



RELIABILITY GROUP NEWSLETTER

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"Material for the April issue must be in the editor's hands by February 25".

Editor's NOTES

This issue announces the availability of Newsletter space for employment advertising on a no-charge basis. We hope this service, which is extended by a few other group newsletters, will prove useful to both members and prospective employers.

The attention of advertisers is called to the ground rules as published in this issue and to the delay times inherent in the publication of a quarterly newsletter. An insertion reaching the Editor on the deadline date will reach the membership in six or seven weeks; a missed deadline means an additional three-month delay. No significant reduction in lead-time, which results from publication and second class mailing time requirements, appears practicable. However, the AdCom and your Editor will give consideration to an increase in publication frequency if warranted by advertising response.

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CONFERENCES

January 25-27	1972 Annual Reliability and Maintainability Symposium (G-R, AIAA, AIIE, ASME, ASQC, AOA, ASTM, IES, SAE, HFS, RAS, SOLE, SSS), Sheraton Palace Hotel, San Francisco, California
January 31 - February 4	1972 International Symposium on Information Theory, Asilomar Conference Grounds, Pacific Grove, California
February 16-18	1972 IEEE International Solid-State Circuits Conference (Solid-State Circuits Council, Philadelphia Section and University of Pennsylvania), Philadelphia, Pennsylvania
March 20-23	1972 IEEE International Convention and Exposition, New York Coliseum and New York Hilton, New York City
April 5-7	1972 Reliability Physics Symposium (G-R, G-ED), Stardust Hotel, Las Vegas, Nevada
April 10-13	Tenth International Conference on Magnetism (G-M, Japan Society for the Promotion of Science), Kyoto International Conference Hall, Kyoto, Japan (See July 1971 Newsletter for charter flight information)
April 19-21	1972 IEEE Region Six Conference: "Microelectronics Systems and Applications", Hilton Inn, San Diego, California
April 19-21	Conference on the Mechanical Aspects of Electronic Design (Hungarian Academy of Sciences, et al), Budapest, Hungary
May 2-3	1972 IEEE Appliance Technical Conference (G-IGA), Evansville, Indiana
May 8-10	26th Annual Technical Conference, ASQC, Washington Hilton Hotel, Washington, D. C.
May 15-17	1972 Electronic Components Conference (G-PHP, EIA), Statler Hilton Hotel, Washington, D. C.
May 16-18	1972 Spring Joint Computer Conference (AFIPS), Atlantic City, New Jersey
June 19-21	1972 International Symposium on Fault-Tolerant Computing (Computer Society and MIT, C. S. Draper Laboratory), Boston, Massachusetts
June 21-23	1972 Joint Measurement Conference (G-IM, ASQC, ISA, NBS, NCSL, PMA), Boulder, Colorado
July 25-27	1972 Conference on Advances in Marine Navigational Aids (UKRI Section, IEE, Institute of Navigation, IERE), London, England
September 4-8	NATO Conference on Reliability Testing and Reliability Evaluation (NATO Advisory Panel on Operational Research), The Hague, Netherlands
September 20-22	1972 Conference on the Automation of Testing (UKRI Section, IEE, EEA, IERE, IME, IPE), University of Keele, Staffordshire, England

Chapter News

Boston

On September 23, an early coffee meeting was held at 5:30 p.m. at RCA, Burlington. William Beaton of the C. S. Draper Laboratory described Reliability Measurement by Failure Analysis. Failures are not necessarily caused by the environment at the time they are observed. Simply dividing operating time by failures may result in an erroneous MTBF calculation. Failures must be analyzed for causative environment and charged appropriately.

At the October 14 meeting, also at RCA, Professor Ernest Rabinowicz of the Surface Laboratory at MIT spoke about Accelerated Life Testing of Consumer Items. He outlined the theory of cumulative stress and showed several examples of its applicability to common items.

Coffee and pastries were served before an early meeting at the Honeywell Radiation Center, Lexington, on November 18. Robert Weagant of Honeywell described Project Skylab and in particular the Earth Resources Applications and Experiments. He discussed the hardware and the results anticipated from a detailed examination of earth areas from an orbiting laboratory.

The fall lecture series, Reliability in Component Engineering, has been well received by personnel from the commercial sphere of business. This series outlines the steps in producing reliable hardware through use of proper components. The interrelationships among selection, application, modeling, test, and failure analysis are shown together with the contribution that can be obtained from each activity to achieve reliability.

The next meeting is to be held at 6:30 on January 13, at the MIT Faculty Club. "Sampling Revisited" will be presented by David McGaughey.

North Jersey

Joe Fragola of Grumman spoke on "Reliability Heresy: Non-Constant Failure Rates" at the November 17 meeting held at Singer-Kearfott, Little Falls. On January 18, Ed Doyle of RADDC will discuss "New Concepts and Trends in Failure Analysis Techniques". The March 22 meeting will feature Stan Grubman on "Specifying Hi-Rel Passive Devices for Military Applications". Both of these meetings will also take place at Singer-Kearfott, while a tour being planned for May 17 will be at a location to be determined.

Officers for 1971-72 are Ken Grace, Chairman; Don Jensen, Vice-Chairman; Ev Labagh, Secretary; Stan Cherkasky, Program Chairman; and Vic Kalata, Publicity Chairman.

Philadelphia

Meetings were held as scheduled on September 16 (E. M. Mazur: Management of Earth Resources), October 19 (H. B. Winitzky: QC of Nuclear Generating Stations), and November 17 (W. F. Witner: No Margin for Error in Pharmaceuticals).

The February 1 meeting - to be held, as all of the remaining regular meetings, at the Presidential Apartments at 8 p.m. - will feature R. Gould on Optimization of AEGIS Availability. Programs for the March 9 and April 19 meetings have not been finalized. As previously announced, the Annual Seminar will take place May 18 at the University of Pennsylvania and will concern failure mode analysis of integrated circuits.

San Francisco

A joint meeting with the G-EM chapter on November 17 was addressed by H. Baron Whitaker, President of Underwriters Laboratories, who discussed "Product Safety and the Political Arena".

On January 27, H. C. Edfors, IIT Research Institute Reliability Analysis Center, will speak on "Plastic Encapsulated Microcircuits" at a meeting to be held at Stanford University's Physics Lecture Hall. At the same location, the February 9 meeting will feature a discussion of the "Alert Handbook" being written for NASA Ames Research Center by Lockheed Missile and Space Corporation; the speaker will be the latter's Warren Geller.

Twin Cities

The chapter's program for the season features joint meetings with chapters of various other groups. The first meeting, held October 21, was co-sponsored by G-EMB; N. Dale Sappenfield, Medtronic, Inc., discussed "Reliability Problems in Medical Electronics", including pacemakers and other medical instrumentation, with emphasis on limited-life items such as depletion in chemical cells. The meeting was preceded by a wine-and-cheese hour and prime rib dinner.

The January 17 dinner meeting at the Jax Cafe will be in partnership with the local chapter of the IEEE Computer Society and will concern Logic Fault Analyzers in Computer Systems. Lionel C. Bening, Jr. will share the platform with another speaker to be announced. Meetings are scheduled tentatively for March 15 with the Power Society chapter and for May 17 with G-IGA. Speakers and topics have not been selected.

Washington

The first meeting of the season was held October 20. Mark Goumas, Assistant to the Planning Head, Chief of Naval Development Staff, gave a talk on "Technological Forecasting in the Naval Material Command and its Uses in R&D Planning". At this meeting, V. E. Gardner, Junior Past Chairman of the chapter, was presented a certificate "for services rendered in furthering the objectives of the IEEE" by Section Past Chairman Charles DeVore. Mr. Gardner is currently serving as Area Publicity Chairman for the 1972 Annual Reliability and Maintainability Symposium.

At the December 8 meeting, Michael Sims of the National Oceanographic and Atmospheric Administration spoke on "Reliability of Oceanographic Instrumentation with Comparison to Military Instrumentation".

Details of the scheduled February 9 meeting have not been settled.

AdCom Election

The following have been elected to three-year terms (through 1974) on the AdCom:

*Paul Gottfried	D. Stewart
Kurt Greene	Martin Shooman
*C. Ray Knight	*Howard Williams

* Re-elected to second consecutive term

David Troxel has been appointed Secretary to the AdCom.

Newsletter to Accept Employment Advertising

Beginning with the April issue, the Newsletter will accept advertising of both "Help Wanted" and "Position Wanted" types. This service will be provided to members and prospective employers on a no-charge basis, subject to the following rules:

- Ads will appear in two successive issues unless cancellation notice is received before editorial deadlines.
- Text for each ad will be limited to ten lines plus identification, with a maximum of 45 characters and spaces per line.
- Ads may be open or blind, but blind "Help Wanted" ads should identify the type of business and the general geographic location of the vacancy.
- Submittals of "Position Wanted" ads should include IEEE membership number.
- "Help Wanted" advertising must fall in the "Equal Opportunity - M&F" category. Agreement to this requirement will be considered to be implied by the submittal of the ad and need not appear in the text.

Reliability & Maintainability Symposium

The 1972 Annual Reliability and Maintainability Symposium, subtitled A Forum on the Assurance Technologies, marks a major milestone: a merger combining the 18th Annual Symposium on Reliability and the 11th Reliability and Maintainability Conference. The new Symposium finds IEEE joined by ASQC, IES, AIAA, ASME, AIIE and SAE as major sponsors and AOA, ASTM, HFS, RAS, SOLE and SSS as participating sponsors - an exceptional base of support.

This issue of the Newsletter is expected to reach the membership two or three weeks before the Symposium dates, January 25-27. Member advance registration at \$35 remains open until January 17. Contact W. L. Finch at 5047 Bela Drive, San Jose, Calif. 95129, (408) 743-1577, if you lost or were missed on the mailed programs. Door registration will be available at \$40 for members at the Symposium hotel - the Sheraton Palace in San Francisco.

CARAD Workshops at Symposium

There are two identical one-day CARAD Workshop sessions scheduled during the 1972 Annual Reliability and Maintainability Symposium in San Francisco. The first workshop starts at 8:30 a.m. Wednesday, January 26, 1972 in the Comstock Room of the Sheraton Palace Hotel. The second workshop will start at the same time and in the same place on Thursday, January 27, 1972.

As indicated in the Program, there will be no advance registration for either of the two CARAD Workshop sessions 4D or 6D. Enrollment is limited to twenty participants per session. The \$20.00 enrollment fee includes solving reliability and circuit problems with the GE Time Share Computer Network using remote teletype terminals in the classroom. In addition to the User Manuals and instruction, the students will receive a completion certificate as part of the course material.

The CARAD Workshop sessions are structured to provide the student with the opportunity to become familiar with the operation of a time share computer as well as the numerous library programs available for immediate application to a wide variety of problems.

HAMS Wanted

The virtually universal tightness of travel budgets appears to be hampering G-R committee operations by limiting committee meetings. The obvious alternative, long-distance conference calls, also is costly in view of desired meeting durations.

The AdCom would like to explore the possibility of setting up ad hoc amateur radio nets as a means for providing verbal contact among members of the various committees. If enough ham volunteers can be found in suitable locations throughout the U. S., each committee member will be able to participate by going to the nearest available transmitter site or via phone patch.

If you are, or know of, a willing ham, please respond to the Newsletter. A list of volunteers will then be made available to the several committee chairmen.

Short Courses

Newsletter policy with respect to short-course announcements, as established by the AdCom, is to provide publication for information only. No endorsement is implied, and no check on course content or instructor qualifications has been accomplished.

The George Washington University

System Safety: January 17-28. Ten days. \$490.

Contact: J. E. Mansfield, Director of Continuing Engineering Education Program, The George Washington University, Washington, D. C. 20006.

University of California at Los Angeles

Analytical Fracture Mechanics: January 31 - February 4. Five days. \$325.

Contact: P. O. Box 24901, Dept. K, University Extension, UCLA, Los Angeles, Calif. 90024.

Theory and Design of Fault Tolerant (Ultra Reliable) Digital Computers: March 13-18. Six days. \$375.

Publications

From the National Bureau of Standards, available through the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402:

Technical News Bulletin, Vol. 55, No. 10, October 1971, SD Catalog No. C13.13:55/10, 30 cents (also available on subscription at \$3.00 per year). (This issue contains an article on Defects in Wire Bonds and announcement of a new ASTM Section on Microelectronic Bonding.)

Study of Cryogenic Storage Tank Fatigue Life, NBS Tech. Note 609, SD Catalog No. C13.46:609, 86 pages, 75 cents.

The Flammable Fabrics Program 1970, NBS Tech. Note 596, SD Catalog No. C13.46:596, 68 pages, 65 cents.

From the Society of Automotive Engineers, Inc., Dept. 527, 2 Penn Plaza, New York, N. Y. 10001:

1971 Intersociety Energy Conversion Conference Proceedings (P38), 1376 pages, \$40 (IEEE member price).

1975 Membership Interest Profile

Publication of the Membership Interest Profile in the April 1970 issue of the Newsletter generated no membership response. Accordingly, the Profile - developed by the G-R Advanced Techniques Committee - is to be regarded as the current indication of the scope of interest of G-R.

Comments and suggestions by the membership are solicited on a continuing basis to maintain the Profile, which is re-published below, current.

1.0 FUNDAMENTAL RELIABILITY THEORY AND TECHNIQUES

- 1.1 Basic principles
- 1.2 Assurance program structure and management
- 1.3 Mathematics/Statistics
- 1.4 Prediction and assessment
- 1.5 Analysis, review and audit
- 1.6 Reliability and Physics
- 1.7 Testing and measurement

2.0 RELIABILITY PROGRAM MANAGEMENT

- 2.1 Requirements analysis and definition
- 2.2 Program planning and direction
- 2.3 Program evaluation and risk assessment
- 2.4 Resource utilization tradeoffs
- 2.5 Interrelation of assurance disciplines
- 2.6 Education and motivation
- 2.7 Configuration management

3.0 RELIABILITY AND PROCUREMENT

- 3.1 Contracting and negotiation factors
- 3.2 Incentive structures
- 3.3 Guarantees and warranties
- 3.4 Vendor and subcontractor control

4.0 RELIABILITY AND COST

- 4.1 Total cost-of-ownership concepts
- 4.2 Life cycle costing principles and techniques
- 4.3 Value tradeoffs in program planning
- 4.4 Product service analysis

5.0 SYSTEM DISCIPLINES

- 5.1 Systems effectiveness - analysis and assessment
- 5.2 Failure modes and effects and criticality analysis
- 5.3 Availability analysis
- 5.4 Software reliability
- 5.5 Human effects - human reliability
- 5.6 Computer techniques
- 5.7 Modeling
- 5.8 Optimization techniques
- 5.9 Logistics and spares provisioning

6.0 MAINTAINABILITY

- 6.1 Design consideration
- 6.2 Detection and diagnostic techniques
- 6.3 Recovery rates - prediction and assessment
- 6.4 Human factors and training

7.0 PARTS, MATERIALS AND INTEGRATED CIRCUIT RELIABILITY

- 7.1 Failure rates and device models
- 7.2 Failure mechanisms and degradation analysis
- 7.3 Screening techniques
- 7.4 Environmental effects
- 7.5 Selection and application control techniques
- 7.6 Packaging and connections

8.0 PRODUCT DESIGN FOR RELIABILITY

- 8.1 Engineering analysis and evaluation
- 8.2 Review techniques
- 8.3 Design margins control
- 8.4 Design features for contamination control
- 8.5 Evaluation and qualification test techniques

9.0 PRODUCT DESIGN FOR SAFETY

- 9.1 Specifications and requirements
- 9.2 Engineering analysis and evaluation
- 9.3 Review techniques
- 9.4 Design margins (safety factors)
- 9.5 Design features for hazard control
- 9.6 Evaluation and test techniques

10.0 RELIABILITY IN MANUFACTURING

- 10.1 Specifications and producibility
- 10.2 Process evaluation and control
- 10.3 Statistical control techniques
- 10.4 Defect reporting and analysis
- 10.5 Contamination control
- 10.6 Screening and conditioning
- 10.7 Acceptance testing techniques

11.0 RELIABILITY TESTING AND DEMONSTRATION

- 11.1 Statistical test design techniques
- 11.2 Reliability test planning
- 11.3 Test data analysis
- 11.4 Reporting, analysis, and corrective action systems
- 11.5 Measurement capability and techniques
- 11.6 Environmental and mission simulation techniques
- 11.7 Accelerated testing

12.0 PRODUCT RELIABILITY TECHNIQUES AND EXPERIENCE

- 12.1 Aircraft
- 12.2 Bio-medical instrumentation
- 12.3 Defense products
- 12.4 Electrical power
- 12.5 Ground transportation
- 12.6 Home appliances
- 12.7 Home entertainment equipment
- 12.8 Industrial control
- 12.9 Information systems
- 12.10 Marine products
- 12.11 Nuclear systems



MEMBERSHIP APPLICATION
RELIABILITY GROUP

Send to: IEEE Headquarters, 345 East 47th Street, New York, N. Y. 10017

Name _____ IEEE Membership No. _____

Mailing Address _____

Company _____

Field of Interest _____

I am a _____ member of IEEE and hereby apply for membership in the
(Grade) Reliability Group. I enclose a check for the Group fee*
(made payable to the IEEE).

I am not now a member of IEEE but would like to join. Please send information.

I am interested in becoming a Reliability Group Affiliate. Please send information.

*Fee: \$5.00 for IEEE members of all grades except Student.
Student fee is \$2.00.

Full rate on payments received September 1 through February 28 (payments received September 1 through December 31 applied through December 31 the following year).
One half rate on payments received March 1 through August 31.