (both on the part of the lecturers and the attendance) and we look forward to inviting our best and brightest colleagues to participate in this enjoyable and informative event. We already have \$5000 pledged to this fund (ASME requires a minimum of \$25,000) and solicitations from additional industrial sponsors are under way.

A final goal for the coming year involves the Journal of Vibration, Acoustics, Stress, Reliability and Design which we presently share with other divisions. Many of us feel that NCAD has progressed to the point where we need to publish our transactions in a journal which is dedicated to our specific discipline. We have explored this possibility with members of ASME's Board on Communications and are now gathering data to support our request. Certainly, a more discipline-specific journal will attract more publications from our own NCAD members.

In closing, I would like to say that NCAD has had a very successful 7 years since its inception but much still needs to be done to keep it growing and meeting the needs of today's and tomorrow's scientists and engineers. These needs can be met by assuring that our membership continues to grow as more and more graduates enter our profession, and by providing new opportunities for our members to actively participate in the Division.

I want to once again encourage all of you to participate in whatever NCAD activity best suits your talents. We have a lot to offer you in terms of professional development. From my own experience I can add that NCAD activities bring together a community of very pleasant and enjoyable colleagues to work with. If you are not already experiencing this added benefit, I invite you to join in!

Gary Koopmann

An ASME Fellow: A Special Honor

Do you have a colleague who has made outstanding contributions to the mechanical engineering profession? If so, consider nominating them to be a Fellow of ASME. This honor cannot be sought or applied for. Rather, it is conferred by ASME as the result of a nomination submitted by an individual's peers without their knowledge. In other words, a mechanical engineer deserving of this special honor will receive it only if *you take the initiative*.

There are two eligibility requirements which must be satisfied for ASME to act favorably on a nomination. First, the nominee must have been a member of ASME for a minimum of ten consecutive years (Student membership does not count). Second, the nominee also must have made outstanding contributions to the engineering profession. These contributions may have been in such diverse areas as project initiation, management, research and education. Very often the successful nominee has contributed significantly in a number of areas.

ASME has prepared a packet entitled "The Making of a Fellow," which you may obtain from ASME Headquarters or your nearest Field Service Office. The necessary forms and instructions are enclosed in the packet. In addition, I encourage you to contact me if you have questions about the process of nomination to Fellow grade or if I can assist you in the nomination process. Also, please apprise me of the status of Fellow nominations within NCAD (in preparation, submitted, etc.) for Division record-keeping purposes. I may be reached at Code 1215, Office of Naval Research, 800 North Quincy Street, Arlington, VA 22717-500, Telephone (202) 696-4301.

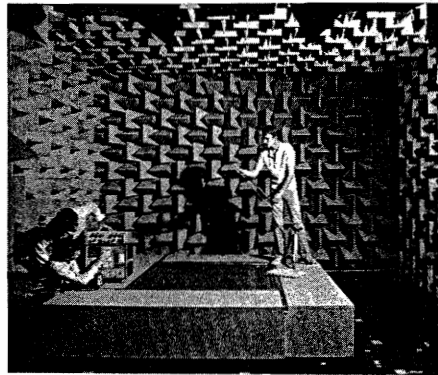
Robert J. Hansen

Plan to Attend WAM '87

Plans for the technical program at WAM '87 are nearly complete. The meeting will be held at the Sheraton Boston Hotel in Boston, Massachusetts on December 13-18, 1987. A total of sixteen technical sessions are planned, along with the traditional Wine and Cheese Reception. Two sessions will be conducted by the Flow Induced Noise and Vibrations Technical Committee on source localization and measurement methods. The new Instrumentation Technical Committee also plans one session. The Rayleigh Lecture will be delivered by Dr. Miguel Junger.

Sound and Vibration Research at North Carolina State University

Graduate teaching and research activities in the areas of sound, vibration, and dynamics at North Carolina State University are coordinated through the Center for Sound and Vibration. The Center, directed by Prof. Richard F. Keltie, is a multidisciplinary program based in the Dept. of Mechanical and Aerospace Engineering. The Center was originally established in 1969, and is composed of faculty and students pursuing solutions to problems in acoustics, noise and vibration control, machine dynamics and mechanical design.



Acoustic Radiation Experiment in the Anechoic Chamber at NC State University

A full range of graduate courses is offered in the areas of acoustics, vibrations, and structural dynamics. Nine faculty members are actively participating in the Center's research programs, and they annually support over twenty graduate students. Outstanding experimental facilities are available, including a 450 m³ anechoic chamber, complete sound and vibration test instrumentation, numerous computer-based data acquisition systems, experimental modal analysis equipment, and a broad range of computational and data analysis facilities.

Current research activities include: structural power flow measurement and control, measurement based modeling of dynamic systems, wave field decomposition studies, dynamic response of geared systems, surface acoustic intensity probe development, numerical radiation studies, active structural control, wavenumber filtering techniques, effectiveness of hearing protection devices, and sound radiation from counterrotating propellers.

Editor: Richard F. Keltie
ASME Contact: Jeff Lenard
(212) 705-7159

WAM '88 Takes Shape

The 1988 Winter Annual Meeting will be held in Chicago, Illinois in December 1988. At the present time twenty-two technical sessions are being planned by NCAD. Six sessions will be held by the Flow Induced Noise and Vibrations technical committee: two on turbulent buffeting, two on coatings, and two on induced noise and vibration. In addition, a session is being planned by the new Structural Acoustics technical committee. If you would like to contribute a paper, contact the chairman of the technical committee.

New Officers Elected For 1987-88

In accordance with the Division's by-laws and operating policies, the election of new officers was held at the TEC in March. The new officers are:

Chairman:

Prof. Gary Koopmann

Vice Chairman:

Dr. Kenneth Baumeister

Secretary/Treasurer:

Dr. Robert J. Hansen

Member:

Prof. Adnan Akay

Member:

Dr. Terence A. Dear

The Division's membership extends its congratulations first to the outgoing officers for their dedication and hard work, and second to the new officers for their willingness to give of their time and energies. It is largely through the efforts of the officers that the Division has prospered and grown throughout its history.

TC on Industrial Noise Plans Organi- zational Meeting at WAM '87

The technical committee on industrial noise plans to hold its first organizational meeting at the ASME Winter Annual Meeting scheduled for December 13-18, 1987, in Boston, Massachusetts. The committee will determine various areas of interest in industrial noise and develop plans for future sessions and symposia. Since the subject of "industrial noise" is quite broad, it will be necessary for the committee to determine which topics are of greatest interest to ASME members, and what present ac-

tivities would be suitable for the technical committee's theme for WAM '88. Individuals interested in this subject are encouraged to attend this meeting to help establish specific topics within the committee's purview. Anyone who is unable to attend the organizational meeting in Boston should contact William J. Hanson at Liberty Mutual Research Center, Hopkinton, MA 01748, (617) 435-9061.

William J. Hanson

TC on Industrial Noise Issues Call for Papers

The newly formed Technical Committee on industrial noise plans to sponsor its first session at WAM '88 in Chicago, Illinois. Since this is a rather broad category, the Technical Committee will be meeting at WAM '87 in Boston, Massachusetts, to establish specific areas of interest. Once these have been defined and prioritized, one will be chosen for the focus at WAM '88. Researchers presently involved in industrial noise projects are encouraged to contact William J. Hanson

at Liberty Mutual Research Center, Hopkinton, Massachusetts 01748, (617) 435-9061, to discuss their activity and interest in participating in the technical session.

William J. Hanson

New Technical Committees Formed

Five new Technical Committees were formed this past year, bringing the total number in the Division up to eleven. The committees and their chairmen are: Industrial Noise (Mr. William Hanson); Machinery Vibrations and Noise (Mr. David Goldsmith), Structural Acoustics (Dr. David Feit); Instrumentation (Prof. Anna Pate), and High Intensity Acoustics (Prof. Gerhard Reethof).

With the addition of these focus areas, there should be a committee that includes nearly everyone's area of special interest. Interested persons should contact the respective chairmen to offer their services in supporting the committees' activities. An excellent way to contribute is through presentation of a technical paper at a meeting.

TC on Numerical Techniques in Acoustics '86-'87: The Best is Yet to Come!

The Numerical Techniques in Acoustics Technical Committee has grown through the formative years and now has reached what appears to be a self-sustaining stage in which we can count on major contributions at each Winter Annual Meeting. At the 1986 WAM the committee sponsored two sessions, with a total of eleven technical papers. Several other papers which dealt primarily with computational methods appeared in other sessions under the general sponsorship of NCAD.

The featured attraction sponsored by the Numerical Techniques Committee for WAM 1987 is a symposium on Statistical Energy Analysis in Acoustics. K. H. Hsu and D. J. Nefske have arranged three sessions, each with four or five contributed papers and keynoted by a distinguished researcher in the development and applications of SEA. The three keynote speakers will be Professor R. H. Lyon, Professor E. H. Dowell and Dr. G. Maidanik. Current plans are for the preparation of a symposium volume. SEA is creating an increasing amount of interest for investigations of structure borne noise and other problems with high modal density. This symposium should prove to be of great relevance to members of NCA and to many others.

At WAM '87 there will also be several other papers in numerical methods, unrelated to SEA, which may be grouped in a fourth session sponsored by the Numerical Methods Committee, or which may appear in other sessions, depending on the distribution of contributed papers, now being reviewed.

Committee membership remains open to members of the division who have an interest in computational acoustics and wish to help guide our efforts in this field. The committee is pleased to add to its membership Dr. David Raj who is a Research Specialist in the Structural Mechanics Section at Babcock and Wilcox.

The committee will continue its schedule of annual meetings in connection with the Winter Annual Meeting. The details of the meeting at WAM '87 will be made known at a later date when the session scheduling is complete. Members of the committee will be notified by mail.

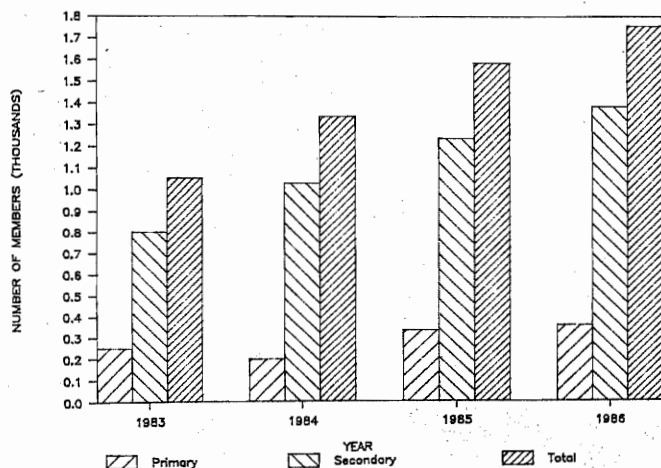
Walt Eversman

NCAD Membership Continues to Grow

In its relatively brief history, the Noise Control and Acoustics Division has experienced continued growth of its membership. Membership has been continuously increasing each year. A primary member is one who declares acoustics and noise control to be his primary technical area of interest. This declaration is made each year upon renewal of membership.

Although the Division has a healthy past, we must not become complacent about its future. Each member should encourage his colleagues to be active in NCAD. Meeting attendance and technical paper presentations are excellent ways to support the Division and sustain its growth. We should be proud of our reputation for having outstanding technical sessions, and work hard to maintain a high level of quality and participation.

NCAD MEMBERSHIP GROWTH



TC on Ducts, Piping and Silencers Defines Goals and Seeks Participants

This committee has interests in research and development activities in Acoustics of Ducts, Piping and Silencers. It is well known that the studies in these areas have extensive applications in acoustics and noise control aspects of mechanical and aero-space engineering. It is the intention of this committee to strengthen this technical forum for the dissemination of research effort in these areas. The scope of the effort includes theoretical and/or experimental work in these areas.

The activities planned for this committee are:

1. To arrange technical sessions both individually, as well as jointly, in ASME meetings.
2. To produce bound volumes of the related papers in these areas.

Representative topics in the area of acoustics of ducts and piping include:

- Acoustic wave propagation in ducts and piping.
- Effects due to higher modes on wave propagation in ducts.
- Wave propagation in lined ducts.
- Effects due to flow and temperature gradient in the medium.
- Acoustic impedance evaluation.
- Acoustical behavior of orifices and valves.
- Active noise control in ducts.
- Acoustical aspects in HVAC systems.
- Acoustical signal processing in ducts.
- Numerical techniques in duct acoustics.
- Acoustical source characterization in duct systems.
- Pressure pulsations in piping.

Representative topics in the area of silencers and mufflers include: (Generally silencers refer to large industrial types whereas mufflers refer to those used in automotive applications.)

- Applications of duct acoustics to silencers and mufflers.
- Reactive and dissipative mufflers.
- Various types of industrial silencers.
- Acoustic performance evaluation of silencers and mufflers.

The committee presently consists of ten members.

Anyone interested in becoming a member of this technical committee or participating in its activities is invited to contact the chairman, Dr. M. G. Prasad, Department of Mechanical Engineering, Stevens Institute of Technology, Castle Point, Hoboken, New Jersey 07030, (201) 420-5571.

M. G. Prasad

Noise Control & Acoustics Division

Executive Committee 1987-88

Chairman:

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