IEEE ELECTROMAGNETIC COMPATIBILITY GROUP

NEWSLETTER

ISSUE NO. 69 - July, 1971

EMC PROBLEMS AND SOLUTIONS

Do you have an EMC related problem that you have been unable to solve? Would you like to have the assistance of several thousand "EMC experts?" If so, submit your problems to the EMC Newsletter so that they may be presented to the EMC community for ideas and solutions.

All of the problems received will be reviewed by the editorial staff and those judged appropriate will be printed in future issues of the Newsletter. Hopefully, some of our readers will be able to offer excellent solutions or suggestions to your problem, and the Newsletter will print those solutions or suggestions that are considered to be most promising. If space is available, several alternative solutions will be presented. Thus, all of the readers will profit from the exchange of problems and ideas. In addition, copies of all solutions, suggestions, or comments received will be forwarded to the reader that submitted the problem.

We hope to present a wide variety of problems concerning the many areas related to EMC such as:

- Prediction and Analysis
- Suppression and Control
- Measurements and Acceptance Testing 6
- Specifications and Standards
- Circuit Design
- Quality Control and Reliability

System Effectiveness and Performance

EDITOR ROBERT D. GOLDBLUM

- Management, Economics, or Legal .
- Frequency Allocation and Assignment
- Philosophy
- Education .
- Ethics

Problems may include one that you have (1) been unable to solve; (2) solved but would like to compare your solution to the readers' solutions; or (3) solved and would like to share your solution with the readers.

In preparing your problem, please try to limit it to one page of single spaced type. A simple sketch or figure may accompany the problem if required. Your name and company affiliation will accompany the problem unless you indicate a desire to have this information withheld.

The success or failure of this Newsletter feature depends entirely on reader participation. If you will send your problems and solutions, the column will provide a media for exchanging knowledge and ideas and will be of immense value to all of us. If there is sufficient reader interest and participation, the EMC Problems and Solutions will become a regular feature of the Newsletter. Don't make others "carry the ball;" submit your EMC problems immediately to:

William G. Duff Atlantic Research A Division of The Susquehanna Corporation Shirley Highway at Edsall Road Alexandria, Virginia 22314

OINDINA NAZ

LEON VALLEY 6024 CAMMIE WAY EDWIN L BRONAUG

EDWIN L BRONAUGH

ELECTROMAGNETIC COMPATIBILITY GROUP NEWSLETTER is published quarterly by the EMC Group of the Institute of Electrical and Electronics Engineers Inc., 345 East 47th Street, New York, N.Y. 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.

103

TX 78238

MEETINGS AND EVENTS

1971 G-EMC SYMPOSIUM EXHIBITS IN NEW YORK

If you attended the March IEEE convention in New York and searched hard enough, you would have found the booth rented by the 1971 EMC Symposium. Tucked away in a dead-end corner, volunteers from many organizations help to staff the exhibit with exhilaration and determination. It is gratifying that so many persons stepped forth and donated many hours of tiring effort.

The exhibit, which was managed by Symposium publicity chairman, Frank Hamell, promoted the G-EMC as well as the Symposium. In addition to many committee members, our thanks go out to the following individuals and their companies and the New Jersey Coast EMC Chapter for their support.

AEL	Service	Corp
C.	Anderson	-
R.	Barton	

RCA Service Corp. J. S. Hill

USAEL-Fort Monmouth J. J. O'Neil

- <u>Southwest Research Corp.</u> J. Cory R. Schulz
- W. Kesselman J. Porok

G. Johnson

<u>Individuals</u> Max Brown Rex Daniels

Fairchild Electro-Metrics D. Mc Kay

Dispite its occultation, the exhibit was successful and a worthwhile endeavor.

NEWSLETTER STAFF

EDITOR: Robert D. Goldblum G. E. RESD 608 Gawain Road Plymouth Meeting, Pa. 19462

ASSOCIATE EDITOR: (Chapter Chatter) Ira M. Berman 1169 S. Country Club Drive Niskayuna, N.Y. 12309

ASSOCIATE EDITOR: (Steering Committee Report) William G. Duff Atlantic Research Corp. 8601 Greeley Blvd. Springfield, Va. 22150

CONSULTING EDITOR: Rexford Daniels P.O. Box 129 Concord, Mass. 01742

ART & DESIGN: LIVEZEY GRAPHICS Executive Plaza Fort Washington, Pa. 19034

SYMPOSIUM FEVER

Symposium fever is spreading across the Bastern United States as preparations for the 1971 International EMC Symposium draw to a conclusion. According to the chairman, Bob Goldblum of G. E. RESD, there are good reasons to be excited about the July 13-15 meeting to be held in Philadelphia. Approximately a half dozen of the 50 + papers will be presented by their European authors. Unusual news media attention is anticipated, to cover papers including "EMI in Cardiac Pacemakers," "the Effect of a Continuous VHF Signal on Animal Growth," "EMI Propogation in Built-up Areas" and the many technical aspects of Spectrum Pollution and the Compatibility of Home and Industrial Devices. Approximately 500 engineers and scientists from throughout the world are expected to probe the technical sessions on EMC Standards, Shielding, Filtering, Digital Systems, System Compatibil and Interference Control.

The highlight event will be the Awards Luncheon, at which Mr. L.A. deRosa, Assistant to the Secretary of Defense for Telecommunication* will give the principle address entitled "Electromagnetic Compatibility - Cost and Promise". There will be many other highlighted features such as the Keynote address given by Hal Gauper, of G.E., entitled "Environment and EMC", and papers including "The FCC Looks Ahead to 1970-1980" by W.E. Ours, FCC, "Review of Prediction Methods for Ground Wave Field Strength" by J. R. Wait, Institute for Telecommunications Sciences, "Radiation Control Act-1968-Performance Standards and Test Criteria" by R. L. Elder, Bureau of Radiological Health, and many others.

For the working engineer, there are six evening workshops scheduled covering Grounding and Bonding Interference in High Voltage Systems Measurement and Techniques Models for Setting Interference Limits Shielding Systems EMC Management

Programs and reservation forms can be obtained by writing P.O. Box 328, Plymouth Meeting, Pa. 19462. Plan to join the excitement, visit the free exhibits and partake in the growing future of the interference technology.

*DOD has established a new management office, <u>TRI-TAC</u>, to coordinate development and acquisition of <u>selected tactical communications</u> <u>equipment</u> for joint use by the Military Services. TRI-TAC will function under the direction of Louis A. de Rosa, Assistant to the Secretary of Defense for Telecommunications; it succeeds Project Mallard (whose funds Congress cut off). U.S. Army BGen. Harold W. Rice is Director of the TRI-TAC Office.

UNDERGROUND TRANSMISSION CONFERENCE

The First Underground Transmission Conference to be sponsored by the Power Engineering Society of the IEEE will be held in Pittsburgh, Pennsylvania on May 21-24, 1972. It will cover all technical and related aspects associated with the transmitting underground of 115,000 volts and above of electrical power. AD COM REPORT OF MEETINGS ACTIVITIES, MARCH 1971 (Condensed)

Discussion is under way between our chairman, Dr. H. Schlicke, and the organizers of the Eurocon Conference (IEEE Region 8, Lausanne Switzerland, October 18-22, 1971) regarding an EMC Session there. Members willing and able to participate are urged to contact Dr. Schlicke.

Our group has been informed by ANSI Committee C63 (that provides USA representation to CISPR) that CISPR is considering New York City for its Plenary Assembly in 1973. ANSI/ C63 indicated that the CISPR delegates are interested in attending an EMC Symposium while they are in the USA. CISPR is the acronym for the French name of the Special International Committee on Radio Interference. Essentially all the European countries as well as USA, Canada, Japan and a few others participate in the work of CISPR. The delegates to the Plenary assembly are the outstanding experts, both in government and in industry, in the area of radio interference regulation and control.

With the consent of our chairman, I contacted both the steering committees of both the New York and San Francisco Symposia, and asked whether a change in dates were possible. The replies were on the whole favorable, both parties agreeing to the swap in dates.

I would call attention that at the SAE Automotive Engineering Congress in Detroit, January 11-15, 1971, one session was devoted to the subject of Automotive Radio Frequency Interference.

1971 SYMPOSIUM RECORD DISTRIBUTION LIMITED

Only 1000 copies of the conference record containing the full text of the papers to be presented at the 1971 International EMC Symposium will be printed. This decision which supersedes an earlier plan to print only paper abstracts, was prompted by good financial indicators such as the projected registrations will exceed the budget figure as already has the number of exhibitors and company sponsors. The records will be distributed in the following order of priority:

- L. To all persons who register for the 3 day Symposium (500 est.)
- 2. IEEE Headquarter subscriptions (250)
- 3. Ad Com disposition (50)
- 4. Sales (200 est.)

NOTE: If you cannot attend the Symposium order your copy today: \$6.00 to IEEE members; \$12.00 to all others. Make checks payable to 1971 EMC Symposium and mail to Box 328, Plymouth Meeting, Pa. 19462. Orders will be honored on a first-come first-served basis and will be filled with surplus copies after the Symposium.

<u>REMINDER</u>: The records will <u>NOT</u> be distributed free to G-EMC members and limited quantities are available.

CROSSTALK FROM THE EDITOR"S MILL

Many of those who attended the IEEE convertion will agree with your Editor, he believes, that the G-EMC Symposium deserved better than a location at the bottom of a dead-end aisle on the third floor. At least we were not alone; the International communications Conference, which will meet in Montreal a month before our Philadelphia Symposium, suffered almost identical isolation. IEEE Convention management should provide a prominent location, preferably at the top of the stairways on the second floor, where all imminent conferences could display and present information in essentially equal status. Since much - if not most - of IEEE's vitality now resides in the Societies and Groups, it behooves the Board of Directors to consider this matter carefully and appropriately rectify the situation.

(Excepted from the G-EMC Jersey Shore Chapter Newsletter).

APRIL 1972 CHARTER FLIGHTS TO JAPAN

A number of charter flights are being organized in connection with INTERMAG 1972 to take IEEE members to Japan for $2\frac{1}{2}$ to 3 weeks in April 1972. These flights will make a trip to Japan possible at less than half cost (Compared with 14/21 day excursion fares, the lowest available to individual travelers). Flights will be on jet aircraft of IATA Scheduled Airline Companies. But to make such cheap transportation possible, your reservation and downpayment by October 1, 1971 is required to reserve the necessary planes. If you are interested in receiving additional information, write to: INTERMAG Irvine's Travel, Box 2198, West Lafayette, Indiana 47906.



Symposium Chairman Bob Goldblum (left) and Publicity Chairman Frank Hamell are standing in the EMC Symposium's exhibit booth at the IEEE Convention in New York City, March, 1971

CHAPTER CHATTER

BY IRA M. BERMAN

A robin tip-toes carefully across the soggy, still-new grass and peers at his reflection in the puddle, growing daily with the soring rains on ground already saturated from melting snows. Two squirrels chase each other around the trunk of an elm, stopping only to dart occasionally to the ground, dig up nuts buried last fall, and gulp down some quick energy. The woodpecker high on the naked birch tree beats out a staccato rhythm, looking for breakfast. Spring sidles in to the north country--with water in the cellar, pot holes in the highway, and the spectre of April 15 staring into your pocketbook. The reluctant arrival of spring above the 43rd parallel has given rise to the old joke that the north country has two seasons: winter and August 15.

Philadelphia seems to have more summer than Schenectady, and this summer Philly will be even hotter than usual. Why? Just a few of hundred (thousand?) EMC Engineers solving the world's EMC problems, that's all.

'Let's violate our normal good manners and let the host city blow its own horn first:

PHILADELPHIA

On January 20, 1971, Mr. Joe Webb of the Lindenwold High Speed Line spoke on Automatic Train Control, and especially how these controls are used on his southern New Jersey commuter line. I sure wish I was there in my capacity as unofficial train buff. They are planning another meeting in the late Spring, but as of the time of this writing details are unknown. Except for the July Annual Symposium, the Chapter plans no more activities-but I think the Symposium is enough! Good luck, and I hope to see you all in July.

ATLANTA

The Georgia folks report a meeting on March 8, 1971, where Bill Free, Senior Research Engineer at the Georgia Tech Electronics Research Division spoke on "Biological Effects of Electromagnetic Radiation." 12 members and 15 non-members attended, and Hewlett-Packard provided the meeting place. What with the current furor (at least noise) over microwave ovens and spectrum pollution in general, this should be a really good topic that all Chapters might consider.

And the April 1971 G-IAP Newsletter mentioned a note about the Atlanta Chapter in our Newsletter from a few issues ago, and from this column, too. It's nice to know that so many folk read the Chapter News.

BOSTON

Officers will be elected May 19, but pubications deadlines sort of cut me off before I could get the names. Next issue, without fail.

Since last report, when I mentioned three meetings in late 1970, Boston has had one more: May'19 (with elections), at the Sylvania/GTE facility. This meeting was joint with G-AES (as were the ones in September and October). Mr/ F. E. Garlington of Sprague spoke on Electromagnetic Pollution (there's that topic again). Boston reports a most successful Symposium on Diversification in Electrotechnology, with an attendance of 106. It was conceived and co-sponsored by four Chapters, and the guiding hands were: Robert Mailloux, Vice Chairman, G-AP; Guideon Kantor, Chairman, G-AP; Chester Smith, Chairman, G-AES; Robert Berkovits, Chairman, G-EMC; and Harlan Howe, Chairman, G-MTT. The date: April 29, 1971, at the U.S. Department of Transportation's newly acquired center in Cambridge.

Good show!

CENTRAL TEXAS

Elections are due in San Antonio in May, so we cannot report the new officers.

Two meetings came and went this past winter. Dr. William Hartwig of the University of Texas spoke on "Current Activities in Electronics Materials Labs" on February 17 (no pun intended; that's what Mike Brennan wrote); four weeks later LT. Gary Ford of the USAF School of Aerospace Medicine used as his topic "EMC of Biomedical Electronic Equipment Aboard Air Evacuation Aircraft." Now <u>there</u> is a service you don't want to interfere with when you use your electronic garage opener.

Would you believe an average attendance of 42.5 per meeting? Of course, that includes one joint meeting with the Central Texas Section, but that is still nothing to sneeze at today.

It's nice to hear of Chapters that are still going strong. CHICAGO

No news from Chicago this issue. How is the 1972 Symposium going?

LOS ANGELES

No news from LA, either, Is it true about California breaking off into the Pacific?

MOHAWK VALLEY

The Mohawk Valley Chapter never fails to amaze me. It is one of the smallest in total membership, but far and away one of the most active. Then had a meeting on November 19, 1970, where Dr. Jose Perini of Syracuse University spoke on "Optimization Methods for Antenna Pattern Synthesis;" on January 21, 1971, Dr. J. Bussgang of Signatron presented "Changing Times" (I wonder what that was about?); on February 23, Dr. D. Weiner of Syracuse U. discussed "Mathematical Modeling of Communications Receivers;" and Dr. D. C. Ross of Ross Communications Engineering helped the members in "Avoiding EMC in ATC Data Acquisition" on March 25. All the meetings except the January one were held in Patty's Stagecoach Inn.

And would you believe that 48 people showed up in the coldest, snowiest January on record?

Installation of Officers is planned for the May 20 meeting. The members are preparing several papers for the July Symposium. So there, Los Angeles and Boston and Atlanta--can you match that for get up and go?

NEW JERSEY COAST

It must be raining around Red Bank: I have received a flood of information and

goodies from the Chairman, Maxwell Brown. And just feast your eyes on the speakers at their meetings: on October 13, 1970, Dr. H. M. Schlicke, Chief Scientist of the Allen-Bradley Co. and Chairman of G-EMC, spoke on "Challenges and Opportunities of our Work on EMC;" Rex Daniels, our Editor Emeritus, gave one of his excellent lectures, "How to Protect Yourself in an Electromagnetic Environment," on November 10; Christmas came to 45 members and guests on December 15; Don White, President of Don White Consultants, competed with the N.Y. Playboy Club bunnies on March 4, 1971, when he presented "A Critique of EMC Specifications" (and I'll bet Don won); and Mr. W. C. Berryman Project Engineer at Bendix, filled the members in on "EMC Aspects of Apollo Lunar Surface Experiments Package (ALSEP) for Flights 14 and 17." Whew!

And! On May 19, Dr. Len Milton, Chairman of the Board of Filtron, spoke on "Vulnerability of Computers." Can you imagine what one "glitch" would do to a computer during a transmission from, say, Jupiter?

New Jersey Coast also sends me some fine looking photographs and a copy of their membership certificate, which is given to each member of their Chapter.

These folks are "coasting" through the current employment unpleasantness, apparently none the worse. Of course, that last pun could be the straw....

SAN FRANCISCO

"I left my heart in San Francisco..." Please send it back with some news, if you will.

SEATTLE

Did you know that Seattle in 5° in lattitude further north than Schenectady? And that it rarely snows in Seattle? And that I haven't heard from them in months?

WASHINGTON, D.C.

Washington and Boston were the only Chapters that noted I made a mistake on my questionnaire that I send out to get Chapter info. (It was a wrong date.) And I note that Washington has done quite well with their meetings, too: on November 19, 1970, Don Cook, EMC Group Leader at RCA Moorestown, described the "EMC/EMI Program for the Aegis System;" Wilfred Dean, Director of Frequency Management for OTP, talked about "The U.S. proposals for the Space WARC" on January 21, 1971; and COL. Thomas W. Doeppner, Deputy Director of Electronics for Army ACS, passed the word on the "Department of the Army EMC Program." What sounds like the best meeting of the season came too late for a full report; May 20, when Dr. David B. Nelson of the AEC spoke on "EMP Effects."

They are still meeting at Blackie's House of Beef. Hey, fellows: send me up a menu, so I can see what kind of place it is. Average attendance for 1970-1971 is 47. Is it the lectures--or the food? HOUSTON

Distressingly quiet down there.

TUCSON

I have a sort of old note from the Chapter

Chairman, Abul Rashid. It discusses the meeting of July 23, 1970. Nothing newer?

PHOENIX

Right on! We have a new Chapter! Their first meeting was held on April 13, 1971, with an election of officers. Chairman: Carl Jesperson/Motorola; Vice-Chairman: Bob Lash/ Salt River Project (that's where they get their water from); Secretary: Dwayne Awerkamp/ Motorola; Treasurer: Harold Niles/General Communications; Membership: Gen Simmons/ Mountain Bell; Arrangements: John Denny/ Honeywell. Fred Nichols presented his recommendations on the Economy and EMC at the meeting.

Congratulations! May you flourish!

Tourist: "How do you pronounce the name of our Pacific island state?" Native: "Havaii." Tourist: "Thank you." Native: "You're velcome."

No matter how you pronounce it, the news is that a Pacific Chapter-at-Large is being formed by Robert R. Ford, Chief, EMC and Measurement Branch, Pacific Communications Area (AFCS), USAF, 1268 Mokapu Blvd., Kailua, Hawaii, 96734 (a ZIP Code, even). Members from Hawaii, Japan, Okinawa, Phillipines, Thailand, Vietnam, and all points beneath the Southern Cross are welcome.

I have made a slight change in the format, primarily to save space. Bob Goldblum has requested that I try this way, as he is becoming page-limited, and he wanted to get in as much Chapter News as possible. I hope no one minds. Please send us your comments.

For those of you who remember my last column (two issues ago), I ended up on a gloomy note. No gloom here! It may not be coming up roses quite yet, but I think G-EMC still has a few sneakies up its collective sleeve. And if the ecologists ever figure out what "Spectrum Pollution" really means, look out world for G-EMC!

See you in July (I hope)!

MARTY



Left to right: Maxwell A. Brown, Chairman of New Jersey Coast Chapten G-EMC, Col. James D. Donnely; Dir. of Electronic Warfare Labs. USAECOM; Rex Daniels, President Interference Consultant, and Bruce Miller, Chapter Secy-Treasurer. Photo was taken during the November. 10, 1970 EMC Chapter Meeting.

PROGRESS & PRODUCTS

TRACKED AIR CUSHION VEHICLES

The Office of High Speed Ground Transportation of the U.S. Department of Transportation is currently planning for systems with vehicle speeds of up to 300 mph. At such speeds traditional steel wheels on a steel rail featured on conventional railroad cars are inadequate and other means of propulsion must be found. When the environmental drawbacks of turbo-jet or rocket engines are considered, a preferable choice of propulsion becomes electric power coupled with new modes of suspension that overcome the disadvantages of wheels.

The recent development of two well known principles offers an attractive solution to these problems: the Linear Induction Motor (LIM) propelling a Tracked Air Cushion vehicle. The motor's principle of operation is similar to that of a conventional electric motor in which magnetic energy is employed to spin a rotor. But there is a major difference: the rotor is replaced by a plate whose construction resembles the rotor after it has been unrolled and laid flat. The wound primary is installed in the vehicle and the rail is laid in the center of the vehicle guideway.

Research into the characteristics of linear induction motors has revealed a number of problems associated with controlling the speed of a LIM-powered vehicle.

Conventional electric locomotives are driven by direct current and their speed is controlled by raising and lowering the voltage. The LIM, however, is powered by alternating current and varying the voltage does not produce desirable speed control characteristics.

The power input to the vehicle must be fairly constant to permit stable operation. Linevoltage drops that occur at distances from power stations force the designer to adjust the internal dc voltage linkage so that it is adequate at both high and low voltage levels, placing an upper bound on the power factor. Secondly, when the vehicle brakes by reversing the inverter and the rectifier, the synchronous condenser now supplies the LIM's magnetizing current and its own capacity places a limit on the reverse thrust available for braking. SUPERCONDUCTING DEVICE MEASURES HEARTBEAT MAGNETICALLY

An article with the above title appeared in the April 1971 issue of the NBS Technical News Bulletin. Several paragraphs have been excerpted as follows:

The instrument, known as a magnetocardiograph, generates electrical signals that are proportional to the heart's magnetic pulses when it is placed in close proximity to the heart. When used to drive an oscilloscope or a strip-chart recorder, these signals provide a magnetocardiogram (MKG) of the heartbeat similar to an electrocardiogram (EKG).

By comparison, an MKG requires no electrodes to be attached to the patient's chest and therefore does not require disrobing. An MKG is also faster and more convenient than other methods. However, it does pose problems. For example, the earth's magnetic field must be compensated for and measurements must be made in a magnetically "quiet" environment away from extraneous fields generated by motors, power lines, laboratory equipment, etc. Successful experiments have been carried out in an abankoned mine shaft in the mountains west of Boulder.

In addition to biomedical applications, the superconducting sensor is useful for detecting magnetic anomalies in the earth's magnetic field distribution. Detection range depends on the strength of the anomaly, noise and gradient fluctuations of the ambient field. Submarine detection is one such possible application. Other areas of interest are geophysical exploration and paleomagnetism.

REPORT #3 ON SNIFFERS

The following has been excerpted from a report issued by Samual W. Daskam of F. G. Mason Engineering, Inc., Fairfield, Conn. Several paragraphs have been excerpted as follows:

In Report #1, "Utilization of Electronic Surveillance Equipment in Crime Countermeasure Programs", it was mentioned that the diode detection, going under several names, was a useful device for a "quick look". Since these devices are priced between \$80 and \$250, it was thought that it may be a handy addition to your equipment. Due to the shortage of time, only a short trial was held to indicate the relative sensitivity of the sniffer.

A full evaluation has now been completed, and I find that I was much too kind in my report. The diode detector as a practical counter-surveillance device is <u>USELESS</u>.

These instruments are so poor for Counter-measures work that this report is being circulated to those receiving Technical Report #1. It is now suggested that this equipment is <u>NOT</u> better than no equipment at all, since it will either give the user a false sense of security or waste his time tracking down false signals.

MICRO-FILTERS

RF Interonics announces the availability of single and dual circuit MICRO-FILTERS. According to the manufacturer, these subminiature parts represent a major advance in the miniaturization of RFI/EMC filters. A variety of physical configurations assure compatibility with many installation requirements, and are designed to operate over a broad temperature range.

For further information contact: RF Interonics, 100 Pine Aire Drive, Bay Shore, N.Y. 11706.

WILLIAM H. EMERSON JOINS E & C

Mr. William H. Emerson has joined the staff of Emerson & Cuming, Inc., Microwave Products Division, Canton, Massachusetts. In this capacity, he will be active in technical aspects of microwave anechoic chambers and microwave absorbing materials. Mr. Emerson was Technical Director of the Microwave Products Department of B. F. Goodrich Sponge Products, Shelton, Connecticut prior to acquisition of that Department by Emerson & Cuming, Inc. Before that he spent 14 years in microwave absorber development at the Naval Research Laboratory, Washington, D.C.

CONDUCTIVE MATERIALS DESIGN GUIDE

A completely new Design Guide containing 99 pages and describing five product lines including; magnetic shielding materials and products; EMI/RFI shielding strips, gaskets, tapes, meshes and textiles; conductive, elastomers and EMI/RFI shield-seals; honeycomb, EMI/RFI shielding vents, filters, windows and enclosures; and conductive systems, adhesives, paints, caulks and lubricants is available. For a free copy write to R. Ventimiglia, 129 Dermody Street, Cranford, New Jersey 07016.



PUBLICATIONS

BOOK REVIEW by Jim Hill

Electromagnetic Interference and Compatibility, Volume 1, Electrical Noise and EMI Specifications, by Donald R. J. White, MSEE/ PE, Don White Consultants, Germantown, Maryland, 1971. \$35.00,582 pages, cloth bound. This is the first in a series of five handbooks which will be released periodically during the coming year. The author has made a significant contribution to the EMC community in gathering together into one volume so much of the basic pertinent reference information in this area required by the practicing EMC engineer. This is information which is also of vital interest at the managment level of any project which must meet contractual requirements for EMC.

The fore-pages include two very complete lists of abreviations, technical symbols, and acronyms of interest to the EMC world. The first chapter is in the way of an introduction to EMI/EMC and touches on spectrum utilization and the background noise level. There is a discussion of coupling mechanisms and the hazard aspects to humans and ordnance. The chapter also includes an overview of the handbook series with a listing of topics to be included in subsequent volumes of the series.

The next two chapters are a comprehensive roster of government agencies concerned with EMC, EMI-related companies, and consultants, and EMI/EMC committees. There is a description of the function of each organization with names, addresses, and telephone numbers of key personnel. The new Executive Order 11556 reorganization of the Office of Telecommunications Policy (OTP) is explained with its relationship to DOD, NASA, FCC, DOT, FAA, NSA, NBS, and BRH. Technical support for OTP is charged to the Office of Telecommunications (OT) of the Department of Commerce. The function and responsibilities of OT is explained in full. The coverage of EMI/EMC committees includes not only the professional societies but also organizations such as JTAC, IRAC, CISPR, ITU, WARC, RTCA, ANSI, AND NFPA.

Three chapters are devoted to EMI specifications and standards. Following an historical summary there is a tabulation of EMI/EMC related specifications and standards including non-military as well as military listings. The overview of specifications is a helpful discussion of the comparison of limits. There is a meaty discussion of each of the current military regulations with emphasis on the MIL-STD-460 family series.

FCC coverage includes the complete text of bulletins issued by the Office of the Chief Engineer on such subjects as Public Law 90-379 (Devices which Interfere with Radio Reception), "Does My Transmitter Need a License", and "FCC Test Procedures for Wireless Microphones and Telemetry Devices". Extracts are taken from the FCC Rules and Regulations; Part 15, RF Devices, and Part 18, ISM Equipment.

The Bureau of Radiological Health of the Public Health Service (BRH/PHS) is charged with

. 8

the responsibility of administering and enforcing Part 78 of PL90-602, Radiation Control for Health and Safety. Sections involving control of Electronic product radiation, record and reporting requirements, performance standards for television receivers, and proposed standards for microwave ovens are presented as excerpts.

The discussion of control plans and test plans is supplemented with two EMI control plans; one a very simple plan which might be used by a company for internal control, and a second complete plan for a complex aerospace system. A sample test plan is a model of the type required for compliance with MIL-STD-461A using test procedures adapted from MIL-STD-462. A discussion of test reports includes the requirements for military as well as FCC reports.

The seven appendices are reprints of the current military directive (DoD Directive 3222.3), with the related regulations and instructions of the Army, Navy, and Air Force. These form a complete description of the DoD EMI/EMC program with the responsibilities of the component services.

Each chapter is rounded out with a bibliography so that the reader can further explore specific areas of interest. A fairly complete index aids the user in pinpointing detailed subject matter for ready reference. All in all, volume one of this series is an auspicious beginning. USH 5/15/71

AFSC DESIGN HANDBOOK 1-X CHECKLIST OF GENERAL DESIGN CRITERIA

A Design Handbook "Checklist of General Design Criteria" has been published and is available to qualified users. This handbook will eventually contain checklists for each of the Design Handbooks in Series 1-0, General. Checklists will be withdrawn from the other Series 1-0 Design Handbooks as soon as they are published in the DH 1-X Handbook. The Checklists are intended for use by systems designers to ensure that all applicable design factors have been examined and all problems have been resolved or otherwise determined to be not applicable to the design.

The handbooks are provided without charge to qualified agencies supporting USAF technical interests and objectives. However, they are subject to special export controls, and each transmittal to foreign governments or foreign nationals may be made only with prior approval of the Handbook Division, ASD/ENZH, Wright-Patterson AFB, Ohio 45433. Government organizations must justify requests based on their need for the handbook in carrying out assigned missions and functions. Non-Government organizations must satisfy one of the following requirements: (1). This hand-book is needed as guidance on Air Force or other governmental contractual effort (state contract number or title of work and responsible governmental office): or (2) This handbook is needed in private or educational technical efforts, the results of which will directly benefit the Air Force (describe work and expected benefits to the Air Force).

If you desire to be placed on distribution for this handbook, please write to the above address.

AFSC DH 1-4, EMC, REVISION NO. 4

In revision No. 4 dated 10 January '71 the frequency spectrum chart in Section 1C has been expanded for the 3MHz to 300 GHz frequency and the AFSC DH 1-4 Design Bulletin, Aircraft Vulnerability to Lightning Strike Damage, has been included in DN 7A2. However, the latter information is being revised extensively and will be included in Rev No 5, 10 Jul 71.

If you have not received revision 4 or do not have a copy of the AFSC Design Handbook, write to ASD/ENZH, Wright-Patterson AFB, Ohio 454333.

IEEE PUBLISHES NEW STANDARDS CATALOG

A new, enlarged catalog of standards and related publications is now available from the Institute of Electrical and Electronics Engineers. Listing more than 200 standards documents, the IEEE Standards Catalog features an extended, easy-to-use subject index and a thoroughly revised format. Included are listings of publications on definitions, methods of measurement, test procedures, recommended practices, specifications, guides and associated documents. Listings of American National Standards developed within IEEE and available from IEEE are detailed.

Copies of the catalog can be obtained without charge by writing: Standards Office, Catalog Dept., Institute of Electrical and Electronics Engineers, 345 East 47th Street, New York, N. Y. 10017.

G-EMC TRANSACTIONS AD COM REPORT MARCH 22, 1971 (Condensed)

<u>Next issue</u>: August 1971, Special Issue on Walsh Function Symposium

Publication Budget:

Voluntary page charges for the author's organization at the going rate (presently \$60 per page) were agreed upon at last Ad Com. Many authors and their companies (roughly 45 per cent) consider these a normal cost of doing business, billable under many government contracts. These charges could not be instituted with the February 1971 issue due to approval procedures required at IEEE headquarters, but should begin with the May 1971 issue. They should make the November 1971 issue economically feasible.

READER SURVEY:

In mid-1970 IEEE headquarters conducted a limited sampled survey of readers of its publications. Although this survey is many respects favorable to us, it also indicates where considerable improvement is needed; namely, in review procedures (which I think has now been remedied) and in decreasing the time interval from manuscript submission to publication (a problem yet to be attacked).

R. B. Schulz - Editor, G-EMC Transactions

CONTROLS

ELECTROMAGNETICS CZAR

In his look at the U.S. Navy from the top, Admiral Elmo R. Zumwalt didn't like what he saw in the electromagnetic area-a hodgepodge of programs which failed to integrate the best mix of detection deception, destruction, command, control and communications subsystems to provide, in part the combat capability needed by the fleet and task force commanders.

He put his feelings strongly in recent notice to major navy commanders, in which he disclosed he was setting up an electro--magnetics "Czar"-a vice admiral-on his staff at the Pentagon.

"Lack of this unifying direction has resulted in a ship and task force environment, plagued by electromagnetic incompatibilities, radiation hazards and unintentional radiations, which have greatly aggravated the commander's already complex problems.

"It has created an environment which is highly vulnerable to enemy exploitation."

The creation of the new office of Tactical Electromagnetic Programs, under the deputy chief of naval operations for fleet requirements and readiness, has not been publicly announced as yet. Nor has the name of the three-star officer who will be its director. A rear admiral will serve as his deputy.

Zumwalt pointed out in his notice-dated Jan. 7, to become effective within two weeksthat sponsors of weapon, sensor, electronic warfare, communications and command and control equipment have all vigorously pursued their programs. (Exerpted from the Anaheim Bulletin-Tuesday, March 2, 1971).

CONTROLLING ECHO AND SINGING IN LONG-DISTANCE TELEPHONE CIRCUITS

An article with the above title appeared in the February 1971 issue of the Wiltron Technical Review. A limited number of copies may be obtained by writing to Wiltron Company, 930 E. Meadow Drive, Palo Alto, Ca. 94303. Several paragraphs of interest are excerpted as follows:

Talker echo by itself has another effect that is perhaps not so apparent. This is that the echo or delay time, as it increases, tends increasingly to disrupt the talker's mental processes. For this reason the telephone system is guided by a curve derived from subjective testing that indicates acceptable echo level as a function of echo time. The curve shows that the average person can tolerate a much higher level for the echo when echo time is short compared to when it is long. Since considerable reflection is to be expected in practice, some attenuation in the received level must be present in longdistance networks at present to meet the requirements imposed by the curve. This same attenuation and control of echo prevents the circuit from singing or oscillating in the mid-voice band, although oscillation at the edges of the voice band is still a possibility, as discussed later.

In making terminal balance measurements and adjustments, a standard termination is connected to the long-distance trunk at the end office to match the nominal trunk impedance (900 ohms + 2.16 µF). In practice, extensive tests have shown that subscriber loops have an average ERL of 11 dB when measured against the nominal trunk impedance. In comparing this average value with the acceptable echo level it will be seen that attenuation of echo in the transmission circuit is a necessity for most-long-distance calls.

SMALL LEAKS LOOM BIG IN RFI WORK

A 3 page article with the above title and written by J. Paraskivas, Raytheon Co., appeared in the February 1, 1971 issue of EDN. The first two paragraphs are excerpted as follows:

RFI in the form of electrical noises, transients, harmonics and other spurious signals can cause loss of data, and it frequently buries low-amplitude signals so thoroughly that they cannot even be detected. We will never eliminate interference completely, but we can at least control the amount that our devices radiate and their tendencies to pick it up. Shielding is the prime weapon in this effort. The problem, as in plumbing, is one of leaks-particularly from panels (with their shaft holes, dial area, switches and the like) and from the joint between access covers and the main enclosure. Any hole or joint in an enclosure, such as the joint between it and its cover plate, is a potential source of leakage.

Right at the outset, we'd probably better clear up any misconception that what is required for containing RF is a "water-tight" shield-for that isn't so. For proof, note how effective a screened room can be. You can see through, or even squirt a hose through, one that is highly effective in providing radio quiet.

STATIC ELECTRICITY FILM

This safety film points out the hazards and control of static electricity. Major portion of the movie is based on a series of demonstrations developed by BuMines, which cooperated on the movie. Film makes these points:

It's not necessary to rub to generate static, mere contact and separation of materials will do.

Static is generated by streams of falling liquids, including non-conducting liquids like water.

Static can be generated in one place and then induced in another area: a sensitive cap is set off when tossing the shorted wires through a static electricity field.

When nature generates static electricity and discharges it in a spark, it does so on a grand scale: lightning

Static is generally controlled by bondind and grounding all surfaces.

Static Electricity 16mm, sound, color, 22 minutes, Catalog No. J10110, Order Dept., American Gas Assoc., Inc., 605 Third Ave., New York, N. Y. 10016, \$203 or rent \$33/ week.

SIDE EFFECTS

LAW AIMED AT "UNNECESSARY" RADIATION PERILS

"The Radiation Control for Health and Safety Act, if used in a spirit of cooperation, may make it possible for man to gain full benefits of electronic technology while avoiding associated radiation perils", said Dr. Robert L. Elder at the 1971 International Convention.

Dr. Elder, who is with the U.S. Department of Health, Education, and Welfare's Bureau of Radiological Health, said that in enacting the radiation control law, Congress gave legislative effect of the Federal Radiation Council's recommendation that "there should not be any man-made radiation exposure without the expectation of benefit resulting from such exposure". In evaluating the benefit versus the risk of a radiationproducing electronic product, he added, uncertainties always should be resolved in favor of public health.

The Bureau of Radiological Health has been given primary responsibility for carrying out the provisions of the radiation act and has set up an electronic product radiation control program for this purpose.

As the key program element, Dr. Elder said, the Bureau establishes and enforces performance standards to limit radiation emissions from electronic devices. He emphasized that such standards are developed only when there is clear evidence of a public health hazard.

So far, radiation limitations have been issued for TV receivers, certain electronic tubes used in science instruction, and microwave cooking ovens. Control standards are being developed for X-ray equipment used in the healing arts. Standards are expected to be issued during 1971 to control radiation from cabinet X-ray units, microwave diathermy equipment, and certain laser devices.

Dr. Elder stressed the importance of basing radiation limitations on well-defined measurements that will assure uniform and reliable results. Control standards also must be made feasible and economical for incorporation into large-scale industry testing programs, he said.

ULTRAVIOLET RADIATION & SKIN CANCER

Repeated exposure to ultraviolet radiation can lead to skin cancer, a Federal radiation scientist noted in reviewing ultraviolet hazards at the 1971 IEEE International Convention. Although the mechanism by which ultraviolet may induce skin cancer is not clear, the cancer-producing wavelengths appear to be shorter than 320 nanometers, said Dr. William M. Leach, a research scientist in Rockville, Maryland laboratories of the Department of Health, Education, and Welfare's Bureau of Radiological Health.

Dr. Leach observed that a rare human genetic disorder known as xeroderma pigmentosum predisposes persons exposed to ultraviolet to skin cancer. Persons with the disease, he said, appear to lack enzymes to repair ultraviolet-induced lesions of elements of DNA, the genetic material which determines the pattern of cell growth.

A number of effects of far ultraviolet radiation on DNA has been either observed or inferred, Dr. Leach said. These, he added, include DNA chain breaks, partial denaturation, cross linking between chains of a DNA molecule, linking between DNA and protein, hydration of certain pyrimidines, and formation of dimers of the cyclobutane type between adjacent pyrimidine bases.

Dr. Leach noted that most of the studies of ultraviolet effects upon cells have been conducted in the far region of ultraviolet radiation which is between 200 and 300 nanometers. Ultraviolet in this region, he said, has been found to cause cell killing, delay in cell division, and cell mutation. In general, he added, the effects are produced most commonly by wavelengths at which nucleic acids most strongly absorb the radiation.

Little is known about cell effects in the near ultraviolet region of between 300 and 380 nanometers, but doses required for cell killing in the region are about 1000 times greater than doses required in the far ultraviolet, Dr. Leach said. No specific absorber has been implicated for cell death in the near ultraviolet region, he added.

Dr. Leach pointed out that two human organs are considered critical targets of ultraviolet exposure - the eye and the skin, including the lips. The usual eye injury, he said, is to the cornea and may lead to blindness. Skin reactions are erythema, tanning, and pigment darkening with moist skin more susceptible to erythema than dry skin.

DID SECRET BEAM PRODUCE RUMORS-OR BRAIN TUMORS?

A one page article with the above title appeared in the March 5, 1971 issue of Medical World News. Several paragraphs are excerpted as follows:

Something either very strange or very coincidental is alleged to have happened at an electronics plant in Pennsylvania. The company involved says nothing significant happened at all. What makes the affair so intriguing is the degree of secrecy surrounding it.

According to a source in Harrisburg, astrocytoma, a brain tumor with an incidence of 2.9 per 100,000 people in the state, has occurred since October 1969 in perhaps as many as four engineers in a group of 23 working on an unidentified program at an unnamed plant.

Edward Baier, director of the state environmental resources department's division of occupational health, asserts that to his knowledge, two engineers developed the tumor and died, one last June, the other last August. Information on a possible third case is sketchy, says the health official, and as for the fourth, "I have only a name that seems Spanish or Italian." That patient, he adds, has apparently disappeared.

The U.S. Bureau of Radiological Health was first notified of the matter in 1970 by one of its consultants, engineer Rexford Daniels. "I was at a meeting in Philadelphia when some of my colleagues expressed concern about possible radiation results at a certain plant," he recalls. "As soon as I reported these fears to Washington, I was told an investigation would be made-but not by me." Daniels feels the Philadelphia affair may be only part of a larger probe into radiation effects. "I know that the National Research Council of Canada, and several agencies overseas, are looking into the possibility that a new variable in electromagnetic radiation may modulate the "alpha" rhythms of the human body. It could be that this variable was present in the Philadelphia facility."

MICROWAVE EFFECTS FEATURED

A special issue of the IEEE Transactions on Microwave Theory and Technique, entitled "Biological Effects of Microwaves" is scheduled for publication in February 1971.

Individual copies may be purchased at the following prices: IEEE members (one copy) \$2.50; public libraries and colleges, \$3.75 in USA and Canada, \$4.25 elsewhere; others \$5.00 in USA and Canada, \$5.50 elsewhere.

AIRWAVES

FCC INQUIRY INTO TVI FROM FM TRANSMITTERS AND OTHER SOURCES

The following has been excerpted from FCC Docket No. 19183 Released April 5, 1971:

The purpose of this Inquiry is to develop data and recommendations as to television receiver improvements and revised FM broadcast assignment principles which can be used to alleviate various kinds of interference to television reception.

We are also concerned about susceptibility of TV receivers to interference from signals other than FM broadcasting. Accordingly, this inquiry is broader in scope than the FM interference problem. It encompasses interference from any source to TV reception, either off the air or by cable.

We are issuing this Notice of Inquiry directed specifically, but not exclusively, to the following issues:

- (a) What interference rejection performance against FM broadcast and other signals can be expected of existing TV receiving installations?
- (b) What TV receiving system performance improvements can be achieved to reduce interference from FM broadcast and other signals?
- (c) To what extent should TV receiving system characteristics be taken into account in establishing allocation and assignment standards to control interference from FM and other signals to TV broadcast reception?
- (d) In consideration of the foregoing issues,

the following TV receiving system parameters appear relevant:

- (1) Adjacent channel selectivity (RF and IF)
- (2) Intermodulation rejection
- (3) Cross modulation rejection
- (4) Dynamic range
- (5) Harmonic generation
- (6) Blanket signal level
- (7) Booster amplifier spuroius responses
- (8) Direct signal pickup, other than through the antenna terminals.

What quantitative values should be asigned to or assumed for, the foregoing parameters?

Relevant comments in response to this Notice of Inquiry need not be limited to the specific issues set forth above. Interested parties responding to this Inquiry shall furnish comments on or before July 1, 1971. An original and fourteen copies of each response shall be filed as required by Section 1.419 of the Commission's rules.

TECHNICAL AREA REPRESENTATIVE MARCH 19, 1971 AD COM REPORT

PL 90-379 is Public Law 90-379 signed into law on July 5, 1968, which added Section 302 to the Communication Act of 1934 - the organic law under which the FCC operates.

Section 302 authorizes the FCC to make reasonable regulations to control the interference potential of devices which in their operation emit sufficient RF energy to be capable of causing harmful interference. It provides further that these regulations shall be applicable to the manufacture, shipment, inport, sale or offer for sale of subject devices. Under this authority the FCC instituted a rule making proceeding (FCC Docket No. 18426) and adopted regulations which became effective on October 1, 1970.

These regulations apply only to the marketing of equipment (shipment, sale, etc) but not to the manufacture. Obviously if the device can not be sold, it will not be built. Second, these regulations do not impose new technical standards for interfering emissions; they merely impose a requirement on the manufacturer and vendor to meet the technical standards for interference control that are currently in the rules. At present the FCC has regulations that apply to transmitters operated under a license, to ISM equipment, to certain minature transmitters that operate without individual license under Part 15, to receiver radiation (if the receiver operates in the range 30-890MHz). The FCC has no standard for automotive ignition interference, for interference from most household appliances - refrigerators, mixers, washers, heating pads, etc.

The FCC is currently preparing a set of rules which set out the procedures to be followed by an applicant to get approval for his equipment if it is subject to the rules at present. These rules will require the manufacturer to file an application and receive the Commission's grant of equipment authorization (type approval, type acceptance or certification depending on the type of equipment). The rules will spell out how the applications are processed and the rights and obligations of the applicant. I expect that these rules will be adopted within the next 3-6 months.

Submitted by Herman Garlan

REPORT ON LAND MOBILE OPERATIONS AT 950 MHZ

A report entitled "Examination of the Feasibility of Conventional Land Mobile Operations at 950 MHZ" has been issued by the Federal Communications Commission. Prepared by the Research Division of the FCC's Office of Chief Engineer, the report covers the first phase of the study--Base to Mobile.

Based on data compiled in metropolitan Washington, D.C., the report (R-7102) should be of interest to parties or companies concerned with the use of land mobile radio for vehicular communications. In addition to acquiring important propagation data, the project demonstrates that satisfactory 950 MHZ coverage of Metropolitan Washington is possible from a good base station site radiating 425 watts, and that lower powered mobile units and a practical number of repeaters should be able to provide the return link from mobile to base.

Copies of the report may be obtained from the Research Division, Room 214, 1229 -20th Street, N.W., Washington, D.C.

SPENCE APPOINTED CHIEF ENGINEER

Raymond E. Spence, FCC Deputy Chief Engineer, has been appointed Chief Engineer, filling the vacancy that resulted from the death of William H. Watkings in January.

Mr. Spence, who joined the Commission in November 1968, had been active in the organization and direction of the Commission's Spectrum Management Task Force. He came to the Commission from the Federal Aviation Administration where he had been chief of the Voice Communications Systems Branch.

In his eight years with the FAA, Mr. Spence was heavily involved in research and development work. Among other activities, he participated in developing plans for application of space satellite technology to the requirements of the aviation industry and served as a member of the U. S. delegation to a conference on space technology sponsored by the International Civil Aviation Organization.

UTC TIME SCALE TO CHANGE IN 1972

On January 1, 1972, The Time scale known as UTC (Coordinated Universal Time, also called GMT, or Greenwich Mean Time), the most commonly used time scale around the world, will be slightly altered.* The present offset from atomic time will be eliminated, and step adjustments will be made in increments of 1 second instead of 0.1 second. Thus, after January 1, 1972, UTC will accumulate time at the same rate as International Atomic Time (IAT), except that whole-second step adjustments, called leap-seconds, will be made as needed to maintain approximate agreement with an earth-rotation-based time scale, UTC is broadcast by many stations, including WWV, operated by the Bureau's Boulder laboratories, and is the basis for standard time in the United States.

The Change will affect only users of precise frequency generators and timekeeping equipment, who probably will have to adjust their equipment or operations. These users include radio and television stations, scientific laboratories, electric-power companies, manufacturers of electronic equipment, and perhaps the makers of navigation and radar equipment. Groups which use precise timing instruments for the sole purpose of synchronizing their activities will not necessarily be affected.

TWO-WAY TRANSMISSION OVER CABLE TV

Tests of two-way cable transmission being conducted over four miles of cable TV system on Los Gatos, Calif. to point the way to Subscriber Response Services (SRS) of all kinds were described by Hubert J. Schlafly, senior vice president of TelePrompTer, at the 1971 IEEE International Convention.

In Los Gatos, Schlafly said, nearly four miles of CATV system have been equipped with crossover filters and subchannel amplifiers designed for a return upstream signal. The system was already carrying 18 channels of TV programming and its subscribers have been provided with 25-channel converters.

Eventual goal of the tests is two-way transmission capability for all CATV systems. Broadband data and video signals will be transmitted from any point in a community, upstream to the CATV headend or control point. There, data can be processed, stored, and/or forwarded, and video signals can be recorded, edited, played back or turned around for downstream transmission to all subscriber outlets.

The SRS techniques offer the opportunity for a community-wide classroom with computers checking attendance and measuring attention and perception; a chance to reach everyone for job training and notification of job openings; use of the home TV set as point-of-sale as well as an advertising medium; instant political polling, TV program rating, or product preference surveys; and for the citizen at home, direct access to emergency aid, tickets and reservations, and to product and business imformation.

IEEE NEWS

CALL FOR PARTICIPATION IN EM POLLUTION STANDARDS DEVELOPMENT

The activities of the EMC Standards committee, known as Committee 27.0 have been under review since the spring of 1970. Impetus for this review was initiated by Dr. Heinz Schlicke by the appointment of Mr. J. E. Bridges as Chairman of Committee 27.0 and the subsequent appointment of Mr. Leonard W. Thomas and Mr. W. Gene Cory as Vice Chairmen.

As a result of this study, it appeared that the IEEE EMC Standards activity should "lead" the electromagnetic pollution needs rather than to react to specific requests. Hence, standards activities on the part of G-EMC will emphasize the following general areas:

- Safeguarding consumers for protection against hazards and objectionable interference conditions.
- (2) Implementation of spectrum allocations based on controlled or known susceptibilities.
- (3) Identifying the performance features of well-designed components, filters, cables and shielding.
- (4) Measurement of interference characteristics of consumer, industrial, scientific, and medical equipments.

As to specific standards, only those activities wherein the IEEE can provide a qualified group will be considered. Traditionally the IEEE standards have been directed largely toward industrial, scientific, medical and consumer areas. Therefore, standards activities in these areas will be conducted within the IEEE Standards Committee regardless of activities elsewhere. There are several reasons for this:

> • In the industrial, scientific, medical, and consumer area, it should be recognized that the IEEE, in general, enjoys significant prestige. Therefore, standards which are developed by the . IEEE in these areas will experience easier acceptance.

• The IEEE Standards should make it relatively easier for manufacturers of RFI equipment and components to conduct sales to industrial, scientific, medical, and consumer goods users.

• The IEEE can draw upon a diversity of talent.

• Participation in IEEE standards activities provides professional recognition not only within the EMC Group, but throughout the IEEE. Where the EMC expert must occasionally transfer into other areas, this can sometimes become an important factor. It should be recognized that all of the suggested or indicated standards activity may not be conducted under the leadership of Committee 27.0. For example, some standards may be more appropriately conducted within the Broadcast and Television Receiver Group or even outside of the IEEE with support from the EMC Standards Committee.

Activity in the IEEE Standards development will provide an opportunity to obtain background and knowledge in the electromagnetic problem areas of the future. It could provide an entree into the interference problems associated with medical equipments or an opportunity to participate with the American National Standards Institute and the Microwave Group regarding microwave biological hazards.

To support the above objectives, 27.0 Mr. Leonard Thomas has been assigned with the responsibility of handling liaison with standards activities outside the IEEE. This would include the ANSI, CISPR, EIA, SAE, and AAMI. The EMC Standards Committee 27.0 has been given the broad responsibility to support and coordinate interference efforts being conducted throughout the IEEE, primarily by the Industry and Applications Group, Broadcast and Television Receivers, Vehicular Communications, and so forth. Mr. W. Gene Cory, has been appointed to handle this.

The EMC Standards Committee 27.0 is comprised of the following members;

J. E. Bridges, Chairman	W. Free
W. G. Cory, Vice Chairman	J. Klouda
L. W. Thomas, Vice Chairman	J. R. Neubauer
J. F. Chappell	Dr. H. Schlicke
S. I. Cohn	J. Senn
R. Daniels	Dr. R. M. Showers
J. P. Dixon	R. E. Taylor
Dr. C. L. Frederick	D. R. J. White

Standards development is carried out by various subcommittees. The subcommittee, upon completing the development of a Standard, submits the standard for approval to Committee 27.0 and other appropriate IEEE standards groups, as required, which might occur in inter-disciplinary instances.

The active subcommittees are as follows: 27.1 - Basic Measurements, Dr. R. M. Showers, Chairman (Currently developing an impulse measurement standard) 27.2 - Definitions, (Chairman to be appointed) 27.3 - Radio and Television Receivers.

27.3 - Radio and Television Receivers.
(Chairman to be appointed)
27.4 - Radio Transmitters, R. E. Taylor,
Temporary Chairman
27.5 - Industrial Electronics, Chairman, J.

27.5 - Industrial Electronics, Chairman, J. Klouda (Currently working on shielding and cabling standards)

27.7 - Mobile Communications, Chairman, J. R. Neubauer (Standard nearly completed)

As of July 23, 1970 the IEEE Headquarters Standards Group approved standards activity in these four additional areas:

- Laboratory measurements of fields from small electronic equipments, Chairman, W. Free.
- (2) Uniform measurement and reporting of low level electromagnetic environments, Chairman, D. R. J. White

- (3) Recommended susceptibility of small electronic equipments to electromag netic waveforms: this would include the susceptibility of radio receivers and to support spectrum allocation as well as work in the susceptibility and biomedical equipments-temporary Chairman, Dr. D. A. Miller: Biomedical Equipments Chairman, Mr. J. Senn for Receiver Susceptibility
- (4) Interference rejection characteristics of filters. Chairman, Dr. H. Schlicke
- (5) Criteria for Spectrum Utilization by Message Transfer Systems: Chairman, Dr. C. L. Frederick

Additional activities which may be undertaken in the following areas:

- Measurement of interference from lighting, lighting controls, and gaseous discharge devices.
- (2) Measurement of interference from motors and motor controllers.
- (3) Measurement of interference from appliances, other than communication receivers or home entertainment equipment, such as microwave ovens, hair dryers, shavers, etc.
- (4) Measurement of interference from electronic toys.
- (5) Measurement of interference and susceptibility for home entertainment electronics such as radios, TV's, organs, electronic guitars, amplifiers, etc.
- (6) Measurement of interference and susceptibility for industrial and scientific equipment.
- (7) Measurement of interference and susceptibility related to computers and signal processing terminal equipments.
- (8) Measurement of interference from sources of switching transients, such as would include, ignition systems, switches, etc.
- (9) Measurement of interference from roadside devices as interfering with mobile receptors.
- (10) Standards relating to safety aspects of spectrum control, such as radiation hazards, electrostatic hazards, shock hazards, etc.
- (11) Methods and criteria for establishing limits for interference and susceptibility measurements.

Various local EMC Groups have expressed an interest in supporting standards activities. One way in which this might be done would be that one or two Groups would take the "lead" in developing the draft of a possible standard. A subcommittee including some members from the local Groups would then review the standard and suggest the revisions, if required. All of the local Groups will be contacted in the next few months in this regard.

It is evident that in order to implement the above standards activities, the wholehearted support of the membership of 27.0 as well as other IEEE groups is required. Those interested in participating in the development of standards should contact the Chairman of 27.0, Mr. J. E. Bridges, or the appropriate Vice Chairman directly.

(Submitted by: J. E. Bridges, Chairman, EMC Standards Committee 27.0)

CHAPTER-AT-LARGE - PACIFIC

The following is excerpted from a letter by R. Ford:

We in the Pacific have a problem not common to the mainland USA. That problem is distance. This makes for difficulties in communication and get togethers for mutual problem solution. I and my branch EMC engineers are (un)fortunate in traveling to most sreas of the Pacific on a fairly regular basis. As such we obtain late EMC information which is probably of interest to many EMC types in other parts of the Pacific. Several prior attempts to establish official DOD or US Government EMC groups have been unsuccessful due to the problems of funding, etc. This group being strictly a spare time professional group sharing mutual interests and problems should be easier to establish and maintain even if most of the participation is by correspondence.

One problem not common to stateside units is that we are not all in one region or under one section. Hawaii is in Region 6, Tokyo in Region 10; many US military group members are shown in Region 10 and some shown as being in no established section. Because of this, I have had some correspondence (and one visit) with the GEMC Ad Comm and with IEEE Headquarters on establishment of Chapter-at-Large. Dr. R.M. Emberson, Director of Technical Services IEEE; Dr. H. Schlicke, Chairman-Ad Comm GEMC; and Mr. L. Thomas, Secretary, GEMC, have all been helpful and encouraging on this arrangement and have authroized the petition for Chapter establishment.

I have at least three volunteers for handling the paper work and associated chores of the Chapter. These people and myself are all willing to help in any practical way in the resolution of EMC and/or Chapter problems. We do have access to a fairly good EMC library and are willing to devote some of our spare time in assisting Chapter members. After Chapter establishment we will prepare the required Chapter By-Laws and request comments, changes, new proposals, etc., and will pass an election ballot for the three official positions required (Chairman, Vice-Chairman, and Secretary). If you have nominations or any other pertinent comments, please feel obligated to note same and attach to your signed copy of the petition.

If you have questions on the above, please contact me as I am the temporary active organizer of the Pacific Chapter-at-Large, IEEE, GEMC.

KOBERT R. FORD 1268 Mokapu Blvd. Kailua, Hawaii 96734 Tel: (Residence) 254-3076 (Office) 656-706

THIS IS THE SPIRIT WE NEED !!

This is just a short note of heartfelt					
appreciation for too ribonor and					
John Dailey Eldon Hughes					
Tom Walter Andy Hish					
George Ufen Fred Motter					
Fred Nichols John Cox					
who volunteered for practically a whole day					
of stuffing, stamping, sealing, and mailing					
all 1970 EMC Symposium Records to the EMC					
membership all over the world. The result of					
their work is a very much needed contribution					
to balancing our hudget					

Heinz Schlicke Chairman-Adcom, G-EMC

STATE OF AFFAIRS

ECONOMIC WELL-BEING OF EE'S

A message from the Ad Hoc Committee to delineate the problems and recommend solutions affecting the professional and economic well-being of the electrical engineer was published in a few IEEE Group Newsletters. The membership was asked to rank the list of problems according to priority and to indicate preferences for the suggested solutions.

Almost all of the respondents feel that there are a number of critical problems facing the engineering profession. A great majority of them think that "lack of portable benefits including pensions" is a serious problem for IEEE members. Lack of accurate forecasting of demand for engineers and the current problem of oversupply is also considered to be another important problem by many members. The respondents are also concerned about the other problems listed in the Ad Hoc Committee message.

Among the suggested solutions, "extending the scope of the IEEE", is favored by the majority of respondents (43%). The second choice is to work through a National *Engineering Association such as the NSPE (31%). The extremes of "doing nothing" or "unionizing" are favored by only a few (about 10% each). It should be mentioned that these 'results are in good agreement with several other polls that have been reported.

Several members have written to say that they take this undertaking by the Ad Hoc Committee as an indication that for the first time the IEEE Management is showing an interest in soliciting the opinion of the membership. However, though many members feel that an opinion poll of all the IEEE members is long overdue, the IEEE Headquarters has thus far been reluctant to carry out such a poll. At the 1971 IEEE Convention, the following reasons were given by the IEEE Mana-gement for this hesitance on their part cost of mailing and difficulty in preparing a suitable questionnaire that would correctly evaluate the opinion of the membership. However, at the same time the possibility of future undertaking of such a poll was not ruled out by the management. If the membership feels that this is an important project for the IEEE they would be well advised to write to the IEEE Headquarters as soon as possible, strongly urging them to solicit the views of the membership on key issues confronting the IEEE, and then taking the

confronting the IEEE, and then taking the necessary steps to implement the desires of the majority. Incidentally, it has been suggested by some correspondents that the IEEE should poll their members on a periodic basis so that the management can keep themselves well-informed of the wishes of the membership.

(This report was written by Professor Roj Mittra, Chairman of the Ad Hoc Committee, University of Illinois, Urbana, Ill. 61801.)

THE EMPLOYMENT CONTRACT

Before the current recession became a reality, a surprising number of engineers were suggesting, in spite of themselves, that an engineering union might after all, be the only way they could expect to protect themselves from the inequities of bad management. Although the business slump greatly curtailed such union talk, the reasons for the talk still exist.

Unless corporate management upgrades its employment policies to avoid, for instance, laying off its engineers at the drop of a contract, they are going to find more and more highly qualified engineers going into business for themselves or using their abilities in areas other than industry, or just fewer engineers.

One solution to the problem-the employment contract-requires the efforts of management, the engineer and his society. The most positive step a company could take in the direction of improved employee relations could be to offer its engineers a contract. Such a contract could help the company as much as the engineer. It could:

- [] Give the company a competitive edge in the hiring of engineering talent.
- [] Neutralize any union-sponsored drives against the company.
- [] Force the company to plan its projects more carefully from their inception.
- [] Lessen random hiring, firing and retraining, all expensive operations. The initial role of the engineer in this

The initial role of the engineer in this job betterment compaign could be to study the efforts of an umbrella organization for engineers that has been organized in England, and organize one in the U.S. English engineering organizations have recently organized a new group, called the Professional Engineers Association Ltd., to help bring about the preparation of a model employment contract. The group will also try to improve salary levels, urge pension portability, and provide jobcounseling services and employment information.

Engineering societies in this country who fell they can't deal directly with the engineer's economic problem could do their part by helping to form an organization like the one in Britian to take on the responsibility.

The engineer's economic problem will not go away, and it may worsen. It behooves the engineer to help himself; the engineer's societies to help their membership. As for the company-it should remember that it has always had a tendency to overrate the loyalty of its employees. It should plan on ways to keep them.

R. L. T. (Comments and replys should be directed to the editor of the Newsletter)

ACKNOWLEDGEMENTS

The editor would like to thank the following individuals and their employers for their contributions to this issue of the Newsletter:

N. Garlan	FCC	
F. Nichols	LMI	
J.S. Hill	RCA Service	Corp.
J.E. Bridges	IITRI	