
Reliability Society Newsletter

Editors: Gary Kushner and Mark Snyder
Vol. 33, No. 2, April 1987 (USPS 460-200)

Annual Awards Program

The Annual Awards Program of the IEEE Reliability Society was conducted on Monday evening, January 26, 1987 in conjunction with the RAM Symposium in Philadelphia. Proceedings of the awards program are as follows:

Introduction and Program Proceedings

— Ms. N. J. McAfee

Guest Editor Awards

— Dr. M. O. Locks
— Dr. A. Satyanarayana

The Annual IEEE Reliability Society Award

“For Pioneering Efforts in Design of Experiments and Significant Contributions in Teaching Statistics and Reliability”

— Ms. B. S. Orleans

Installation of AdCom Officers

— Dr. T. L. Fagan	President
— Mr. B. A. Bang	Vice President
— Mr. A. Constantinides	Vice President
— Mr. A. Coppola	Vice President
— Mr. S. Keene	Vice President

Kudos

— Mr. A. O. Plait

President's Remarks

— Dr. T. L. Fagan

Please join us in congratulating the recipients of these special awards and wishing the new AdCom officers a very successful year in their new positions.

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RS Newsletter Inputs

All RS Newsletter inputs should be sent to one of the associate editors, **Gary Kushner**, 499 Brigham St., Marlboro, MA 01752, or **Mark Snyder**, Digital Equipment Corporation, 24 Porter Road (LJ01/C2), Littleton, MA 01460, per the following schedule:

For July Newsletter:	by April 15
For October Newsletter:	by July 15
For January Newsletter:	by October 15
For April Newsletter:	by January 15

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Chapter Activities

North Jersey Chapter Completes a Busy 1986 Philadelphia Chapter Meetings

After five successful meetings during the first half of 1986, the North Jersey Reliability Chapter resumed its busy schedule in September after a brief summer break. During the break, the Chapter's Executive Committee, including Ray Sears (Chairman), Hank Moss (Vice-Chairman), Mallik Arjunan (Secretary), and John Wronka (Treasurer) planned for the 1986 fall program.

The September meeting featured Ira Custman as the keynote speaker discussed optimum techniques, materials and testing that could be used to prevent failure mechanisms in thick-film hybrids. Various failure mechanisms and a brief description of hybrid construction were discussed.

In October, Reliability Predictions for complex electronic equipment were addressed by John Healy, Richard Fagerstrom, and John Kitchin of Bell Communications Research (Bellcore). Bellcore has developed alternative models for predicting integrated circuit failure rates. The Bellcore contingency described a prediction approach based on data from several manufacturers of telecommunications equipment and from several companies that provide telecommunications service.

The subject of the November meeting was the use of warranties in the procurement of DoD weapon systems as mandated by public laws. Richard Kowalski reviewed the evolution of DoD warranty policy over the past decade; summarized the provisions and requirements of the latest warranty legislation; and discussed the impact of this legislation on reliability and maintainability design efforts. The November meeting was also conducted in conjunction with the Society of Logistics Engineers. Elections were also held and the results left Ray Sears as Chairman, and Hank Moss as Vice-Chairman; John Wronka has moved to Secretary, while Shyam Pandey has taken on the role of Treasurer. A new position called the Meeting Program Coordinator, was also instituted and filled by Mallik Arjunan.

One of the enhancements made to the fall meeting series was the provision of a free buffet to all meeting participants. The food was welcomed by the many participants who had to fight rush hour traffic to attend the meetings.

Another busy year is planned for 1987, and all are invited to attend the meetings which are held on the third Tuesday of every month except June, July, August, and December. The dinner/meetings will be held at the ITT auditorium, 500 Washington Ave., Nutley, NJ starting at 6:00 PM. For information on future meetings call Mallik Arjunan, (201) 284-3475.

September 16, 1986

- Who is Responsible for Reliability
Harvey E. Schock, Jr.—University of Pennsylvania
- What's Happening to your Money?
John V. Picone — University of Pennsylvania

October 21, 1986

- Tour of the Navy Combat System Engineering Development Site
RCA, Moorestown, New Jersey
- Text Management Overview and Demonstration
Richard J. Camlin and Janet Rochester
RCA, Moorestown, New Jersey

November 25, 1986

- Practical Considerations for Legal Protection of Development Work
Stephan Gribik — University of Pennsylvania
- High Speed Computers Utilizing GaAs Technology
Wayne Moyers — University of Pennsylvania

Central New England Council

We had a very interesting January 21, 1987 meeting presented by Mr. Don Harrahy from Mitre Inc. describing Mitre's Reliability Center and recent progress for the Air Force's R&M 2000 activities.

RAMS Attendance in late January was significantly reduced because the snowstorm closed Philadelphia's airport. Attendees enjoyed the talks and demonstrations.

Our February 18th meeting was at the Hanscom AFB Officers Club. We enjoyed an interesting discussion provided by Mr. John Lever of DEC on "Control Of Corrosion On Parts For Field Support."

The All Day Spring Seminar is ready to run on Thursday, April 23, 1987 at the Sheraton Tera in Framingham, MA. We have 8 great papers and our keynote speaker is Gene Carrubba. The details are provided elsewhere. Please join us!

If you have been doing any interesting work that could be of interest to our membership, please plan to present it as a paper. I hope to see you at our next event.

RELIABILITY SOCIETY 25TH ANNUAL ALL DAY SEMINAR

THURSDAY, APRIL 23, 1987 AT THE SHERATON TARA, ROUTE 9, FRAMINGHAM, MA.

Sponsored and conducted by the Reliability Society Chapter

RELIABILITY IN THE AGE OF AUTOMATION

The Seminar will feature a keynote address on the impact of Reliability in the Age of Automation by Gene Carrubba, Corporate Manager of Product Assurance, Symbolics, INC. and include papers on:

"The "New - New Analysis" of DRAM Reliability" by Gene Bridgers, SEA Corp.

"The Role of Failure in the Design Process" by Gordon Cawood, Raytheon

"Reliability Engineering for Information Systems: The Emerging CASE Technology" by Elliot Chikofsky, Index Technology

"Reliability of Motor Driven Components Used in the Electronic Packaging" by Hsien-sheng (Jason) Pei, DEC

"A Cost-Optimization Model for Determining Optimal Burn-In Times at the Models/System Level of Products" by Themis Genadis and Janice Cohen, DEC

"Specifying Support Requirements for EDP Systems in Current Environments" by Joseph Bradley, Dynamics Research

"Designing Servicable LANS - Today's Imperative" by Stephen Moro, DEC

"A Multifaceted View of Reliability Engineering" by Moneer Azzam, Raytheon

"Distributed Systems Fault Management Model" by Bruce Luhrs, DEC

For information concerning the seminar, contact Jake Bajakian at (617) 443-9521 ext. 2782 or Vivian Thorsen at (617) 443-9521 ext. 4165

REGISTRATION FOR 25TH ANNUAL ALL DAY SEMINAR

For registration, complete the following and mail with check payable to Reliability Chapter, Boston Section IEEE to Mr. Norm Smith, 37 Pinehurst Ave., Nashua, NH 03062. Registration fees before April 10, 1987 are \$125 for IEEE members and \$150 for non-members. Late registration fees are \$25 more. Fees include refreshments, lunch and dinner.

Name _____
Affiliation _____
Business Address _____
Phone () _____
IEEE Member? Yes No

IEEE Reliability Spring Seminar

IEEE Reliability Spring Seminar

Rutgers University Graduate Program

Rutgers University will offer, starting in January 1987, the Ellis R. Ott graduate program in Quality Assurance Sciences. The Program will be jointly offered by the Department of Industrial and Systems Engineering and the Department of Statistics.

American industry has set a goal to improve quality, productivity and reliability. The purpose of this program is to train professionals in the use of modern statistical and industrial engineering methods to meet this goal.

The program offers two degrees:

M. S. in Industrial and Systems Engineering
Option in Quality and Reliability Engineering
M. S. in Statistics
Option in Quality Management and Productivity

Both degree programs require 30 credits of coursework and share core courses in Statistical Quality Control, Quality Management, Reliability Engineering, Design of Experiments and Life Data Analysis. In addition, students in Industrial Engineering take courses in Production.

University of Maryland Graduate Program

Recognizing the presence of a national need for emphasis upon various aspects of reliability within the educational role of universities as well as in research and development, the University of Maryland has established a Center for Reliability Engineering. The first director of the Center is Dr. Marvin Roush, a professor the College of Engineering.

The current year is the first offering a full curriculum of courses leading to a Masters degree in Reliability Engineering although some of the courses have been available for a number of years. During the Spring 1987 semester the courses available will include: Basic Reliability Engineering, Advanced Reliability Engineering, System Safety Engineering, Risk Assessment for Engineers, Reliability Engineering Seminar, Applied Probability and Statistics, and Topics in Structural Reliability Engineering.

The Masters degree program is an Engineering College-wide program planned to serve the needs in all engineering disciplines; e.g., aerospace, chemical, civil, electrical or mechanical engineering. While there is a core of required courses, the students develop and have approved appropriate elective courses to form a complete set of coherent courses that will satisfy their specific objectives. Examples could include a plan heavy in mathematics courses to satisfy the electives for a person who is a reliability analyst while courses in business and management might be better suited for the person anticipating a position of program manager.

The required courses are offered during evening hours and are available on the University of Maryland Instructional Television network. There are open classroom sites in College Park and Shady Grove as well as direct connection to classrooms available in company facilities of the numerous ITV subscribers. Videotapes of the courses are available for lease or sale.

The Center for Reliability Engineering is actively seeking affiliation with companies and agencies having needs in the reliability area. Such collaborations are currently in place with Westinghouse, Litton-Amecom, Baltimore Gas & Electric, and Lockheed-Georgia. The involvement of faculty in a broad range of current research and development activities brings a valuable perspective to the classroom and provides access to a powerful resource for industry. Current research programs at the University span the range from developing expert systems to the use of radiation to develop more reliable materials. Other programs use statistical techniques in the design of reliable structures or the integration of CAD techniques with considerations of reliability and maintainability.

Persons interested in learning more about the Center for Reliability Engineering can call Dr. Roush at (301) 454-2431.

Call For Papers

1988 ANNUAL RELIABILITY AND MAINTAINABILITY SYMPOSIUM

1988 January 26, 27, 28

Billmore Hotel

Los Angeles, CA USA

What's Happening? A Review of Assurance Developments for the Future

SUBMITTAL DEADLINE — 1987 APRIL 14

PAPER SUBMITTAL REQUIREMENTS

If you wish to present a paper, now is the time to contact us. We need the following as soon as possible but 1987 April 14 is the deadline.

- For each author and coauthor:
 - Name
 - Work address and phone number
 - Home address and phone number
 - Brief biographical sketch
- Paper title must not exceed 50 letters and spaces — count them — the printer will truncate at 50.
- Paper summary shall not be more than 1000 words structured in the following three sections:
 - (1) Problems or Questions Addressed
 - (2) Work Performed
 - (3) Results and/or Conclusions Reached

Please note that initial screening for candidate papers is based solely on these summaries. If a summary does not clearly indicate the paper's value (i.e., the 3 sections itemized above), it will generally receive no further consideration. Therefore, it is essential that your initial submission be carefully prepared.

All papers must be new and must not have been presented at a national meeting prior to the Symposium. Papers presented at local meetings are acceptable. Authors must indicate the status of any previous or planned presentation/publication of the subject material covered in their submittal. All submittals become the property of the Symposium and cannot be returned.

TEN COPIES of each author's (and coauthor's) name, work address and phone number, home address and phone number, brief biography, paper title and paper summary must be sent to:

Alan Plait
RAMS Program Chairman
Mantech Support Technology, Inc.
2320 Mill Road
Alexandria, VA 22314 USA

Authors will be notified of Program Committee decisions in early June 1987. Full text drafts will be required by 1987 July 31 for review. Comments from this review will be returned to the authors by September 2. Final camera ready papers and slides must be submitted not later than 1987 September 30 and must be accompanied by the author's signed release for publication in the Symposium Proceedings. These dates do not have slack, and authors should fully recognize the responsibility of their commitment to this schedule when the initial submittal is made.

Authors should be aware of the P.K. McElroy Award, which recognizes superior papers and presentations. All submitted papers are graded by the Program Committee. The top contenders are selected and the presentations monitored, during the Symposium, by a group of past general chairmen. The highest scorer is given a plaque and \$500. The presenter is also given a gratis registration for the next Symposium when the award is made.

INTER-RAM Conference

Announcement

Name: 14th International Reliability, Availability and Maintainability (14th Inter-RAM) Conference for the Electric Power Industry in operating, maintaining, improving, upgrading, and extending the life of existing production and delivery systems.

Date: May 26-29, 1987
Location: Toronto, Canada
Hosted by: Ontario Hydro
Contact: Dr. M. S. Grover, Ontario Hydro, H14-G4, 700 University Avenue, Toronto, Ontario, Canada M5G 1X6
Tel: (416) 592-7728; Telex: 06-217662

Exhibition: Industrial, technical, and educational exhibits.

Special Events: — A Plenary session on RAM, energy and electricity issues.
— Tutorials in generation, transmission and distribution areas.

Additional Information

Theme: The theme "Getting More Out Of What We Have" emphasizes practical application of RAM techniques

Endorsed by: IEEE, CEA, ASQC, ASME, NERC, CNS and other major technical and professional societies involved in the electric power industry.

PC-Based Computer Program

An Interactive PC-Based Computer Program for the Analysis of Exponential and Weibull Failure Times

An interactive and user friendly PC-based computer program, based on a *new* approach for analyzing failure data that can be described by an exponential or a Weibull distribution is available. Color coded computer graphics are extensively employed providing a user results which are in terms of high resolution graphs, charts, plots and tables.

The novel feature of the approach underlying the program is the incorporation of expert opinion or informed judgment into the analysis. This is in keeping with the modern day trend toward artificial intelligence and expert systems. Expert opinion could be provided by an expert, typically an engineer, scientist or user, or by an engineering model, such as the one based on S-N Curves or Miner's Rule, etc. Provision is also made for incorporating the analyst's opinion on the expertise of the expert.

The computer code is written in Basic and can be used on an IBM-PC, XT and AT with a math co-processor. The program offers the user various options via a Master Menu. The choice of the options and the input requirements are self explanatory. In most instances, the user is asked to make one of several choices to access the options. The program performs numerical integration which is internalized; this produces results that are attractive and easy to interpret by a user with only elementary and basic knowledge of reliability. The program can be used as a module in a larger system involving Computer Aided Reliability or in fast evolving RAM/CAD systems.

For more information, please write to Professor Nozer D. Singpurwalla, Director, The Institute for Reliability and Risk Analysis, The George Washington University, Washington, DC 20052.

Technical Operations

The Vice President of Technical Operations presides over a number of technical committees, each of which maintains liaison in its respective functional area and reports progress at each AdCom meeting. Reports and articles generated by these committees frequently appear in the Newsletter. Please

join us in extending thanks to Vernon E. Gardner and Marion P. Smith, outgoing chairpersons of the Health Care Engineering Committee and International Reliability Committee, respectively. The current roster of the Technical Operations Committee, chaired by B. A. Bang follows.

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International Reliability Physics Symposium Publication Services

IRPS Announces the Availability of Tutorial Notes from the 1984, 1985, and 1986 International Reliability Physics Symposiums

For the last three years the International Reliability Physics Symposiums have had in-depth tutorial lectures by industry's leading experts. In conjunction with the tutorials a set of tutorial notes was printed. A limited number of these remain and are available for \$25 each. Three volumes are available; 1984 Tutorial Notes, 1985 Tutorial Notes and 1986 Tutorial Notes.

The contents of the 1984 Tutorial Notes includes:

- **Hermeticity, A Tutorial**, by Aaron Dermarderosian, Raytheon, and Benjamin A. Moore, RADC; "History and Introduction" and "Needs/Applications in a Production Environment," by Ralph McCullough, Texas Instruments; "Test Methods and Their Limitations," by Robert Merrett, British Telecoms Research Labs; "Permissible Leak Rates-Moisture Ingress," by Aaron Dermarderosian, Raytheon; and "Standard Procedures and Reference Standards," by Stanley Ruthberg, National Bureau of Standards.
- **Microsectioning Tutorial**, Chairman: T. Mills, Hewlett-Packard, over 100 pages of introduction and history, guides for future lab use and current microsectioning techniques from experts in the field.
- **Reliability Modeling**, by A. V. Ferris-Prabhu, IBM.
- **Calculating Failure Rates from Stress Data**, by Robert M. Alexander, INTEL.
- **Microcircuits Adhesives Tutorial**, by D. M. Shenfield, Ablestik Laboratories.
- **The Implications of Scaling on VLSI Reliability**, Murray H. Woods, INTEL.

The contents of the 1985 Tutorial Notes includes:

- **Metallization for Integrated Circuits**, by P. B. Ghate, Texas Instruments.
- **Part Selection and Screening Procedures**, by Conrad H. Zierdt, Jr., Bell Laboratories.

- **Update on Implications of Scaling on VLSI Reliability**, by Murray H. Woods, INTEL.
- **Plastic Packaging, All There Is to Know**, by Walter H. Schroen, Texas Instruments.
- **Surface Analysis Techniques**, by Thomas Rossiter and Diane Feliciano-Welpe, Oneida Research Services; Robert K. Lowry, Harris Semiconductor, Phillip WH Schuessler, IBM.
- **How to Set Up Statistically Valid Experiments**, by William T. Fitch, Motorola

The Contents of the 1986 Tutorial Notes includes:

- **Hot-Carrier Damage Mechanisms**, by Anant G. Sabnis, AT&T Bell Labs
- **PLCC Surface Mount Technology, A Component Manufacturer's Perspective**, by Rich Sandkuhle & Ken Yee, INTEL
- **GaAs Reliability**, by A. Christou, Naval Research Laboratory
- **A Tutorial on Silicides**, by A. K. Sinha, AT&T Bell Laboratories
- **Electromigration/Stress Effects in Microelectronics**, by Ilan A. Blech, Zoran Corp.
- **Oxide Reliability in VLSI Technology**, by David A. Baglee, Texas Instruments
- **Micromechanics of Microcircuit Materials**, by B. R. Livesay, Georgia Institute of Technology
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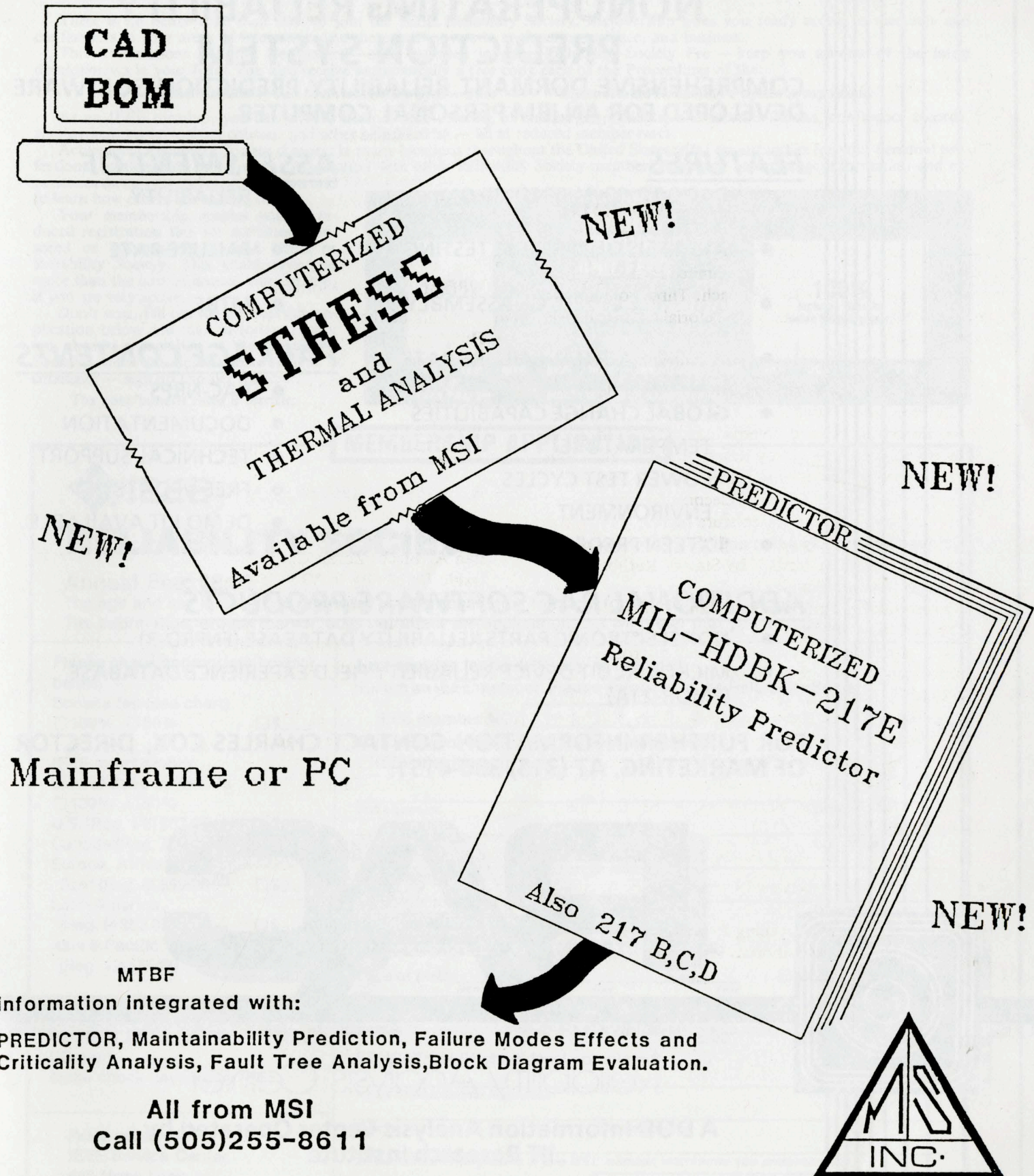
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For additional information contact IRPS Publication Services, RR2-Box 500, Rome, NY 13440, (315) 339-3968.

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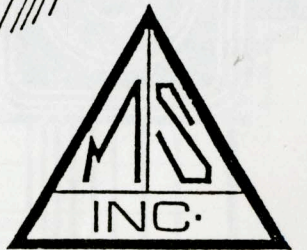


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Reliability Society Newsletter

Invitation to Membership in the Reliability Society

There is no better time than now to join the IEEE Reliability Society. Membership gives you ready access to meetings and conferences in your areas of interest, and to the prime movers in engineering, science, and business.

This Transactions and the Newsletter — both included in your Reliability Society Fee — keep you abreast of the latest developments in your field. You also receive automatically a free copy each of the Proceedings of the:

- Annual Reliability and Maintainability Symposium
- International Reliability Physics Symposium.

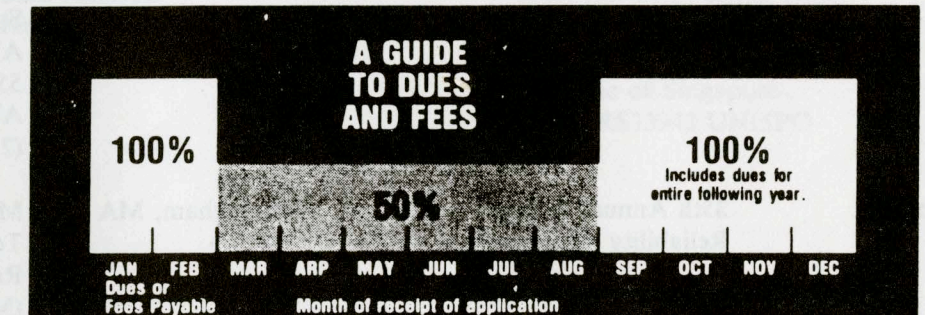
As an IEEE member, you can choose from a wide offering of standards, products, and services (books, conference records, employment surveys, short courses, and other helpful aids) — all at reduced member rates.

Active local Reliability Society chapters in many locations throughout the United States offer opportunities for your personal professional participation and growth. Association with other Reliability Society members helps you to exchange information and experiences on current technical problems and to learn how others are solving them.

Your membership entitles you to reduced registration fees for activities sponsored or cosponsored by the IEEE or Reliability Society. This could save you more than the cost of annual membership, if you are very active.

Don't wait. Fill out the membership application below and mail in today. If you are already a member of the Reliability Society, show this application form to a colleague — sign up another member.

The cost/benefit ratio is terrific.



MEMBERSHIP APPLICATION



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APPLICANTS FOR IEEE MEMBERSHIP

PLEASE COMPLETE THE FOLLOWING INFORMATION:

Date of birth _____ Male Female

Were you ever a member of IEEE? Yes No

If Yes, please furnish (If known):

Grade _____ Membership No. _____

EDUCATION (Highest level completed)

Name of educational institution _____

Course _____ Degree received _____ Date _____

Course _____ Degree received _____ Date _____

ENDORSEMENT (Signature of one IEEE member, who knows you professionally.)

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TRACKING CODE			
Event Code	Event Date	Brochure Code	Broch Date
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April 1987

Conference Calendar

DATE	CONFERENCE	PLACE	CONTACT
1987			
Apr. 7-9	1987 International Reliability Physics Symposium	San Diego, CA	David Yaney 1987 International Reliability Symposium AT&T Bell Laboratories 555 Union Blvd. Allentown, PA 18103 (215) 439-6118
Apr. 23	25th Annual Spring Reliability Seminar	Framingham, MA	Miss Vivian Thorsen Technical Program Raytheon Corp. (Met 5-1-210) 528 Boston Post Road Sudbury, MA 01776
Apr. 27-29	Third Annual Conference on Electronic Packaging and Corrosion in Microelectronics	Minneapolis, MN	Prof. Morris E. Nicholson Corrosion Research Center 1776 N. Pascal Avenue St. Paul, MN 55113
Apr. 28-30	Workshop Telecommunications Products Services: Quality After Sale	Val David, Canada	Mrs. Patricia Delfino NYNEX Enterprises 441 Ninth Avenue, 8th Floor New York, NY 10001 (212) 502-7135
May 26-29	INTER-RAM	Toronto, Canada	Dr. M. S. Grover Ontario Hydro 700 University Avenue H14-G4 Toronto, Ontario, Canada M5G1X6 (416) 592-7728 Telex: 06-217662
June 1-3	IASTED International Conference on Reliability and Quality Control	Los Angeles, CA	Canadian Secretariat IASTED P.O. Box 25, Station G Calgary, Alberta, Canada T3A 2G1 (403) 270-3616
June 24-26	IASTED International Conference on Reliability and Quality Control	Paris, France	Canadian Secretariat IASTED P.O. Box 25, Station G Calgary, Alberta, Canada T3A 2G1 (403) 270-3616

Sept. 22-25	IV International Conference on Reliability and Exploitation of Computer Systems Relcomex '87	Wroctaw, Poland	Prof. Wojciech Zamojski RELCOMEX '87 Wroctaw Technical University Institute of Engineering Cybernetics Janiszewskiego STR 11/17 50-372 Wroctaw, Poland Tel. 21-26-77
Oct. 19-21	International Symposium on Physical and Failure Analysis of Integrated Circuits	Singapore	Daniel S. H. Chan Electrical Engineering Dept. National University of Singapore Kent Ridge, Singapore 0511 Republic of Singapore Telex: RS33943 UNISPO

Bellcore ARPP Software

Bellcore is delighted to announce the availability of its *ARPP Software Version 2.0*. This latest version of our reliability prediction software incorporates the April 1986 Revisions Table A (Device Failure Rates) and Table D (Device Quality Factors) of the Bellcore Technical Reference, *Reliability Prediction Procedure for Electronic Equipment* (TR-TSY-000332). Use of this product during the early stages of system development can help detect possible reliability problems in sub-unit level, thus avoiding architectural modifications in the latter stages of development when they are more costly to rectify. Utilizing Bellcore's ARPP software in life cycle cost studies can help set optimal pricing and maintenance policies for the system or product.

ARPP Software, which is already in use by several leading electronic equipment manufacturers and the Bell Operating Companies, was specifically improved to provide greater accuracy and ease of use. Bellcore's developers incorporated valuable user input and improved prediction techniques in making the accuracy enhancements which are partially listed below:

- Base failure rates are changed (generally lowered) for Integrated Circuits (specifically, digital, integrated circuits, random access memory devices, read-only memory devices, and linear devices).
- Base failure rates for Integrated Circuits are now reported at Quality Level II instead of at Quality Level III.

- Failure Rates for non-hermetic versus hermetic Integrated Circuits are now distinguished by use of separate Table D Quality Factors (at a non-hermetic to hermetic ratio of 1.2 to 1) rather than by use of separate base failure rate tables. In general, failure rates for non-hermetic versus hermetic integrated circuits are now less divergent.
- Quality Factors for Discrete Semiconductor Devices now give a plastic to hermetic failure rate ratio of 1.2 to 1. The previous ratio was 2 to 1.
- Failure rates and categories for General Purpose Diodes are revised.
- Failure rates for Fiber Optic Transmitters and Detectors are added.

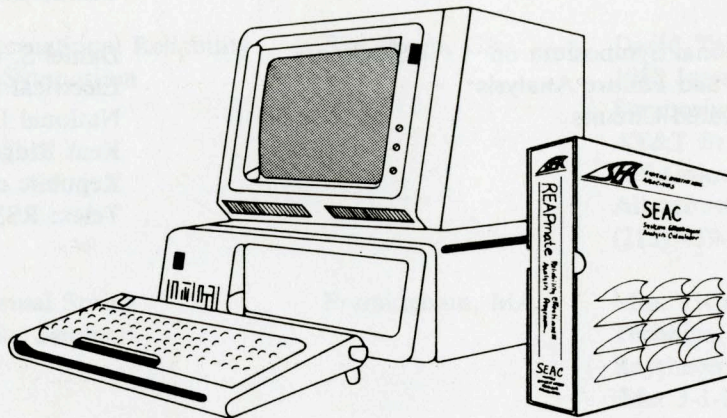
The revised package also incorporates the following ease-of-use enhancements:

- Direct access to device data base
- Addition of user-supplied failure rate information to the data file
- Batch processing mode to assist the experienced user
- Improved output format design and informational content
- Assigned default values

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RAMCAD™ is now available with REAPmate, again bridging the gap between reliability and maintainability analysis (RAM) and computer aided design (CAD) environments.

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REAPmate is an integral member of SEA's SEAC family of predictive analysis software, which includes programs to address system reliability, maintainability, cost-effectiveness, FMECA, failure reporting, logistics, design-to-cost, and bit effectiveness analysis.

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