IEEE

Electromagnetic Compatibility Society

Newsletter

ISSUE NO. 101 SPRING 1979 EDITOR: ROBERT D. GOLDBLUM

VICE ADMIRAL F. S. PETERSEN RECEIVES DB AWARD ON BEHALF OF THE NAVAL AIR SYSTEMS COMMAND

Vice Admiral F. S. Petersen, Commander of the Naval Air Systems Command, was the recipient of the dB Society's 1979 Distinguished Performance Award. The dB Society voted unanimously to award its trophy to the Naval Air Systems Command for their:

"Outstanding International Contributions to the Field of Electromagnetic Compatibility"

The award was made on February 28, 1979 at the Naval Aviators' luncheon meeting during which Congressman Jim Lloyd (D-CA) was the keynote speaker. The selections factors in granting this honor included:

International - Leadership and technical contributions to the "Air Standards Coordinating Committee" for English speaking countries

International - Leadership and technical contributions to European countries through NATO

International - Leadership and technical contributions in advancing the state-of-the-art of aircraft and missile construction techniques using composit structures

Domestic - Education, through writing and distribution of design manuals; and eight motion pictures on the design, test, and management of Electromagnetic Compatibility contributing to the preservation of the Electromagnetic Spectrum

Domestic - Development, direction, management, and supervention of the Electromagnetic Compatibility Advisory Board (EMCAB) concept

International - Lightning, and static electricity research, development and corrective action bulletins altering industry to continually evolving manufacturing techniques for Air Safety. Six movies on Lightning and Static Electricity as well as 3 movies on Radome design were produced.

The decade Bunch (dB Bunch) is a fraternity of senior wualified engineers devoted to excellence in the field of EMC. Their interests include introducing young engineers, as well as new suppliers, into this complex discipline. According to Walter D. McKerchar, dB Bunch President, "The Naval Air Systems Command is eminently qualified to be the recipient of this year's award and we are pleased and privileged to make this presentation."

IEEE ELECTROMAGNETIC COMPATIBILITY SOCIETY NEWSLETTER is published quarterly by the EMC Group of the Institute of Electrical and Electronics Engineers, Inc., 345 East 47th Street, New York, NY 10017. Sent automatically and without additional cost to each member of the EMC Group.

Second class postage paid at New York, N.Y., and additional mailing offices.

EDUCATION COMMITTEE NEWS

The last Newsletter contained announcements of several courses being offered this spring. Check dates given in that Newsletter if you are interested.

It is interesting to note that seminars on spread spectrum communication are appearing. As this technology is reduced to hardware, I imagine that both testing and EMC analysis will be done using techniques significantly different from those standard today. It might be a good move to take a short course in this subject.

Another area that is obviously booming is microcomputers. I'm sure that you have all had hundreds of seminar brochures cross your desks in the last year. It may help your testing or analysis work to take a hands-on workshop in that area.

Wes Johnson of Boeing in Wichita is contemplating teaching a senior level course in EMC at a local college. I'm sure he would appreciate any help you could offer if you have taught a course at that level or have been involved in any way. Contact Wes at 3411 Edgemont, Wichita, KS 67208. A course outline and references to use would be very helpful.

If you have information of an educational nature, please send it to me or call at 612-574-4900.

The first announcement that I have for courses next fall comes from the Center for Professional Advancement. Their course in Electromagnetic Compatibility Engineering will be given by Henry Ott on September 24-26, 1979 in California. Contact the center at 201-249-1400 for further information.

Sincerely,

Kenneth W. Exworthy

Kenneth W. Exworthy
Chairman, Education Committee

EMCS NEWSLETTER MATERIAL DEADLINES

Our EMCS Newsletter is published quarterly with the 4 issues coming out in January, April, July and October. Any material to be included in these issues must be sent to the editor, Robert D. Goldblum, R & B Enterprises, 1050 Colwell Lane, Conshohocken, PA 19482 by the fifteenth of the month prior to publication.

IEEE SALARY SURVEY

Let your fingers do the walking to your next pay raise. They might - with the aid of the 1979 IEEE Membership Salary and Fringe Benefit Survey. IEEE is now gathering data, in the form of a salary questionnaire, for this bi-annual survey. One out of every five IEEE members (excluding students and retirees) is asked to complete and return the questionnaire. Salary averages are then cross-tabulated with detailed categories, such as levels of professional responsibility within industry or service to the employer.

The Salary Survey provides a vital, up-to-date reference for members. It also furnishes industrial, governmental, and academic management and personnel officers with valuable salary information. If you receive the questionnaire, please complete and return it: You help fellow members, and yourself. After all, you might want to know how your salary corresponds to local and national trends, years of experience, highest degree earned, and scores of other variables used to profile electrical and electronics engineers and other related professionals.

NEWSLETTER STAFF

EDITOR: Robert D. Goldblum
R & B Enterprises
P. O. Box 328
Plymouth Meeting, PA 19462

ASSOCIATE EDITOR: (Chapter Chatter)
Charles F. W. Anderson
1716 Reppard Rd.
Orlando, FL 32803

ASSOCIATE EDITOR: (Book Reviews)
James S. Hill
6706 Deland Drive
Springfield, VA 22150

ASSOCIATE EDITOR: (EMC Personality Profiles)
William G. Duff
Atlantic Research Corp.
8601 Greeley Blvd.
Springfield, VA 22150

ASSOCIATE EDITOR: (Sequency Union)
Dr. G. Robert Redinbo
Electrical & Systems Engrg. Dept.
Rensselaer Polytechnic Institute

ASSOCIATE EDITOR: (Abstracts)
Edwin L. Bronaugh
Southwest Research Institute
P. O. Drawer 28510
San Antonio, TX 78284

ASSOCIATE EDITOR: (Photographer)
Fred J. Nichols
LMI, Inc.
6056 W. Jefferson Blvd.
Los Angeles, CA 90016

EMC PERSONALITY PROFILES

by William G. Duff

RALPH M. SHOWERS

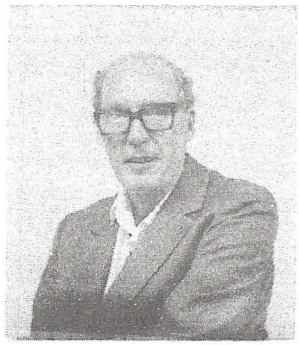
Dr. Showers received the Ph.D. degree in 1951 from the University of Pennsylvania, where he's professor of Electrical Engineering in the Moore School of Electrical Engineering. In 1940 and 1941, he was with the General Electric Co. in Philadelphia, PA and Schenectady, N.Y. During World War II, he was temporarily with the Office of Field Service of the Office of Scientific Research and Development in connection with research in the general field of short-range communications.

His responsibilities at the Moore School include teaching of courses in physical electronics and communications, and supervision of research in the areas of microwaves, systems engineering, physical and solid state electronics and radio interference. Dr. Showers has authored and co-authored many technical papers and reports on radio interference and solid state electronics. He was editor and co-author of "The Radio Frequency Interference Master," published by the Department of the Navy in July 1962 as NAVSHIPS 94180, which contains technical information accumulated over a period of almost 15 years under contracts for the Navy. He also was editor and co-author of an Engineering Design Handbook on Electromagnetic Compatibility for the Department of the Army, DARCOM Publication 706-410 in 1977. Dr. Showers was a member of the committee which prepared the report published by the Joint Technical Advisory Committee (JTAC) of the IEEE and EIA titled "Spectrum Engineering - The Key to Progress, A Report on Technical Policies and Procedures Recommended for Increased Spectrum Utilization," 1968, which was the result of four years of study by many technical experts in telecommunications.

Dr. Showers is a Vice President of the International Special Committee on Radio Interference (CISPR) and a Vice President of the U.S. National Committee of the International Electrotechnical Commission (IEC); member of the IEC Committee of Action Working Group on Electromagnetic Compatibility; Technical Advisor to the U.S. National Committee for IEC Technical Committee 77, Electromagnetic Compatibility; Chairman of Subcommittee A of CISPR, Radio Interference Measuring Equipment; Vice President for Technical Services, IEEE Electromagnetic Compatibility Society; Chairman of the Standards Coordinating and Liaison Committee of the IEEE Communications Society; and has been a member of the IEEE Standards Board since 1972. He is also a member of the Joint Telecommunications Advisory Committee (JTAC) of IEEE.

He is a Fellow of the Institute of Electrical and Electronic Engineers, Inc.; member of the Operations Research Society of America, American Association for the Advancement of Science, American Association of University Professors, and Sigma Xi.

CHAPTER CHATTER



by Charles F. W. Anderson

My apologies to all for missing two issues in succession. I'll try to make this column a full up-date.

Albuquerque (Joint AP-S, S-MTT and EMC-S Chapter) Larry Scott, newly-elected Chapter Chairman for 1979, sent in a comprehensive report of their 1978 activities, some of which have been reported previously. The March 30th meeting was addressed by Prof. Aleksandr n. Sandalov of Moscow State University, who discussed the history, general cultural and academic aspects and research at that institution. He also described the techniques he used in theoretical investigations, utilizing computers, of non-linear processes in active media, stratification effects in microwave devices and some general aspects of relativistic electronics. An April 20th, Dr. Allan C. Schell presented a talk titled "Spatial Filtering for Antenna Sidelobe Control." He described these filters, which consist of a number of planar reflecting layers separated by air spaces. The layers are uniform in the transverse direction and may consist of dielectric or wire grids, which funtion as a series of reactances that produce very small net reflections of near-broadside waves, but strong reflections of waves traveling at angles far from broadside.

The Joint Chapter and the Department of Electrical Engineering and Computer Science of the Univ. of New Mexico, in cooperation with professional and government groups, sponsored a Nuclear EMP Meeting on June 6-8. The roster of session chairmen read like a "Who's Who of Nuclear Effects." Topics ranged from Singularity Expansion Method to lightning phenomena in relation to EMP.

A field trip to the VLA radio telescope facility near Socorro, NM took place on October 7th. The group which made the trip saw the 12 25-meter-diameter antennas presently in place, and the computer center which controls the antenna array and signal processing.

On November 16th, Dr. J. Pace Vandevender spoke on "Power Flow for Particle Beam Inertial Confinement Fusion." Current research activities at Sandia Laboratories in the field were discussed, such as target ignition, power transmission and compression. Recent results, using self-magnetically insulated transmission lines, were presented.

The Chapter's annual year-end party was held on December 22nd at the home of Dr. and Mrs. Karl S. Kunz who provided an enjoyable time for all who attended. Larry, on behalf of the Chapter, extended his thanks to the Kunz's for their hospitality.

1979 officers, in addition to Dr. Scott, are:

Vice Chairman	-	Clay Taylor
Secretary	-	Robert L. Hutchins
Treasurer	-	James F. Prewitt
Membership/Nominations Committee Chairman	-	Robert Fisher

New Jersey Coast Don Heirman continues his fine job as Editor of the Chapter's Newsletter (now apparently the only Chapter Newsletter). Since the NL serves both VT and EMC members, the Chapter AdCom sponsored a contest for a logo which would reflect the joint membership affiliations. (We may be able to show the winning entry in the next issue.)

The Chapter's November 16th meeting featured Duane L. Huff, of Bell Labs, Whippany, speaking on "The Chicago Developmental Cellular System for Advanced Mobile Phone Service." He described the system being used under FCC authorization to evaluate the cellular approach to mobile telephone service. The Equipment Test Phase took place starting in July 1978, with the Service Test Phase scheduled to begin at the end of the year.

On December 12th, Warren Thiers, of Honeywell, Tinton Falls, presented "EMC in Health Care Facilities." Warren pointed up the fact that although interaction between equipments and systems in high technology areas of modern hospitals is jeopardizing the safety of both patients and

staff members, the existence of the problems is generally not even admitted to by medical staffs and administrations. He emphasized that most EMI problems encountered in health care facilities could readily be solved by EMC engineers with only minimal medical instrumentation backgrounds.

The October/December issue of the Chapter NL contained the final installment of the history of the early years of the NJ Coast Chapter, which has been compiled by John O'Neil.

The January meeting was addressed by the well known Fred M. Link, frequently referred to as the "Father of FM Land Mobile Radio," whose topic was "A Funny Thing Happened on the Way to Presend-Day Land Mobile Radio." Mr. Link's presentation featured many "story-behind-the-story" anecdotes of the early days of land mobile radio.

In February, the Chapter held a joint meeting with the AFCEA. The speaker was General A. B. Crawford, of DEC, Inc., discussing the topic, "The Merging of the Data Processing and Data Communications Technologies."

Plans for the remaining meetings are firming up, as is the TEM Cell Seminar to be held at Bell Labs - Holmdel, the last week in June.

Central New England On 24 October, the Computer and EMC Society Chapters sponsored a meeting at which William G. Klein, of K & S Laboratories, spoke on the subject, "Static Electricity: Problems and Solutions in Computer Facilities." He reviewed the fundamentals of static generation in relation to practical operation situations, effects of discharges upon computers and related equipments, and described methods of controlling static. There were 35 attendees. William J. Cook, Staff Assistant for Frequency Management of the Office of the Assistant Secretary of Defense, was the speaker at the January 16th meeting. His topic was "The Importance of the World Administrative Radio Conference to National Defense." DoD participation in national and international preparation for WARC-79 was emphasized, including spectrum usage for national security and specific defense-related proposals. Attendance was 20. The chapter sponsored a meeting on March 21st, at which the topic was "The Use of Electrically-conductive Organic Surface Coatings for Shielding and Grounding of Plastic Enclosures." J. P. Kosiorski, of Technical Wire Products was the speaker.

The Chapter has been exploring the possibility of sponsoring the 1985 EMC Symposium. Discussions have been held with the Boston Section Executive Committee, and tentative approval has been received.

Nominations for 1979/80 Chapter Officers are:

Chairman: Chester L. Smith
Vice Chairman: Arthur W. Murphy
Secretary/
Treasurer: John M. Clarke

The election was held at the March 21st meeting and results will be announced in the next issue of this Newsletter.

Washington Ernie Freeman's excellent reports help me keep the COTY (Chapter of the Year) award score because he tallies the earned points each time he sends them in. Thanks a meg, Ernie. Their first meeting of the season was on September 7th. Don White spoke on "EMC Problems and Practices Outside North America." There were 20 members and one guest in attendance.

The Chapter held its second meeting of the 78-79 season on November 1st. Fred Bauer of the Ford Motor Co. was the speaker. His topic was "Getting the Glitches Out - The Auto Manufacturers Look at EMC." Fifty-five members attended - a new record!

On January 18th, Dr. Chuck Jackson of the House Subcommittee on Communications was the speaker. His topic was "The Proposed Communications Act of 1979." His talk focused on aspects of the proposed rewrite of the Communications of 1934 which are of particular interest to the EMC community. Among the items discussed were the points of view presented during the hearings on the Van Deerlin/Frey bill (similar to the current one) and possible changes to the proposed bill. Thirteen guests and 34 members were present.

The March meeting topic was "How the State Department Views the 1979 WARC." Dick Schrum of State was the speaker. In May, Roger Madden of FCC will discuss "New Interference Standards for Narrowband Land Mobile Radio Services."

New York/Long Island Great News! This long-inactive group has gotten it together again and is back in business! Arnold Albin reports that the Chapter met on 18 October at the Ploytechnic Institute of New York at Framingdale. Jerry Rothhammer of AILTECH spoke on "New Developments in EMC Instrumentation." He also demonstrated the latest AILTECH EMI/EMC receiving system. There were 14 attendees. A November meeting was planned with the topic "Lightning Effects on Aircraft."

Central Texas Some you win - some you lose. Ockie Jouffray, who was visiting Martin Marietta's Orlando Division as a USAF test engineer, informed me that the Chapter is now inactive. (Not the kind of news I like to report!)

(Possible) Dayton Chapter Len Thomas has informed me that Herb Bartman at Wright-Patterson AFB is trying to get an EMC Chapter started in the area. IEEE HQ has sent him a list of the Society members in the area. If there are any other IEEE members in that area who are not EMC-S affiliates but who would be interested in helping to form a chapter, please contact Herb: 5303 Middlebury Rd., Dayton, OH 45432.

EMS COMMITTEE REPORTS

ADCOM NEWS HIGHLIGHTS

The $60K Challenge: President Janoski reported receiving a letter from Dr. Neil D. Pundit, Director of the IEEE Technical Activities Board outlining the Institute's financial deficit for 1979 and soliciting voluntary contributions from Groups and Societies to reduce thid deficit. After discussions, it was voted to voluntarily contribute $500.00 from Society funds toward the reduction of the deficit.

Report of the Vice President for Communications Services: EMC Transactions - Mr. Schulz, Editor: With respect to special issues, the paper response to the presently authorized special issue on Interference Reduction in Electronics Equipment had been poor, so it was suggested that the papers submitted be published in regular issues of the Transactions. With respect to the Twenty-Year Subject Index, it was the consensus that it be published as Part II of the February 1979 Transactions issue. It was voted to publish a special issue of the Transactions on EMC models, as proposed by Dr. Farrar. EMC Abstracts - Mr. Bronaugh, Chairman: It was reported that the next Newsletter issue would contain 12 abstracts. Mr. Bronaugh said that there were about 100 20 200 articles and items to be reviewed, but the abstract in-ut was progressing very slowly because his review committee had not the time to devote to the review. He was concerned about the slowness of completion of special abstracts covering recent CISPR Publications and book reviews. Mr. Bronuahg would welcome the services of additional reviewers.

EMC Symposiums:

1978 - Atlanta - June 20-22 - Mr. Toler, Chairman of the Symposium Committee, submitted a Preliminary Financial Report for the Symposium. In addition, he reported an attendance of 361, 64 papers presented and 14 papers at the poster session. There was a workshop of six panel members, and 14 different technical organizations used the Symposium as the nucleus around which they scheduled meetings. He presented Mr. Kesselman, Society Treasurer, a check for $4,000 as partial payment of the surplus from the operation of the Symposium.

1979 - San Diego - October 9-11 - Mr. Nichols, Chairman of the Symposium Steering Committee, forwarded the report covering the progress of the Steering Committee. It was reviewed, and Mr. Cory will check with Mr. Nichols on variations of the registration fees.

1980 - Baltimore - October 7-9 - Mr. Schulz, Secretary of the Symposium Steering Committee, submitted a copy of the minutes of the November 16, 1978 Steering Committee meeting. The decision on whether the Sequency Union (Walsh Functions) Symposium will be held in conjunction with the 1980 EMC Symposium should be made in about three months.

1981 - Boulder - August 18-20 -It was reported that this Symposium would be held in Boulder using the Univ. of Colorado facilities.

1982 - San Francisco - August-September - President Janoski received a letter proposal from Mr. Nalbandian, Chairman of the 1982 EMC Symposium Steering Committee that the 1982 EMC Symposium will be held in the San Francisco area. In view of the absence of a symposium budget, the receipt of the letter was noted, and no action was taken.

1983 - Washington, DC - October 18-20 - The Symposium will be held at the International Inn, No. 10 Thomas Circle, N.W. Planning is in the initial stages to determine the optimum technical program and management concepts for the Symposium and EMC Society 25th Anniversary activities.

1984 - San Antonio - A consideration; no proposal received

1985 - Boston area - Mr. Cory reported conversations with a representative of the Central New England Chapter about hosting a symposium. A consideration; no proposal received.

A question was raised as to the possibility of an International IEEE EMC Symposium being held overseas. It was noted that the Japanese had inquired about holding an EMC Symposium in Japan. Mention was made of the recent (1978) EMC Symposium held in Poland at which there were no attendees from the USA, at which the general attendance was reported as rather poor. The scheduled EMC Symposium in Rotterdam (May 1979) was mentioned. There were discussions about both International and Regional EMC Symposiums. Mr. Cory stated he would pursue the Japanese inquiry and determine the extent of their interest, and will include all available facts about all overseas EMC Symposiums and prepare a report for presentation at the next AdCom meeting.

eport of Vice President for Technical ervices: Standards Committee - Dr. Showers reported on conversations with Mr. Taggart, Chairman of the EMCS Standards Committee, wherein Mr. Taggart reported that the review of IEEE Standards, for which the EMC Society is responsible, is nearing completion, and it is anticipated that a report on this review, with recommendations will be prepared for submission to the AdCom. A report was received from

A report was received from Ralph Taylor reporting on the status of the proposed IEEE Standard Measurement Procedures for Field Disturbance Sensors. The copies of the typed version did not arrive and were not available at the meeting. The next step in processing this draft standard is to submit it to the EMCS Standards Committee for vote, after which it will be submitted to the IEEE Standards Board for approval. The final draft of IEEE Recommended Practice, Measurement of Spurious Emission from Land-Mobile Communication Transmitters, Project P377 was out for ballot before the EMC Society Standards Committee, and that the vote should be completed within the next 30 days, after which time it will be ready for submission to the IEEE Standards Board for approval.

Mr. Exworthy had completed a review of IEEE Standard 139 - Measurement of Field Intensity above 300 MHz from RF Industrial, Scientific & Medical Equipments, and his recommendations will be forwarded to Mr. Taggart.

Mr. Schulz had completed his review of IEEE Standard 299 -Recommended Practice for Measurement of Shielding Effectiveness ness of High-Performance Shielding Enclosures, and his report had been forwarded to Mr. Taggart with a copy to Mr. Kesselman who proposes to use IEEE Stand. 299 as a reference in the forthcoming revision of MIL-STD-285, "Attenuation Measurements for Enclosures, Electromagnetic Shielding, for Electronic Test Purposes, Method of." Dr. Showers will discuss future work on IEEE Standard 299 with Mr. Taggart. Mr. Schulz agreed to send Dr. Showers copies of his comments on IEEE Standard 299 and MIL-STD-285.

Report of Vice President for Professional Services: Employment Analysis Committee - Mr. Allen, reporting for Mr. Freeman, Chairman of the Committee, stated that the Committee had reviewed the Employment Analysis forms completed by AdCom members during the Atlanta Symposium and had made minor revisions to the form. Discussions were presently underway in the Committee as to the best way to distribute the forms to the membership to insure a significant return. Consideration is being given for distributiion of the forms at EMC Symposiums with a receptacle or box situated nearby to collect the completed forms during the symposium.

Social Implications of Technology Committee (CSIT) - An interest existed at the National Bureau of Standards at Boulder in the social implications of technology. Contact was made by NBS personnel with the Chairman of the CSIT, Steve Unger. As a result of this contact, Mr. Taggart has agreed to be the EMC Society representative to the CSIT.

TAB publicity on CSIT activities announced that the first CSIT award for "Outstanding Service" in the public interest will be presented to three employees of the San Francisco Bay Area Rapid Transit (BART) at WESCON in September. Activity has begun in developing television debates on the pros and cons of limiting technology and its implication. Stations to be contacted include New York's WNET.

IEEE Technical Activities Board Committee:

FCC Notice of Inquiry, General Docket No. 78-369. Mr. Art Wall, a representative of the Federal Communications Commission, reviewed the Commission's Notice of Inquiry into the matter of Radio Frequency Interference to Electronic Equipment, General Docket No. 78-369. He stated that this NOI was a reply to Congressional Inquiry on the subject matter. He suggested that responses to it be submitted to the Commission by July 1, 1979. Dr. Showers stated that FCC NOI General Docket No. 78-369 was an action item at the meeting of Americal National Standards Committee C63 on Radio Electrical Coordination, scheduled for December 7, 1978, the next day, and that the IEEE was one of the member organizations of Committee C63. Members present were invited to attend the C63 meeting, and assist in preparing a response to this document. It was determined that the responsibility within the AdCom is in the Standards Committee which is chaired by Mr. Taggart. Mr. Gauper and Mr. Heirman volunteered to work with Mr. Taggart in developing an IEEE EMC Society response to the FCC NOI.

Election of FY-79-80 AdCom Officers: Mr. Nalbandian, Chairman of the Nominations Committee conducted the election of AdCom Officers for the calendar year 1979, and the following resulted:

For President: Miss Jacqueline Janoski
For Vice President: Mr. Donald Heirman
For Secretary: Mr. Leonard W. Thomas
For Treasurer: Mr. Warren Kesselman

MEETINGS & EVENTS

CALL FOR PAPERS

You are invited to submit a paper describing new developments in the theory or practice of communications for possible inclusion in the technical program of NTC '79. The following technical disciplines will be represented:

- Aerospace & Electronic Systems
- Communication Electronics
- Communication Switching
- Communication Systems Disciplines
- Communications Technology Forecasting
- Communication Theory
- Computer Communication
- Data Communication Systems
- Digital Processing Techniques
- Electromagnetic Compatibility
- Frequency Standards & Utilization

Only original and previously unpublished papers are acceptable. NTC '79 is co-sponsored by the Communications Society, Aerospace and Electronic Systems Society, and Geoscience Group. Authors are encouraged to suggest specific technical disciplines they feel should review their papers. Papers not utilized because of subject matter mismatch, but of satisfactory quality, will be considered for inclusion in general interest sessions sponsored by NTC '79 along with late papers received before June 20th.

Schedule

Call for Papers Deadline (Papers receiving full consideration)	May 20, 1979
Late Papers Deadline (Limited consideration)	June 20, 1979
Notification of Acceptance	July 10, 1979
Late Papers Notification of Acceptance	August 10, 1979
Camera-ready Copies Received by NTC Publication Chairman (5 pgs. max.)	September 10, 1979

The author's name, complete return address and telephone number should appear on the summary. The remaining pages and illustrations should bear the author's name and the title of the paper. Authors are requested to send five double-space copies in English of both a one-page summary and a manuscript (not to exceed 3000 words) plus illustrations to:

Dr. Thomas P. Quinn
Chairman, Technical Program NTC '79
P. O. Box 31031
Temple Hills, MD 20031

EMC SESSIONS

The EMCS will sponsor a technical session at the 1979 National Telecommunications Conference (NTC) in Washington, DC on 27-29 November 1979 at the site of our 1976 EMC Symposium. The session title is "In the Field Reduction of EMI in the Telephone Plant." The session organizer is Raymond Nerenberg, New York Telephone Co., 1411 Broadway, Room 330, New York, NY 10018; Tel.: 215-395-6873.

This session will present practical considerations in solving field installation EMI problems. Case studies and solutions will be highlighted, as well as future techniques and education. A panel discussion will follow to answer specific audience EMI problems.

Our ICC'79 EMCS-sponsored session in Boston will be on June 12th between 2:00 P.M. and 5:00 P.M. The draft advanced program listing for the ssession is shown below:

SESSION 31
Radio-Frequency Communications Health Hazards: Facts, Fears and Issues
Tuesday, June 12, 1979
Organizer: H. J. Hesler, National Telecomm. and Info. Adminis.
Chairman: H. J. Hesler
Sponsor: EMCS

1. Power Densities from 4 GHz and 6 GHz Radio Relay
   S. D. Hathaway, Bell Labs
2. Radio Frequency Radiation: The Build-Up of Knowledge, Background, and Concerns
   S. Koslov, Johns Hopkins
3. A Review of Selected Effects of Microwave Radiation on Biological Systems
   S. F. Cleary, Virginia Commonwealth Univ.
4. Radiofrequency Environments in the United States
   D. E. Janes, U. S. Environ. Protect. Agency
5. Power Density Levels in the Immediate Vicinity of Representative Microwave Radio Towers
   R. C. Peterson, Bell Labs
6. Microwave Anxieties: The U. U. S. Embassy in Miscow - A Case in Point
   H. Pollack, Dept. of State
7. Panel Discussion

NOTES FROM SEQUENCY UNION

A 1980 INTERNATIONAL SYMPOSIUM ON NONSINUSOIDAL FUNCTIONS?

BY
G. ROBERT REDINBO

In the Winter Edition of this Newsletter I attempted to start a dialogue concerning the feasibilty and desirability of holding an international meeting for researchers working with nonsinusoidal functions. My view was that any such conference should be in conjunction with one of the regularly scheduled EMC Symposia.

Quite frankly, the response to those comments has been underwhelming - no correspondence, no telephone calls. However my personal contacts with the leadership of the 1980 EMC Symposium have been most encouraging. Everyone has been extremely enthusiastic about having a larger number of technical contributions from members of the Sequency Union. If only I had obtained that kind of response from researchers working in the area of nonsinusoidal functions, definitive plans could have been made.

The current status of a 1980 meeting dealing with nonsinusoidal functions is tenuous. The 1980 EMC Symposium Committee has tenatively reserved more hotel rooms at the Baltimore Dockside Hilton as well as scheduling more meeting rooms. Our present plans involve incorporating a call for papers on nonsinusoidal functions with the one for the 1980 EMC Symposium. The call will be issued in early summer and the required paper summaries would be due in the Fall, 1979. An extensive mailing to all persons interested in the various aspects of nonsinusoidal functions is planned.

Based upon the technical response a decision would then be made as to whether enough good sessions could be organized. From 4 to 6 comprehensive sessions in this area are needed to attract the necessary audience.

Accordingly I have asked Ferrel Sandy, a well-known member of the Sequency Union, to act as technical program coordinator for these sessions. (His address and telephone number are given below.) He will direct the review and session organization processes. However, I must emphasize that at this point we are not certain that enough high-quality papers can be solicited and there is the possibility that the critical technical mass cannot be assembled. We are proceeding because we know that there are numerous technical papers on these subjects appearing in the literature monthly but the open question is whether the research community judges a new symposium a desirable method for exchanging current technical information.

[G. Ferrel Sandy, MS-W332, MITRE Corp., 1820 Dolly Madison Blvd. McLean, Va. 22102 (703-827-6822)]

EMCABS

EDWIN (ED) BRONAUGH

In this issue we are publishing 36 abstracts. Several of these abstracts cover the important work of the International Special Committee on Radio Interference (CISPR), and should be of considerable interest to those engineers and scientists involved in the design of equipment for the international market place. Many, perhaps most, of the EMC regulations and standards promulgated by the governments of countries other than the U.S.A. are based heavily on the work of the CISPR and are reflected clearly in the CISPR documents abstracted in this issue.

We appreciate the suggestions on ways to improve the EMCABS that have been passed along to us from you readers, and we hope you continue to keep in touch. We are attempting to work the suggestions you have sent us into our approach. I wish to thank the other members of the EMCABS Committee for their fine support, without which there would be no EMCABS. They are:

L. F. Babcock
J. S. Hill
R. N. Hokkanen
J. R. Janoski
M. Kant
D. R. Kerns
G. R. Redinbo
R. B. Schulz
R. M. Showers

RF HAZARDS: WHAT WE DON'T KNOW CAN HURT
(EDITORIAL)
Bearse, Stacy
Editor
MICROWAVES
Vol. 16, No. 8, August 1977, p 38

ACCESSION NO.
EMCABS 11-78-13

ABSTRACT: This summer this subject has been headlined by the national press, debated in prime-time television newscasts and aired at Senate subcommittee hearings. Storm warnings have definitely been raised, the public has been exposed to the controversy and Government agencies are springing into action. The findings of the biological studies could spell trouble for the microwave industry.

INDEX TERMS: RADHAZ, radiation hazards, publicity, editorial

EFFECTS OF NON-IONIZING RADIATION GIVEN PRIORITY STATUS BY CONGRESS (NEWS)
Harris, Paul
Washington Editor
MICROWAVES
Vol. 16, No. 8, August 1977, pp 9-10

ACCESSION NO.
EMCABS 11-78-14

ABSTRACT: The National Academy of Sciences is expected to be given the green light by Congress this fall to conduct a comprehensive study of the current state of knowledge of the health effects of non-ionizing radiation. Included in this study, the first overall probe ever conducted, will be an evaluation of current radiation standards and a look at likely hazards of emerging technologies.

INDEX TERMS: radiation, non-ionizing, effects, study, RADHAZ, standards

CISPR Publication 16, CISPR SPECIFICATION FOR RADIO INTERFERENCE MEASURING APPARATUS AND MEASUREMENT METHODS, 10 kHz to 1 GHz.

International Special Committee on Radio Interference (CISPR)
International Electrotechnical Commission (IEC)
1977

ACCESSION NO.
EMCABS 3-79-01

ABSTRACT: This publication stipulates performance requirements for radio interference measuring apparatus, including the associated artifical mains network for measuring interference voltages, currents, power or field strengths within the range of the measuring apparatus. This publication covers 10 kHz to 1 GHz.

Separate sections cover measuring apparatus, conduction measurements of radio interference, radiation measurements of radio interference, method of measurement of various types of interference-producing devices and systems, radio interference measuring apparatus having detectors other than quasi-peak, audio-frequency interference measurements, measurement of disturbances due to switching operations, measurement of the shielding efficiency of coaxial cables having one or two braids in the metric wavelength range, and statistical considerations in the determination of limits of radio interference.

INDEX TERMS: Instrumentation, measurement, interference measurements, high frequency, low frequency, very high frequency, ultra-high frequency

CISPR Publication 1: Specification for CISPR Radio Interference measuring apparatus for the frequency range 0.15 MHz to 30 MHz.

International Special Committee on Radio Interference (CISPR)
International Electrotechnical Commission
1972

ACCESSION NO.
EMCABS 3-79-02

ABSTRACT:

The measuring set (usually of the superheterodyne type) has the following general characteristics: solely manual control of sensitivity; a defined overall bandwidth; a quasi-peak output voltmeter of known time-constants connected directly to the output of the radio-frequency stages (Intermediate-frequency stages in the case of a superheterodyne receiver).

The receiver is intended to measure the noise signal which may be conducted into the supply mains or radiated from the appliance. In the general case when the appliance is connected to the supply mains, use is made of a special circuit known as the artificial-mains network.

The present specification prescribes only those characteristics imposed by the principles of the method of measurement and refers primarily to the superheterodyne type of receiver.

INDEX TERMS: Instrumentation, measurement, interference measurements, high frequency

CISPR Publication 5: Radio Interference Measuring Apparatus Having Detector other than Quasi-Peak.

International Special Committee on Radio Interference (CISPR)
INTERNATIONAL ELECTROTECHNICAL COMMISSION
1967

ACCESSION NO.
EMCABS 3-79-03

ABSTRACT:

The scope of CISPR specifications is extended to include forms of indication other than quasi-peak, including peak, rms and average. The effects of bandwidth and type of interference are discussed.

INDEX TERMS: Instrumentation, detectors, interference measurements

CISPR Publication 6: Specification for an Audio-Frequency Interference Voltmeter.

INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE (CISPR)
International Electrotechnical Commission (IEC)
1976

ACCESSION NO.
EMCABS 3-79-04

ABSTRACT:

The audio-frequency interference voltmeter is a device which can be used for various purposes including making measurements at the outputs of radio receivers. It includes various types of audio weighting circuits which can be used for evaluating audio circuits.

11

INDEX TERMS: Interference measurement, audio frequency, instrumentation

CISPR Publication 7: RECOMMENDATIONS OF THE CISPR (1969), Pub. 7A, First Supplement, 1973, Pub. 7B, 2nd supplement 1975.

ACCESSION NO. EMCABS 3-79-05

International Special Committee on Radio Interference (CISPR)
International Electrotechnical Commission (IEC)
1969

ABSTRACT:

This publication reproduces the formal Recommendations of the CISPR on matters relating to radio interference and its suppression, including recommended limits and methods of measurement pertaining to ISM, motor vehicles, high voltage lines, receivers, and appliances.

INDEX TERMS: Radio interference, interference limits, measurement techniques

CISPR Publication 8: REPORTS AND STUDY QUESTIONS OF THE CISPR 1969, CISPR Pub. 8A(1973); CISPR Pub. 8B(1975).

ACCESSION NO. EMCABS 3-79-06

International Special Committee on Radio Interference (CISPR)
International Electrotechnical Commission (IEC)
1969

ABSTRACT:

This publication reproduces the formal Reports and Study Questions of the CISPR on matters relating to radio interference and its suppression.

The publication is divided into two parts, as follows:

Part I: Reports
Part 2: Study Questions

INDEX TERMS: Study program, radio interference, measurement techniques

CISPR Publication 9 (3rd Ed): LIMITS OF RADIO INTERFERENCE AND LEAKAGE CURRENTS ACCORDING TO CISPR AND NATIONAL REGULATIONS

ACCESSION NO. EMCABS 3-79-07

International Special Committee on Radio Interference (CISPR)
International Electrotechnical Commission (IEC)
1976

ABSTRACT:

This publication reproduces in tabular form the limits of interference recommended by the CISPR along with National limits of various countries participating in the CISPR. Section one: CISPR limits of radio interference and report of National Limits. Section two: Maximum permissible values of leakage currents and limiting values of capacitance and energy for radio interference suppression capacitors.

INDEX TERMS: Radio interference, interference limits, leakage currents

CISPR Publication 10, ORGANIZATION, RULES AND PROCEDURES OF THE CISPR (Second edition)

ACCESSION NO. EMCABS 3-79-08

International Special Committee on Radio Interference (CISPR)
International Electrotechnical Commission (IEC)
1976

ABSTRACT:

In 1971 the first edition of CISPR Publication 10 was issued in order to bring together in one document all matters affecting the organization, rules and procedures of the CISPR.

This second edition incorporates the changes necessary in the organization and methods of working of the CISPR resulting from the decisions taken at the CISPR Plenary Assembly in West Long Branch (USA) in 1973, and in Montreux (Switzerland) in 1975.

INDEX TERMS: CISPR Rules of Procedure, Organization, Radio Interference

CISPR Publication 11, LIMITS AND METHODS OF MEASUREMENT OF RADIO INTERFERENCE CHARACTERISTICS OF INDUSTRIAL, SCIENTIFIC AND MEDICAL (ISM) RADIO-FREQUENCY EQUIPMENT (EXCLUDING SURGICAL DIATHERMY APPARATUS)

ACCESSION NO. EMCABS 3-79-09

International Electrotechnical Commission (IEC) (1975)
1975

ABSTRACT:

This publication applies to the radiation of electromagnetic energy from industrial, scientific and medical (ISM) radio-frequency equipment which may cause interference to radio reception. It establishes uniform requirements for the radio interference suppression of ISM radio-frequency equipment, fixes limits of interference and describes methods of measurement and gives guidance to achieve the requirements. The frequency range covered is 150 kHz to 18 GHz. References are made to the frequencies designated for ISM purposes by the I.T.U in this range and to 2450 MHz, 5800 MHz and 25,125 MHz.

INDEX TERMS: Radio interference, industrial equipment, medical equipment, scientific equipment, interference limits, measurement techniques

CISPR Publication 12, LIMITS AND METHODS OF MEASUREMENT OF RADIO INTERFERENCE CHARACTERISTICS OF IGNITION SYSTEMS OF MOTOR VEHICLES AND OTHER DEVICES

ACCESSION NO. EMCABS 3-79-10

International Special Committee on Radio Interference (CISPR)
INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC)
1975

ABSTRACT:

This publication applies to the radiation of electromagnetic energy from motor vehicles and other devices equipped with internal combustion engines which may cause interference to radio reception. It establishes uniform requirements for radio interference suppression of ignition systems, fixes limits of interference, describes methods of measurement and gives guidance for suppression methods.

INDEX TERMS: Radio interference, interference limits, measurement techniques, ignition systems

CISPR Publication 13, LIMITS AND METHODS OF MEASUREMENT OF RADIO INTERFERENCE CHARACTERISTICS OF SOUND AND TELEVISION RECEIVERS

ACCESSION NO. EMCABS 3-79-11

International Special Committee on Radio Interference (CISPR)
International Electrotechnical Commission (IEC)
1975

ABSTRACT:

This publication applies to the generation of electromagnetic energy from broadcast sound and television receivers and to their immunity to all types of interference. The frequency range covered extends from 150 kHz to 1000 MHz. It describes the methods of measurement applicable to sound and television receivers and specifies limits for the control of interference from such equipment and also its immunity.

INDEX TERMS: Radio interference, interference limits, measurement techniques, receivers

CISPR Publication 14, LIMITS AND METHODS OF MEASUREMENT OF RADIO INTERFERENCE CHARACTERISTICS OF HOUSEHOLD ELECTRICAL APPLIANCES, PORTABLE TOOLS AND SIMILAR ELECTRICAL APPARATUS

ACCESSION NO. EMCABS 3-79-12

International Special Committee on Radio Interference (CISPR)
International Electrotechnical Commission (IEC)
1975

ABSTRACT: The document establishes uniform requirements for the radio interference suppression of household electrical equipment, portable tools and other electrical apparatus which may cause interference to radio reception, fixes limits of measuring methods and limits for the suppression of radio interference generated by household appliances, portable tools and other above mentioned electrical apparatus. Frequency range is 0.15 MHz to 300 MHz. This publication applies to the conduction and the radiation of electromagnetic energy from household electrical equipment, portable tools and other electrical apparatus which may cause interference to radio reception, such as: office machines, cine or slide projectors, electric toys, recording apparatus, milking machines, motor driven electromedical apparatus, etc., High frequency apparatus for heating and therapeutics, motors sold separately, and tools with power in excess of 2 kW are excluded.

INDEX TERMS: Radio interference, interference limits, measurement techniques, appliances

CISPR Publication 15, LIMITS AND METHODS OF MEASUREMENT OF RADIO INTERFERENCE CHARACTERISTICS OF FLUORESCENT LAMPS AND LUMINAIRES

ACCESSION NO. EMCABS 3-79-13

International Special Committee on Radio Interference (CISPR)
International Electrotechnical Commission (IEC)(1975)
1975

ABSTRACT:

This publication applies to the conduction and the radiation of electromagnetic energy from fluorescent lamps and luminaires which may cause interference to radio reception. It establishes uniform requirements for the radio interference suppression of fluorescent lamps and luminaires, fixes limits of interference, describes methods of measurement and gives guidance for methods of measurement of the insertion loss and of interference voltages of switch-start fluorescent lamp luminaires.

The frequency range covered is 160 kHz to 1400 kHz.

INDEX TERMS: Radio interference, interference limits, measurement techniques, fluorescent lamps. luminaires

RESEARCH AT PROJECT UHV ON THE PERFORMANCE OF CONTAMINATED INSULATORS, PART I. BASIC PROBLEMS

ACCESSION NO. EMCABS 3-79-14

Mikio Kawai
General Electric Co., Pittsfield, Mass.
IEEE Trans. on Power Apparatus and Systems
PAS-92, No. 3, May/June 1973, pp. 1102-1110

ABSTRACT:

The basic contamination research problems at Project UHV are discussed. Results of flashover tests on 27 types of insulators are presented with discussions on the test method. The performance of insulators if found not to be proportional to the leakage distance, and the influence of the shape of the insulator unit on its performance is demonstrated.

Consideration of flashover probabilities make it evident that contamination design of high voltage lines must be approached on a statistical basis, and an outline of this approach is provided.

INDEX TERMS: Radio interference, high voltage lines, insulators

RANDOM GEOMETRIC SERIES AND INTERSYMBOL INTERFERENCE

ACCESSION NO. EMCABS 3-79-15

F. S. Hill, Jr. and Mario A. Blanco
Department of Elec. Eng., Univ. of Massachusetts, Amherst

IEEE Transactions on Information Theory
IT-19, No. 3, May 1973, pp. 326-335

ABSTRACT:

An interesting and long-standing problem in probability theory is surveyed, and its applications to analyzing the effects of intersymbol interference in digital transmission systems are discussed. Old and new results are presented which enable one to obtain analytical forms for the probability density function of the intersymbol interference in special cases. The probability of error is then computed and compared with some popular upper bounds.

INDEX TERMS: Radio interference, intersymbol interference, digital systems

COMPARISON OF RADIO NOISE PREDICTION METHODS WITH CIGRE/IEEE SURVEY RESULTS

ACCESSION NO. EMCABS 3-79-16

IEEE Radio Noise Subcommittee Report

IEEE Transactions on Power Apparatus and Systems
PAS-92, No. 3, May/June 1973, pp. 1029-1042

ABSTRACT:

A collection of directly comparable radio noise field data from 75 high- and extra-high-voltage lines was presented in earlier papers by a joint CIGRE and IEEE task force. In the present paper a summary of different methods for calculating radio noise levels from transmission lines is presented and a comparison of measured and calculated values is given.

INDEX TERMS: Radio interference, high voltage lines, corona

RESEARCH AT PROJECT UHV ON THE PERFORMANCE OF CONTAMINATED INSULATORS, Part II - APPLICATION TO PRACTICAL DESIGN

Mikio Kawai
General Electric Co., Pittsfield, Mass.

ACCESSION NO. EMCABS 3-79-17

IEEE Transactions on Power Apparatus and Systems
PAS-92, No. 3, May/June 1973, pp. 1111-11120

ABSTRACT:

Results of full-scale tests on V-suspension strings up to 50 standard insulators (about 24-ft long) are presented and the need of such tests is demonstrated. Because of pronounced nonlinearity on standard insulator strings, the use of large disc insulators is recommended for UHV line insulation. A practical design method for anti-contamination design is developed on a statistical basis.

INDEX TERMS: Radio interference, high voltage lines, insulators

PERFORMANCE OF INSULATORS FOR DIRECT CURRENT TRANSMISSION LINE UNDER POLLUTED CONDITION

I. Kimoto, T. Fujimura, K. Naito
NGK Insulators, Ltd. (New York and Nagoya, Japan)

ACCESSION NO. EMCABS 3-79-18

IEEE Trans. on Power Apparatus and Systems
PAS-92, No. 3, May/June 1973, pp. 943-949

ABSTRACT:

This paper describes the results of investigation into the performance of suspension type insulators for HVDC transmission line under polluted condition. Shed profile plays a big role in determining DC withstand voltage value. The withstand voltage value for DC is lower than that for AC rms, and the higher the deposit density is, the smaller becomes the ratio of the DC value to the AC.

INDEX TERMS: Radio interference, high voltage lines, insulators

SIGNAL-TO-NOISE RATIO AS A PREDICTOR OF SPEECH TRANSMISSION QUALITY

Tapas K. Sen and J. Douglas Carroll
Bell Laboratories, Holmdel and Murray Hill, N.J.

ACCESSION NO. EMCABS 3-79-19

IEEE Trans. on Audio and Electroacoustics
AU-21, No. 4, August 1973, pp. 384-387

ABSTRACT:

Signal-to-noise ratio expressed in decibels may be generalized to the form 10 log S^a/N^b, where S and N are, respectively, signal and noise values expressed in power units. In the usual definition of signal-to-noise ratio, the exponents a and b both assume values of +1, that is, the ratio a/b = 1. This study was designed to examine the optimum value of a/b as a predictor of speech transmission quality data. Results of factor analysis, multiple regression analyses, and canonical correlation analyses showed that values of a/b greater than one were better predictors of transmission quality than a/b = 1.

INDEX TERMS: Audio frequency, interference to noise, signal to noise, speech transmission

NOISE AND INTERFERENCES IN ELECTRICAL NETWORKS--AN UNDERGRADUATE EXPERIMENT

Arnon Cohen
Department of Electrical Engineering, Univ. of Connecticut

ACCESSION NO. EMCABS 3-79-20

IEEE Trans. on Education,
E-16, No. 3, August 1973, pp. 161-166

ABSTRACT: The topic of noise and interferences in electrical networks is seldom discussed at the sophomore or junior levels. Electrical Engineering students, however, may encounter interference problems in their first laboratory course. Practical techniques of noise minimization in measurement setups are usually considered a work of art rather than a topic that can be methodically introduced. This paper describes a laboratory experiment investigating noise sources and their elimination that requires only inexpensive and generally available instrumentation. Background material is presented in a simplified manner taking into consideration the fact that the students at this level have not been exposed to probability and advanced electromagnetic theories. The experiment concentrates on the environmental noise and the various techniques to reduce the coupling between the system and noise sources. A brief introduction to noisy signal detection techniques is also included.

INDEX TERMS: Electrical noise, interference, electric networks, education, environment

SOME PRACTICAL LIMITATIONS ON THE USE OF PERTURBATION SIGNALS FOR RESOLUTION ENHANCEMENT

Gerald Cook
School of Engineering & Applied Science, Univ. of Virginia

ACCESSION NO. EMCABS 3-79-21

IEEE Trans. on Industrial Electronics & Control Instrumentation
IECI-20, No. 3, Aug 1973, pp 114-117

ABSTRACT:

The application of a triangular perturbation signal as a means of improving the resolution of quantizers is discussed. The particular problems which occur with digital processing are examined. Inaccuracies caused by discrete sampling, and imprecise triangle wave amplitude are investigated, and relationships which bound the errors caused by these factors are established. These relationships are useful in designing the resolution-enhancement system.

INDEX TERMS: Digital signals, data processing, perturbation

EVALUATION OF THE SHIELDING PROPERTIES OF CABLE TRAYS FOR USE IN AN INDUSTRIAL ENVIRONMENT

Alfred W. Scheide
Dept. of Elec. Eng., University of Cincinnati

ACCESSION NO. EMCABS 3-79-22

IEEE Trans on Industry Applications
IA-8, No. 6, November/December 1972, pp 783-787

ABSTRACT:

The proper shielding of control cables in an industrial control system is an important part of the system's design. With the advent of direct digital and analog processes control in large industrial facilities such as steel mills and power plants, the minimumization of interference induced in the communication link by the in-plant transducers and analog or digital controller becomes an important problem. The communication link may be very short, or run for several miles, depending upon the installation. In most cases, this link is a pair of electrical conductors. It is often necessary to shield these control and instrumentation cables. This paper describes a series of tests that were developed to determine the shielding efficiency of cable trays made of various types of material. Tests are described for both electromagnetic and electrostatic fields. As in most engineering decisions, the final choice of material must be the result of a compromise.

INDEX TERMS: Industrial control, cable shielding

COMPUTER WIRING SYSTEM--RACEWAYS, CIRCUITS AND WIRE TERMINATIONS

ACCESSION NO. EMCABS 3-79-23

Marvin R. Melkus, Frank J. McHigh and Timothy T. Ho
Kaiser Industries Corp., Oakland, Ca.

IEEE Trans on Industry Applications
IA-8, No. 6, November/December 1972, pp 772-782

ABSTRACT:

This paper introduces a computerized wiring system that is new in the industry. It begins with the reasons for the development of the computer program to process the wiring system data in favor of conventional drafted schedules and diagrams. A brief explanation of the computer program is given, and the common details associated with wire methods are redefined for use by the computer. The program operates by itemizing the input data of raceways, circuits, and wire terminations; processing these data to creat maintenance files and print various schedules. Sample schedules included in the paper show how some of the schedules are intended for use by the designers, some for contract documentation, and others for construction and maintenance. Methods for updating, revising, and maintaining the computer file are also included, and a general guide for planning and controlling a project via computer wiring system methods is offered. Finally, the merits of the computerized system are discussed with possible future improvements perfected.

INDEX TERMS: Industrial control, cabling, wiring, computer techniques

SIGNAL DETECTION IN THE PRESENCE OF COCHANNEL INTERFERENCE AND NOISE

ACCESSION NO. EMCABS 3-79-24

M. J. Wilmut and L. L. Campbell
Royal Roads Military College; Queen's Univ., Ont. Canada

IEEE Trans. on Communications
COM-20, No. 6, December 1972, pp. 1153-1159

ABSTRACT:

The problem of detection of a sinusoidal signal in the presence of white Gaussian noise and an interfering sinusoid at a nearby frequency is discussed. In the case of coherent detection, several possible receivers are analyzed and probability of error curves are calculated. In some cases it is possible to reduce the effect of cochannel interference significantly by proper choice of a receiver. In the case of uncoherent detection, error probability curves have been calculated for the standard envelope detector for several values of frequency separation. The performance of the envelope detector can be degraded substantially by the presence of an interfering sinusoid.

INDEX TERMS: Cochannel interference, random noise, coherent detection

ADAPTATION OF THE P-N JUNCTION BURNOUT MODEL TO CIRCUIT ANALYSIS CODES

ACCESSION NO. EMCABS 3-79-25

L. R. McMurray and C. T. Kleiner
North American Rockwell Electronics Group, Anaheim, Ca.

IEEE TRANS. on Nuclear Science
Vol. NS-19, No. 6, December 1972, pp. 76-85

ABSTRACT:

Transient electrical pulses impressed upon a circuit containing semiconductors subject the semiconductors to a thermal transient. Potential burnout of the parts is of particular interest and concern. A model is presented which permits the calculation of the transient temperature throughout the semiconductor given the instantaneous power dissipation within the device. The basic technique is to magnetically partition the device by isothermal surfaces, and construct the corresponding RC circuit. Lateral dispersion of the heat (two dimensional heat flow) is included as part of the model. The model has been compared to theory and test. The model is simple and can be easily programmed as a subroutine and attached to existing TREE circuit analysis programs. This permits efficient calculations from the applied electrical pulse to the internal temperature of the semiconductor for prediction of burnout.

INDEX TERMS: Susceptibility, P-N Juntions, transients, burnout, computer program

SEMICONDUCTOR DEVICE DEGRADATION BY HIGH AMPLITUDE CURRENT PULSES

ACCESSION NO. EMCABS 3-79-26

W.D. Brown
Sandia Laboratories, Albuquerque, N. M.

IEEE Trans. on Nuclear Science
Vol. NS-19, No. 6, December 1972, pp. 68-75

ABSTRACT:

This paper presents the results of a lengthy and comprehensive investigation of semiconductor device degradation from nanosecond current pulses. Topics discussed include (1) previously established literature on pulse degradation and second breakdown, (2) experimental results obtained in several studies, (3) pulse damage recovery using several annealing techniques, (4) a model of the pulse damage, (5) possible methods of hardening against pulse degradation, and (6) a preventive measure that can be taken to eliminate pulse damage.

INDEX TERMS: Susceptibility, P-N Junctions, transients, burnout, computer program

EMP Response of a Cavity: Field Generation within a Lossy Dielectric Cylinder Excited by a Radiation Pulse

ACCESSION NO. EMCABS 3-79-27

D.L. Mangan and G. J. Scrivner
Sandia Laboratories, Albuquerque, N.M.

IEEE Trans. on Nuclear Science
Vol. NS-19, No. 6, December 1972, pp 41-48

ABSTRACT:

A dielectric electromagnetic field problem is solved for a finite length cylindrical cavity bounded by perfectly conducting walls. The cavity is filled with a homogeneous lossy dielectric material. Analytic solutions for the relevant components of the electric and magnetic fields generated by an axially propagating current pulse are presented. Results obtained for various sample problems are discussed.

INDEX TERMS: EMP, cavity resonator, dielectrics

APPLICATIONS OF TIME-DOMAIN METROLOGY TO THE AUTOMATION OF BROAD-BAND MICROWAVE MEASUREMENTS

ACCESSION NO. EMCABS 3-79-28

A. Murray Nicolson, C. Leonard Bennett, Jr. D. Lamensdorf & Leon Susman
Sperry-Rand Research Center, Sudbury, Mass.

IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES
Vol. MTT-20, No 1, January 1972, pp. 3-9

ABSTRACT:

It is only recently that measurement of the transient response of microwave systems directly in the time domain has become practicable. It has led to growi interest in the concept of specifying broadband performance solely by a transien response measurement. Results of the use of time-domain techniques to obtain, within the range 0.1 to 10 GHz, such data as the S parameters of networks, the constitutive parameters of microwave materials, the driving-point impedance and transfer function of microwave antennas, and the frequency-domain scattering parameters of conducting surfaces in free space are described.

INDEX TERMS: Time-domain measurements, microwaves, transients

TRANSMISSION LINES

Gerhard W. Juette
General Electric Co., Pittsfield, Mass.

ACCESSION NO. EMCABS 3-79-29

IEEE Trans. on Power Apparatus and Systems
PAS-91, No. 3, May/June 1972, pp 865-873

ABSTRACT: The effects of different types of transmission-line noise on television reception are examined. Curves relating annoyance with measured signal-to-noise ratios are produced. Tolerability criteria are derived. Finally, the use of a TV set as noise detector for TVI measurements is introduced.

INDEX TERMS: High voltage lines, television interference, signal to noise

HOW TO CHOOSE INSULATORS FOR POLLUTED AREAS

Paul Claverie, Yves Porcheron
Electricite de France, Paris

ACCESSION NO. EMCABS 3-79-30

IEEE Transactions on Power Apparatus and Systems
PAS-92, No. 3, May/June 1973, pp 1121-1131

ABSTRACT: The mechanism of flashover due to contamination on polluted insulators has been analyzed in a recent publication. It has been shown that, making use of the salt fog test and by a proper choice of the concentration of the sprayed saline solution, it was possible to reproduce in laboratories artificial contaminating layers equivalent to any natural layers. Consequently, the degree of pollution in a locality can be characterized by reference to the salt fog test and expressed in terms of an equivalent salinity. This degree of contamination can be determined by recording on the site the maximum leakage current of a standard-type insulator. The final result of these works is a practical method for selecting line or post insulators in polluted areas.

INDEX TERMS: Radio interference, high voltage lines, insulators, contamination, simulation

SERIES COMPENSATED LINES-VOLTAGES ACROSS CIRCUIT BREAKERS AND TERMINALS CAUSED BY SWITCHING

D. D. Wilson
General Electric Company, Schenectady, N. Y.

ACCESSION NO. EMCABS 3-79-31

IEEE Transactions on Power Apparatus and Systems
PAS-92, No. 3, May/June 1973, pp 1050-1056

ABSTRACT: The increased use of series capacitive compensation for voltage control, stability, or loading on transmission systems had led to more extensive studies of the switching phenomenon of series compensated lines. In many EHV applications of series compensation, shunt reactors are also applied, further leading to certain unique switching phenomena. Analyses indicate several areas of concern not associated with non-series compensated lines including; a) protection of terminals against switching surges, b) low frequency oscillations in the shunt reactor-series capacitor circuit which may expose lightning arresters to very severe energy requirements, c) significant voltages across the circuit breaker when interrupting faulted lines. The first two areas will be discussed and the third analyzed in greater detail. The data in this paper was obtained from studies on the Transient Network Analyzer.

INDEX TERMS: Switching, transmission lines, transients

A METHOD OF CALCULATING THE RI FROM HVDC CONVERTER STATIONS

Maruvada P. Sarma, T. Gilsig
Hydro-Quebec Institute of Research, Varennes, Quebec, Canada

ACCESSION NO. EMCABS 3-79-32

IEEE Transactions on Power Apparatus and Systems
PAS-92, No. 3, May/June 1973, pp 1009-1018

ABSTRACT: Radio interference (RI), generated due to the periodic switching c the valves, is an imporant factor in the design of HVDC converter stations. method is developed in this paper for calculating the RI level of any given converter station layout. The method consists basically of determining the equivalent circuit for the valve turn-on transients, analyzing the currents as a function of frequency in all elements of the circuit, and finally calculating the RI around the station using the currents obtained above together with data on the physical layout of the station. The proposed method of calculation is applied to two typical station configurations. Some general characteristics of the RI as a function of different parameters is studied, and RI frequency spectra for points around the station obtained. The effectiveness of typical inductive broadband RI filters is studied.

INDEX TERMS: DC converters, high voltage lines, transients

INTERFERENCE INTO ANGLE-MODULATED SYSTEMS CARRYING MULTI-CHANNEL TELEPHONY SIGNAL

B. A. Pontano, J. C. Fuenzalida, and N. K. M. Chitre
COMSAT Laboratories, Clarksburg, Md.

ACCESSION NO. EMCABS 3-79-33

IEEE Transactions on Communications
COM-21, No. 6, June 1973, pp 714-726

ABSTRACT: An investigation of interference between angle-modulated systems carrying multichannel telephony, which is directly applicable to existing satellite and terrestrial radio-relay systems, has been undertaken. This study includes a general solution for arbitrary narrowband interference into an angle-modulated system with arbitrary modulation. The algorithm has been implemented on a digital computer to provide calculations of interference between two FDM/FM systems. The analysis is valid for all modulation indices, and may be applied to any PM, FM, or preemphasized FM baseband. A comparison of calculated results and experimental measurements shows good agreement. An extensive investigation, covering a wide range of modulation indices and basebands, has been conducted for the particular case of preemphasized FDM/FM signals. Wherever possible, a generalized presentation of interference result is given.

INDEX TERMS: Interference, angle modulation, telephony, satellite systems, FDM/FM

STATISTICAL SUPPRESSION OF INTERFERENCE WITH DIVERSITY IN A MOBILE-RADIO ENVIRONMENT

Leonard Schiff
RCA Laboratories, Princeton, NJ 08540

ACCESSION NO. EMCABS 3-79-34

IEEE Transactions on Vehicular Technology
VT-21, No. 4, Nov. 1972, p. 121

ABSTRACT: In a small-cell mobile-radio system different base stations transmi different signals simultaneously, and at the same carrier frequency, to mobile vehicles in their respective cells. It is desirable that these cochannel stations be placed as close to one another as possible without creating undue interference. However, as a vehicle moves within a cell, both the desired and undesired signals exhibit Rayleigh (local) fading, creating a relatively high probability that the interference exceeds the signal. On the other hand, at the frequencies contemplated it is relatively simple to constrict additional antennas that provide independently fading signals, thereby offering the use of diversity technqiues. Three different switch diversity techniques are considered, and the improvements produced by each are calculated. It is also shown that some are effective in combating an additional difficulty of the mobile-radio environment; this difficulty is that while the signal received in a moving vehicle is locally Rayleigh, the mean of this Rayleigh process changes slowly with time.

INDEX TERMS: Propagation, diversity, cochannel, frequency management, mobile communication

Book Reviews

by Jim Hill, EMXX Corporation

In this issue, we have two book reviews plus a letter regarding a previous review.

"International and National Radio Frequency Interference Regulations" by Herbert K. Mertel has just been released as Volume I of Don White's Multi-Volume EMC Encyclopedia Series. This is planned as a 40 volume series. In the next EMCS Newsletter, we plan to review another volume in the series, "Electromagnetic Interference Control in Medical Electronics" by Michael F. Gard.

The second review for this issue is "Man-Made Radio Noise" by Edward N. Skomal, a compilation of the author's work over the past 15 years.

In the last issue, Dr. Sidney Frankel's letter commented on Dr. Clayton R. Paul's review of his book, "Multiconductor Transmission Lines." Now, Dr. Paul has requested that, in fairness to him and in the interest of the readers of this newsletter and Dr. Frankel, that we publish Dr. Paul's reply. We agree that this is a reasonable request and herewith include his letter. You may want to refer to Newsletter Issue No. 98 for the original book review and to Issue No. 99 for Dr. Frankel's letter of comment.

Dr. Clayton R. Paul's Letter

Dear Mr. Hill,

In the summer issue of the EMCS Newsletter, I reviewed Dr. Sidney Frankel's recent book, "Multiconductor Transmission Line Analysis." Dr. Frankel commented on that review in the fall issue of the EMCS Newsletter. I should like to explain my rationale so that the review of Dr. Frankel's book will be placed in the proper perspective.

I should also like to make it clear that I consider the content of Dr. Frankel's book to be a thorough and quite complete discussion of virtually all aspects of Multiconductor Transmission Lines. For those readers who are willing to spend an appropriate amount of time in studying this inherently complex subject, their efforts would be quite worthwhile.

In reviewing this book, I focused on its applicability to the majority of the EMC community who do not deal with this topic on a day-to-day basis. Hence, the emphasis in my review was directed toward the extent to which a nonspecialist in this area could easily absorb the excellent material in this book. In this regard, I felt that every effort should be made by the author to make ths subject matter as clear and understandable as possible. Consequently, I concentrated on points that I felt were hindrances to nonspecialists and did not devote an appropriate portion of my review to pointing out the numerous, positive aspects of this book.

My statement about the "traditional" or "conventional" treatment of certain topics was meant to be complementary in the sense that I feel that this feature is helpful to nonspecialists who read the book. Dr. Frankel comments that "In no instance, however, has any earlier report been transferred in toto to this book." In order to set the record straight, I should, once again, point out that this book and a Harry Diamond Labs technical report also authored by Dr. Frankel (HDL-TR-091-1, June 1974) are the same. (The NTIS number of this report was incorrectly transcribed from my original letter and should be ADA 000 848.) Minor editorial corrections have been made in converting this technical report to the book. The contents of the two, however, are virtually identical.

In my review, I pointed out that a certain matrix product in Dr. Frankel's book is written incorrectly. At the risk of belaboring this point and since Dr. Frankel questioned the statement in some detail in his reply, I should like to clarify the problem. Equation (2-34) in the book is written as

$$\begin{bmatrix} I^i \\ I^o \end{bmatrix} = \begin{bmatrix} E \end{bmatrix} \begin{bmatrix} YV^i \\ YV^o \end{bmatrix} \qquad (2\text{-}34)$$

where

$$[E] = \begin{bmatrix} -j\cot\Theta_\ell, & j\csc\Theta_\ell \\ -j\csc\Theta_\ell, & j\cot\Theta_\ell \end{bmatrix} \qquad (2\text{-}35)$$

The vectors I^i, I^o, YV^i, YV^o in (2-34) are each n X 1. Thus the vector

$$\begin{bmatrix} I^i \\ I^o \end{bmatrix}$$

is 2n X 1 as is the vector

$$\begin{bmatrix} YV^i \\ YV^o \end{bmatrix}$$

In order that (2-34) represent a valid matrix multiplication, [E] must therefore be 2n X 2n. However, [E] given in (2-35) is 2 X 2. In order that (2-34) be correct, [E] should be written as

$$[E] = \begin{bmatrix} -j\cot\Theta_\ell I_n & j\csc\Theta_\ell I_n \\ -j\csc\Theta_\ell I_n & j\cot\Theta_\ell I_n \end{bmatrix}$$

where I_n is the n X n matrix with ones on the main diagonal and zeros elsewhere. For a reader who has some familiarity with the book's topic, it is clear what the author intended. My concern was for the nonspecialist who may be trying to study this text in detail in order to become familiar with the topic.

Dr. Frankel mentions he is concerned that my discussion of notational points and the proper exposition of certain matrix products in Chapter 2, such as discussed in the previous paragraph, may mislead the readers concerning the validity of the results in this book. I should like to make it perfectly clear that my discussion of these points is in no way intended to question the validity of any of the book's results. My statement with regard to the "correctness" of certain vector-matrix products in Chapter 2 concerned the proper exposition of these products. The problem was one of notation not validity of results. In fact, I find no reason to question the validity of his results.

In order to balance my original review, written primarily for the nonspecialist, I should now like to give a review for those who are familiar with the topic which points out some of the humerous highlights of this book. Chapters 2 and 7 provide a complete discussion of the solution of the transmission line equations for lossless lines in homogeneous media any lossy lines in inhomogeneous media, respectively. In particular, Chapter 7 includes the solution of the line equations via Laplace transforms so that transient excitation may be considered. The results are therefore not restricted to single frequency excitation and thus should be of considerable interest to the EMP community. The important concept of bi-orthogonal modes is also discussed in Chapter 7. This points out the important fact that one cannot normalize the current and voltage eigenvectors individually since the transmission line equations impose a constraint between the voltage and the current eigenvector pairs. Dr. Frankel also develops a novel approach to the problem of nearly identical eigenvalues in the propagation matrix in Chapter 7: the Average Pole Expansion method. The presence of nearly coincident eigenvalues can result in some severe computational problems when the line equations are solved on a digital computer. Dr. Frankel suggests a novel technique for dealing with this problem.

Distributed excitation of the line (as with external-field illumination) as well as lumped excitation via the terminal networks is covered in detail in Chapter 4 and the external-field coupling parameters are considered in further detail in Chapter 7. The terminal networks at the ends of the line are considered to be in the form of matrix Thevenin equivalents so that there is no restriction on their internal structure.

The per-unit-length parameters of resistance, conductance, inductance and capacitance are given a detailed treatment in Chapters 5, 6, 8, and 9. The capacitance parameters for numerous cross-sectional configurations are derived in Chapters 8 and 9. Alternative techniques for determining the line parameters such as analog and numerical methods are discussed in Chapters 11 and 12, respectively. Quite often, these techniques offer the only practical solution for certain complicated line structures and their discussion completes this topic.

Chapter 3 discusses what might be referred to as microwave filter design. The increasing utilization of higher frequencies and microcircuit technology requires a more in-depth knowledge of microwave filtering as a corrective device for certain interference problems. Thus this topic is quite relevant from an EMC standpoint. Chapter 3 provides a fairly detailed discussion of these types of devices.

An additional highlight of the text is the in-depth treatment of the excitation of the line by external fields. The transmission line equations are solved for this case for lines in homogeneous media in Chapter 4 via the Laplace transform in terms of general, external-field coupling parameters. The external-field coupling parameters are derived for numerous, specific configurations in Chapter 10. Of particular importance is Dr. Frankel's work on coupling to braided shield cables (see IEEE Trans. on EMC, Feb. 1974) which is discussed in Chapter 10.

As I pointed out in my original review, Dr. Frankel's book considers both the solution of the transmission line equations and the determination of the parameters of the line (per-unit-length capacitance, resistance, inductance, conductance). As I also pointed out, this is an important, positive aspect of the book. Many of the results on multiconductor lines given in the literature do not address these two topics in the same article. Having both these topics covered in the same place has the distinct merit of providing a great deal of continuity in one's study of the complete subject of multiconductor lines.

In closing this re-review of Dr. Frankel's book, I should like, once again, to make it clear that a considerable amount of valuable as well as novel material concerning multiconductor lines is contained in this book. This text is one of the few individual sources that I am aware of having such a detailed treatment of so many aspects of multiconductor transmission lines. For those readers who are familiar with the subject or those who are interested in devoting an appropriate amount of study in order to become familiar with this topic, I recommend Dr. Frankel's book.

Sincerely,

Clayton R. Paul

Clayton R. Paul

"International and National Radio Frequency Interference Regulations"

BY

Herbert K. Mertel
Multi-Volume EMC Encyclopedia Series, Volume I
Published by Don White Consultants, Inc.
Route 1, Box 450, Gainesville, VA 22065
1978, Clothbound, 175 pages
Price $27.50

The author, a recognized authority in the field of international regulation of radio frequency interference, has written this book as a digest of international, regional, and national radio frequency interference control requirements for consumer, industrial, and commercial equipment that consumes, processes, or generated electrical energy. It is of principal interest to engineers and managers who make products for the international market; and who, therefore, must be familiar with the importing country's requirements. The objective of this assembly of requirements from many countries is to help eliminate trade barriers that may occur if a product does not meet the radio-frequency regulations of an importing country. In some instances, ignorance of these regulations has caused rejected orders, expensive modifications, and loss of reputation.

The book is roganized into six chapters dealing with the various aspects of RFI regulations. Chapter 1 lists and describes the various international organizations and organizations in the USA that issue standards. RFI standards of each organization are listed with prices and the procedure for obtaining them. Chapter 2 on approval and certification procedures presents administrative procedures for obtaining official approval of product compliance with RFI requirements. A truly international certification system for RFI does not yet exist. In the European Common Market there is an effort underway to harmonize the legal aspects of RFI control between the EEC member countries. In the USA there is a mixture of voluntary industry control and enforcement by the FCC for some types of equipment. Certification procedures for Canada, West Germany, United Kingdom and other national agencies are explained.

Chapter 3 is concerned with CISPR RFI limits and the limits imposed by regional and national authorities. The regional authorities cited are the European Economic Community and the Eastern European countries. Together, these are the closest thing to an international limit now existing. The national limits are discussed on a country-by-country basis from Australia to United States of America, 24 countries in all.

RFI instrumentation is described in Chapter 4. Basically, this is CISPR type instrumentation, generally referred to as "quasi-peak" instrumentation. Examples of commercially available instrumentation are given. The use of other instrumentation, such as spectrum analyzers and peak-type instrumentation and the data conversion to CISPR data parameters is explained.

Chapter 5 reviews the methods and techniques required to measure RFI. The methods described are based on CISPR recommendations with some additional practical measurement approaches. National regulations and CISPR recommendations require susceptibility testing only for radio and TV receivers. Consequently, only susceptibility testing of receivers is considered in this chapter.

The trend of RFI regulations is discussed in Chapter 6. The author predicts that steadily increasing cooperation among engineers working in the field of standardization will result in progress toward the use of the CISPR limits and measurement methods as a worldwide standard within the next 5 to 10 years.

An appendix is dedicated to safety and shock hazard regulations. Safety requirements for electrical equipment are considered because safety of equipment will determine the RFI-preventive techniques such as grounding, shielding, wiring, and filtering. IEC Publication 65, "Safety Requirements for Mains Operated Electronic and Related Apparatus for Household and Similar General Use," endorsed by over 22 countries, is discussed in some detail as a typical safety regulation. Ionizing radiation, shock hazard, insulation requirements, and the safety earth terminal also are discussed.

Each chapter and the appendix is well documented with references for the user who wants to dig deeper into any facet of the subject. In addition, there is a detailed index.

Your reviewer feels that this book will be helpful to anyone planning to move his electrical/electronic product from a national market into the international marketplace. It will give him an insight into the requirements, limits, test procedures and safety requirements of each country in which he would sell his product. To the engineer, it will introduce him to limits, measurement instrumentation and techniques somewhat different from those currently used in USA specs and standards. In view of the author's prediction that CISPR limits and measurement methods will become a worldwide standard within 5 to 10 years, it is not too soon to become familiar with the subject of this book.

"Man-Made Radio Noise"

BY

Edward N. Skomal
Published by Van Nostrand Reinhold Co.
135 West 50th Street, New York, NY 10020
1978, Clothbound, 350 Pages
Price $19.95

The author, Edward N. Skomal, has studied natural and man-made radio noise since 1964. He is currently a radio systems engineer with the Aerospace Corp. in El Segundo, CA. According to the author, man-made radio interference is a problem that affects everything from air travel and ship navigation to heart pacemakers and the car radios. It is an all pervasive part of the environment that we live and work in. It increases in a direct ratio to the extent that our civilization becomes computer/electronic oriented. At the same time, it looms larger as a bothersome source of interference.

The author has organized his subject into 7 chapters. Chapter 1 defines man-made noise and identifies four types; coherent transmitters, restricted radiation devices, ISM equipment, and incidental radiation devices. This is distinguished from naturally occurring radio-noise sources; atmospheric, galactic, disturbed solar, and Jovian. Data are presented to show the strengths and relationships between the various noise sources.

Chapters 2 and 3 present the available experimental data on automotive ignition and electric power facilities that are of the most utility and the greatest reliability, with the exception that these measurements, drawn from numerous studies, provide a detailed assessment of the features of the radiated fields of automotive and power utility sources. There is a development of the best analytical representation of either the mean radiated signal power or field intensity, depending on availability and utility for these noise sources. Chapter 2 includes the development of a competent model for the envelope statistics of automotive ignition noise applicable both to stationary vehicles and automotive traffic.

Chapter 4 looks at the industrial, scientific, medical, consumer, and transportation sources of radio noise. The author explains the generation of incidental radio noise from industrial ovens, electric welders, mining equipment, and neon lighting. The data presented show the typical spectral energy distribution from various of these sources. There is a similar treatment for consumer oriented products such as garage door openers and gas discharge lighting fixtures. These particular noise sources are the most common and have the highest intensity.

In Chapter 5, the author presents the theory of the envelope statistics of man-made radio noise. Developed in this chapter are the amplitude probability distribution and the lower-order moments of the noise envelope for two classes of noise emitters defined in relation to the bandwidth of an observing or affected receiver. This is a comprehensive analysis of the noise-envelope statistics based upon and summarized in the works of Middleton. Some measured data is presented to permit an assessment of the validity of the models.

Chapters 6 and 7 treat man-made incidental noise from the viewpoint of a composite interference that is most commonly encountered by wireless systems operating in or above urban areas. In Chapter 6, a great deal of measured data is presented for surface man-made noise in a composite metropolitan area. Its strength and distribution in relation to frequency are shown for business, residential, and rural class areas. Chapter 7 presents measured data from airborne surveys. Various polarizations, altitudes, frequencies, and offset distances are provided, and the dependence of incidental-noise level upon each parameter is determined using the surface representations of composite noise developed in Chapter 6.

Each chapter is bolstered with a list of references to satisfy the researcher who would delve further into the subject. An appendix on calculation of the voltage gradient at the conductor surface is taken from CISPR Publication 1, second edition, reference 30. An author index and subject index concludes the book.

With escalating government regulation of the radio-noise environment, a form of urban pollution, there is a need for an exact understanding of the cause, intensity, distribution, and growth of man-made incidental interference. Several sections of this volume provide an understanding and insight that will be valuable in intelligently planning a metropolitan-area noise-abatement-and-control program. By assembling the present experimental and theoretical informationon the man-made incidental-noise phenomenon into a single volume, those areas of this field that are substantially incomplete or omperfectly understood will stand in clear contrast and serve as a guide for further exploration.

IEEE INSURANCE PROGRAMS AND OTHER NON-TECHNICAL BENEFITS AND SERVICES

AN OVERVIEW

by Leo Young,* IEEE Executive Vice Pres.

IEEE benefit programs from life insurance to AVIS car rentals came into prominence with the establishment of the Individual Benefits and Services (IB&S) Committee in January 1978. The Committee, of which I was the chairman in 1978, acts as an oversight committee to monitor existing programs, and it also carefully screens potential new programs, which it may recommend for IEEE Executive Committee approval.

How did it all start? Group insurance programs for membership organizations started on a limited basis in the 1940's by providing relatively low-cost disability income protection insurance primarily for members of professional organizations with a high proportion of persons who were self-employed. By the late 1940's, these plans were relatively widespread for state and county medical, bar, and accounting organizations. In 1949, the American Society of Civil Engineers (ASCE) launched one of the first national membership plans. The ASCE Program started with disability income insurance and was the first group insurance program for a national engineering, scientific, or technical organization. During the 1950's and '60's, the other major engineering organizations and the vast majority of individual membership organizations started membership insurance programs. During the several decades of development, the scope and variety of different coverages broadened considerably.

A disability income protection insurance program was started for one of IEEE's predecessor societies, the American Institute of Electrical Engineers (AIEE) in 1961, which was taken over by the IEEE when the Institute of Radio Engineers (IRE) merged with AIEE in January 1963. The first Board of Directors of IEEE hotly debated the program and voted to continue it by a narrow margin.

What programs does IEEE offer? As time went on, new insurance programs were added. A list, together with number of participants at the end of 1978, is shown below:

Disability Income	5095
Major Hospital	2772
Life Insurance	36,799
Family Members	37,071
Accidental Death and Disability	6964
In Hospital	4238
Excess Major Medical	5707
Auto/Homeowners	158
Group Annuity	43
Major Medical	102
Total Members	61,878
Family	37,071
Participation	98,949

The program with the largest number of participants is the life insurance program (over 36,000 IEEE members, plus over 37,000 family members - spouses and children). This program was once listed in a survey as the best of about one hundred group insurance plans. It is till, probably, by far the best program of its kind available to engineers. If you haven't looked into it, you should.

A departure made by the committee in 1978 was to negotiate a car rental discount with AVIS. It started in September 1978 with a 15% discount, which was increased to 25% in February 1979 because of the larger-than-expected participation.

A program now being looked into by the IB&S Committee is a health test program. If it seems feasible, it will be offered to IEEE members, possibly as early as this calendar year, but only if it passes a number of stringent criteria.

Who participates? There has been speculation that some engineers join IEEE only or mainly because of its good insurance programs. It is true that many people say they recover their IEEE membership dues and more, when they compare costs with the next-best insurance product available.

To lay the question to rest, a computer statistical analysis was run to see how many IEEE group insurance policy holders also belong to an IEEE Group, Society, or Council, the latter being a reasonable criterion of technical interest. The percentage turned out to be 48.5% (counting only non-student members). The corresponding number for all IEEE (non-student) members if 54.5%. The closeness of the two numbers (48.5 and 54.5) seems to indicate that IEEE group unsurance policy holders, as a whole, are typical of IEEE members, as a whole.

How does IEEE monitor? IEEE prefers not to hire a staff or make any profit on these programs (as do some other organizations). Instead, IEEE deals with an independent administrator of its insurance programs (the Smith-Sternau organization), whom the IB&S committee monitors closely. Thus, IEEE does not benefit financially from the programs; a disclaimer is added on offerings to make it clear that IEEE's ro role is that ot the "honest broker." IEEE selects or monitors the programs carefully, but ultimately the business is transacted directly between the client (the IEEE member) and the agent, and is their sole responsibility. The principal advantages to the IEEE member are:

- Lower cost
- Independent monitoring
- Convenience

The current chairman of the IB&S Committee is Art Killin, while I act as coordinator with the Executive Committee. The cognizant staff members are Leo Fanning in the Washington office and Charles Stewart in the New York office. If you have any questions or suggestions, feel free to write to us.

*Dr. Young became the first chairman of the Individual Benefits and Services Committee, established by the Board of Directors, in 1978.

PROFILE - IEEE AWARDS BOARD

One extremely important activity of a professional society is the recognition of distinguished achievement and service of its members. IEEE accomplishes this through an extensive awards program, which is administered by the IEEE Awards Board, chaired in 1977-78 by Nathan Cohn. The 1979 Chairman will be Joseph E. Rowe.

"In a professional society, the recognition by one's fellow engineers constitutes the best award for one's work," Dr. Cohn says.

IEEE Awards serve several purposes: 1, They express recognition for outstanding contributions to electrical and electronics engineering; 2, They are an incentive to youth to emulate excellence; 3, They publicize the achievements of the profession and its members; and, 4, They identify IEEE with these achievements.

The IEEE Awards fall into six categories: Medal of Honor, Major Annual Medals, Field Awards, Service Awards, Prize Paper Awards, and Scholarships.

"All members have the opportunity to recognize others, and to be recognized themselves if they have done something outstanding," Dr. Cohn says.

In some cases, nominees for awards must be IEEE members. Other awards are open to all, regardless of membership. All individual members, Groups/Societies and Sections and other organizational entities of IEEE may nominate candidates for awards.

"It is a question of individuals accepting the responsibility as professional people to initiate the nominations for work they know, by people they respect. The hope is that nominators will have a sense of commitment to the task, to make a worthwhile contribution," Dr. Cohn says.

All nominators must support their nominations with relevant information.

"It is a taxing task for the nominator to fill out forms and gather documentation. It takes time and effort. But, like anything else, the result is worth the effort," Dr. Cohn says.

The Awards Board, with 17 members appointed by the IEEE Board of Directors, processes the nominations and makes recommendations to the Board of Directors for each Award. The Awards are presented at major IEEE meetings and conferences of wide scope and interest.

The Medal of Honor and the five Major Annual Medals designate achievements having general significance for the profession. The 11 Field Awards recognize unusual accomplishment in a particular field of interest. The two Prize Paper Awards are for publications significant in their excellence. The two Scholarships aim to support superior students. In addition, the IEEE Service Award recognizes outstanding service to the Institute.

For more information on the awards or to request the necessary forms for nomination, contact Una B. Lennon, Secretary to the Awards Board, IEEE Headquarters, 345 E. 47 St., New York, NY 10017; 212-644-7882.

UNITED VOICE FOR ENGINEERING PROPOSED

The need for a single organization to speak for engineering was discussed at the recent EJC Assembly. The new organization - to be called the American Engineering Councils - would combine the purposes of Engineers Joint Council (EJC), the Association for Cooperation in Engineering (ACE) and other federated activities of the societies.

ENVIRONMENTAL QUALITY COMMITTEE

The EQC is investigating the possibility of sponsoring a public forum on electrotechnology and the environment. A speakers bureau has been established for meetings covering the application of electro-technology in improving the environment. A position paper is being developed on the subject. Further details: Conrad R. DeSieno, 212-422-4800, Ext. 303.

WANT TO BE A PART OF THE ACTION?

Calls for action by IEEE members on legislative issues of concern to the engineering profession can be heard on USAB's Information Line. Want to know what's happening in Washington? Call 202-785-2180.

EMC TRANSACTIONS INDEX AVAILABLE

A limited number of copies of the twenty year Index of the EMC Transactions are available - at no charge - by writing to:

IEEE Services Center
445 Hoes Lane
Piscataway, NJ 08854

NONE OF THE ABOVE

The State of Nevada includes "None of the Above" on its election ballot and it wins a good share of the elections even though the person with the highest vote count gets installed in office anyway. The main effect of this option, then, is that the person who wins the office does so because of votes for him, not because of votes against the other candidate(s). All of the anti votes are case as "None of the Ab Above."

What would happen in the IEEE employed such a balloting system? For example, consider the possible results in the Bayless-Hogan contest for Executive Vice President last year. Think of the anti Board votes that became anti Bayless votes and consequently Hogan votes. And think of the votes that went to Bayless from members who resented the idea of the considerable amount of money that was being spent by the Good Government Group on Hogan's behalf. If all these negative votes could have been cast for "None of the Above" might not the results have told a different story? After all, the winner had less than a 150 vote plurality.

Contemplate further the impact of such a choice on other contests and non-contests. Think of the valuable information it would yield. This concept, a recent innovation in Nevada, is also being pushed by one of the minor parties in California. When it might be considered by the Institute is left to the imagination of the reader.

(Reprinted from "IMPACT," Nov.-Dec. 1978)

ELECTROSTATIC DISCHARGE SYMPOSIUM

A symposium dealing with electrical overstress (EOS) and electrostatic discharge (ESD) effects on solid state microelectronics is being sponsored by IITRI, Reliability Analysis Center. It will be held on September 25-27, 1979 at Stouffer's Denver Inn, Denver, CO. The symposium will pay special attention to the reliability problems associated with ESD during processing, packaging, handling and testing, and design steps which can be implemented to reduce the ESD hazard.

For registration and general conference information, contact Mr. Ray Walker, IITRI/RAC, RADC/RBAC, Griffiss AFB, NY 13441; Tel.: 315-330-4151.

IEEE APPROVES REVISED POLICY STATEMENTS ON REGISTRATION OF ENGINEERS

At its year-end meeting on December 10-11, the Board of Directors approved two revised policy statements on Registration of Engineers, one reflecting the transnational scope of IEEE and the other directed toward residents of the U.S.

The first policy statement, PROECTION OF THE PUBLIC, treats registration as a means for promoting the public welfare and is applicable to all countries. The policy expresses the fundamental and valid purposes for licensure and registration of engineers, namely, "to protect the health, safety, and welfare of the public." It further states that IEEE "shall interface whenever and wherever appropriate with legislative and regulatory bodies" in matters of legislation, regulations, codes or customs which impact on electrical and electronics engineering.

The second policy statement, REGISTRATION OF U.S. ENGINEERS, assumes the existence of the broader policy statement and focuses on registration procedures and reciprocity. It pledges IEEE's active participation "in the development of sound registration procedures which will adequately protect the public interest while imposing a minimum of restrictions on the practice of qualified engineers." The policy further states that IEEE "promotes complete reciprocity through uniform requirements for licensure and registration."

FOURTEENTH INTERNATIONAL MICROWAVE POWER SYMPOSIUM

The Fourteenth International Microwave Power Symposium will be held in Monaco from June 11-15, 1979. On June 11th, there will be a series of "short courses" beginning with a combined morning session on "Fundamental Properties of Microwave Power." The afternoon will consist of three sessions running concurrently on "Microwave Oven Use in the Home and in Catering," "Microwave Industrial Applications and Measurements," and "Biological Effects and Safety Aspects of Microwaves."

June 12th, 13th and 14th will be devoted to the presentation of original papers which, among others, will include: industrial applications and microwave systems; energy balance of microwave processes; equipment safety, RF interference and frequency allocations: engineering, economics and marketing; medical and biological applications and effects of microwaves; microwave properties of materials; food industry applications; microwave power generation, transmission and rectification; domestic and commercial microwave ovens; and microwave instrumentation and measurements.

The symposium, as organized by the French Committee for Electroheat (C.F.E.) in cooperation with IMPI, will have English and French as its official languages, with simultaneous translation during sessions. Registrants will have the opportunity to go on field trips and to view the exhibits of microwave equipment at the symposium site.

For additional information, contact: IMPI, Box 634, SUB 11, Univ. of Alberta, Edmonton, Alberta, Canada T6G 2E0; Tel.: 403-433-6045, or Comite Francais D'Electrothermie, 79 rue de Miromesnil, 75008 Paris, France; Tel.: (1) 522.91,60/(1) 387.53.29.

SOCIAL IMPLICATIONS OF TECHNOLOGY

The first Award by the Committee on Social Implications of Technology for "Outstanding Service in the Public Interest" was presented to three employees of the San Francisco Bay Area Rapid Transit at WESCON in September. The three engineers, Holger Hjortsvang, Robert Bruder and Max Blankenzee, suffered considerable personal loss in their efforts to bring attention to unprofessional engineering practices in the design of the BART system. The cash award with the CSIT certificate was supplied by an anonymous IEEE member. As a result of this case, the IEEE has established a procedure for supporting engineers whose jobs could be in jeopardy for upholding the Institutue's code of ethics for the protection of the public.

WWV RESUMES 20 MHz SERVICE

Standard time and frequency station WWV, located near Ft. Collins, Colorado, and operated by the National Bureau of Standards, has resumed broadcasting on a frequency of 20 MHz. Increased sunspot activity is improving propagation conditions at 20 MHz, thus giving that frequency the most reliable long distance reception (especially on the U.S. east coast) for many of the daylight hours.

Service on the new frequency will continue as long as conditions warrant. WWV service will continue unchanged on 2.5, 5, 10 and 15 MHz, and all other NBS radio broadcasts (WWVB, in Ft. Collins, and WWVH, in Hawaii) also will remain unchanged. The National Bureau of Standards has broadcast time and frequency information from station WWV since 1923. The signals as broadcast are accurate to within one part in 100 billion. They serve users as varied as electric power and telephone companies, radio and television stations, and navigators of ships and planes, all of whom depend heavily on precise time and frequency information.

EMC COMPUTER MODELS

A special issue of the EMC Transactions is being organized on the subject of EMC Computer Models. Emphasis will be on models which are accurate and yet simple enough for easy implementation by the average reader. Information on such models is now being requested by the issue organizer. If you care to contribute to the issue, please contact:

Dr. Andrew Farrar
IIT Research Institute
ECAC, North Severn
Annapolis, MD 21402
Tel.: 301-267-4321

BUDGET SURPLUS FOR 1978

According to the forecast of Controller Tom Bartlett, IEEE's General Funds for 1978 will show a net of $750,000 over expenses, including investment income, following a year in which many operational areas performed well ahead of budgeted income.

At the same time, IEEE's Societies are reporting a $600,000 year-end surplus - down from 1977's year-end surplus of $1.25 million.

The above quoted figures incorporate a later revision of those reported in February's "The Institute."

INSTITUTIONAL LISTINGS

The IEEE Electromagnetic Compatibility Society is grateful for the assistance given by the firms listed below and invites application for Institutional Listings from other firms interested in the electromagnetic compatibility field.

SERVICE DIVISION, AMERICAN ELECTRONICS LABS., INC., Richardson Rd., Montgomeryville, PA 18936
EMI/EMC, shield, enc. consult. test. & anal.; Scrn. rm. (incl. for large veh.); Comp. instr. for Mil. EMI test.

AILTECH, Los Angeles Operation, 5340 Alla Road, Los Angeles, CA 90066
Computer operated/automatic/manual EMI test system, EMI meters, antennas, and components.

ELECTRO-METRICS, Division of Penril Corp., 100 Church St., Amsterdam, NY 12010
EMI meters and automated systems incl., calculator/computer-based;20 Hz-40 GHz*MIL-STD/CISPR/VDE/SAE/FCC.

EMERSON & CUMING, INC., Canton, MA—Gardena, CA—Northbrook, IL.
Eccoshield RF shielded chambers—Eccoshield EMI/RFI gaskets and materials—Eccosorb anechoic chambers.

METEX ELECTRONIC SHIELDING GROUP, A Unit of Metex Corporation, 970 New Durham Road, Edison, NJ 08817
EMI/RFI, EMP & EMC Shielding Materials, Custom-Engineered Conductive Components, and Coatings.

CENTRALAB/USCC, 4561 Colorado Blvd., Los Angeles, CA 90039
EMI/RFI Filters, Monolithic Ceramic Capacitor (Chips).

TECKNIT, INC., 320 N. Nopal St., Santa Barbara, CA 93103
EMI/RFI Shielding Products, Conductive Components, Textiles, Coatings, Adhesives, and EMC Windows.

HONEYWELL, ANNAPOLIS OPERATION, P. O. BOX 391, Annapolis, MD 21404
Telephone (301) 224-4500
EMI/EMC/TEMPEST, R & D, Test and Analysis, Communication and Digital Design

CHOMERICS, INC., 77 Dragon Ct., Woburn, MA 01801
Telephone (617) 935-4850
EMI/RFI shielding materials: gaskets, adhesives, coatings, shrinkable cable shields

An Institutional Listing recognizes contributions to support the publication of the IEEE Newsletter and TRANSACTIONS ON ELECTROMAGNETIC COMPATIBILITY. Minimum rates are $75.00 for listing in one issue; $200.00 for four consecutive issues. Larger contributions will be most welcome. No agency fee is granted for soliciting such contributions. Inquiries, or contributions made payable to the IEEE, plus instructions on how you wish your Institutional Listing to appear, should be sent to M. Bonaviso, The Institute of Electrical and Electronics Engineers, Inc., 345 East 47 Street, New York, NY 10017.