



RELIABILITY GROUP

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Table of Contents

EDITOR'S NOTES.....	1
CHAPTER NEWS.....	1
PERSONALIA.....	2
TRAINING COURSES.....	2
SYMPOSIUM ON RELIABILITY.....	2
1968 IEEE INTERNATIONAL CONVENTION.....	2
CHAPTER MEETINGS.....	3
HINTS AND KINKS, BY PAUL GOTTFRIED.....	4
CHAPTER AWARD.....	4
ORGANIZATIONAL CHANGES FOR IEEE RELIABILITY GROUP ADOPTED BY AD COM.....	5
YEARLY IEEE RELIABILITY GROUP DUES TO BE INCREASED TO \$5.00.....	6
IEEE RELIABILITY GROUP ADMINISTRATIVE COMMITTEE.....	6
REPORT ON RELIABILITY PHYSICS SYMPOSIUM, BY G.T. JACOBI.....	7



Editor's notes

The IEEE Reliability Group Newsletter has four issues scheduled each year, in January, April, July, and October. It is important that I receive news inputs approximately one month in advance of each issue's publication date. The publication date of the next newsletter is April 1968 and, therefore, the news items and articles should be received by me on or before March 1.

I wish to express my appreciation to all those individuals who so faithfully contributed articles, chapter news, and committee reports to the newsletter during the past year. The news inputs received for this January 1968 newsletter are especially encouraging. Let's keep up the good start made in January 1968.

Please address "Letters-to-the-Editor": Leonard L. Schneider, TRW Systems, One Space Park, 76/5106, Redondo Beach, California 90278.

CHAPTER NEWS



Binghamton

Three fall meetings were held by the Binghamton Chapter with attendance ranging from eight to twenty-three members. The subject of the November 13, 1967 meeting was "Risk Assessment in Complex Aerospace Systems" and the guest speaker was Mr. A. M. Smith of General Electric Company in Philadelphia, Pennsylvania. Mr. Charles Peace from Mohawk Airlines at Utica-Rome Airport spoke on "Reliability Aspects of Air Worthiness" at the chapter's October 16, 1967 meeting. "Technique for Reliability Circuit Design Review in Space Electronics" was the topic presented by Mr. P. J. Franciscovich of the IBM Corporation in Owego, New York at the meeting on September 25, 1967.

Connecticut

Mr. Julian Reitman, Norden Division of United Aircraft Corporation in Norwalk, Connecticut spoke to forty-five attendees on "The Application of Simulation in System Performance" at the Connecticut Chapter's meeting on September 19, 1967.

Los Angeles

Mr. Robert R. Reeds of Monrovia, California has been elected chairman of the Los Angeles Chapter. Mr. William P. Hart, Jr. is past chairman.

New York/Long Island

Chairman J. J. Drvostep reports an October 24, 1967 meeting of the New York/Long Island Chapter in Bethpage, New York on "Submersibles and Space Systems." Mr. G. H. Sandler spoke on "Reliability and Maintainability of Space Systems" and Mr. W. H. Rand's subject was "Reliability of Submersibles." Both speakers were representatives from Grumman Aircraft Corporation.

North Jersey

Two fall meetings were held by the North Jersey Chapter. On September 20, 1967, Mr. Ridgely Park of Westinghouse in Pittsburgh, Pennsylvania spoke to fifth-three attendees on "Reliability Applications to Commercial Products." On October 19, 1967, twenty-one persons participated in a panel discussion led by military and commercial business representatives on "Components and Systems."

Philadelphia

The United States Fairless Hills Plant was toured by thirty-nine members at the Philadelphia Chapter's October 25, 1967 meeting. "Reliability of the Protective Relaying System at Fairless Works, United States Steel Corporation" was the topic presented by Mr. Gunnar Adolfsen, United States Steel Corporation, Fairless Hills, Pennsylvania. Mr. Jess Funk, United States Naval Fleet Missile System at Corona, California discussed the "Background and Approaches Taken to Develop the Forthcoming Revision B of MIL-HDBK-217."

TRAINING COURSES

RELIABILITY SEMINARS FOR SPACE-AGE QUALITY/RELIABILITY TECHNOLOGY:

SEMINAR 67-1: BASIS RELIABILITY ENGINEERING covers the fundamental principles and practices of reliability engineering ... predicting, measuring, controlling, and improving product reliability.

SEMINAR 67-2: ADVANCED RELIABILITY ENGINEERING presents techniques to simplify "Reliability Mathematical-Modeling of Complex Systems."

Locations	Dates of Seminar 67-1	Dates of Seminar 67-2
San Francisco	April 5-6	April 19-20
Los Angeles	April 26-27	February 9-10
New York	March 15-16	March 22-23
Boston	January 12-13	January 19-20
Chicago	February 9-10 May 3-4	May 17-18 --
Detroit	(open)	(open)
Dallas	(open)	(open)

For details, write or call E. F. Dertinger & Associates, 5762 Raven-spur Drive, Palos Verdes Peninsula, California 90274; telephone (213) 756-8645 (day), (213) 541-1350 (evening).

ELECTRONIC CIRCUIT DESIGN BY COMPUTERS, NATIONAL ELECTRONICS CONFERENCE (NEC), FEBRUARY 19-21, 1968, PHEASANT RUN LODGE, ST. CHARLES, ILLINOIS:

This conference is a series of 3-day seminars designed to provide a solid foundation in the latest phases of electronic technology. The Institute of Electrical and Electronics Engineers, Region IV, is among the seventeen institutes and universities sponsoring this NEC professional growth series of seminars. Inquiries should be directed to National Electronics Conference, Inc., 228 North LaSalle Street, Suite 2104, Chicago, Illinois 60601; telephone (312) 372-0190.

LIFE TESTING AND SYSTEMS RELIABILITY AND MAINTAINABILITY, CROWELL COLLIER INSTITUTE OF CONTINUING EDUCATION, MARCH 25-APRIL 5, 1968 NEW YORK CITY:

Contact Mr. J. Warren Young, Crowell Collier Institute of Continuing Education, 866 Third Avenue, New York, New York 10022, for program information.

INTEGRATED LOGISTIC SUPPORT 885.10, UNIVERSITY OF CALIFORNIA, LOS ANGELES, BOELTER HALL, ROOM 5704, FEBRUARY 13-17, 1968:

The University of California Extension, Los Angeles, is presenting this 5-day course for program managers, project engineers, systems engineers, logisticians, reliability engineers, maintainability engineers, and resource managers. Program information may be obtained from Engineering and Physical Sciences Extension, University of California Extension, P. O. Box 24902, Los Angeles, California 90024; telephone (213) 478-9711 or 272-8911, Extension 7277 or 3121.

SYMPOSIUM

SYMPOSIUM ON RELIABILITY, JANUARY 16-18, 1968, AT THE SHERATON-BOSTON HOTEL, BOSTON, MASSACHUSETTS: The theme of this symposium is "Reliability in Perspective." The Institute of Electrical and Electronics Engineers and the Society for Non-destructive Testing are co-sponsors. For details, contact Mr. V. R. Monshaw, Program Chairman, Astro Electronics Division, Radio Corporation of America, P. O. Box 800, Princeton, New Jersey 08540.

1968

IEEE International Convention

IEEE INTERNATIONAL CONVENTION AND EXHIBITION, MARCH 18-21, 1968, COLISEUM, NEW YORK HILTON, NEW YORK: Program emphasis is on new technical interdisciplinary and tutorial and state-of-the-art activities. Additional program information may be obtained from Mr. J. M. Kinn, Institute of Electrical and Electronics Engineers, Inc., 345 East 47th Street, New York, New York 10017.

CHAPTER MEETINGS

ADVANCE LOCAL CHAPTER MEETINGS

CHAPTER	DATES OF MEETINGS	TIME AND PLACE	SUBJECT	SPEAKER	CONTACT
Binghamton	January 15, 1968	To be announced	To be announced	To be announced	H. J. Beal, IBM Corp., Owego, New York
Binghamton	February 7, 1968	7:30 p.m. - IBM Education Center, Endicott, New York	Attacking Reliability Problems: Some Case Histories	M. A. Young	H. J. Beal
Canaveral/Daytona Beach	February 12, 1968	6:30 p.m. - Daytona Beach, Florida	NASA Reliability and Quality Assurance - Progress and Prospects	John A. Condon	P. J. Mulligan, P. O. Box 2500, Daytona Beach, Florida 258-3571.
Connecticut	February 12, 1968	6:30 p.m. - Dinner 7:30 p.m. - Speaker New Haven, Conn.	The Reliability and Maintainability of Consumer Products	To be announced	Alan Knapp, Norden Div. of United Aircraft Corp., Norwalk, Conn. 838-4471, Ext. 4559 or Edward Haddad, General Dynamics, Electric Boat Division, Dept. 456, East Point Road, Groton, Conn., 466-2305
Connecticut	May 15, 1968	Time to be announced Burndy Library, Norwalk, Conn.	Relationship between Theoretical and Operational Reliability	To be announced	Alan Knapp or Edward Haddad
New York/Long Island	January 23, 1968	6:00 p.m. - Social and Dinner Meeting Kings Grant Motel, Plainview, Long Island	Unreliability - or Incomplete Maintenance A Space Program of Proven High Reliability	M. J. Kirby Sperry Gyroscope Co. A. L. Geraci Sperry Gyroscope Co.	A. Boguslaw, NASL, Brooklyn, New York (212) MA 5-4500, Ext. 358
New York/Long Island	February 20, 1968	To be announced	To be announced	To be announced	A. Boguslaw
Philadelphia	March 21, 1968	To be announced	Tour and Meeting on Microcircuitry	To be announced	D. I. Troxel, RCA, Bldg. 1-5-3, Camden, N.J.
Philadelphia	April 24, 1968	To be announced (Ladies invited)	Product Evaluation Techniques	Dr. Mendenhall of Consumers Union	B. Tiger, RCA, Bldg. 1-5-3, Camden, N.J.
Philadelphia	May 21, 1968	To be announced	Conference on Failure Analysis	To be announced	G. Beckhart, RCA, Moorestown, N. J.; G. Ashendorf, RCA, Bldg. 16-4, Camden, N.J.; N. Kutner, G.E., P.O. Box 8048, Philadelphia, Penn., 19101
San Francisco	January 25, 1968	6:00 p.m. - Meet the Speaker 7:00 p.m. - Dinner Stanford View Restaurant, Palo Alto, Calif. 8:00 p.m. - Program Physics Lecture Hall, PH 101, Stanford Univ.	Reliability Allocation, Prediction, and Failure Rate Establishment Techniques	Fred Tator, Philco-Ford	W. W. DeVille, Philco-Ford, WDL, 3825 Fabian Way, Palo Alto, Calif. 94303, (415) 326-4350, Ext. 6133
San Francisco	February 15, 1968	6:00 p.m. - Meet the Speaker 7:00 p.m. - Dinner Stanford View Restaurant 8:00 p.m. - Program PH 104, Stanford Univ.	Reliability Analysis by Computer Methods	William Abbott, Lockheed Missile and Space Company	C. E. Leake, Lockheed Missile and Space Co., 60-50 Bldg. 529, Sunnyvale, Calif. 94088 (408) 742-3629
San Francisco	March 21, 1968	Ibid	Maintainability Techniques	John T. Decker, Sylvania Electric Products, Inc.	H. R. Caldwell, Sylvania Electronic Systems, Western Division, P.O. Box 188, Mountain View, Calif. (415) 966-3153
San Francisco	April 18, 1968	Ibid	Design Review Techniques	To be announced	C. E. Leake
San Francisco	May 16, 1968	Ibid	Reliability Physics	R. C. Stewart, Lockheed Missile and Space Company	C. E. Leake
San Francisco	June 20, 1968	Ibid	Part Screening Techniques	Ben Croghan, Lockheed Missile and Space Company	C. E. Leake
Washington	January 8, 1968	6:30 p.m. - Dinner Beefeater's Restaurant 518 Tenth St., N.W., Washington, D.C. 8:00 p.m. - Meeting PEPCO Auditorium, 929 E Street, N.W. Washington, D.C.	The DoD Tactical Satellite Communications Program (TACSATCOM)	E. Grogan Shelor, Assistant Director of Defense Research and Engineering for Communication and Electronics	A. O. Plait, Communications and Systems, Inc., 6565 Arlington Blvd., Falls Church, Va. 22046, (703) 533-8877

Chapter News

(CONTINUED)

San Francisco

Chairman H. R. Caldwell reports the San Francisco Chapter has enjoyed large turnouts of forty to fifty members at each of two fall meetings. The October 19, 1967 meeting was a presentation by Mr. Art Schmid of Planning Research Corporation on "The Use of Computers for Reliability Analysis." The second meeting on November 16, 1967 consisted of a tour of the Lockheed Missile and Space Company's failure analysis laboratory. Mr. Ross Bunstead, manager of the laboratory, was host for the tour.

Brochures describing the chapter's series of six spring meetings are available upon request from the group chapter officers. Please refer to the "Advance Local Chapter Meeting" section for addresses.

Personalia

Congratulations to those members of our G-7 Reliability Group who have been elected to the grade of Fellow for 1968 by the board of directors of the Institute of Electrical and Electronics Engineers for their outstanding and extraordinary qualifications in their particular fields.

Helmer H. Dahl	CHR Michelsen Inst. Bergen, Norway	Acoustics & Microwave Techniques
Fernand F. P. Nouvion	D E T E Chief Engr. Traction Studies Paris, France	Modern Electrical Railroads
Henry A. Stone, Jr.	Bell Telephone Labs. Whippany, New Jersey	Advanced Components for Communications Systems

James P. Welsh	Buffalo, New York	Thermal Measurement & Cooling of Electronic Equipment
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Presentation of the Fellow award certificates will be made locally by the IEEE section to which each fellow belongs. Recognition of the awards will also be made by the president of IEEE at the annual banquet on March 20, 1968 during the IEEE International Convention in New York City.

Mrs. Catherine D. Hock, vice chairman of the Education Committee of the IEEE Reliability Group, has accepted the position of Deputy Director, Office of Research Implementation, National Highway Safety Bureau, Federal Highway Administration, Department of Transportation. Mrs. Hock was formerly Assistant to the Director, Apollo Reliability and Quality, Office of Manned Space Flight, National Aeronautics and Space Administration.



Hints & Kinks

By

PAUL GOTTFRIED

Booz, Allen Applied Research, Inc.

Until a couple of years ago, it was customary for moderators of Reliability sessions to introduce the subject with a joke intended to define just what a Reliability Engineer does. The jokes have subsided, but explaining our jobs to laymen remains difficult.

One reason for the difficulty may be that our work falls in several areas, among which we have not drawn sufficiently clear distinctions. To be sure, the title of one of our textbooks refers to "Management, Methods, and Mathematics" -- but the contents, like most of our communications with the outside world, emphasize the mathematics to the near exclusion of the other areas. It may help us and others if we take the trouble to define our spheres of activity, even arbitrarily.

"Management" in the context of Reliability can be taken to include all measures that provide control. We are concerned with the contractual and procedural relationships between a contractor and his customer on the one hand, and between that contractor and his suppliers on the other. In addition, we are concerned with the internal relationships of those concerned with Reliability and all others within the same corporate organization. The primary tools take the form of documents, although interpersonal relationships of course are of great importance as well. The documents include specifications, program plans, reports, and the like; their implementation involves organizational structure. The job of management is not unlike that in other fields: achieving the compatibility of requirements and resources, under control.

The "Methods" of Reliability are the engineering procedures that determine equipment integrity and longevity. Reliability depends on the choice of parts and materials, the design philosophy that determines their interactions, the methods employed to protect them from adverse operational environments, and the care and process controls employed in their assembly into equipment and systems. Diverse procedures are available for achieving the desired ends.

As in other branches of engineering, a major challenge lies in the selection and combination of procedures to meet the requirements without violating constraints on other equipment and procurement characteristics -- weight, volume, performance, cost, and schedule, to make some of the tough ones (not necessarily in the order of their importance). To the extent that the efficacy and byproduct effects of specific Reliability measures are not precisely known, and the full spectrum of alternative combinations cannot be explored, the Reliability engineer must employ that elusive and valuable commodity known as "engineering judgment." In this as in most of his other duties, he does not differ materially from other engineers.

All measures of system behavior and worth enter into analysis, both when each measure is being considered as a separate aspect and when it is regarded as one of the numerous parameters of effectiveness. Almost all measures, including Reliability, must be treated quantitatively. For probabilistic and time-dependent measures such as reliability, accurate and plausible quantification inherently is more difficult than for directly measurable factors such as some performance parameters. The mathematics of Reliability provides the means for estimating the consequences of implementing specific "Methods" and, perhaps, of "Management" choices. It also provides a basis for tradeoffs among Reliability and other effectiveness parameters.

The three areas of Reliability activity described here demand somewhat differing points of view and talents. The interplay among them, however, is (or should be) continuous; desirable results are not achieved unless there is dialogue between the practitioners of "Methods" and those of "Mathematics," and "Management" concerns itself with producing the environment needed by the others. In this as in many other respects, Reliability does not differ significantly from other disciplines.

Chapter Award

Winners of the Reliability Group Chapter Award are to be announced by Mr. K. Koon, Membership and Organizational Vice Chairman, during the annual banquet of the Reliability Symposium in January 1968 at Boston, Massachusetts.

The purpose of this award is to motivate chapters, and especially chapter officers, to structure a program in their chapter which is complete as possible in the encouragement of advances in all professional areas of reliability.

In order to be fair to all chapters, the measurement period for the first award is August 1, 1966 to December 31, 1967. Listed below are the rules for the Reliability Group Chapter Award.

1. Number of Meetings

One hundred points will be earned for every meeting in excess of 4 per year and a loss of 100 points for every meeting less than 4 per year in which a chapter participates. Joint meetings with other chapters or the section and symposiums will count for

this item. Meeting records furnished by the chapters to IEEE will be used for this measurement.

2. Symposium or Conference

Five hundred points will be earned for each day-long symposium or conference arranged and sponsored or co-sponsored by a chapter. Meeting records furnished by the chapter to IEEE will be used for this measurement.

3. Training

One hundred points will be earned for each training course sponsored by a chapter and held in their area. The training course can be one of those prepared by the G-7 Ad Com or can be one at the college or university level which is motivated by the chapter. To be eligible for these points, the chapter must furnish written proof to the newsletter editor who will forward a copy to the Ad Com vice chairman for Membership and Organization.

4. Written Papers

One hundred points will be earned for each paper written and presented by a member of the chapter at a reliability symposium or conference either national, regional, or local. Two hundred points will be earned for each paper written by member of the chapter and published in the G-7 transactions. To be eligible for these points, the chapter must furnish written proof to the newsletter editor who will forward a copy to the Ad Com vice chairman for Membership and Organization.

5. Newsletter Items

One hundred points will be earned for a chapter when it has submitted information to the newsletter editor which is actually published. The points will be earned for each newsletter in which such chapter information appears. The newsletter editor will verify, upon request, that a chapter is eligible for points.

6. Speakers List

One hundred points will be earned each time a chapter has as its speaker some one from the Speakers List. It will be the responsibility of the chapter chairman to indicate on his meet-

ing report to IEEE that the speaker was on the Reliability Speakers List.

The award consists of \$100 for first place, \$50 for second place, and \$25 for third place. No tie will be allowed and the judgment of the Group Awards Committee will be final.

The award will consist of a check to each IEEE section in which the winning chapters are located to be used only by the respective reliability chapter for improving their professional status. The chairman of the first-place chapter will also receive a certificate or plaque to commemorate the award as a recognition of his personal leadership.

The award will be on a calendar year basis with the period of measurement from 1 January to the following 31 December.

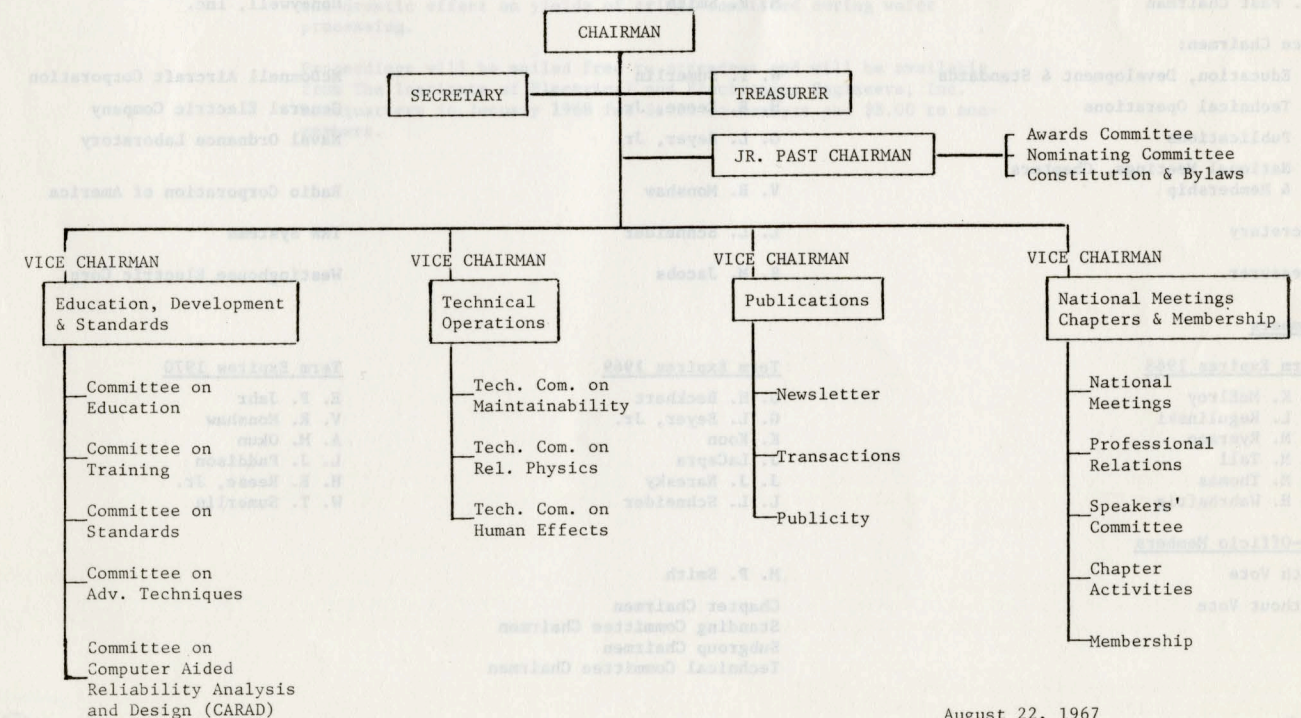
To qualify for an award, a chapter must be in operation and be authorized by IEEE prior to 1 January of the measurement period.

The awards will be made by the Ad Com upon recommendation of the Group Awards Committee. No tie will be allowed and the judgment of the Group Awards Committee will be final.

Organizational Changes for IEEE Reliability Group Adopted by AD COM

Chairman E. F. Jahr announced the Ad Com's decision in an October 1967 ballot to adopt organizational changes for the IEEE Reliability Group to implement a membership system in accordance with the following chart.

IEEE RELIABILITY GROUP (G-7)



August 22, 1967

Yearly IEEE Reliability Group Dues to be Increased to \$5.00



Effective 1968 fee year, the Ad Com voted to accept Treasurer V. R. Monshaw's recommendation that IEEE GR membership fees be increased from \$3.00 to \$5.00/year to provide for a balanced budget in 1968. Counterbalancing this fee increase is the Ad Com's decision to continue the distribution of the Annual Symposium on Reliability Proceedings to all GR members because it represents a major benefit of membership.



IEEE Reliability Group Administrative Committee

(G-7) 1968-1969

Administrative Committee Officers to December 31, 1968

Chairman	E. F. Jahr	IBM Corporation
Jr. Past Chairman	M. P. Smith	Honeywell, Inc.
Vice Chairmen:		
Education, Development & Standards	W. T. Sumerlin	McDonnell Aircraft Corporation
Technical Operations	H. E. Reese, Jr.	General Electric Company
Publications	G. L. Beyer, Jr.	Naval Ordnance Laboratory
National Meetings, Chapters & Membership	V. R. Monshaw	Radio Corporation of America
Secretary	L. L. Schneider	TRW Systems
Treasurer	R. M. Jacobs	Westinghouse Electric Corp.

Members

Term Expires 1968

P. K. McElroy
T. L. Regulinski
C. M. Ryerson
M. M. Tall
J. M. Thomas
W. H. Wahrhaftig

Term Expires 1969

G. H. Beckhart
G. L. Beyer, Jr.
K. Koon
J. LaCapra
J. J. Naresky
L. L. Schneider

Term Expires 1970

E. F. Jahr
V. R. Monshaw
A. M. Okun
L. J. Paddison
H. E. Reese, Jr.
W. T. Sumerlin

Ex-Officio Members

With Vote: M. P. Smith
Without Vote: Chapter Chairmen, Standing Committee Chairmen, Subgroup Chairmen, Technical Committee Chairmen

Report on Reliability Physics Symposium

BY

GEORGE T. JACOBI

On November 6-8, 1967, the Sixth Annual Symposium on Reliability Physics (formerly Physics of Failure in Electronics) was held in Los Angeles. For the first time the symposium was an IEEE event, co-sponsored by the Electron Devices Group and the Reliability Group.

Over thirty papers in seven sessions were presented. There were sessions on Physical Reliability, three sessions on Semiconductors and Surface Effects, a session on Metallization and Contacts, and on Passive Devices. A flash session was presented which permitted authors of 10-minute news type papers to submit abstracts as late as the first day of the symposium. Among the exciting presentations flushed out by this method was a film presentation of "Electrotransport in Aluminum Thin Films" by I. A. Blech and E. S. Meieran, Fairchild Semiconductor. The films clearly showed the migration and reversal of crystallite vacancies under reversal of applied field, culminating in coalescence of the vacancies and fusing of the films. Among the invited papers, E. H. Schwuttker, IBM, presented a chamber of horrors under "In-Process Control of Structural Defects in Semiconductor Manufacturing." His slides clearly showed the drastic effect on yields of crimes committed during wafer processing.

Proceedings will be mailed free to attendees and will be available from The Institute of Electrical and Electronics Engineers, Inc. headquarters in January 1968 for \$6.00 to members and \$8.00 to non-members.

