Editor's Notes

This is the last issue of the Newsletter to be published under my direction. In some ways it has been an interesting two plus years and in another it has only confirmed some of the things I already knew, i.e., people will accomplish many things but to describe these achievements in writing is too great a sacrifice.

The Annual Reliability and Maintainability Symposium’s Board of Directors recently made a decision to no longer allow its co-sponsors to present awards at the Symposium Banquet. The reason cited was that there are now too many co-sponsors and too much time is used in the presentation and acceptance of such awards. However, at the 1977 Symposium one of the sponsors presented its annual award to a woman (a first for the Symposium). Is there a relationship? It makes one wonder!

The new editor at this time is nameless. You will be meeting him in the April issue of the Newsletter. Please give him your support in any way possible.

Contents

<table>
<thead>
<tr>
<th>Contents</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Editor's Notes</td>
<td>1</td>
</tr>
<tr>
<td>Chapter Chairman has a new name</td>
<td>1</td>
</tr>
<tr>
<td>Chapter News</td>
<td>2</td>
</tr>
<tr>
<td>Letter to the Editor</td>
<td>3</td>
</tr>
<tr>
<td>Military Specification: Friend or Foe</td>
<td>3</td>
</tr>
<tr>
<td>What Are Specifications and Standards?</td>
<td>5</td>
</tr>
<tr>
<td>Reliability: The Quest for Semiconductor Perfection</td>
<td>9</td>
</tr>
<tr>
<td>Interesting Items</td>
<td>10</td>
</tr>
<tr>
<td>IEEE Seeking Delegates to Attend 1978 POPOV Society Congress</td>
<td></td>
</tr>
<tr>
<td>NSPE Selects Engineers Week Theme for 1978</td>
<td>10</td>
</tr>
<tr>
<td>Writing As It Should Be Written or Rules of the Game</td>
<td>11</td>
</tr>
<tr>
<td>Are You A Missing Member?</td>
<td>11</td>
</tr>
<tr>
<td>New 1978 IEEE Officers Announced</td>
<td>11</td>
</tr>
<tr>
<td>Predicting and Influencing Organizational Decisions</td>
<td>11</td>
</tr>
<tr>
<td>Short Courses</td>
<td>14</td>
</tr>
<tr>
<td>Conferences</td>
<td>14</td>
</tr>
<tr>
<td>Call for Papers</td>
<td>15</td>
</tr>
<tr>
<td>Conference Calendar</td>
<td>15</td>
</tr>
<tr>
<td>Chapter Chairman</td>
<td></td>
</tr>
<tr>
<td>Baltimore</td>
<td></td>
</tr>
<tr>
<td>Mr. Ray Seid</td>
<td></td>
</tr>
<tr>
<td>Westinghouse Electric Corp.</td>
<td></td>
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<td>Box 746, MS 454</td>
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<td>Baltimore, Maryland 21203</td>
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<tr>
<td>Binghamton</td>
<td></td>
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<td>Mr. Joseph J. Rexford</td>
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<tr>
<td>IBM Corporation</td>
<td></td>
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<td>Dept. 351, 002-1</td>
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<tr>
<td>Owego, New York 13827</td>
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<tr>
<td>Boston</td>
<td></td>
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<td>Mr. William P. McCabe</td>
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<td>Sanders Associates, Inc.</td>
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<td>NSI 1-2208/1-1660</td>
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<td>24 Simon Street</td>
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<td>Nashua, New Hampshire 03061</td>
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<td>Canaveral/Daytona</td>
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<td>Mr. Thomas F. Novak</td>
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<td>Radiation, Inc.</td>
<td></td>
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<td>P.O. Box 37, MS 1-600</td>
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<td>Melbourne, Florida 32901</td>
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<td>Central New England Council</td>
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<td>Mr. William P. McCabe</td>
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<td>Chicago</td>
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<td>Mr. Henry A. Malec</td>
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<td>GTE, Automatic Elec. Labs</td>
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<td>Box 2317, A-6</td>
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<td>Northlake, Illinois 60164</td>
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<td>Cleveland</td>
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<td>Mr. Vincent R. Lalli</td>
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<td>MS 500, 211</td>
<td></td>
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<td>Cleveland, Ohio 44135</td>
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<tr>
<td>Connecticut</td>
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<td>Mr. David J. Finnicum</td>
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<td>Ellington, Connecticut 06029</td>
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<tr>
<td>Florida West Coast</td>
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<td>Mr. Charles M. Krzesicki</td>
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<td>Largo, Florida 33540</td>
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</table>
Chapter News

Baltimore

The Baltimore Chapter will hold its next meeting February 21, 1978, at the Belvedere Int. Mr. Larry Rosen, Mormons, Inc., will be the speaker. The April 18, 1978 meeting will be a joint meeting with the Washington/Virgina Regional Chapter. Mr. Naunie McKeen, Westinghouse Electric Corporation, will discuss "The Quali-
...ty/Reliability Interface."*

Boston

In September Lt. Col. Fred Neufeldt (USA) delivered an interesting presentation on the RW aspects of the TACAN Program to 40 attendees, and in October/November Don Fradette of Raytheon conducted a 5-week lecture series on "Mathematical Techniques for Reliability." Thirty-five people attended this lecture series.

On December 14, 1977, Mr. Bob Hoenisch of Sanders Associates discussed "A Manager's Look at Reliability." January 18, 1978, Mr. A. Minicucci, Raytheon will discuss "LCC/DTC." February 15, 1978, Mr. E. Curchio, GTE Sycom will present "Reliability Space Review," and the final meeting will be March 15, 1978. All meetings will be held at the Officers Club, Hanson Field. The year will be ended as usual with an all-day seminar on April 27, 1978. This year's theme will be "Exploring the Assurance Science."

Chicago

"Successful Reliability Seminar Conducted for 40 Engineers in Chicago Chapter"

The 2nd Annual Tutorial Reliability Program was conducted on November 12, 1977 and featured a broad range of reliability criteria relating to the electronics, electric, and solar industries. Slides, over-heads, and handouts were given by five instructors to project the reliability statistics and formulas needed to plan a reliable system.

New to the program this year was Utility Power Considerations and Solar Power Considerations. The featured speakers and topics were:

- Hugh Edinger
  - Reliability Basics, Maintainability and a Reliability Film by UN
    - "Basic Reliability Concepts"

Henry Malo

GTE Automatic Electric Labs

Reliability Modeling and Cost Effectiveness

Ray Schimer

ITT, Telecommunications

Stan Anderson

Commonwealth Edison

Elliottib

Utility Power Reliability Considerations

Paul Clawson

KGA Engineering Co., Inc.

Solor Power Considerations

Other chapter activities included a tour of the Underwriters Laboratories in Northbrook, Illinois in October. Tour guide R. York from I.L. explained the different departments which include: explosion devices, air conditioning, heating, smoke detectors, fire control and sprinkler systems, roofing, insulation, and fireproofing. Coming events will include Thomas C.B. Ayres of DeLeuw, Cather & Co., speaking on Mechanical Reliability in February 1978, and in April 1978 Mr. Hugh Edinger of GTE, Ill, will present a panel session on the Reliability of Magnetic Bubble Memories. Time and place of both will be announced at a later date.

New York/Long Island

The Long Island and Metropolitan New York Chapter have been integrated into one Reliability Chapter known as the "New York/Long Island Chapter."**

The officers for the 1977-1978 year are:

Chairman: Joseph Deveaux

Grammar Aerospace Corporation

Vice-Chairman: Hank H. Wolf

Grammar Aerospace Corporation

Vice-Chairman: Harvey Bernstein

Underwriters Labs, Inc.

Our program for this year is as follows:

At the first meeting on September 29, Mr. Robert H. Gunter, Supervisor of Reliability Services, Holmes & Nattc, Inc., presented some interesting facts about Nuclear Energy, and described the exten-
...t to which some energy sources can be expected to meet our re-
"requirements by the year 2000. On November 15, Mr. Dan Piaton, Chief of the Division of En-

...vironmental Assessment of the New York Outer Continental Shelf Office spoke on the "Risks Associated with Outer Continental Shelf Exploration and Production Operations." Exploration, develop-
...ment, and production operations encounter many geological and meteorological hazards, which along with equipment failure and human error can lead to blowouts of exploratory wells, damage to production platforms, spills from pipelines and tankers, as well as loss of human life.

Meetings planned for next year include:

March: An updated report of experience encountered by Pan Am in the procurement and maintenance of avionic equipment with reliability and mainta-
...nability warranties.

April: A tour of the expanded and modernized Underwriters Laboratories facility at Melville, Long Island.

Philadelphia

The first meeting of the year was held October 18, 1977. The speaker was Mr. Charles R. Helfing, General Electric Company, who discussed "Reliability versus Cost; Studies of Industrial and Commercial Power Systems."**

Washington/Northern Virginia

The November meeting featured a talk by Mr. Cal Dicks of General Electric entitled "Reliability Analysis: Applied to Mechanical and Structural Systems."*** Areas of discussion included problems encountered during reliability analysis of these systems, design and analysis techniques and their relationship to reliability, and selected reliability disciplines which may be effectively im-
..plemented to enhance the reliability of mechanical and structural systems.

Mr. Dicks is a seniors engineer with the General Electric Company currently providing engineering services to the Naval Air System Command. His experience in reliability includes reliability analysis, equipment specifications, management and control documentation, and other related areas. His background in mechanical and structural systems includes stress/strain analysis and testing of aircraft and munitions. He has authored papers on Structural Reliability.

Other meetings are scheduled as follows:


Letter To The Editor

Dear Editor:

Notes on Reliability Testing for Industry Use:

1. Good article by W.T. Greenwood, Jr.

2. On Corrid package, two considerations are most important:
   2.1 Goals test data after burn-in and test. Corrid typically has 1 to 2 percent breakdown during handling in these burn-in tests.
   2.2 Based on recent industry testing, including STC, Epsilon B or Novolette type packages are showing fewer (but fewer) failure rates than Corrid, both early life and long term.

3. On epoxy and Corrid devices, temperature cycling is a very cost effective screen. Temperature cycling costs 3 to 5 cents per device, depending on quantity. Commercial devices such as PEPI and Epsilon B have about the same temperature cycling and some right elec-

...trical parameter testing. In any case, temperature cycling should be a part of any burn-in screens program and will result in even better life performance.

Sincerely,

J.R. Adams

Manager of Component Technology Storage Technology Corp.

Military Specifications: Friend or Foe? By Gary Anderson

Product Manager Federal Systems Information Handling Services

Englewood, CO 80110

The designer may believe that mil specs and related documents exis-
...t only to assure a certain level of quality and performance in government contract work. While this is part of their purpose, the system of military documents actually has three main objectives:

- Standardize minimum physical and performance specifications for thousands of materials, components, and systems commonly used in military systems.
- Provide documentation needed by those designing and inspecting military systems.
- Aid in the procurement of the billions of dollars worth of materials, components, and systems purchased for military use.
Vendor Are Responsible Too. Purchasing a part as a subsystem to a contract can be a problem, especially if it is difficult to find the required parts in the QPL, internal standard, or approved vendor list. Remember, the contract applies to the subcontractors and vendors too. However, the building and evaluation of these parts is a responsibility of delivery. Usually, an importance specification is sent to the vendor or subcontractor, with drawings and specifications. Once a document has been superseded, it will no longer be printed. The letter superseding one which is important for detailed contracts or revisions to additions to existing equipment, may be difficult to obtain or completely unavailable when needed. The required books of standard files is not only a time and cost problem, but may also lose more time-consuming and inconvenient.

What Are Specifications and Standards?

All military and federal specifications and standards, Military Handbooks and Qualified Products Lists (QPL) are important elements to aid the Department of Defense (DoD) in the efficient procurement of equipment and services for military needs. Understanding the process and function of each will help contractors to work more efficiently within the federal government procurement system. Also, they will help the inspector avoid many pitfalls.

Military Specifications issued by DoD, define materials, products, or processes used, or only purchased by military activities. Two basic types are "coordinate" and "qualified coordinate." Coordination is circulated to an extensive list of military departments for sign-off approval and are considered of general interest to all DoD operations. Limited coordination specifications are of interest to a limited group only and goes through a less involved approval cycle. To illustrate the pricing format, consider the military specification for an attenuator.

Military Attenuators (Q-49204)

State and local governments, public agencies, and other entities must make sure their procurement practices are in compliance with the various laws and regulations that govern public procurement. This includes understanding and applying the principles of fair and open competition, equal opportunity, and good government. Compliance with these laws and regulations is essential to ensure transparency, fairness, and accountability in the procurement process. Failure to comply can result in legal and financial consequences. Therefore, it is crucial for procurement professionals to stay informed about the latest developments and changes in procurement laws and regulations. This ensures that they can make informed decisions and take appropriate actions to comply with the law, protect the public interest, and safeguard public resources.
Reliability can be improved if weak or failure-prone components can be removed or replaced before they cause failures. This is especially true in certain product areas that are subject to repeated stress. Components should be restructured to reduce stress points. For example, a telephone line may be stressed by repeated temperature changes. In this case, the stress can be reduced by using a different material for the line or by changing the design of the line so that it is less sensitive to temperature changes.

The reliability of a product can be improved by using a better design or by changing the materials used in the product. For example, a circuit board may be designed so that it can withstand higher temperatures without failing. This can be done by using a different type of metal for the circuit board or by changing the design of the circuit board so that it is less sensitive to temperature changes.

Another way to improve reliability is to use a better manufacturing process. This can be done by using a more accurate process or by using a cheaper process. For example, a circuit board may be manufactured using a more accurate process so that it is less likely to fail. This can be done by using a more expensive process or by using a cheaper process.

The reliability of a product can also be improved by using a better testing process. This can be done by using a more accurate test or by using a cheaper test. For example, a circuit board may be tested using a more accurate test so that it is less likely to fail. This can be done by using a more expensive test or by using a cheaper test.

The reliability of a product can also be improved by using a better maintenance process. This can be done by using a more accurate maintenance process or by using a cheaper maintenance process. For example, a circuit board may be maintained using a more accurate maintenance process so that it is less likely to fail. This can be done by using a more expensive maintenance process or by using a cheaper maintenance process.

The reliability of a product can also be improved by using a better support process. This can be done by using a more accurate support process or by using a cheaper support process. For example, a circuit board may be supported using a more accurate support process so that it is less likely to fail. This can be done by using a more expensive support process or by using a cheaper support process.

The reliability of a product can also be improved by using a better disposal process. This can be done by using a more accurate disposal process or by using a cheaper disposal process. For example, a circuit board may be disposed of using a more accurate disposal process so that it is less likely to fail. This can be done by using a more expensive disposal process or by using a cheaper disposal process.

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Semicontact manufacturers test devices at a number of reliability
levels. These include tests imposed by individual customers, and
d others designed by the manufacturer for meeting the needs of many
customers. The customer specifies screening and reliability con-
formity tests which he feels are necessary for his particular applica-
tion. Some apply their own standard program to devices to provide a
consistent level of reliability for all customers. The severity, and
consequently the cost of such programs depend upon the program
structure.

The Department of Defense specifications for military devices use
the JAN prefix to denote the level of reliability. These include the
JAN standard (J), JAN-SRT (J), JAN-NCS (J), which requires de-
fect selection test (J), JAN-AGT (J), which results in acceptance
Group B type program (group B testing is sampling evaluation) and
the JAN-MC type device (e.g., JAN-V38X-J), which requires prelimi-
ary screening followed by a Group B test. Also included is the
JANTXV type device (e.g., JAN-TX3N5T), which gets a screening
program with visual inspection followed by a Group B test. These
devices then proceed to higher reliability levels, which are based on
the MIL standard reliability tests used universally. These MIL
programs are sometimes used as starting points by
makers who want to specify their own programs.

Another available option is a reliability program prepared by the
semiconductor manufacturer, which is an in-house quality stan-
ard to judge the effectiveness of a given test and its contribution to
the reliability of its product. They are run routinely by the manufacturer
in much the same way that military JAN type programs are run. At
Heilwig, many of these devices are catalog items and can be
be purchased off-the-shelf. The higher volumes that can be run rep-
resent cost savings to the customer. Usually the reliability is equivalent
to military devices and, therefore, a cost-effective option.

After all tests are completed, a chance remains that a reliability
hazard was undetected. It is worthwhile to sacrifice one or more
devices for a closer look. After the package is carefully opened, a
visual inspection can determine whether the interior is still clean as
it was prior to sealing. Bond strength can be determined by bond-
pull testing. Aging has an effect, the results may differ from previous
in-process bond-pull results. Photographs can document the new
configuration of the chip and its assembly. The super-
depth of field with high magnification makes the scanning electron
microscope an extremely useful tool for destructive physical analysis.

Organizations other than the manufacturer can administer screen-
ning. Reliability screening companies are usually well equipped for the
tasks they carry out. Often they can complete a program in less
time and at lower cost than the manufacturer. Since they have no
incentive for the reliability of the manufacturer's device, they are viewed
as having an unbiased attitude. For large volumes and for devices used
directly, reliability testing companies are quite cost-effective.
However, the outside reliability test house often has difficulty in
the highly specialized, lower volume products, since special testing
may be required. Special handling may not be compatible
with their standard procedures for high volume products. Hence, microwave devices do not readily lend themselves to
outside screening. Usually manufacturers maintain in-house test equipment.

While the outside test house can screen according to a prescribed
specification, the customer is at a disadvantage if problems requiring
corrective action are performed by the manufacturer. The manufacturer
will have to be convinced that the tests were appropriate and applied
correctly, since the manufacturer is ultimately responsible for the
finished product.

1. A typical distribution of the currents in a packaged
microwave semiconductor. The ac-
tual distribution will vary by device
number, manufacturing lot, and en-
vironmental conditions.

2. A small protrusion similar to these shown at arrows probably
caused the arc between gate area and
source of this GaAs FET. Devices with
no improper soldering were protected from ambient thermal
voltage spikes. The standard pro-
cedures for MOS IC's are applicable and
admirable.

3. A minute particle between the emitter housing wire and the chip
cap of this device has caused an em-
erator short. The fact was ac-
celerated by subjecting the device to
thermal and mechanical stress to loosen the part, which may have
become weakly attached to the wall of
the package. The electrical short was
detected during a vibration test
with bias.

4. Area between the arrows was not
wetted by the cap solder. The MIL
standard bubble test cannot detect
minute voids that have no gross hermeticity
problems of this magnitude. A wet
radiographic test would detect
minute hermeticity leaks with near
100 percent confidence.

5. The contact button and barrier
metal of this Schottky diode have been
emerging into the air. The dark spot
as the perimeter was caused by re-
peated short electrical pulses. The
device developed a severe blue
coloration but maintained nor-
mal forward bias characteristics.

6. Acceleration range of most
temperature dependent failure
characterizations. The lower boundary
(A) refers to movement of ionic
charge in the oxide passivation.
The upper boundary (B) applies to
the desorption of metal from the
silicon. Some failure mechanisms
are not temperature dependent and
are referred to have a higher slope than those shown by slope B.

7. There is very little metal between the bonding pad and the end of the bale
of the device shown by this cross-
section. Thus the expected difficulty in inspecting separation between
metallic contacts is significantly
more common in microwave compo-
nents. The SEM or high magnification
optics are required for adequate in-
pection.

Defining Quality Limits and Lot Tolerance
For each scientific sampling plan, such as those in MIL-STD-105,
a curve can be drawn to show the sampling plan's ability to dif-
ferentiate between accepting and rejecting lots where percentage
of defective units may vary over a range of percent defective. The
curve is the operating characteristic of the sampling plan. The
OC curve is a plot of the probability that the sampling plan will give an
acceptance decision for production lots where the percent defective is
within the range of the curve. An example of the curve for a sample-
ing plan follows with the AQL and LTPD points shown in the ac-
companying graph. AQL stands for "acceptable quality limit,"
and LTPD stands for lot tolerance percent defective." These represent
the qualified limits which were at either end of the sampling plan
curve.

AQL is the value of percent defective which instructs the curve at
the 95 percent acceptance point. (The 95 percent is not firmly fixed and
varies from what many plans specify. It is a generally used value
described by AQL, however; it means that percent defective
at or below the AQL value will be accepted by sampling almost all of
the time. Quality worse than the AQL will have a poor chance of being
accepted. It is used as a limit which indicates the quality levels
a manufacturer must maintain in order to have most of his lots go through the process without rejection. If quality gets
worse than the AQL, the manufacturer will get more lots returned for
workmanship.

The LTPD point is the percent defective which has only a 10 per-
cent chance of being accepted. Plans designed as LTPD sampling
plans are intended to fix at 10 percent a top limit for poor quality.
In the example, lots with more than 5 percent defective devices would
be less than 10 percent of the time and rejected over 90
percent of the time. When reliability is the objective, a poor lot cannot
be tolerated. Since an LTPD plan minimizes the possibility of a very
poor lot being accepted, it is frequently used and reliable for work.

Reprinted from MSN, November 1977

Interesting Items
Women in the Sciences
A study of the professional status of male and female members of
the Academy of Management found that women members appeared
to perceive and experience a less favorable professional environment
than their male counterparts. Male respondents perceived a significantly
more positive university enrollment for women members of the Academy than
do the female respondents. Male respondents reported a significantly
higher monetary income than females. There was too much money in
the reported ages. For women, the average salary was 76.100
per cent of the lower end of the ($40,000 to $100,000 range while men
within the upper end of the ($40,000 to $100,000 range.

NSF Rotator Program Seeks Minorities and Women
The National Science Foundation seeks to increase representation of
minorities and handicapped persons in roto-
tor programs. This program is designed to augment the permanent staff
of scientists and other professional employees at NSF with faculty
members of colleges and universities who will serve in non-career
positions for a period of one to two years. Scientists with a Ph.D plus
six years of scientific research are particularly welcome. The applica-
tions deadline is September 1, 1977. Interested persons should send
solicited statements of interest to Herbert Harrington, Jr., Director,
Office of Minority Programs, National Science Foun-
dation, Room 536, 1800 G Street, N.W., Washington, D.C. 20550

Women Do Better In Washington
Women in Washington, D.C. are more likely to be working, and
working full-time than are women in other parts of the country, but
the female earnings gap is wider there than elsewhere. In the
Washington, D.C. area, the average salary for a woman with a collar
worker is $12,742, compared to $18,882 for men. Women scientists face the same problems as other women in their ef-
tort to move upward, and a female scientist is likely to be in
several groups, the higher the credentials for women, the wider the gap
between them and similarly qualified men.

NEW IEEE Newsletter, "Women Engineering Students"
The purpose of this newsletter is to serve the special interests of
women engineering students on college campuses in the United States,
Articles for and about women engineers, both students and
professionals, are featured.

In its second year of publication is The Women Engineering Students' Newsletter, sponsored by IEEE's Committee on Profes-
sionals Opportunities and Women. The newsletter contains news of the professional organization WISE (Women in Science and Engineering), of the special interests of technical-minded women, and of courses, workshops, conferences, and books for and about women engineers and
engineering students. Also in this Spring issue are accounts of the personal experiences of two women, one a graduate student
in nuclear engineering and one an instrument engineer, who attended the Detroit Diesel Allison Division of General Motors. Violet P. Haus is

Women in Science Program
The National Science Foundation (NSF) has made 34 awards
totaling $607,640 for projects designed to increase participation by
women in scientific careers. Women presently constitute 51 percent
of the population, but only 10 percent of those employed in science
and engineering.

Projects made through the NSF's Women in Science Program,
are for two types of projects aimed at developing and testing curriculums and teaching techniques to encourage the participation
of women in sciences. Included is $229,330 for 24 Science Career Workshops in 18 States and nearly $467,350 for 30 Science Center Facilica-

tion Projects in 7 States.

Women Ph.D. Scientists/Engineers Not Faring As Well As Men
Women Ph.D.s in science and engineering continue to make less
money and find themselves in unsuitable and lower status careers. There are the central findings of two recent National
Research Council reports.

According to the 1975 report, the median annual salary for all
women and white doctoral scientists was $23,000, with engineers earning the highest median salary -- $25,000. The median
salary for men was $32,000, while the median for women was only
$19,000. Female doctors working in private practice earned a
median salary was about $21,000 over what was done for $25,000 for male nurses.

The 1975 profile also indicated the unemployment rate among
female scientists and engineers Ph.D.'s is significantly higher than for
men: 3.0 percent for women, 0.8 percent for men. The percen-
tage of women who were employed part-time and seeking full-
time employment in 1975 was 2.4 percent compared to 0.5 percent for men: in 1975 the percentage of women was 5.5 percent and 0.7 per-
cent for men.

Women Academic Scientists and Engineers Increase in 1976
The number of women employed full time as scientists and

engineers by universities and colleges reached 35,900 in January 1976. This was the second consecutive year that their numbers had increased by 5 percent. Men, still far outnumbering women, totaled 194,000 in 1976, but their rate of increase was only 2 percent in each of the last two years.

These data resulted from NSF's 1976 Survey of Scientific and Engineering Degree Recipients from Universities and Colleges. Despite the higher growth rate of women, there has been little change in their share of the full-time science and engineering enrollment from 15 percent in 1974 to 17 percent in 1976 and 1978.

Aerospace Employment Levels Off

U. S. aerospace industry employment will stabilize at approximately 89,000 workers by June 1977, according to a survey by the Aerospace Industries Association. This forecast is based on the assumption that a major reorganization and downsizing will end a major decline which peaked in 1973 at 196,000, and at 105,000 in 1976. The aerospace manufacturing segment will show a decline in employment, but by June 1977 it will employ 37,000, down 27 percent from December 1975. The primary reason for the decline is the productivity improvements that have been achieved during the last two years.

Writing As It Should Be With or Rules Of The Game

1. Each pronoun agrees with its antecedent.  
2. Just between you and I, use is important.  
3. Variable changes in the Regional representation of the Board of Directors, so there will be seven geographical regions, one in each region. 
4. Watch out for irregular verbs which have come into our language.  
5. Don't use double negatives.  
6. Look for consistent use of your.  
7. When dangling, don't use participles.  
8. Avoid using passive voice as much as possible.  
9. Don't write a run-on sentence get you punctuation.  
10. About sentence fragments.  
11. In the themes report articles and stuff that we use common to keep a string of items apart.  
12. Don't use more than two commas in the subjects of sentences.  
13. In its important to use apostrophes right.  
14. Don't abbrev.  
15. Check to see if you say any words out.  
16. In my opinion think that an author when he is writing should get into the habit of making use of too many unnecessary words that he does not really need.  
17. Just put by rare, lay off cliches.  

Knowing the Missing Member

Are you the missing member? The kind who would have liked to get involved and mingle. If you didn't have to fight Through forty miles of traffic We'd be at the place. To meet at some far outpost The problems that are inside? After eight long hours of working On committees, schedules, table. It's hard to have an active part If you're too "pooped" to walk? You need to compromise But feel way down somewhere Is "ain't" right for you Say you didn't really care. So think it over members. It is really fair to do To locate every meeting place Where some can't come at all.
antibody. If the "scores" for the various alternatives are such that it is unclear which should be chosen, i.e., there is ambiguity on one or both of these criteria, we are in a situation where decision making is quite limited. While I agree that great decision makers to some extent, and experience and confidence will usually let us know, we cannot give up on the idea that we can improve our decision processes, we could obtain no better advice - based on many research studies - than that more people need to be trained or that we need to take more courses about how to improve our decision making is quite limited. While, in general, we are not the decision makers to be valued, a need for help does increase our ability to predict outcomes. It also shows that there is a need for more specific training. First, to know that the alternative that I think is the last, and then the alternative that I don't think that the alternative that I think is the last, is "the lead," and that we don't need to do anything else. We only need to understand that one alternative is the best of the best. We need to attempt to do, within the bounds of ethics, good taste, and the limits of our future relationships and to get what we are due to cause the decision process to close up.

1. Relation Between Context and Various Decisions

When decision makers use information, they do not use it uniformly. Some information is used in a different way or as a different decision is made. This is true. The information that is used, is used as a different context is made. We can assume that, in all cases, the results are obviously the same. The results are obviously the same. The results are obviously the same. If the results are obviously the same, the results are obviously the same.

The case, that is weighted in part by the ambiguity associated with the relevance and importance of various elements of organizational politics in decision making, so it seems time to turn our attention to the question of why.

4. The Influence and Importance of Powerful Persons

We all know situations where what seems to be the best solution on technical or economic grounds is later found to be bad for political reasons.16,17 We are all aware of cases where the technical and economic solutions seem to be consistent with the political or social preference of the decision makers. In spite of these things, it is important to realize that there is no clear way of knowing when or how a decision will be influenced by the individuals who are in a position to make decisions. It is important to realize that there is no clear way of knowing when or how a decision will be influenced by the individuals who are in a position to make decisions.


Conferees

1978 Annual Reliability and Maintainability Symposium
January 17-19, 1978, Los Angeles, California

Contact:
U.S. Ortean
450 Connecticut Ave, N.W.
Washington, D.C. 20008

The program will feature the following:

MANAGEMENT

Managers' Views of RAM

The opening session of the Symposium will bring together the Symposium Advisory Board - top level managers from government and industry - who will comment on the importance of the RAM Community to the needs of top management. The panel will be encouraged to discuss successes and failures of the community and to indicate how assurance practitioners might better serve the needs of management.

Continuing with this topic, the Tuesday evening session will provide a unique opportunity for dialogue between the practitioners and Program managers. Distinguished from the usual, nightly technical session in which assurance practitioners talk to each other, speakers at this session will be nominated from military and commercial organizations. They will discuss the impacts of the assurance technologies on their programs, describe associated problems and deficiencies from their perspective, and suggest methods for improving the interplay between the manager and the assurance community. Discussion between the audience and the panel will be encouraged.

MOTIVATION

Several sessions have been arranged to treat approaches and factors that motivate RAM achievement. Special attention will be given to actual experiences in the use of various techniques. Included will be:

Life Cycle Cost (LCC)

This year's LCC session will review the application and implementation of LCC policies. Contractor experiences will be examined and analyzed and the effects of such factors as maintainability and logistics on LCC will be considered.

Reliability Improvement Strategies (RIS)

The RIS session will emphasize actual experience with the concept. Board Air Force experience with warranty procurements will be discussed in one paper, while another will document a case history of a TACAN RIS implementation. Long-term warranty contracts and data reporting requirements will be the topic of other papers.

Product Liability

Several examples of liability issues will focus on the specific circumstances, the legal issues involved, and the outcome of the litigation. A wide range of product types will be covered in the several papers.

METHODS

Reliability Theory

Five recognized experts from the faculties of major universities will examine the mathematical theory of concern to the assurance technology. Particular stress will be placed on mathematical concepts and approaches whose application can be of significant value to the assurance community.

Conference Calendar

Mar. 15-17 Simulation Symposium (13th)
Tampa, Florida

Mar. 20-24 Subscriber Loop and Services Inc. Symposium
Georgia Tech
Sheraton Bilmore
Atlanta, Georgia

Mar. 21-23 Industrial Applications of Microprocessors
Sharon
Philadelphia, Pennsylvania

Mar. 22-24 Vehicle Technology Conference
The Regency Hotel
Denver, Colorado

College of Engineering
University of Rhode Island
Kingston, Rhode Island

Apr. 3-5 Computer Architectures Symposium (18th)
Ricky's Rainier House
Palo Alto, California

Apr. 4-5 Rubber and Plastic Industry Tech. Conference
Akron, Ohio

Apr. 6-8 Private Electronic Switching Systems Inc.
IEE, London, England

Apr. 10-12 Annexes, Speech and Signal Processing
Carnegie Inst.
Tel-Aviv, Israel

Apr. 10-12 SOUTHEASTCON
Atlanta, Georgia

Apr. 11-13 Joint RailTech. Conference
Radisson Street
St. Paul, Minnesota

Apr. 12-14 Electronics in Resource Management (Region 6)
Hollywood Inn
Albuquerque, New Mexico

Apr. 12-14 Pattern Recognition and Artificial Intelligence
NASA Inst.
Ft. Belvoir, VA

Jan. 18-19 Integrated and Guided Wave Optics
Salt Lake Hilton
Salt Lake City, Utah

Jan. 24-26 Reliability and Maintainability
The Biltmore
Los Angeles, California

Jan. 29- Feb. 3 Power Engineering Society Winter Meeting
Stapler Hilton
New York City

Feb. 2-3 4th Joint College Curricula Workshop in Computer
Science and Engineering
Orlando, Florida

SHORT COURSES

Detroit Research Institute Short Courses

Problems in Reliability Testing
Soutghfield, Michigan, February 21-22, 1978

Product Reliability - Introduction to Weibull Analysis
Chicago, Illinois, March 6-8, 1978

George Washington University Short Courses

Introduction to Fault Free Analysis
Washington, D.C., January 30-February 3, 1978

Statistical Methods in Reliability: Application of Recent Development to Reliability Problems
Washington, D.C., January 30-February 3, 1978

Air Pollution Control Equipment Operation and Maintenance

Contact: Director, Continuing Engineering Education
George Washington University
Washington, D.C. 20052
(202) 994-6536

Technology Applications Laboratory, Seventh International Workshop, San Jose, California, March 6-10, 1978

Contact: L.B. Webster, Technology Applications Laboratory
3876 Highway A1A
Suntique Beach, Florida 32977
(305) 777-1400

14
<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Location</th>
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<tbody>
<tr>
<td>Feb. 7-9</td>
<td>Laser and Electro-Optical Systems II</td>
<td>Town and Country Hotel</td>
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<tr>
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<td>San Diego, California</td>
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<tr>
<td>Feb. 13-15</td>
<td>Aerospace and Electronic Systems Winter Convention (WINCON)</td>
<td>Los Angeles, California</td>
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<td>Feb. 15-17</td>
<td>Int'l Solid-State Circuit Conference</td>
<td>Hilton</td>
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<td>San Francisco, California</td>
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<tr>
<td>Feb. 28-</td>
<td>Compton Spring</td>
<td>San Francisco, California</td>
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<td>Mar. 2</td>
<td>Control of Power Systems</td>
<td>Lincoln Plaza Hotel</td>
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<td>Mar. 1-3</td>
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<td>Oklahoma City, Oklahoma</td>
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<td>Apr. 16-18</td>
<td>Region V Conference &quot;Energy '78&quot;</td>
<td>Camelot Inn</td>
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<td>Tulsa, Oklahoma</td>
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<tr>
<td>Apr. 18-20</td>
<td>Internati'l Reliability Physics Symposium</td>
<td>Town and Country Hotel</td>
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<td>San Diego, California</td>
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<td>Apr. 20-21</td>
<td>Textile Industry Tech. Conference</td>
<td>Atlanta Hilton Hotel</td>
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<td>255 Courtland and Harris St.</td>
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<td>Atlanta, Georgia</td>
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<td>Apr. 24-26</td>
<td>Electronic Components</td>
<td>Disneyland, Anaheim, California</td>
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<td>May 3-5</td>
<td>Pulp and Paper Industry Tech. Conference</td>
<td>Atlanta Hilton Hotel</td>
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<td>Atlanta, Georgia</td>
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<td>May 8-11</td>
<td>Offshore Technology</td>
<td>Houston, Texas</td>
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<td>May 9-11</td>
<td>Cleveland Electrical-Electronics Conference and Exposition</td>
<td>Cleveland Convention Center</td>
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<td>25th Silver Anniversary</td>
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<td>May 9-12</td>
<td>Intermag (International Magnetics Conference)</td>
<td>Palazzo dei Congressi</td>
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<td>Florence, Italy</td>
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<td>May 10-12</td>
<td>Conference on Software Engineering</td>
<td>Hyatt Regency Hotel</td>
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<td>Atlanta, Georgia</td>
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<td>May 15-18</td>
<td>Cement Industry Tech. Conference</td>
<td>Hotel Roanoke</td>
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<td>Roanoke, Virginia</td>
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<td>May 15-18</td>
<td>Plasma Science Intern'l</td>
<td>Asilomar</td>
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<td>Monterey, California</td>
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<td>May 15-19</td>
<td>International IEEE/AP Symposium and USNC/URSI Mtg.</td>
<td>Adult Education Center</td>
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<td>University of Maryland</td>
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<td>College Park, Maryland</td>
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<tr>
<td>May 16-18</td>
<td>Aerospace and Electronics Conference (NAECON)</td>
<td>Dayton Convention Center</td>
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<td>Dayton, Ohio</td>
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<td>May 17-19</td>
<td>Circuits and Systems Intern'l Symposium</td>
<td>Roosevelt Hotel</td>
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<td>New York, N.Y.</td>
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<td>May 17-19</td>
<td>1978 Carnahan Conference on Crime Countermeasure</td>
<td>Carnahan House</td>
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<td>Lexington, Kentucky</td>
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<td>May 23-25</td>
<td>Electro/78</td>
<td>Boston-Sheraton</td>
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<td>Hynes Auditorium</td>
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<td>Boston, Massachusetts</td>
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<td>May 24-26</td>
<td>Symposium on Multiple-Value Logic</td>
<td>Chicago, Illinois</td>
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<td>May 29-</td>
<td>Intern'l Quantum Electric Conference (10th)</td>
<td>Atlantic, Georgia</td>
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<td>June 1</td>
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<td>June*</td>
<td>Power Electronics Specialist Conference</td>
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<td>June*</td>
<td>Recent Advances and Future Trends in Magnetic Discs</td>
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<td>June 4-7</td>
<td>International Conference on Communications</td>
<td>Sheraton Hotel</td>
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<td>Toronto, Ontario, Canada</td>
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<td>June 5-8</td>
<td>Industrial Power Systems Dept. Conference</td>
<td>Stouffer's</td>
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<td>Cincinnati, Ohio</td>
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<tr>
<td>June 5-8</td>
<td>National Computer Conference</td>
<td>Anaheim Convention Center</td>
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<td>The Disneyland Hotel Comp.</td>
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<td>Anaheim, California</td>
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<td>June 5-8</td>
<td>13th Photovoltaic Spec. Conference</td>
<td>Shoreham Americana Hotel</td>
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<td>Washington, D.C.</td>
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<td>June 12-14</td>
<td>Intern'l Symposium on Electrical Insulation</td>
<td>Marriott Hotel</td>
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<td>Philadelphia, Pennsylvania</td>
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<td>June 20-22</td>
<td>Intern'l Symposium on Electromagnetic Compatibility</td>
<td>Sheraton-Biltmore Hotel</td>
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<td>June 21-23</td>
<td>Fault Tolerant Computing</td>
<td>Toulouse, France</td>
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<td>June 21-23</td>
<td>Machine Processing of Remotely Sensed Data</td>
<td>West Lafayette, Indiana</td>
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<td>June 26-28</td>
<td>Design Automation Symposium</td>
<td>Las Vegas, Nevada</td>
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<td>June 26-29</td>
<td>Conference on Precision Electromagnetic Measure</td>
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<td>Ottawa, Ontario, Canada</td>
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<td>June 27-29</td>
<td>International Microwave Symposium</td>
<td>Chateau Laurier</td>
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<td>Ottawa, Ontario, Canada</td>
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<td>July*</td>
<td>Nuclear and Space Radiation Effects Conference</td>
<td>University of New Mexico</td>
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<td>Albuquerque, New Mexico</td>
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<tr>
<td>July 16-21</td>
<td>Power Engineering Society Summer Meeting</td>
<td>Los Angeles, California</td>
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