Electromagnetic Compatibility Society



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EDITOR: ROBERT D. GOLDBLUM

Newsletter

FCC CAUTIONS AGAINST CHANGES IN VERIFIED COMPUTING EQUIPMENT PUBLIC NOTICE 3281 APRIL 7, 1982

It has come to the Commission's attention that manufacturers are making changes in computing equipment on the mistaken assumption that a "minor" change will not affect the compliance of the computer with the FCC requirements.

The adoption of the verification procedure has, on the one hand, reduced the burden on the manufacturer by relieving him of the need to file an application with the Commission and wait for the Commission's response before starting to market his product. In relieving the manufacturer of the filing and waiting burden, the Commission made the manufacturer responsible for the continued compliance of his product. It cannot be stressed too strongly that the manufacturer has the responsibility to avoid changes unless a firm determination is made that the change will not throw the product out of compliance. While a detailed analysis will help make such a determination, the preferred method is by testing the revised product. The manufacturer is cautioned that many changes, which on their face seem insignificant, are, in fact, very significant. Thus, a change in the layout of a circuit board, or the addition or removal or even the rerouting of a wire, or even a change in the logic will almost surely change the emission characteristics (both conducted as well as radiated) of the device. This is particularly true of a device housed in a non-metallic enclosure. Whether this change in characteristics is enough to throw the product out of compliance can best be determined by retesting.

Manufacturers of computing equipment are urged to test products coming off the production on a regular schedule. Such testing provides assurance that the quality of the final product has not deteriorated. Secondly, such a regular schedule of testing will detect any changes that may inadvertently creep into the production process.

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EDUCATION COMMITTEE NEWS

Several short courses on EMC related topics are scheduled for the summer and fall of this year.

McGraw-Hill Seminar Center is presenting a course, "Controlling Electromagnetic Interference" on September 22-23 in Chicago and on July 13-14 in Los Angeles. The seminar leader is Ernest R. Freeman. For more information, contact McGraw-Hill at 212-687-0243.

The Center for Professional Advancement is sponsoring a course, "Electromagnetic Compatibility Engineering," to be presented on August 23-26 in New Jersey and October 5-8 in San Mateo, California. The instructors will be Henry Ott and Don Heirman. For more information, contact the Center at 201-249-1400.

Don White Consultants will be offering "Grounding and Shielding" in San Diego on September 21-24. "Design & Measurement For Control of EMI" is scheduled for Toronto on August 17-20. "EMC Design of PCBs and Electronic Modules" is scheduled for August 24-26 in Los Angeles. "EMI Control in Electronic Data Processing Equipment" will be presented in Tampa, Florida on September 20-24. For more information, call 703-347-0030.

R & B Enterprises has announced its fall 1982 series of four training seminars, concentrating on EMI problems and design solutions. The seminars, to be held in Boston, MA, Philadelphia, PA and Rochester, NY in September and October are: "Designing to Meet FCC Docket 20780," "Grounding, Bonding and Shielding," "EMI Susceptibility Requirements for Computing Equipment," and "Printed Circuit Board and Wiring Design for EMI Control." Also, a free, one-day EMI Symposium will include presentation of papers by well known experts in the EMI community, as well as displays and exhibits of the latest in EMI control products and test instrumentation. Also being offered by R & B is a two-day test workshop, comprised of both classroom instruction and hands-on experience in their suburban Philadelphia EMI test laboratory. For specific information on any of R & B's offerings, call 215-828-6236.

In order to be included in the newsletter, information on courses and seminars must reach me by December 1 for the winter issue, March 1 for the spring issue, June 1 for the summer issue, and September 1 for the fall issue.

The Education Committee would like to compile a list of colleges and universities which offer an EMC course as part of their normal undergraduate or graduate curriculum. Anyone with information on such courses should contact me, giving the name of the college or university, the name of the course, whether it is a graduate or undergraduate course, elective or required, and the number of credits.

> Henry Ott Chairman, EMCS Education Committee

Bell Laboratories Room 2C-248A Whippany, NJ 07981 201-386-6660

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REPORT ON EMC-S BOARD OF DIRECTORS MEETING JUNE 10, 1982

President Bill Duff presided over the second Board meeting of 1982 at the Sheraton Houston Hotel in Houston, Texas. The meeting facilities were provided by the Computer Society which was one of several societies sponsoring the National Computer Conference which was held that week. We thank them for their hospitality.

The meeting was called to order a few minutes before 1:00 P.M. with 14 of the 22 Board members in attendance, as well as several other members. The major topics discussed were the following:

1. The 1981 audit of our books indicated a 12/31/81 net worth of \$108,900 which is up by \$29,000 over the previous year. At the current expense and income activity, the net worth by the end of this year will be around \$132,000, which is within the IEEE guidelines for a Society of our size.

2. The Newsletter editor is seeking an Associate Editor to handle a new feature for our Newsletter — an opinion column. This has been reported as a service you, our readers, are seeking. Contact Bob Goldblum at 215-828-6236.

3. Andy Nalbandian was appointed, and Board approved, to replace the unexpired term of <u>Marge Stone</u> who submitted her resignation as a Board member-at-large. Andy will fill Marge's unexpired term which ends on 31 December 1982.

4. The final plans for the 1982 Symposium in Santa Clara on 8-10 September were presented by Andy. There will be 3 parallel technical sessions each day, including workshops. Registration costs will be about \$100/person. Lodging costs are fixed at \$54/night; 500 rooms have been reserved for advance registrants prior to 1 August. Overflow space has been reserved in the nearby Sunnyvale Hilton. Excursions to San Francisco and Carmel/ Monterey also will be available. For further information, call Andy (408) 742-5336. Plans for Washington (1983) DC, San Antonio and Tokyo (1984), Boston (1985), and San Diego (1986) were discussed. The Board approved the San Diego preliminary budget.

5. Bud Taggart has requested to step down as our Standards Committee chairperson, effective immediately. The Board approved his replacement, Don Heirman, who accepted, effective 1 October 1982. In the interim, Bud will assist, as needed. It was encouraging to hear that Dayton Section has volunteered to help in our standards effort.

6. The Education Committee has received replies from a questionnaire sent out about developing college courses on EMC. The replies indicated that it would be difficult to replace required courses in college curricula with ones on EMC. Suggestions to provide guest EMC lecturers were made. Any further ideas on this topic should be forwarded to Hank Ott (201) 386-6660.

7. Central Texas now has a Chapter with R.D. (Bob) Hunter as its elected chairperson. All members in the Austin-San Antonio area now have an opportunity to provide organized EMC activity and plan for the 1984 Symposium in San Antonio. Bob can use your help. He can be reached at 11704 Santa Cruz Drive in Austin 78759. Possible Chapters in Chicago, Central Florida, and Orange County, CA are in the works. Contact Fred Nichols for further details, (213) 870-9383.

8. Jim Toler (404) 894-3964 and Don Clark (404) 894-3535 are busy with membership development activity. They are contacting the 124 members who did not renew Society membership in 1982. In addition, at their request and Board approved, the Society again will pay for EMCS annual membership fee of \$7.00 for all IEEE members who attend the Santa Clara Symposium. A booth similar to that at the Boulder Symposium will be set up in the exhibit area to accommodate the rebate. Pass the word and get your associates attending the Symposium to sign up.

9. Gene Knowles reported that an EMC session on the new FCC Part 15J rules as they apply to computing devices was held at Northcom in Seattle. This was sponsored by our Intersociety Relations committee chaired by Lou Loubello. The session had an overflow crowd.

10. Bill Duff reported on the February 1982 IEEE Technical Activities Board (TAB) meeting held in Washington, DC. Items that TAB addressed include:

- a. An engineering education position paper
- b. Nuclear testing accreditation
- c. Reviewers for the Spectrum
- d. Book Broker costs for conference publications
- e. Technical Resource Directory (Bill represents EMCS)
- f. Support for Student Prize Paper Directory— The EMCS Board approved a \$100 contribution to offset the expenses of publishing the directory.

If you have any questions, contact Bill at (703) 642-4049.

11. An extensive discussion was held on a proposed EMC Society position paper on House Bill HR 5008 which would provide enabling legislation to authorize the FCC to determine if regulations on audio and visual equipment susceptibility are necessary. The position paper was prepared by the EMCS Government Relations Committee chaired by George Hagn. The principal drafter was Rick Gould speaking for the ad hoc committee of himself, Hagn, Carl Schmitt, Henri Pichal, and Leonard Thomas. The statement "...favors the passage of enabling legislation to permit the FCC to set minimum performance standards for susceptibility of audio and video electronic equipment to interference, such power to be employed only when necessary to alleviate widespread, serious and continuing interference caused by poor design of both domestic and imported devices." The EMCS Board agrees in principle with the position paper and asked the drafters to incorporate some of their suggested changes and distribute the smooth draft for whatever further action need be taken prior to the September Board meeting in Santa Clara. For further information, call Bill Duff.

After the meeting adjourned, a brief meeting was held with the members of the 1984 Tokyo EMC Symposium Steering Committee who were present. Dr. Sato, Committee Chairman, conducted the meeting with three of his advisors from Japan present. The US steering committee members present included Gene Cory, Gene Knowles, Dick Schulz, Tei Iki, and Don Heirman. One of the most important facts presented was that the cost to attend this conference is COM-PARABLE to that at large cities in this country. Registration, food, and lodging are about the same as for conferences in this country, providing proper guidance is given. The round trip air fare, if paid several weeks in advance, can be around \$1000 and even less if tour charters are arranged. The Tokyo Symposium Committee has offered to provide all the necessary guidance to take advantage of the excellent economies that most fear do not exist. The bottom line is that there is no reason not to plan to attend because of unreasonable costs. The steering committee asked for field trip suggestions during the symposium. Those suggested included a trip to the Japanese Government Emission test site, visits to robotized assembly plants, tours of camera factories, and even trips on the high speed train. For more information, write to Tei Iki, Sony Corp., 1650 W. Bernardo Drive, San Diego, CA 92127.

The next Board meeting will be held on Tuesday, 7 September 1982, at the Marriott Motel in Santa Clara at 1:00 P.M. This is the day immediately preceding the Symposium. By the way, Andy Nalbandian suggested coming early, or even the weekend before the meeting, to take advantage of the next door Great Adventure Amusement Park. The park will not be open, except for weekends, after Labor Day. See you at the Board meeting which you are all invited to attend.

Don Heirman Immediate Past President, EMCS

WAYS OF SUPPRESSING EMI AFFECTING MOBILE RADIO EQUIPMENT

Owners and operators of vehicles with mobile communication equipment will be interested in a new publication from the Commerce Department's National Bureau of Standards (NBS) that describes methods of suppressing electromagnetic interference (EMI) affecting this radio equipment. Although NBS performed its study primarily for the nation's law enforcement community, the findings are applicable to most users of mobile radios. The report, titled *Methods of Suppressing Automotive Interference* (SP 480-44), concentrates on radio systems utilizing narrowband FM communications in the 25 MHz to 900 MHz frequency bands; these bands were selected as those most commonly used by public safety agencies.

The report discusses the sources of EMI within a vehicle, including the ignition system and electric motors used to operate a variety of equipment from windshield wipers to rotating warning lights. There is a thorough discussion of customary practice and new methods of suppressing ignition EMI. In addition to known techniques such as the use of resistor spark plugs, resistive spark-plug cable, and grounding straps, the report describes more recent developments such as the use of silicone grease in the distributor and means to reduce conductive fan-belt discharge. The report concludes that EMI can be reduced significantly by employing these techniques.

Prepared by NBS for the National Institute of Justice, U.S. Department of Justice, the report is available for \$6.00 prepaid from the National Technical Information Service, Springfield, VA 22161. Order by title and PB #82—165259.

COMAR POSITION PAPER ADOPTED

The position paper on human exposure to microwaves and other radio-frequency electromagnetic (RFEM) fields, prepared by the Committee on Man and Radiation (Comar), was adopted by the IEEE Executive Committee.

The position paper calls for more extensive research into the effects of microwaves on the human body and states that the IEEE believes safety guidelines such as the ones recently proposed by the American National Standards Institute are adequate, based on present-day knowledge of the biological effects of microwaves.

FIFTH ELECTROMAGNETIC COMPATIBILITY SYMPOSIUM AND TECHNICAL EXHIBITION ZURICH, MARCH 8-10, 1983

After four successful international symposia, in Montreux 1975 and 1977, Rotterdam 1978, and Zurich 1981, each attended by approximately 500 participants from nearly 30 countries and up to 25 exhibitors, the Fifth EMC Symposium and Technical Exhibition will be held from March 8-10, 1983 at the conference facilities of the Swiss Federal Institute of Technology (ETHZ).

The conference is being organized by the Institute for Communications Technology of the ETHZ under the auspices of Mr. F. Locher, Director-General of the Swiss PTT, and is sponsored by the Association of Swiss Electrotechnicians (SEV/ASE). Prof. Dr. P. Leuthold is Symposium President, with Prof. Dr. F. L. Stumpers and E. Dunner, Vice Presidents. Further members of the Organizing Committee are Dr. T. Dvorak (Organizing Chairman), Prof. Dr. R. M. Showers (Chairman of the Technical Program), and Mr. H. K. Mertel (Chairman, Workshops Program). A number of national and international professional organizations technically support the conference.

The technical program of the symposium will feature papers on such topics as: social and economic impact of EMC; electromagnetic pollution, control and enforcement; national and international cooperation in EMC; immunity of electronic systems; electromagnetic compatibility of communications, electric power and automotion; EMC hazards to ordnance and vital safety systems; compatibility of medical electronics; biological effects of R.F. energy; interference propagation, source-to-receptor coupling; nuclear electromagnetic pulse (NEMP) impact; regulations, limits, standards and specifications; measuring methods and instrumentation, production testing; design of compatible euqipment, suppression methods and devices; special techniques: sequency functions, spread-spectrum, fibre optics; EMC education.

There is currently much public interest in biological effects of electromagnetic fields, and many countries are preparing or revising their standards, while the non-thermal effects still remain a controversial subject. Responding to the needs of those involved with this difficult problem, a special section of the symposium program will be arranged in which such questions would be brought to discussion, allowing an international exchange of views to accelerate the progress in this field.

The workshops, many arranged on a question-answer basis in direct contact with the speakers, will provide an introduction to newcomers, and will respond to the needs of practicing engineers. The exhibition, which also will be open to the non-registered public, will introduce modern measuring techniques, new technologies in materials and components, as well as EMC training programs. The full text of all conference papers will be made available in the conference proceedings, "EMC 1983." The "Symposium Record" will be made available to all attendees of the conference, as well as to the most important technical libraries throughout the world.

Due to the steady growth of the conference, fees have been kept at the same level since 1975, and the technical and social program offered within the regular registration has been extended. In addition to the authors' lunch, interesting technical excursions and an attractive ladies' program, all participants will be hosted to a complimentary cocktail party on the first day of the symposium. The special excursions will be organized both during and after the Symposium.

Copies of the Preliminary Program, available as of October 1982, registration forms, special inquiries, and further information may be obtained from: Dr. T. Dvorak, ETH Zentrum-KT, 8092 Zurich, Switzerland; Tel.: (411) 256-2790; TWX: 53178 ethbi ch.

CALL FOR PAPERS

The Cedar Rapids (IA) Section of the IEEE has issued a call for papers for its 29th Annual Fall Conference to be held November 10-11, 1982 at the Five Seasons Civic Center in Cedar Rapids. Theme of the Conference is "EMI/EMP — How They Affect Engineering Design," and presenters are being solicited for: General Theme Technical Sessions - to inform practicing hardware and software designers about topics related to the conference theme; Power Technical Sessions - to focus on topics in the power field; Product Sessions - to inform practicing hardware and software designers about available products; and, Poster Sessions - to give participants a chance to see a broad view of applications in the electronics industry.

Persons interested in submitting a presentation may contact Jim Hanson, IEEE Fall Conference, Box 451, Marion, IA 52302; Tel.: 319-395-4236. Submission deadline for the General Theme and Power Technical Sessions is July 1, 1982; August 6th for the Product Sessions, and September 24th for the Poster Sessions. Of interest to note is that presenters of Technical Sessions will be provided travel and lodging expenses.

IEEE 1983 INTERNATIONAL SYMPOSIUM ON ELECTROMAGNETIC COMPATIBILITY

October 24-26, 1983

Shoreham Dunfey Hotel Washington, DC

The 1983 IEEE International Symposium on Electromagnetic Compatibility will be the Silver Anniversary celebration for the EMC Society. The theme of the symposium will be "A Quarter Century of EMC Progress" and it is fitting that this symposium be held in the Nation's Capital. A large attendance from both industry and government is expected. The symposium will focus on the current "state-of-art" after a quarter century of EMC progress and look into the future to see where efforts should be directed. Particular emphasis will be given to the systems approach to EMC which involves reduction of undesired emanations and the reduction of the susceptibility of electronic devices and systems. Authors are invited to submit original, unpublished papers in all areas of EMC theory and practice. Suggested topic categories include, but are not limited to, the following:

TECHNICAL AREAS

| Design |
|-------------------|
| Control |
| Analysis |
| Regulations |
| Standards |
| Measurements |
| Instrumentation |
| Radiation Hazards |
| Sequency Theory |

Lightning EMP ESD Materials Management Filters Systems Vulnerability

APPLICATION AREAS

| Aerospace | Defense |
|-------------------|--------------------------------|
| Automation | Electrical Power |
| Bio-Medical | Environments |
| Communications | Production |
| Components | Remote Sensing |
| Computers | Spectrum |
| Automotive | Utilization |
| Consumer Products | Legislation |
| Signal Processing | Non-Sinusoidal Applications |

Prospective authors should submit a 50 to 70 word abstract and a 500 to 700 word summary (up to five illustrations) that clearly explain their contribution, its originality, and its relevance to the EMC discipline. For anonymity during review, please identify author(s) only on the cover sheet. Upon acceptance, authors will receive forms and instructions for the preparation of materials to be printed in the Symposium Record. If poster presentation is desired, please indicate on the material submitted. Papers written by bona fide students will be eligible for a student prize.

AUTHÒR'S SCHEDULE

| Abstract and Summary (3 copies require | ed) |
|---|--------------------|
| | December 15, 1982 |
| Notification of Acceptance | . February 1, 1983 |
| Camera-ready Copy | |
| Submit abstracts and summaries to: Will | |

nical Program Chairman; Atlantic Research Corporation, 5390 Cherokee Avenue, Alexandria, VA 22314.

SIXTH INTERNATIONAL WROCLAW SYMPOSIUM ON ELECTROMAGNETIC COMPATIBILITY 1982

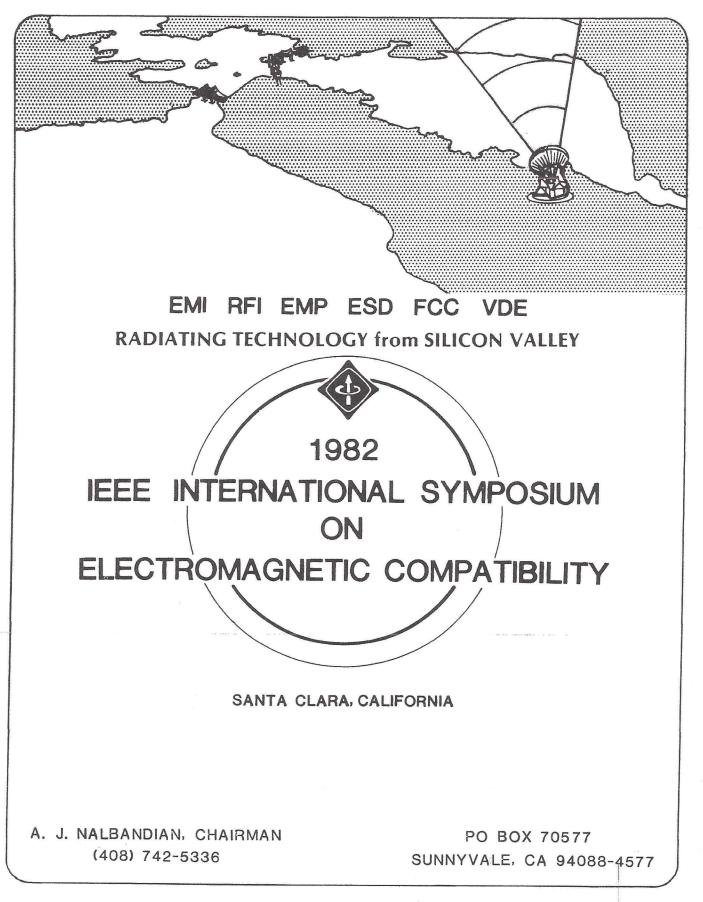
Last year, an announcement informing you that the Sixth Wroclaw Symposium and Exhibition on EMC, to be held on June 22-24, 1982, was published. They since have informed us of the following:

"Due to difficulties beyond our control, the Wroclaw Symposium will not meet in 1982. But, as the difficulties arose only recently, and we have the texts of the majority of the papers offered, it has been decided that it would be useful and beneficial to the EMC community to publish them in the appropriate volume.

This volume will contain the full texts of all of these papers in one of the official symposium languages, English or Russian, as presented by the author, and summaries in the second language. The papers are prepared by leading scientists and engineers from many research centres and relevant industries around the world, and reflect state-of-the-art. They cover many aspects of EMC theory and practice, and EMC is understood in a broad sense as the ability of a device or system to function in its electromagnetic environment without introducing or suffering intolerable disturbances.

A limited number of copies of the volume will be available in fall, 1982 from the EMC Organizing Committee at a price of US \$40, and orders with checks enclosed should be directed to the EMC Organizing Committee, Box 2141, 51-645 Wroclaw 12 Poland. Checks should be made payable to the bank account of the Wroclaw Technical University, 50-370 Wroclaw, Poland in the National Bank of Poland, I O/ M Wroclaw, No. 93060-66240-151-6787.

At the same time, we would like to confirm that plans for the Seventh Wroclaw EMC Symposium and Exhibition remain unchanged and we will be happy to meet you in Wroclaw, in 1984. Further information concerning the future event will be disseminated in due course."



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Book Reviews



by Jim Hill, EMXX Corporation.

In this issue, we review two books from across the sea, one from England and the other from Germany. *Electrical Interference in Electronic Systems* was written by R. E. Martin in the Queen's English, using words such as earthing, screening, earth bars and earth mesh. Nevertheless, it is easy to understand and is well organized. One unusual feature is the 26-page section devoted to the bibliography which includes references to a number of our own IEEE EMC Society publications. Although the book orginally was released in England, this edition has been printed in the United States and is available from the Research Studies Press in Forest Grove, Oregon.

High Voltage Measurements—Equipment and Methods by Adolph J. Schwab was received from Springer-Verlag, Berlin, Germany. Because it is written in German, it was necessary to find a reviewer fluent in this language. Professor Harmuth of Catholic University volunteered to do the review, which is included here. While the first edition of this book was translated into English and it is expected that an English translation of this second edition will be issued, there is no indication of the date on which this may become available.

In the next issue of this newsletter, we will be back with some of the recent American EMC book releases.

"Electrical Interference in Electronic Systems" BY R. E. Martin Published by Research Studies Press 8 William Way, Letchworth, Herts, England or P.O. Box 92, Forest Grove, Oregon 97116 Copyright 1979 Hardbound (198 pages): \$37.75 Reviewed by James S. Hill The EMXX Corp.

6706 Deland Drive, Springfield, VA 22152

The author has subtitled his book *Its Avoidance within High-Voltage Substations and Elsewhere* to indicate its principal application in this direction. This also is borne out by the copyright being held by the Central Electricity Generating Board, the British public utility for electrical power. The book is particularly concerned with the use of electronic equipment in high-voltage substations and describes the ways within a substation in which harmful interference may enter the electronic systems, as well as indicating approximate measures for the control of this interference. Interference effects external to the station are not considered. The proliferation of computers in the control of electric power distribution and their placement in high-voltage substations has opened up a new set of problems for engineers trained to design for kilowatts and megawatts. Computers operate at milliwatt and microwatt levels and are sensitive to a spectrum of frequencies to 100 MHz or higher. In the highest-voltage stations, there are special considerations because of the large physical size of the components forming the residual impedances and stray capacitances. The large powers and increased stored energy available in these highvoltage stations also increase the danger of destruction of solid-state electronic equipment by transient overloading, or if not destruction, by false operation which may be destructive to the power distribution system.

The first three chapters of the book are devoted to an introduction, a few pages on the scope, and "How to Use This Book," which includes a short glossary of terms. Chapter 4, which constitutes a full third of the text, summarizes each of the basic discrete means by which interference may gain ingress to a system having particular reference to the substation case. As these means are examined, protection measures are described, such as shielding, filtering, signalling, earthing, and supply arrangements as are necessary to achieve the desired interference immunity so as to permit continued normal operation of the equipment and to prevent damage and harmful effects. Chapter 4 is particularly helpful in including simplified typical schematics illustrating each type of interference ingress and, where appropriate, the diagrams are in two parts showing the circuit before and after treatment necessary to control the particular variety of interference ingress. In using the advice of this chapter, the reader must make certain adjustments. "Earthing" must, of course, be translated to "grounding," "screening" becomes "shielding," "station earth mesh" translates to "station ground bus" and 50 hertz, not 60 hertz, is the power frequency.

Chapters 5 and 6 deal with interference levels as measured at typical substations and the susceptibility of computers to levels of interference observed at locations in England, Belgium, and France. On the basis of these reports, certain recommendations are made for computer immunity to specified levels of magnetic fields, and both steady state and transient electromagnetic fields.

Chapters 7 and 8 give advice on the design of equipment to be installed in substations, in particular, in the selection of the logic family and in the values of attenuation required to control conducted and radiated interference ingress to the equipment. Guidelines for attenuation are laid down. Chapter 9 is a checklist of desirable precautions which is, in effect, a resume of the design principles set forth in the preceding chapters. Chapter 10 is given over to the description of pertinent test specifications and methods. These are categorized into voltage-withstand tests, mains interference tests, electromagnetic field withstand test, and screening, barrier isolation and filtering tests. For each of these test categories, one or more test-procedures is briefly-described. It is interesting to note that one of these is IEEE Std. 472-1974, Surge Withstand Capability Test.

Conclusions and recommendations are covered in Chapters 11 and 12. These are single paragraph resumes of the design practices described in the earlier chapters, together with some forward looking comments on work that should be done toward identifying the environment in the high-voltage substation and in employing new techniques such as optical-fibre and free-space optical transmission systems. Acknowledgements are given in Chapter 13. These indicate that the book is based on the author's work while employed at the Central Electricity Board, London, England.

The author makes frequent use of references throughout the book. These 90 references are listed in Chapter 14. In addition to the references, there is a 26 page bibliography. Many of the sources listed in the bibliography include abstracts and notes citing the relevant material. It is interesting to note that while most of the sources are European, there are a number of references to *IEEE Transactions and Symposium Records* as well as to US Air Force and NASA sources.

To round out his coverage of the subject, the author has included two appendices. Appendix A is a list of 73 manufacturers who are referred to in the text. The list includes addresses and, in many cases, telephone and telex numbers of the manufacturers. Appendix B is a short treatise on the interaction of electromagnetic fields with shielded cables. This is examined from the standpoint of cable leakage and of penetration by external fields. Cable leakage may be unintentional, as in radiation from a CATV cable, or it may be intentional, as in leaky feeder systems developed for use on railways and in mines. The problem of shielding performance of coaxial cables is examined by considering the two parameters, surface transfer impedance and capacitive coupling impedance.

In conclusion, I found this book to be a well organized presentation of problems and solutions concerning the installation of sensitive electromagnetic equipment in the hostile environment encountered in a high-voltage substation. It is full of good practical advice and, in addition, it includes a very extensive list of references and bibliography for the reader who may want to conduct further research into the problem.

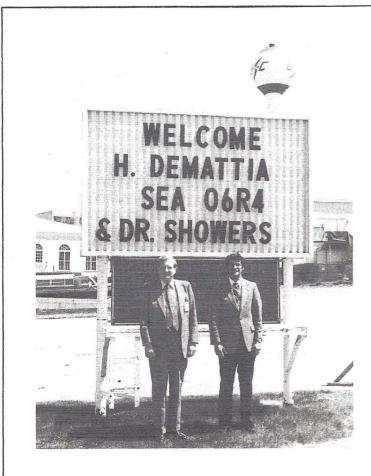
> "High Voltage Measurements Equipment and Methods" (German title: Hochspannungsmesstechnik-Messgerate und Messverfahren) BY Adolf J. Schwab Published by Springer-Verlag 175 Fifth Ave., New York, NY 10010 Hardbound (278 pages): \$55.00 Reviewed by Henning F. Harmuth Catholic University, Washington, D.C.

This is the second edition of a book originally published in 1969. The first edition has been translated into English and Russian, which is a good measure for the quality of a book; it also suggests that an English version of the second edition may become available, which should be welcome news to those who cannot fully appreciate such wonderful string words as "Hochspannungsmesstechnik" or "Scheitelspannunnungsmesseinrichtung."

The first chapter discusses the use of oscilloscopes for the observation of fast varying voltages and currents. As the title implies, the voltages range from tens of kilovolts to megavolts. This chapter contains a section on electromagnetic compatibility (elektromagnetische Vertraglichkeit), which discusses the effects of faulty grounding and improper shielding on measurements.

The use of high voltage dividers in conjunction with oscilloscopes is treated in considerable detail in the second chapter. Chapter 3 is about the measurement of the peak voltage for DC, AC, and transient voltages. Chapter 4 deals with Rogowski coils, and Hall effect generators. Chapter 5 surveys nonconventional methods for the measurement of high voltages and currents; these methods rely primarily on optical links between a point at high voltage and the test equipment, in order to avoid the expensive insulation required by conventional transformers. Chapter 6 is devoted to the measurement of the properties of dielectric materials, while Chapter 7 treats discharges in cavities of insulating materials.

The book contains 256 illustrations and a list of 885 references. These numbers are a good indication of the thoroughness of the book. Let us add that the book is very readable—at least for those fluent in technical German specialized to high voltage test engineering.



NAVAL UNDERWATER SYSTEMS CENTER (NUSC) BRIEFING

On 29 April, Mr. H. DeMattia was the recipient of a technical briefing provided by personnel supporting the Shipboard "Below-Decks" EMC R&D Program. The briefings were led by Mr. Davis S. Dixon from NUSC and Dr. Ralph Showers of the University of Pennsylvania. Discussions centered on the EMC prediction programs progress validating EMI models and implementing the electrical/electronic equipment and cable arrangement capability.

On 30 April, Mr. DeMattia was briefed by Dr. David Dence, Head, Submarine Electromagnetic Systems Department and other Code 34 employees on the NUSC electromagnetic capabilities. This included a tour of the NUSC EMC Measurements and Computer Laboratories and the Fiber Optics Laboratory. EMC management issues also were discussed with Mr. William Prysner, Head, Design Division.

EMCABS

In this issue, we are publishing 36 abstracts. These are abstracts on various EMC topics. We plan to continue publishing abstracts of papers from previous EMC Symposia and from other conferences. The EMCABS committee is composed of the members listed below. By way of introduction to the community, they are listed with their company affiliations.

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| Challenges of EMI Measurements | EMCABS: 1-6-82 | | EMCABS: 4-6-82 |
| Challenges of EMI Measurements Charles K. S. Miller National Bureau of Standards, Washington, D.C. PB81-233736, Not available NTIS, Final Report Mar 81, 8p, Sept 22-25, Paper in NCSL Newsletter 21, nl p16-23, Mar 81 ABSTRACT: In recent years, there has been increasing publicity devoted to the proliferating problems associated with electromagnetic interference (EMI). The first step in understanding the nature of the EMI problem and ultimately controlling or regulating the sources is being able to quantify the problem through accurate measurement. EMI measurements are difficult to make because of the wide range of field strengths and frequencies, the complex waveforms, transient sources, field condition, etc. NBS has had an active program underway for some time to upgrade the state-of-the-art for EMI measurements and this program is producing important results. This paper reviews the EMI problem, describes the measurement challenges and NBS' response, and discusses the implications of EMI measurements for the metrology community. INDEX TERMS: EMI Measurements, field strengths, complex waveforms, transient. | | Tracking Mains Filter K. Radhakrishna Rao and R. S. Moni Indian Institute of Technology, Madras Wireless World October 1981 October 1981, pp 62-64 ABSTRACT: The circuit described is a high-Q, self-tuned band-rejection filter for suppressing low-frequency interfering signals, particularly 50 Hz power-line interference. It makes use of four op-amps and a phase- correction scheme and needs no precision components. Because the notch frequency of the filter tracks the frequency of the interference signal, tolerances and temperature coefficients of the frequency-determining passive components do not affect the performance. INDEX TERMS: Tracking, Filter, Notch Frequency, Active, Band-elimination. | |
| | EMCABS: 2-6-82 | R.F. Induced Problems and Solid-State RTTY Terminals | EMCABS: 5-6-82 |
| A CQ Exclusive CQ Interviews: Mark S. Fowler, Chairman, FCC Dr. Theodore J. Cohen, N4XX CQ Magazine March 1982 March 1982, pp 18-22 ABSTRACT: In an interview with Dr. Theodore J. Cohen, N4XX, Mr. Mark S. Fowler, Chairman of the FCC, gives his views and attitudes about radio frequency interference and the regulatory activities of the FCC, among other topics. INDEX TERMS: Federal Communications Commission, Regulations and Policies, Amateur Service, RFI, Self-regulation. | | Bill Henry*, K9GWT and Jim Bartlett[†], K1TX *616 W. Church St., Champaign, 1L., [†]2109 Branch Dr., Champaign, 1L 61820 CQ Magazine, December, 1981 December, 1981, pp 36-38 ABSTRACT: Over the past 10 years, there has been an explosion in RTTY activity on the amateur bands, | |
| Earth Station Interference Problems and How To Tame Them With Filters | EMCABS: 3-6-82 | | EMCABS: 6-6-82 |
| Glyn Bostick and Wesley Scriba, WA2QKU Unadilla/Reyco Div. Microwave Filter Co., Inc., E. Syracuse, NY 13057 CQ Magazine February, 1982 February, 1982, pp 35-36 ABSTRACT: When you pointed your dish upward to get all that good stuff, you t your earthly troubles behind, right? Wrong! Over 50 percent of personal earth stati picture degradation on one or more of the 24 channels, and one in five initially is pictures on any channel) due to reception of unwanted microwave transmissions-(T1, hereafter). INDEX TERMS: Satellite TV, Earth Station, Interference, Filters, Microwa Out-of-Band. | ions suffer mild to severe inoperable (no lookable —Terrestrial Interference | Spherical Dipole for Radiating Standard Fields M. L. Crawford and J. L. Workman Electromagnetic Fields Division, National Bureau of Standards, Boulder, CO 8030 Conference on Precision Electromagnetic Measurements, CPEM Digest 1980 IEEE 80CH1497-71M, June 23-27, 1980, pp 424-429 ABSTRACT: This paper describes a 10 cm diameter, self-contained, spherical dipole standard field at discrete frequencies between 30 MHz and 180 MHz. Results are press compare radiated emission measurements performed in shielded enclosures, in trat (TEM) cells, and on an open-field test site. INDEX TERMS: Standard Fields, Standard Radiator, Spherical Dipole. | that radiates a constant, ented using the dipole to |

| 1 | | EMCABS: 7-6-82 | EMCABS: 10-6-8 |
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| | The Design of Ultra-broadband (0.2 MHz – 26 GHz) High Sensitivity Radiation Probes S. Hopfer and Z. Adler General Microwave Corporation, Farmingdale, N.Y. Conference on Precision Electromagnetic Measurements, CPEM Digest 1980 IEEE 80CH1497-71M, June 23-27, 1980, pp 430-433 ABSTRACT: The work reported in this summary is an outgrowth of the increasing demand for surveying the electromagnetic environment over wider frequency ranges and at lower levels than has heretofore been deemed necessary. Three orthogonally mounted elements form the RF structure of the probe. Each element consists of a relatively long, narrow thin film strip of approximately 6000 ohms resistance. At its center, a small gap is bridged by a Schottky diode chip. The diode, in turn, is shunted by an R-C microcircuit. To provide d.c. continuity, interconnecting resistive strips are employed on the underside of a 2 mil thick dielectric substrate. The extreme broadbanding is achieved by matching the characteristics of the resistive strip to those of the Schottky diode. INDEX TERMS: Ultra-broadband, High Sensitivity, Radiation Probes. | | Electromagnetic Interference Control in Industrial Facilities Dr. J. L. Norman Violette J. L. N. Violette Associates EMC Technology & Interference Control News Vol. 1, No. 1, January, 1982 ABSTRACT: The modern industrial environment is becoming increasingly dependent upon the applications of highly complex automatic control systems. The failure of a single critical component or the inadvertent injection of erroneous data can be catastrophic in terms of time lost, unacceptable product quality or the complete rejection of a product batch, all translatable into increased cost. This article explores some of the possible means (coupling paths) whereby unwanted electromagnetic signals (conducted or radiated) can find their way into industrial automatic control systems and produce undesirable, and often catastrophic, effects. Some solutions to specific situations also are suggested. INDEX TERMS: Industrial EMI Control, Process Control Networks, Power Distribution Systems. |
| | Unified Theory of Near-Field Scanning Paul F. Wacker 101 Hickory Avenue, Boulder, CO 80303 Conference on Precision Electromagnetic Measurements, CPEM Digest 1980 | EMCABS: 8-6-82 | ECC Lasson Computer EMI with Design and Manufacturing Space |
| IEEE 80CH1497-71M, June 23-27, 1980, pp 434-436 ABSTRACT: As a part of a unified theory of near-field analysis and measurement, a rigorous unified theory of near-field scanning is presented with emphasis upon high accuracy and extremely efficient data processing, both with and without correction for the pattern of the probe. The analysis is explicitly applied to spherical, circular cylindrical, plane polar, plane radial, and rectangular scanning of both electromagnetic and scalar systems. Concepts common to all such systems are used with a unified notation, leading to general-but-explicit data-processing formulas with plug-in expressions based upon the theory. This facilitates transfer of understanding and computational efficiencies between various systems, in particular, facilitating the understanding of the complicated algebra of spherical electromagnetic scanning. The analysis has revealed many conceptual errors of the literature and workers in the field and has led to new developments including (a) a new form of plane polar scanning, (b) plane radial scanning, (c) practical techniques for determining complex dyadic scattering patterns, and (d) use of the mathematics of quantum-mechanical selection rules for inverse scattering analysis and minimizing effort in determining patterns. INDEX TERMS: Near-field, Analysis, Measurement, Scanning, Data Processing, Plane Polar Scanning, Plane Radial Scanning, Complex Dyadic Scattering, Inverse Scattering, Patterns. | | fficient data processing, itly applied to spherical, ctromagnetic and scalar leading to general-but- his facilitates transfer of r, facilitating the under- lysis has revealed many opments including (a) a or determining complex election rules for inverse ing, Plane Polar Scan- | FCC Lassoes Computer EMI with Design and Manufacturing Specs Phil Dobrogowski and Eric Heyden AMP Inc., Harrisburg, PA Electronics Vol. 55, No. 5, March 10, 1982, pp 126-132 ABSTRACT: The growing number of complaints identifying digital equipment as a source of radio and television interference has led the FCC to promulgate some new rules regarding the allowable emissions from these devices. This article summarizes these new rules and reviews some of the typical sources of these emissions and some recommended techniques for emissions reduction. INDEX TERMS: EMC, FCC Regulations, Conducted and Radiated Emissions, Spectral Analysis, Coupling, Grounding, Shielding. |
| | HF Magnetic Field Standard Ichiro Yokoshima and Futoshi Uchiyama Radio & OptoElectronics Division, Electrotechnical Laboratory of Japan Conference on Precision Electromagnetic Measurements, CPEM Digest 1980 IEEE 80CH1497-71M, June 23-27, 1980, pp 437-439 ABSTRACT: For calibration of field strength meter with loop-type antennas, magne a small loop antenna has widely been used and a single turn balanced loop with a employed as the primary standard. Field strength has been calculated from the cross the loop current measured by the thermocouple. For higher frequency use, however ments of the current and the cross section are decreased in this conventional technic loop should be much smaller than the wavelength used. In order to overcome these already has proposed a method by which the magnetic field strength is determined fro antenna measured at the input port and the incident power into the input port. INDEX TERMS: Calibration, Field Strength Meter, Loop Antenna, Magnetic | thermocouple has been section of the loop and , accuracies in measure- que since the size of the e difficulties, the author m a property of the loop | The Thermal Response of a Human in the Near-Zone of a Resonant Thin-Wire Antenna Ronald J. Spiegel U.S. Environmental Protection Agency, Health Effects Research Laboratory, Research Triangle Park, NC 27711 IEEE Transactions on Microwave Theory and Technique MTT-30, No. 2 Feb 1982, pp 177-185 ABSTRACT: The thermal response of a human in the near-zone of an antenna was determined by numerical procedures. The approach taken was to modify the heat transfer equations for man in air to account for thermal loading due to the energy absorbed from the radiating antenna. The absorbed power density distribution in the human body was determined by considering the body and antenna to be a coupled system in which the resulting system of equations was solved by moment method procedures. This information then was analyzed by a thermal response model consisting of a series of transient conduction equations with internal heat generation due to metabolism, internal convective heat transfer due to blood flow, external interaction by convection and radiation, and cooling of the skin by sweating and evaporation. INDEX TERMS: Biological effects, Thermal response, Non-ionizing radiation. |

| | Transmission Through Slits Formed by Inclined Planes Eric J. Hamilton and V. Kerdemelidis Department of Electrical Engineering, University of Canterbury, Christchurch, Net IEEE Transactions on Antennas and Propagation Vol. AP-30, No. 2, March 1982, pp 199-204 ABSTRACT: The phase and the amplitude of electromagnetic fields transmitted th slits are investigated both theoretically and experimentally. The slits are formed by conducting planes. The approximate theory employed is based on the modification diffraction by a half-plane (modified geometrical theory of diffraction (GTD)). The ments were performed using a parallel-plate range. Results indicate that the effect of t the planes tends to be of importance only for the cases of narrow slit, i.e., $\lambda/3$ or INDEX TERMS: Diffraction, Leakage, Slits. | rough two-dimensional / two inclined perfectly n of the high frequency experimental measure- he relative inclination of | Metallic Zinc EM1/RF1 Shielding of Plastic Electronic Enclosures Merle L. Thorpe TAFA Metallisation, Inc., Concord, N.H. EMC Technology and Interference Control News Vol. I, No. 2, April, 1982, pp. 22-27 ABSTRACT: Currently, a number of approaches are being taken to solve the shieldir enclosures. One of the approaches uses an arc spray metal which gives shielding in th once applied, can be handled immediately and can give the bond strength equal to or no aging problem. This paper describes the arcspray zinc shielding technique. Z conductive of any commercially applied shielding coating on plastic, except pure silver fraction of the resistivity of nickel loaded paint. In many cases, adequate shielding is attenuation. This is met easily by arcsprayed zinc. INDEX TERMS: EM1/RF1 shielding, arcsprayed zinc shielding coating, plastic | he 70-90 dB range, and better than paints with inc is by far the most c. Arcsprayed zinc has a produced by 30-40 dB |
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| 15 | EMCABS: 14-6-82 Resonant Behavior of a Small Aperture Backed by a Conducting Body Roger F. Harrington Department of Electrical and Computer Engineering, Syracuse University, Syracuse, NY 13210 IEEE Transactions on Antennas and Propagation Vol. AP-30, No. 2, March 1982, pp 205-212 ABSTRACT: The problem of an electrically small aperture in a conducting screen backed by a conducting body is analyzed. It is found that aperture-body resonances can occur for which the power transmitted through the aperture backed by a conducting body is much larger than that when the body is not present. An example is an electrically small aperture resonated by a capacitor across its midpoint. In the loss-free case, the transmission cross section of a small resonated aperture is $3 \lambda^2/4 \pi$ independent of the size or shape of the aperture. For actual conductors, the transmission cross section will be increasingly reduced by conduction loss as the aperture is made smaller. INDEX TERMS: Aperture, Coupling, Resonance, Transmission Cross Section. | | A BASIC Program for Designing Chebyshev Filters John M. Barge and Ed Wetherhold Honeywell Inc., Signal Analysis Center EMC Technology & Interference Control News Vol. 1, No. 2, April, 1982, pp. 60-69. ABSTRACT: Passive LC filters are used extensively in EMC applications, such as a spectrum analyzer pre-selection, but the design and implementation of these filters of time consuming. Normally, to obtain the component values for a certain filter requir find the normalized values of filter parameters, such as cutoff frequency, impedance cient, etc. on the published tables and then make scaling calculations. This process is s This article presents a simple and versatile BASIC computer program that is capab based on the actual measured capacitor values and that can be used by EMC engi INDEX TERMS: Chebyshev filters, BASIC program. | ften can be difficult and ement, it is necessary to e level, reflection coeffi- low and prone to errors. le of generating designs |
| | EMCABS: 15-6-82 Inverse Scattering Characteristics of Electromagnetic Waves by Conducting Bodics. Yasumitsu Miyazaki Toyohashi University of Technology Report of Technical Group on EMC, IECE and IEE of Japan Vol. 81, No. 241, EMCJ 81-81, pp. 19-24 ABSTRACT: Inverse scattering problems of electromagnetic waves incident to conducting bodies of com- plex shapes are discussed by using the conformal mapping method. Plane waves incident to conducting bodies are scattered in the forward and backward region. Scattered fields are investigated with respect to the angular spectrum. The optimum shape of conducting body is determined from data of the angular spectrum of the mapped circular cylinder. Two dimensional inverse scatterings are considered. INDEX TERMS: Inverse scattering, conformal mapping, angular spectrum. | | CISPR PUBLICATION 15 - Limits and methods of measurement of radio interference characteristics of fluorescent lamps and luminaires International Special Committee on Radio Interference (CISPR) International Electrotechnical Commission Central Office of the IEC, Geneva, Switzerland March 1982, 31 pages ABSTRACT: Fluorescent lamps generate radio interference that may impair radio the long and medium wave bands. Because the direct measurement of the interference an extremely difficult matter, the attenuation of the interference by the luminaire is being a rather simple method, it will ensure sufficiently low interference levels if luminaires satisfies minimum requirements. The attenuation requirements for fluorescent lamps and luminaires specified in not differ from those given in the first. However, the measuring methods have bee technical progress. CISPR Publication 15 also describes one method which is app of switch-start operated fluorescent lamps. Simpler methods for other types of lur being studied. INDEX TERMS: Interference measurement, fluorescent lamps. | e generated by a lamp is measured instead. This the attenuation by the this revised edition do en adapted to match slicable to most types |

| CISPR Publication 17 - Methods of measurement of the suppression components International Special Committee on Radio Interference International Electrotechnical Commission Central Office of the IEC, Geneva, Switzerland March 1982, 52 pages ABSTRACT: This new CISPR publication describes procedures for measuring the insertion loss of passive RF suppression filters consisting of single elements or combinations of inductors, capacitors and resistors. As a general rule, suppression characteristics of capacitors, inductors and filters depend on the impedances between which they work, on operating current and voltage levels, and other factors such as ambient temperature. In order that it is possible to compare the results of measurements of these characteristics which are performed in laboratories all over the world, or as stated by various manufacturers in their specifications, one set of standard test methods must be used. The test methods in this new publication include those for use in a laboratory or on a production line. They utilize fixed impedance terminations or "worst case" terminations and specify those to be used in model installations. It also specifies voltage and current loading requirements. INDEX TERMS: Interference filters, attenuation measurement. | | Interference from Pocket Calculators in Aircraft N. A. Ferrett, BSc, C Eng., MIERE and G. A. Jackson, BSc, C Eng. MIEE Civil Aviation Authority, The Electrical Research Association Limited Proceedings of the Conference on Electromagnetic Compatibility IERE Conference Proceedings No. 39, pp 303-309 ABSTRACT: It is well known that certain pocket calculators, when placed in the radio, can disturb reception. Interference might be caused in a more critical situati aircraft. Calculators are permitted to be used in civil aircraft and recently specialized can available to enable flying crew to perform navigational calculations in-flight. It was conthe potentially interfering characteristics of these devices should be investigated and the measurements and discusses the results obtained and the relevance of specifications were measured in the frequency range of the ADF band paper also describes qualitative tests which were made in several light aircraft and avionic equipment undergoing bench tests. INDEX TERMS: Pocket calculators, interference, measurements, aircraft, navig | on as, for example, in alculators have become nsidered desirable that his paper describes the hich might be applied. I (0.19 - 1.8 M Hz). The in close proximity to | |
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| 17 | EMCABS: 20-6-82 Transient Electromagnetic Measurements of a Brass Ship Model F. J. Deadrick; UCRL-52452. Distribution Category UC-37 Lawrence Livermore Laboratory, University of California, Livermore, CA ABSTRACT: The direct time-domain transient electromagnetic measurement techniques were utilized to characterize the electromagnetic coupling properties of two high frequency shipboard antennas. The experi- mental results were obtained using the RSNF/PGG-1 brass ship model (1/48th scale) located over a perfect ground plane. The application of the time space domain measurement techniques to marine environments is discussed. INDEX TERMS: Transient EMP, EM model measurement. EMP Coupling to Ships F. J. Deadrick, H. S. Cabayan, K. F. Kunz, R. M. Bevensee, L. C. Martin and R. W. Egbert UCRL-52803, Distribution Category UC-13 (Jan. 1981) Lawrence Livermore Laboratory. University of California, Livermore, CA ABSTRACT: The scale-model tests were conducted to establish the adequacy and limitations of model measurements as tools for predicting electromagnetic pulse (EMP) coupling voltages and currents to the critical antennas, cables, and metallic structures on ships. The scale-model predictions are compared with the results of the full-scale EMP simulation test of the Canadian ASW ships, HMCS Huron. The scale-model tests in conjunction with the data base from EMP coupling modules provide important information for source model development and permit effective low-cost study of particular system configurations. INDEX TERMS: EMP coupling, scale model experiment. | | Development of Tests and Criteria to Evaluate Grounding Systems Wils L. Cooley and Robert L. McConnell West Virginia Univ., Morgantown, Engineering Experiment Station PB81-238354, PC A09/MF A01 Open File Report 1 Jul 79-31 Oct 80 Nov. 80, 177 p, Bumines-OFR-103-81 Contract JO19916 ABSTRACT: This report covers several aspects of mine safety ground systems, prin coal mines. The design of a combined ground fault-ground check monitoring system is is made of grounding systems for dc shuttle cars. Complete resistance data and results of self-salting ground rods are presented. A detailed resistance and economic analysis of composite materials for building inexpensive and effective ground beds in hig desireability of penetrating the coal seam with a bore-hole safety ground is investigate mine substation grounding and bonding Workshop. INDEX TERMS: Grounding Systems, mine safety, ground fault, and dc. | presented. An analysis of physical inspections is presented for the use h-resistivity areas. The |
| | | | Shielded Conductor Cable System K. D. Castle National Aeronautics & Space Administration, Houston, TX, Lyndon Johnson S, Patent-4 264 940, Not Available NTIS Filed 30 Nov 76, patented 28 Apr 81, 4p N APPL 746 579. Supersedes PAT-APPL-746 579-76, N77-13338 (15-04, p. 0465) ABSTRACT: A cable system carries one or more insulated conductors completely having one end connected to ground. A lightning protector network connects the or ground. The protector network is normally open circuited and becomes only short c momentary abnormal surge voltage induced in the shield. The protector network's c change completes a conducive circuit path between the shield and the two grounde shield current which has the desired effect of protecting the signal carrying conduct large surge voltage. INDEX TERMS: Shielded Conductor, lightning, surge voltage. | 481-27397/1, PAT- enclosed within a shield ther end of the shield to ircuited in response to a open to short impedance d ends for conducting a |

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| | Electromagnetic Shielding National Technical Information Service, Springfield, VA PB81-808669, PC NOI/MF N101, Report for 1972-Jul 1981 Aug 81, 341 p. Supersedes PB80-810849, and NTIS/PS-79/0526 ABSTRACT: The bibliography presents research on electromagnetic shielding of electronic and electrical equipment personnel, and ordnance. The shielding effectiveness of materials and structures is covered. Nuclear electromagnetic pulse shielding is included. (This updated bibliography contains 334 citations, 33 of which are new entries to the previous edition.) INDEX TERMS: Shielding, bibliography, electromagnetic, shielding effectiveness, nuclear electromag- netic pulse. | EM Sensor for Determining Impedance of EM Field Andrew A. Cuneo, Jr. and James J. Loftus Department of the Army, Washington, D.C. PAT-APPL-6-275 470, PC A02/MF A01, Patent Application. Copy of application available NTIS. Filed 19 Jun 1981, 9 p. AD-D008 710/6 ABSTRACT: A method and device are given for determining the impedance of the electric and magnetic fields in the near and far fields associated with a radiating antenna. The electric and magnetic field components are sensed in a far field location and the system is calibrated using a known relationship between the electric and magnetic field components. The sensed signals are transmitted optically via a fiber optic link to an optical receiver. The received optical signals are modulated by an audio signal generator and input into a ratio detector via variable attenuators which are used to calibrate the system. Multiple subsequent ratios are measured and recorded as a function of location of the sensor. INDEX TERMS: EM Sensor, impedance, EM field, electric, magnetic, fields, near, far fields, fiber optic link, and optical receiver. |
| 19 | EMCABS: 26-6-82 Using a TEM Transverse Electromagnetic Cell for EMC (Electromagnetic Compatibility) Measurements of Electronic Equipment M. L. Crawford and J. L. Workman National Bureau of Standards, Washington, D.C. National Engineering Lab. PB81-244857, PC A04/MF A01 Jul 81, 71 p. NBS-TN-1013, Supersedes PB-296-325 ABSTRACT: This publication describes the physical design and electrical evaluation of pertinent parameters which influence the use and operation of a transverse electromagnetic (TEM) cell. Detailed, step-by-step procedures are given for using a TEM cell for performing either radiated EM susceptibility testing or for measuring radiated EM emissions from electronic/electro-mechanical equipment. INDEX TERMS: Transverse Electromagnetic Cell, EMC, Measurements, EM susceptibility, and EM emissions. | Elimination of Short Pulse Interference in Pulse Compression Radars. J. D. Wilson Naval Research Lab., Washington, D.C. AD-A 103 533/6, PC A02/MF A01, Interim Report 3 Sep 1981, 15 p. Report No. NRL-8507 ABSTRACT: Preliminary to a study on environmental mapping based on real data, a simulation was developed to study short pulse interference and its effect on detection in a pulse compression radar. A simulation was needed because the available data were recorded after the pulse compression network. This is too late to eliminate short pulse interference; it must be detected and eliminated prior to pulse compression. The simulation also treats the problem of removing clutter and short pulse interference when both are present. The simulation involved a signal of approximately the same level as the noise, short pulse interfer- ence peaking 40 dB above the noise, and clutter with average level the same as the peak level of the short pulse interference. With these levels, either short pulse interference of clutter would inhibit detection; but, prepulse compression blanking of the interference and postpulse compression cancellation of the clutter allowed detection of the target signal. INDEX TERMS: Short Pulse Interference, simulation, pulse compression, and radar. |
| | EMCABS: 27-6-82 EM1/ RFI Shielding Effectiveness Evaluation of Bolt-Together Shielded Rooms in Long-Term Aging. Raymond G. McCormack Construction Engineering Research Lab. (Army) Champaign, IL. AD-A102 754/9, PC A07/ MF A01, Final Report Jun 81, 144 p. Report No. CERL-TR-M-296 ABSTRACT: This report presents the results of a laboratory evaluation of electro-magnetically shielded rooms that represent that state-of-the-art in demountable, bolt-together shielded rooms. First, the initial shielding effectiveness was measured; next, the rooms were housed for a 3-year "aging" period in a laboratory area whose environment was controlled during working hours for human comfort. Additional evaluators included a study of how easily the rooms could be assembled, a comparison of shielding effectiveness when different seam bolt torques were used, and a comparison of particle board and plywood panel cores. The study results show that significant degradation of shielding effectiveness occurs with aging, so periodic maintenance will be necessary if optimum shielding is required. INDEX TERMS: EM/ RF1, Shielding, Evaluation, and Shielded Rooms. | EMCABS: 30-6-82 Lightning, Surge and Transient Protection. 1978-July. 1981 (Citations from the NTIS Data Base) Supersedes PB80-810781 and NTIS/PS-0154 National Technical Information Service, Springfield, VA. PB81-808677, PC NO1/MF NO1, Report for 1978-Jul 1981 Aug 1981, 191p ABSTRACT: Techniques and devices for the protection of electronic and electrical equipment are presented in these Federally-sponsored research reports. The citations include research and suppressors, limiters, lightning arresters, electromagnetic pulse protection devices, and overvoltage protection networks. Electro- magnetic shielding is excluded. (This updated bibliography contains 184 citations, 78 of which are new entries to the previous edition.) INDEX TERMS: Lightning, surge, transient protection, suppressors, limiters, lightning arresters, protec- tion, and bibliography. |

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| | Electromagnetic Topological Description of a Ground-Based Missile Launch Control Center. E. F. Vance Dikewood Industries, Inc., Albuquerque, NM. AD-A103 055/0, PC A03/MF A01. Final report Jun 1980, 29p, AFWL-TR-79-132 Contract F29601-76-C-0149 ABSTRACT: A representative set of EMP interaction problems is identified for a gr its topology. Approaches to the solution of these problems are briefly described. The illustration are the AC power unit, the buried communication cables, the communic cable, the silo lid, and the internal power cables. INDEX TERMS: EM Sensor, Impedance, EM Field, electric, magnetic, fields fiber optic link, and optical receiver. | problems identified for cation antenna and lead | Thunderstorm Hazards Flight Research: Storm Hazards 1980 Overview. P. L. Deal, G. L. Keyser, B. D. Fisher, and N. L. Crabill National Aeronautics and Space Administration N81-27062/1, PC A03/MF A01. Technical Report, Jun-Oct 1980. June 1981, 29p NASA-TM-81974 ABSTRACT: A highly instrumented NASA F-106B aircraft, modified for the storm hazards mission protected against direct lightning strikes, was used in conjunction with various ground based radar lightning measurement systems to collect data during thunderstorm penetration flights. During 69 thus storm penetrations, there were 10 direct lightning strikes to the aircraft. No problems were encountered any of the aircraft's systems as a result of the strikes and the research instrumentation performed as desig Electromagnetic characteristics of nine strikes were recorded, and the results of other experiments cor the theory that X-ray radiation and nitrous oxide gas are being produced by processes associated directly thunderstorm electric fields and lightning discharges. A better understanding of aircraft lightning attach mechanisms and strike zones is being accomplished by careful inspection, identification, and document of lightning attachment points and swept stroke paths following each strike to the aircraft. INDEX TERMS: Storm Hazards, lightning, lightning measurement, thunderstorm, electromagne electric fields, and lightning discharges. | n and onder- with gned. offirm with ment ation |
| 21 | Electromagnetic Topological Description of a Rocket Vehicle in Flight. E. E. Vance Dikewood Industries, Inc., Albuquerque, NM. AD-A103 056/8, PC A02/MF A01. Final Report Jun 1980. 24p. DC-FR-1289-2. AFW1-TR-79-133. Contract F29601-76-C-0149 ABSTRACT: The system topology for a rocket vehicle in flight is first developed partitions the interaction of the system with the EMP into external interaction interaction, and internal interaction. For each of the three partitions, represent interaction problems are identified and approaches to solving some of them are d INDEX TERMS: Electromagnetic, Topological, rocket vehicle, interaction, and | n, intermediate internal tative elementary EMP iscussed. | Radio Frequency Interference at the Geostationary Orbit M. K. Sue Jet Propulsion Lab, Pasadena, CA. N81-27345/0. PC A03/MF A01. Final Report. 15 Jun 81. 39p NASA-CR-164531. JPL-PUB-81-34. Contract NAS7-100 ABSTRACT: Growing demands on the frequency spectrum have increased the possibility of radio frequenterference (RFI). Various approaches to obtain in orbit RFI data are compared; this comparison ind that the most practical way to obtain RFI data for a desired orbit (such as a geostationary orbit) is throug extrapolation of in orbit RFI measurements by a low orbit satellite. It is concluded that a coherent program that uses both experimental data and analytical predictors provides accurate RFI data at mic cost. INDEX TERMS: Radio Frequency Interference, RFI. | uency icates gh the RFI |
| | A Fiber Optic Cable Communications Link for Tethered Remotely Controlled Submersibles. M. McCord Naval Ocean Systems Center, San Diego, CA. AD-A103 432/O, PC A02/MF A01. Research Report Oct 80-Jan 81. Mar 81, 17p, Report No. NOSC/TD-443 ABSTRACT: This document presents a concept for a fiber optical cable communication tethered, remotely controlled submersibles. FOCL was conceived as a possible elecence (EMI) tolerant alternative to the EMI susceptible electromechanical cable co Mine Neutralization System (MNS) Advanced Developmental Model (ADM). consists of an electro-optical/mechanical cable, a cable handling and storage unit, a units, and a pair of signal processing units. Functionally, FOCL is capable of electrical power and four telemetry signals (two narrowband signals and two wid signals) over a composite electro-optical mechanical cable. The conceived FOCL is by virtue of its optically isolated interfaces, and, thus, represents a potential solution of the MNS. Also, once developed, FOCL will be highly adaptable to many othe INDEX TERMS: Fiber Optic, Communications Link, Submersibles, fiber options link, FOCL, electromagnetic interference, widebar susceptibility. | ectromechanical interfer- mmunication link of the The envisioned FOCL a pair of optical interface transmitting three-phase leband television-quality inherently EMI tolerant to the EMI susceptibility er applications. ptical cable communica- | Test Set for Transient Protection Devices John E. B. Tuttle Department of the Army, Washington, D.C. PAT-APPL-6-277 306, PC A02/MF A01. This Government-owned invention available for U.S. licensing and possibly for foreign licensing. 25 Jun 1981. 23p. AD-D008 611/6 ABSTRACT: A method and device for testing protection circuits comprising positive and negative voltage protection circuits and high voltage fast rise time protection circuits. A bipolar test signa alternative positive and negative high voltage pulses is applied to the circuit under test. Determination is whether the pulses are within a predetermined voltage window. Signals indicating pass/fail responsive t determination are generated. A high voltage fast rise time negative pulse is applied to the circuit under Changes in the voltage-time waveform are sensed and compared to predetermined levels. Pass/fail signal generated in response to the comparison. INDEX TERMS: ¹ Test Set, Transient Protection, protection circuits, high voltage, and fast rise t | e high I with made o that er test. als are |

EMC PERSONALITY PROFILES



ANDY NALBANDIAN

The EMC Personality Profile in this issue is Andy Nalbandian. Andy received a Bachelor of Science degree in Electrical Engineering from the University of California in 1952. Since that time, he has pursued graduate study in electrical engineering at the University of Santa Clara.

Andy started his career with North American Rockwell in 1952. During his eight years with Rockwell, he was involved in the design and production of the F86L, B70, and F108 aircraft. Andy became a group leader at Rockwell, and in this capacity, he was responsible for the design of control systems and for the electronic systems integration and installation on these aircraft. He was one of the key engineers who were instrumental in the record completion of the F86L.

In 1960, Andy joined the California Institute of Technology Jet Propulsion Laboratory. Andy became the electromagnetic compatibility group supervisor at JPL, and in this capacity, he directed the EMC and magnetic control test and analysis for all JPL flight projects. He also was responsible for the operation of the EMI and magnetic control research laboratories and developed a sensitive S-band noise receiver system to measure to -150 dBm in 100 Hz bandwidth. In his work at JPL, Andy was responsible for defining test philosophy, establishing test facility requirements and supervising the preparation of specification launch procedures and test reports. Andy also was the cognizant engineer for the Mariner 69 ultraviolet spectrometer design and development effort at JPL.

In 1967, Andy left JPL to go to work for the Lockheed Missiles and Space Company where he is currently the electromagnetic compatibility research specialist. At Lockheed, Andy is responsible for major space program EMC efforts. He organizes, plans, directs and reviews the work of other EMC engineers, establishes EMC requirements, and provides an interface with customers, associates and design and test groups. He also participates in the evaluation of proposals, directs subcontractor efforts and performs an analysis of EMC problems on space vchicles, RF systems and test support equipment and facilities. At Lockheed, Andy has been involved with the Polaris and Poseidon missile systems.

by William G. Duff



In addition to his engineering work, Andy had a fairly interesting business on the side. In 1978, he opened and operated a large auto body shop. Through his hard work, he was able to build up the business to the point where he had a work force of seven employees. Andy managed the business and was involved in all phases of auto body work, including collision estimating, body work and painting. He finally sold the business in 1981 because it was more than he could manage in his spare time.

In addition to these activities, Andy has been very active in the IEEE EMC Society. He is currently a senior member of IEEE. Andy is Chairman of the Steering Committee for the 1982 IEEE International Symposium on Electromagnetic Compatibility. The Symposium will be held on September 8, 9, and 10th, 1982 in Santa Clara, California, and all indications are that the symposium will be an outstanding success. A number of exhibitors already have signed up for the symposium, and it appears there will be an excellent attendance from the Silicon Valley area. He has been quite active in a number of other conferences. He was co-chairman of the 1975 Westcon technical program. He was the EMC session chairman for the ICC 1975, and he was publication chairman for the 1974 IEEE International Symposium on EMC.

Andy was elected to the IEEE EMC Society Board of Directors in 1977 and served a three-year term as chairman of the membership committee. He served as the chairman for the San Francisco IEEE EMC Chapter during 1973 and 1974 and the San Francisco Chapter received the chapter of the year award during his term as chairman.

Andy has received certificates from JPL for his efforts on the Ranger and Mariner spacecraft. He also received a North American Rockwell special award for record development of the F86L aircraft. Andy has published several papers during his career.

Andy currently lives in Saratoga, California. He is married and has four children. Andy's outside interest is in Middle Eastern Music. Andy is one of those people that has to keep busy all the time, and he currently enjoys playing the "oud" for belly dancing in nightclubs. He also still enjoys fixing cars.

Andy would like to extend a special invitation to all of you to attend the 1982 IEEE EMC Symposium in Santa Clara. While you are at the symposium, please say "hello" to Andy and thank him for his efforts and contributions to the EMC community.

CHAPTER CHATTER



by Charles F.W. Anderson

CENTRAL NEW ENGLAND

Officers for 1982/83, as elected at the Chapter's April 21st meeting, are as follows:

Chairman: John M. Clarke (USAF/ESD) Vice Chairman: Arthur W. Murphy (GTE-Sylvania) Secretary/Treasurer: Lennart Long (US/DOT)

At that same meeting, Ron Richard of IFI discussed the commercial evolution of the Crawford Cell (TEM Transmission Cell), based on the development done at NBS, Boulder, CO. Various configurations, applications and limitations, with regard to their use, were presented. "Antennas for Radio Astronomy in the EMC Environment," was the topic of the presentation given by Pamela Waterman of Mitre Corp. on May 19th. Sources of EMC problems and some of the measures that can be taken to control this form of pollution were discussed. The meeting, sponsored by the EMC-S, was held jointly with A & P.

LOS ANGELES

Speaker at the May 20th meeting was "Navy" Joe Fisher whose topic was "Why Design for Electromagnetic Environmental Effects?" Joe presented a description of what the electromagnetic environment is, how it affects aircraft, and how electromagnetic environment effects (E3) are expected to develop in the near future. He also gave brief descriptions of Naval Air Systems Command's major E3 Programs, and of NAVAIR field activities and interaction with other agencies. Joe is the Electromagnetics Branch Head in the Engineering Support Management Division of the Naval Air Systems Comand in Washington, D.C. A graduate of ITT in Philadelphia, PA and from CTI in Kansas City, MO, he is one of the founding engineers of the Navy's E³ programs and is responsible for planning and directing NAVAIR's electromagnetic technology program, which provides support for all of the Navy's aerospace vehicles. Joe represents the Navy at NATO overseas conferences, and in the Air Standards Coordinating Committee meetings, representing all English speaking countries. He is NAVAIR's liaison to the SAE AE-4 committee and EIA G-46 committee, and is a senior member of the IEEE and one of the dB Society founders, at the present time serving as its treasurer. Joe has won many awards and a score of letters of appreciation and certificates for accomplishments in E3.

SAN DIEGO

"Spectrum Analyzers in EMC" was the topic of Bob Bridges' presentation at the April 14th meeting. Discussed were the history of spectrum analyzers in EMC measurements, how a spectrum analyzer is different from an EMC receiver and what this implies, and the FCC computing-device measurements. Bob, of Hewlett-Packard, received a BSE in Engineering and an MS in Physics from Arizona State University. During the last two years, he has spent full time investigating the use of spectrum analyzers for making EMC measurements.

Dan C. Anderson, V.P. of Marketing and Product Development for Richmond Div. of Dixico, Inc., whose topic centered on the subject of "Static Awareness," was guest speaker at the June 9th meeting. Dan's lecture, lightened with amusing and illustrative magic effects (he is a member of Hollywood's famous "Magic Castle"), helped to contribute to the current surge of interest in the phenomenon. Dan received his degree in chemistry from Emory University of North Carolina, and while on the staff of Richmond Corp., he developed several antistatic packaging films, for clean room and spacecraft drape use and for the protection of static sensitive electronics. His published papers on clean and antistatic packaging procedures broke new ground in the industry and still are definitive reference works.

SOUTHERN CALIFORNIA

Officers, elected on May 12th, are:

Chairman: David H. Hoffman (Ford Aerospace & Comm. Corp.) Vice Chairman: Jesse Marquez (Wedemeyer/Marquez) Treasurer: Robert T. Bly (Consultant) Secretary: Allan F. Woldrow (FMC Corp.)

токуо

High quality presentations continue to be given, as evidenced by the topics discussed at the March 20th, April 27th and May 25th meetings of the EMC Japan.

PAPERS PRESENTED AT THE RESEARCH MEETINGS ON EMC JAPAN

March 20, 1982, Tokyo

- "Low Level Microwave Biological Effects," by Teruhisa HOCHIN, Mikihito ANDO, Tetsuo IKEDA, Nagoya Institute of Technology, Report of Technical Group on EMC, IECE and IEE of Japan, Vol. 81, No. 241, EMCJ 81-78, pp. 1-6
- "Response of Radio Interference Measuring Apparatus to Repeated Pulses (II)," by A. SUGIURA, T. OGUCHI, S. MIYAJIMA, Radio Research Laboratories, M.P.T., Report of Technical Group on EMC, IECE and IEE of Japan, Vol. 81, No. 241, EMCJ 81-79, pp. 7-12
- "Electromagnetic Shield Properties of Plastics and Ceramics with Resistance and Conductance Particles," by Yasumitsu MIYAZAKI, Shoji TOMINAGA, Masaoki
- TANAKA, Toyohashi University of Technology, Report of Technical Group on EMC, IECE and IEE of Japan, Vol. 81, No. 241, EMCJ 81-80, pp. 13-17

ABSTRACT: Electromagnetic wave properties in plastics and ceramics containing high resistance particles and high conductance particles are discussed for electromagnetic shield and absorption. In order to have nonreflection materials for protection of electronic equipments from external radiation source and noise, fundamental characteristics of electromagnetic shield are investigated. Quasi-static properties and high frequency properties are shown by potential consideration and random wave technics.

 "Inverse Scattering Characteristics of Electromagnetic Waves by Conducting Bodies," by Yasumitsu MIYA-ZAKI, Toyohashi University of Technology, Report of Technical Group on EMC, IECE and IEE of Japan, Vol. 81, No. 241, EMCJ 81-81; pp. 19-24

ABSTRACT: Inverse scattering problems of electromagnetic waves are discussed for conducting bodies of complex shapes by using conformal mapping method. Plane waves incident to conducting body are scattered in the forward and backward region. Scattered fields are investigated for the angular spectrum. Determination of the shape of conducting body is shown from datas of the angular spectrum for mapped circular cylinder. In this paper, two dimensional inverse scatterings are discussed.

- "An Amnidirectional Antenna for Measuring Power Density of Radio Waves Radiated in Urban Districts," Tatsuichi KAWANA, Toshichika ANDO, Akira SUGI-URA, Kango TOKUSHIGE, Radio Research Laboratories, Report of Technical Group on EMC, IECE and IEE of Japan, Vol. 81, No. 241, EMCJ 81-82, pp. 25-30
- "Three Dimensional Visualization of Heat Generation Pattern within the Phantom Using Cloud Point of Nonion Surface Active Reagent to Electromagnetic-wave Exposure," by Itsuo YAMAURA, Electrotechnical Laboratory, Report of Technical Group on EMC, IECE and IEE of Japan, Vol. 81, No. 241, EMCJ 81-83, pp. 31-36.

 "Inhibitory Effect of Magnetic Field on the Growth Process of E. Coli at High Critical Temperature," Hidenori KIYOSHI, Yoshio EBINA, Hidetoshi MIIKE, Hajime HASHIMOTO, Faculty of Engineering, Yamagushi Univ., Report of Technical Group on EMC, IECE and IEE of Japan, Vol. 81, No. 241, EMCJ 81-84, pp. 37-39

April 27, 1982, Tokyo

 "Reduction of Interference on Telephone from Broadcasting Waves," by Akiumi KURIYAMA, Tatsuo SHI-MAMURA, Musashino Electrical Communication Laboratory, Masakazu Nakagawa, Shinetsu Telecommunicaton Bureau, N.T.T., Report of Technical Group on EMC, IECE and IEE of Japan, Vol. 82, No. 16, EMCJ 82-1, pp. 1-6.

ABSTRACT: This paper describes the inductive interference due to induced voltage on telephone lines from the broadcasting waves, which affect voice-band frequencies at the telephone. The measurements are performed at the experiment system using capacitive coupling to AM signal generator. The results show the amplitude of the intermix in the telephone receiver per induced voltage (common mode and normal mode). Also included is the design for the common mode filter for AM broadcasting waves.

 "Inducing Voltage Reducing Method by Arrester and Electromagnetic Shielding Cable," by Mitsuo HATTORI, Hiroaki KOGA, Tsuyoshi IDEGUCHI, Ibaraki Electrical Communication Laboratory N.T.T., Report of Technical Group on EMC, IECE and IEE of Japan, Vol. 82, No. 16, EMCJ 82-2, pp. 7-12.

ABSTRACT: As high voltage power transmission networks are expanded, it becomes an ever greater problem to suppress higher induction voltage on telecommunication lines. This paper proposes a new protection method, using an electromagnetic shielding cable, whose wire conductors are connected to ground through arresters. The induction voltage reducing effect of this method is very excellent, even under high induction voltage. The new method is more economical than other methods, especially when it is used for higher induction voltage. Key words: shielding, induction, arrester.

 "The Reduction of the Electromagnetic Noise of the Shinkansen by Setting Conducting Line Arrays on Both Sides along a Railroad," by Takashi YAMAGUCHI, Kanazawa Institute of Technology, Yoshifumi AMEMIYA, Nagoya University, Report of Technical Group on EMC, IECE and IEE of Japan, Vol. 82, No. 16, EMCJ 82-3, pp. 13-18

ABSTRACT: The electromagnetic noise is radiated from the contacts between pantographs and trolley wires when trains run along the Shinkansen, and it causes the television jamming in VHF-band. As a countermeasure, it is effective for the reduction of the noise to set up the conducting line arrays at the sides of the railroad. Numerical computations are made for various characteristics of the reduction level of the noise in the far-zone field. It is shown that the planes of the array must be set up with an adequate tilt in order to stabilize the reduction effect in the horizontal area of both sides along the railroad.

 "Level Estimation and Current Dependence of Radio Noise Caused by High Speed Sliding Contact Without Arc Discharges," by Shinji UEBAYASHI, Osamu FUJIWARA, Yoshifumi AMEMIYA, Faculty of Engineering, Nagoya University, Report of Technical Group on EMC, IECE and IEE of Japan, Vol. 82, No. 16, EMCJ 82-4, pp. 19-22.

ABSTRACT: This paper describes the noise level caused by the sliding contact without arc discharges. The noise currents consist of two types of transient current waveforms with irregular repetition intervals. One of them occurs when the contacts are broken, and the other occurs when the contacts are made. A method to calculate the noise level from these transient waveforms and the medians of the repetition intervals is given, and the results are confirmed experimentally. Using the above method, the current dependences of the noise level also can be explained quantitatively.

May 25, 1982, Tokyo

- "Lightning Surge Voltage Limiting Circuit for Telephone Switching Systems," by Akira TOMONO, Yokosuka Electrical Communication Laboratory, N.T.T., Report of Technical Group on EMC, IECE and IEE of Japan, Vol. 82, No. 36, EMCJ82-5, pp. 1-6.
- 2. "Evaluation of an Effect of Contact Discharge Noise on

TV Picture Patterns using Composite Noise Generator," by Nobuo HANDA, Hideaki SONE, Hiroshi ECHIGO, Tasuku TAKAGI, Faculty of Engineering, Tohoku University, Hiroshi INOUE, Akita University, Report of Technical Group on EMC, IECE and IEE of Japan, Vol. 82, No. 36, EMCJ82-6, pp. 7-12

ABSTRACT: This paper shows evaluation results of an effect of contact discharge noise on TV picture patterns using composite noise generator (C.N.G.). C.N.G. generates noise, amplitude probability distribution (A.P.D.) of which fits very well to the A.P.D. of contact discharge noise. Using C.N.G., we could obtain each effect of discharge noise paramaters (ex. Interval time, Duration, A.P.D.) on it.

- "Practicable Measurement of Space Standing Waves at Oblique Incidence by Direct Measurement Method of Scattering Characteristics of EMW Absorber," byMitsuhiro ONO, Toru SHIBUYA, Yamagata University, Takashi YOKOTO, Fujitsu Co., Ltd., Masato NISHIURA, Hitachi Cable, Ltd., Report of Technical Group on EMC, IECE and IEE of Japan, Vol. 82, No. 36, EMCJ82-7, pp. 13-18.
- "Optical Fiber Datalinks for Nuclear Instrument Modules," by Yoshihiro UDA, Tadashi TAKAOKA, Nippon Electric Co., Ltd., Report of Technical Group on EMC, IECE and IEE of Japan, Vol. 82, No. 36, EMCJ82-8, pp. 19-24.

For information on obtaining copies of the papers, contact Prof. Risaburo Sato, Tohoku University, Dept. of Electrical Communications, Faculty of Engineering, Sendai, Japan 980.



Richard B. Schulz IIT Research Institute Annapolis, Maryland 21401

EMC STANDARDS ACTIVITIES

This index lists recent manuscripts received (but, not yet accepted) for publication in the EMC Transactions. New indexing symbols are included to indicate the subjects treated. For details on the meaning of these symbols, refer to the editorial "Coding Scheme for a Technology-Alerting Index" which appeared in the May 1982 issue of the EMC Transactions. Draft copies of the manuscripts may be available, upon request, from participating authors.

- 12d 81-50 Antennas for Nonsinusoidal Waves II. Sensor Derived from the Large Current Dipole—H.F. Harmuth, Dept. of Electrical Engineering, The Catholic University of America, Washington, DC 20064. (202) 635-5193. 12c, 111j, 099d
- 12d 81-51 Antennas for Nonsinusoidal Waves III. Improved Large Current Dipole-H.F. Harmuth (see 81-50) 12/11c, 099d
- 17d 81-52 Antennas for Nonsinusoidal Waves IV. Array of Large Current Dipoles-H.F. Harmuth (see 81-50) 17/12c, 099d
- 17c 81-53 Antennas for Nonsinusoidal Waves V. Monopulse Antenna Array-H.F. Harmuth (see 81-50) 17/12d, 099d
- H16i 81-54 Scattered Cochannel Interference in Radar Systems—F.Box (and W. Kuebler) 12122 Holly Knoll Circle, Great Falls, VA 22066. (703) 356-4809. J10b.
- IOe 81-55 Standard Site Method for Determining Antenna Factors—A.A. Smith, Jr., Data Systems Div., IBM Corp., Poughkeepsie, NY 12602. (914) 463-7726. IOb/f/g, A2e

- B7e 82-3 Measurements of Electromagnetic Radiation from Automotive Ignition Systems—W.R. Ribbens, Dept. of Electrical and Computer Engineering, The University of Michigan, Ann Arbor, MI 48109. (313) 764-2390. B7d, A5f, A1b.
- D9d 82-5 Propagation Along a Line Parallel to the Ground Surface: Comparison Between the Exact Solution and the Quasi-TEM Approximation—P.Degauque, G. Courbet, and M. Heddebaut, Electronics Dept., Lille University, 59655 Villeneuve d'Ascq Cedex, Francs. (20) 91.92.22. D9b/e.
- B3d 82-6 Evidence for the Conversion of Noise Envelope Statistics by Radio Propagation Processes—E.N. Skomal, The Aerospace Corporation, P.O. Box 92957, Los Angeles, CA 90009. (213) 648-7024. B4d/e, J7d/e.
- O4d 82-7 The Cross-Correlation Functions of Distorted Walsh Functions—Z. Qishan and L. Zhihua, Electrical Engineering Dept., Beijing Institute of Aeronautics and Astronautics, Beijing, China.
- O99i 82-8 Design of Walsh-Function Generator-L. Yi-hua, (see 82-7).
- 15d 82-9 Antennas for Nonsinusoidal Waves VI. Slot Antennas-H.F. Harmuth (and S. Ding-rong) (see 81-50) H5/15c.
- 12/4i 82-10 Development of E/H Near-Field Probe—T.M. Babij and H.I. Bassen, Bureau of Radiological Health, Food and Drug Administration, Rockville, MD 20857. A2i.
- 12d 82-11 The Cylindrical Dipole As a Sensor or Probe—R.W.P. King, Div. of Applied Sciences, Harvard University, 9 Oxford Street, Cambridge, MA 02138. (617) 495-4468. A2d.
- D8i 82-12 Corrective Measures for Minimizing the Interaction of Power Lines with MF Broadcast Antennas—C.W. Trueman, S.J. Kubina, and J.S. Belrose, Concordia University, Loyola Campus, 7141 Sherbrooke St., West, Montreal, Quebec H4B 1R6, Canada. (514) 482-0320, ext. 281. 110/11j.
- Bla 82-13 On the Noise Field Strength—V.H. Padula-Pintos, Centro Arg. de Est. de Radiocom. y Compatibilidad Electromagnetica (CAERCEM); Julian Alvarez 1218; (1414) Buenos Aires, Argentina. 772-1471. Bld/f
- II/4i 82-14 Automotive Underhood Radiation Antenna System (AURAS)—R.J. Spiegel, C.A. Booth, and E.L. Bronaugh, Southwest Research Institute, P.O. Drawer 28510, San Antonio, TX 78284. R.J. Spiegel is now at US Environmental Protection Agency, Health Effects Research Laboratory, Research Triangle Park, NC 27711. (919) 541-7542. A2f, B7e, H25e, 11/4b/e/f/j.
- Fle 82-15 On the Measurement of Surface Transfer Impedance—A.R. Martin and M. Mendenhall, Raychem Corporation, 300 Constitution Drive, Menlo Park, CA 94025. (415) 361-3333. A2b, D7e.
- J10d 82-16 A Novel Method to Analyze Electromagnetic Scattering of Complex Objects-K. Umashankar and A. Taflove, IIT Research Institute, 10 W. 35th St., Chicago, 1L 60616. (312) 567-4489.
- M/Ld 82-17 A Comparison of Lightning Electromagnetic Fields with the Nuclear Electromagnetic Pulse, M.J. Master, M.A. Uman, and E.P. Krider. M.J. Master (and M.A. Uman) are with the Department of Electrical Engineering, University of Florida, Gainesville, FL 32611. (904) 392-0911 M/Lb/c, NOd.
- 11f 82-18 The Conical Antenna as a Sensor or Probe-R.W.P. King, Harvard University, Gordon McKay Laboratory, 9 Oxford St., Cambridge, MÁ 02138. (617) 495-4468. A2b.
- 099d 82-19 Ordering of Walsh Functions—L. Zhihua, Electrical Engineering, Beijing Institute of Aeronautics and Astronautics, Beijing, China.
- Ble 82-20 Noise Amplitude Distribution Measurement of Sferics Below 500 kHz, H.S. Oranc and N.H. Shepherd. New address not available.
- G6d 82-21 The Lowest Order of Intermodulation Among a Set of Frequencies and Extraction of an Intermodulation-Free Frequency Subset—S. Morito, Institute of Socio-Economic Planning, The University of Tsukuba, Sakura, Ibaraki 305, Japan. 0298-53-5182.
- S9d 82-22 Shielding of Thin Generic Enclosures from Static Magnetic Fields—F. Lattarulo, Dept. of Electrical Engineering, University of Bari, 70125 Bari, Italy. S2/4d.
- Alj 82-23 "Rusty-Bolt" Demonstrator (Correspondence)—R.F. Elsner, Martin Marietta Aerospace, Strategic Systems Division, P.O. Box 179, Denver, CO 80201. (303) 977-9156.

RECENT DEVELOPMENTS CONCERNING EMC STANDARDS

ANSI C95. Radiation-hazard standard C95.1 has been revised extensively in draft form and now appears to be several months away from complete committee approval.

ANSI MD105. The May meeting of this committee approved a statement recommending that ANSI C63 be consulted on EMC concerns of instrumentation.

IEEE S27. Many IEEE EMC standards now are being reviewed for updating. Two new standards, IEEE 473-1981 and IEEE 475-1981, were approved in 1981 and are being published. (See Spring 1982 Newsletter.)

RTCA SC141. A new document, RTCA DO 176-1982, concerning FM broadcast interference to airborne systems has just been published. (See Spring 1982 Newsletter.)

SAE AE-4. This most active committee has standards work underway in the following areas: MIL-STD-461/462 update, business systems, cabling techniques, system compatibility, composite materials techniques, and lightning protection.

SAE ESC/SC. One new standard on whole-vehicle radiated susceptibility has been published. (See Spring 1982 Newsletter.) Another existing standard, J1113a on EMC test procedures for vehicle components, presently is undergoing substantial revision by the committee.

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.

> 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.

> > TECKNIT EMI Shielding Products, 129 Dermody St., Cranford, NJ 07016 Telephone (201) 272-5500

EMI/EMP/ESD Shielding Materials, Gaskets, Vent Panels, Windows, and Conductive Coatings and Adhesives

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.

SPECTRUM CONTROL, INC., 8061 Avonia Rd., Fairview, PA 16415 Telephone (814) 474-1571 Telex 510/699-6848

EMC test and consulting VDE, CISPR, MIL-461, FCC. Mfr. RF fillers, RFI capacitors, chips, variable caps----in stock at HALLMARK.

LECTROMAGNETICS, INC., 6056 W. Jefferson Blvd., Los Angeles, CA 90016 Telephone (213) 870-9383

RF shielded enclosures, modular, prefabricated & all welded. RFI/EMI power line filters; signal line filters

An Institutional Listing recognizes contributions to support the publication of the IEEE Newsletter and TRANSACTIONS ON ELECTRO-MAGNETIC 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.