



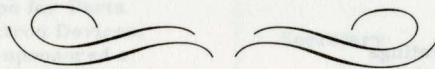
RELIABILITY GROUP

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31 May 1968

Mr. L. L. Schneider
TRW Systems
Redondo Beach, California

Dear Len:

On behalf of the members of the IEEE Reliability Group and the Group Administrative Committee, I wish to express our thanks for the benefits and pleasure we have derived from the Newsletter during your term as Editor. We are pleased you will be able to continue as a member of the Ad Com and as Secretary of the Group.

During your five years as Newsletter Editor, the Group membership has increased fifty percent (from 1775 to 2643), and the number of Chapters has increased substantially. As a matter of fact, I have just learned that members in the Montreal Section have requested permission to form a new Reliability Chapter.

I believe that your efforts have contributed significantly to the growth and improvement of the Reliability Group.

Sincerely,

George L. Beyer, Jr.
Publications Vice Chairman
IEEE Reliability Group



EDITOR'S NOTES

Your new Editor relinquishes this space, with pleasure, to make room for this Open Letter:



CHAPTER NEWS

Binghamton

The Binghamton Chapter and the American Society for Quality Control co-sponsored an annual one-day conference in March. The Chapter was pleased by the participation and words of praise by the attendees, which numbered 320. Mr. K. A. Lyman, Advisory Engineer at the IBM Electronic System Center and a member of the Chapter, presented a paper on "Ground Alert Factors Influencing Mission Success Probability" at the Ninth Annual West Coast Reliability Symposium. A Chapter meeting consisting of a tour of Link Group General Precision System, Inc., was held on May 7. New Chapter officers for the 1968-69 season are:

Chairman: Clark Hackley
General Electric Co.

Vice-Chairman: Ralph E. Kuehn
IBM

Secretary: John B. Bird
General Electric Co.



Baltimore

The Baltimore Chapter is planning to conduct five meetings during the 1968-69 season. Meetings will be held on the 4th Monday of September, November, January, March, and May. Newly elected officers are:

Chairman: Leroy Resser
Martin Marietta Corp.

Vice-Chairman: James King
Westinghouse Electric Corp.

Secretary-Treasurer: Larry Lambert
Martin Marietta Corp.

Jr. Past Chairman: E. E. Scheneman
Westinghouse Electric Corp.



Boston

On February 29, L. C. Hamiter, Jr., of the NASA Marshall Space Flight Center discussed "Assuring the Reliability of Microcircuits Used in Space Applications".

"Q. C. and Reliability Can Utilize Computers" was the subject of a paper presented by W. Myers of Delco Products at the March 7 Chapter meeting.



Canaveral-Daytona Beach

At the January 22 Chapter meeting, Mr. Charles M. Clarke of the General Electric Co. presented "Conclusions of NASA/MAR Electromagnetic Compatibility Workshop Seminar". On February 12, Dr. John E. Condon of NASA Headquarters discussed "NASA R&QA - Progress and Prospects". Election and installation of new Chapter officers took place at the annual meeting in June. The nominees for 1968/69 season were:

Chairman: T. M. Barlow, Jr.
Radiation Inc.

Vice-Chairman: J. B. Mills
General Electric Co.

Secretary/Treasurer: J. J. Grillo
Radiation Inc.



Connecticut

Mr. Louis Coutermash, Bunker-Ramo Corporation, addressed the February 12 Chapter meeting on "Quality Assurance in a Commercial Company".



North Jersey

"MOS Circuits, Failure Modes and Analysis Techniques" was the title of a paper presented by Mr. John Cocking, General Instruments Co., at the February 15 Chapter meeting.



Philadelphia

On March 28, a panel presentation of "Military-Industry Committee on Life Cycle Costing" took place at the Chapter Meeting. The moderator was E. Westcott of RCA.

Outgoing Chairman Bernard Tiger has announced the election of the following 1968/69 Chapter officers:

Chairman: Max Tall
RCA

Vice-Chairman: Jack Isken
IRC

Secretary: James H. Goodman
RCA



CHAPTER NEWS

San Francisco

Highlight presentations this spring included those on "Maintainability Techniques" by John Decker of Sylvania, and on "Reliability Physics" by Bob Stewart of the Lockheed Palo Alto Research Laboratory. On June 20, Ben Croghan of the Lockheed Missile and Space Company will speak on "Parts Screening Techniques". The following Chapter officers have been elected for 1968/69:

Chairman: Bob Welch
Sylvania Electronic Systems

Vice-Chairman: Bill DeVille
Philco-Ford/WDL

Secretary/Treasurer: Chuck Leake
Lockheed Missile & Space Co.

Program Chairman: Lou Finch
Lockheed Missile & Space Co.



Washington, D.C.

Mr. Robert O. Black, Chief of the Assessment Division, Quality and Reliability Management Office, U. S. Army Missile Command, addressed the Chapter on "Logistic System Simulation" at the February 21 meeting. On March 20, Mr. Alan O. Plait -- Manager of Reliability and Operations Research, Communications and Systems, Inc., and an officer of the Chapter -- presented a tutorial lecture entitled "Cooking Up Good Reliability with a Recipe for Parts Management". On April 24, the Reliability, Electron Devices, and Parts, Materials and Packaging Chapters co-sponsored a talk by Jack Q. Reynolds, Manager of Reliability for Collins Radio Company, on "Effects of Sustained Temperature Cycling on Electronic Parts". The Chapter participated in judging of local Science Fairs, selecting Mr. James Norman, North-western Senior High School, Hyattsville, Maryland, and Mr. John Delaney, St. Mary's Academy, Alexandria, Va., for special awards for their Reliability-related projects. Newly elected Chapter officers are:



THE QUIET ONES

The following Chapters have announced neither officers nor meetings during the past year:

Florida West Coast
New Jersey Coast

The following announced the past year's officers, but no meeting reports have been submitted during the year:

Chicago
Huntsville



hints and kinks

With this issue, your Hints and Kinks correspondent has become your Newsletter editor. This change is bound to have some effects on both the Newsletter and the column.

From time to time, as on this occasion, the column will address itself to the editor's views about the purposes and needs of the Newsletter. When this is the case, it should be understood without any further invitation that the views of the G-R membership on Newsletter policy, content, and format are solicited. Your communications for this purpose need not be "for publication"; any sort of note or telephone call to the editor will serve.

At other times, the column will be used as in the past -- as a medium for expression of pet peeves, personal idiosyncrasies, and commentary on current trends in the world of Reliability. However, your editor feels that he should not enjoy sole use of this platform. The column therefore will be open to guest columnists, subject to space availability, publications policy, and the laws of libel. (This provision is intended as an addition to the long-standing but rarely exercised offer to publish Letters to the Editor.)

A few platitudes are in order. The Newsletter exists as your communications channel. It will continue to bring you information from the IEEE, from your Administrative Committee, and from other sources in as timely a fashion as publication schedules permit. It ought to serve also to transmit your opinions, suggestions, and news items to the Administrative Committee and to the membership at large. It cannot be useful for this purpose unless you choose to use it.

At the time of this writing, plans were being set for the mailing of a questionnaire concerning newsletters of the various Groups to a sample of the IEEE membership. The recipients of these questionnaires are urged to complete and return them promptly. Neutral responses are just as important as strong opinions; expressions of strong disagreement with present newsletter practices could, in the absence of response from those who prefer the status quo, lead to changes not desired by the majority. (At their meeting in March, the editors of the two-dozen-or-so IEEE newsletters voiced a wide variety of contradictory opinions concerning what a newsletter should or should not contain.)

In closing, a personal statement of appreciation to the outgoing editor, Len Schneider. His reward will probably come from observing the squirmings of his successor.

Advanced Techniques Committee

In September of 1966, the IEEE Reliability Group Administrative Committee formed an Advanced Techniques Committee. The function of this committee is "to detect and investigate the need for specific advances in reliability engineering techniques, including analytical and prediction techniques and theory, and to simulate interest and developments leading to their availability for use".

The following is a summary of a report by the committee. This report, "Recommendations for Reliability Research", was submitted by committee chairman Ralph E. Kuehn at the last G7 Administrative Committee meeting.

During the past year, efforts have been made to develop recommendations for needed Reliability Research. The committee has developed the recommendations contained in this report and presents them without ranking their relative importance or urgency. In developing the report, inputs from responsible Reliability engineers in approximately 30 companies were used. The committee's recommendations, therefore, represent the composite views of a broad spectrum of the Aerospace Industry.

I Development and Evaluation of Screening Techniques

Although screening techniques have been applied mostly at the parts level, they can be applied at any level from basic materials to complete equipments. Many of the techniques employed are based on rather superficial engineering considerations and are often applied as a general rule without evaluation of the relationship to the failure mechanisms of the specific part being screened. Criteria need to be identified and methods formulated for applying these criteria to determine when a program should include screening, what screening techniques should be applied, and where and how the screening techniques should be applied.

II Reliability Efforts Versus Achievement

Reliability programs in support of equipment design, development, and production generally include a variety of tasks such as a Program Plan, Parts Selection, Prediction, Worst Case Analysis, Failure Mode and Effect Analysis, etc. The effectiveness or contribution of each task toward achievement of reliability requirements is usually not evident except as a subjective appraisal. Techniques need to be devised for quantitative evaluation of the contribution of different reliability tasks to the achievement of product reliability.

III Reliability Prediction

Reliability prediction has been a topic of major interest throughout the history of reliability engineering because the ability to predict implied the ability to control. Through the combined efforts of government and industry, methods have been developed to predict reliability. Perhaps the most serious drawbacks to these are reflected in their restriction to electronic equipments and their lack of accuracy. Major areas requiring attention, therefore, are the development of prediction methods for non-electronic systems, the improvement of prediction accuracy, the determination of methods for quantifying influencing factors and circumstances, and the improvement of statistical methods.

IV Non-Electronic Reliability

Over the past 15 to 20 years, methods and techniques for prediction and evaluation of electronic reliability have received extensive attention. This emphasis on the reliability of electronics has overshadowed the need for similar strong efforts in other areas. Techniques and procedures need to be developed for the reliability assessment of mechanical, electromechanical, and structural components. Criteria should be developed for the qualification of composite mechanical devices or structures and for the preparation of acceptance specifications (including non-destructive test and inspection procedures which will detect degradation introduced in manufacture). Techniques and procedures for the utilization of test data in the reliability assessment of mechanical devices or structures should be developed, and an overall measurement index based on test and operational data is required.

VIII Reliability Demonstration

Reliability demonstration testing is becoming more and more of a major effort with respect to the procurement of military equipments and systems. The chronic desire to find a means for shorter and cheaper tests, tests with more predictable outcomes, etc., emphasizes the importance of knowing the true risks applicable to the various methods of testing. A knowledge of the increased risk from earlier truncation, from tests designed on the basis of other than the exponential distribution, and tests making use of prior knowledge all need investigation and exposition. Sequential tests of availability, wherein neither reliability nor maintainability is separately specified, need to be expanded and carefully analyzed for the calculation of true risks. These areas are quite extensive, and it would appear desirable to prepare a Reliability Demonstration Handbook on this material.

V Reliability as a Function of Materials, Processes, and Manufacturing

The application of advanced design and reliability techniques has resulted in designs of great potential reliability. All too often, the material, processes, and procedures used in the fabrication and assembly of the physical hardware have seriously degraded the reliability potential of the design. Research should be undertaken to determine the inherent physical properties and characteristics of materials necessary for the reliable application of materials and control of processes. Development of techniques for analysis of the reliability potential and capability of processes prior to their implementation in factory lines is required. Tests and specifications necessary to qualify materials and processes merit attention; and a selected materials listing for bonds, adhesives, potting compounds, coatings, and associated processes should be established.

VI Accelerated Testing

The basic problem of accelerated testing is the determination, with a desired degree of confidence, of a valid relationship between failures occurring at higher than normal use stresses and failures at normal use stresses. At present, accelerated testing has been kept as simple as possible with usually only one stress being accelerated during a test. Investigation and development are needed in the areas of: (a) extension of accelerated testing techniques to more complex electrical and mechanical assemblies, with the eventual aim of formal reliability demonstration testing as well as product improvement testing; (b) exploration of the dependencies and problems of modeling and data analysis encountered with concurrent application of multiple accelerated stresses; and (c) utilization of accelerated testing techniques in initial part selection and as a means of ensuring continued satisfactory performance at receiving inspection.

VII Reliability as a Function of Environment

The effects of environmental conditions on parts, assemblies, equipments, and systems continue to present analytical and empirical problems to the Reliability engineer. Reliability models need to be developed which take into consideration the effects of both single and multiple environments. These models are needed at the part, assembly, equipment, and system level for all types of hardware.

CONTINUED

conferences

(Editor's Note: Numerous announcements of short courses at various universities have been received. Unfortunately, most announcements arrive too late for inclusion in the April Newsletter; as most courses are given in the June-August period, publication in the July Newsletter would not seem to serve any useful purposes. Readers interested in 1969 offerings should contact the appropriate institutions directly. Among those known to offer Reliability-related courses are George Washington University, New York University, Northwestern University, Polytechnic Institute of Brooklyn, Syracuse University, University of Michigan, and University of Missouri-Rolla.)

August 13-16	1968 Intersociety Energy Conversion Engineering Conference, Boulder, Col. Write: 1968 IECEC, P. O. Box 517, Littleton, Colorado 80120	November 27-30	Tele-Communication, Tele-Metering and Tele-Control, Mexico City. Write: Ing. Carlos A. Maigler, IEEE Seccion Mexico, Culiacan 115, Mexico 11, D. F.
October 23-25	1968 International Electron Devices Meeting, Sheraton-Park Hotel, Washington, D.C. Abstracts due August 1. Write: Donald A. Chisholm, Program Chairman, Bell Telephone Laboratories, Murray Hill, N. J. 07974	December 2-4	1968 Reliability Physics Symposium, Washington, D.C. Abstracts due August 15. Write: Seymour Schwartz, Code CQF, NASA/Electronics Research Center, 575 Technology Square, Cambridge, Mass. 02139
November 12-14	Automatic Support Systems for Advanced Maintainability. Sheraton-Jefferson Hotel, St. Louis. Abstracts: Closed. Write: Don L. Reed, Program Chairman, P. O. Box 4124 Jennings Station, St. Louis, Mo. 63136	1969 January 21-23	1969 Annual Symposium on Reliability, Palmer House, Chicago. Abstracts: Closed.
November 19-21	Seventh IEEE Photovoltaic Specialists Conference, JPL, Pasadena, California. Abstracts: Closed. Write: Robert E. Fischell, Conference Chairman, Applied Physics Lab., The Johns Hopkins University, 8621 Georgia Ave., Silver Spring, Md. 20910	March 24-27	1969 IEEE International Convention, New York Hilton Hotel and Coliseum. (All invited papers.)

publications

The following publications are available from the Institute of Environmental Sciences, Executive Secretary, 940 East Northwest Highway, Mt. Prospect, Illinois 60056:

- Proceedings of Annual Meetings (1959-1967)
- Tutorial Lecture Series 1965 (Climatics), 1966 (Dynamics), 1967 (General)
- Solar Radiation: State of the Arts Survey (1965)
- Solar Radiation: Bibliography (1965)
- Solar Radiation Proceedings (1965)
- Marine Environments: A Glossary... A Profile
- Aircraft and Propulsion Facility Survey

The following publication has been announced by the U. S. Department of Commerce:

Roberts, Aaron Gene, Organic Coatings - Properties, Selection, and Use, National Bureau of Standards Building Science Series 7, February 1968, 187 pages, \$2.50 (May be ordered from the Superintendent of Documents, the Clearinghouse for Federal Scientific and Technical Information, or Department of Commerce Field Offices)

personalia

Professor T. L. Regulinski of the Air Force Institute of Technology, Wright-Patterson Air Force Base, Ohio, was appointed Associate Editor of the IEEE Transactions on Reliability by the Administrative Committee at its May 19 meeting. Professor Regulinski has previously been active in Reliability Group educational activities and as a member of the paper review committee.

IEEE Transactions on Reliability: Acknowledgement

Publications of the IEEE Transactions on Reliability requires the work of many persons contributing their time and talent. Each worthy paper submitted to the Transactions Editor is reviewed by at least three specialists in a given facet of reliability. The reviewers are usually one of the associate editors and members of the Papers Review Committee. In recognition of their services to the Reliability Group, their names are listed below.

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