

The Institute of Electrical and Electronics Engineers Inc.

Hyderabad Section



L to R: Sasmith I. Reddy, Ch. V. Narasimha Rao
of IEEE Student Branch-Tirupati. Winners of
Vincent Bendix Award for 1988-89
(See Pages 2 & 3)

NEWSLETTER

Vol. 3, No. 1, April 1989

About the IEEE

The Institute of Electrical and Electronics Engineers, Inc. (IEEE) is a transnational organization with over a quarter million member in 137 countries. The world's largest engineering society, its objectives are technical, professionals and societal.

The IEEE's technical objectives center on advancing the theory and practice of electrical, electronics, and computer engineering and computer science. To meet these objectives, it sponsors conferences and meetings, publishes a wide range of professional papers and provides educational programs. In addition, the Institute works to advance the professional standing of its members. It also has a mandate to enhance the quality of life for all people through the application of its technologies, and to promote a better understanding of the influence of these technologies on the public welfare.

Today, the IEEE is a leading authority in areas ranging from aerospace, computers and communications to biomedical technology, electric power and consumer electronics. When it began its second century in 1984, it rededicated itself to innovation, excellence, the exchange of information and the quest for improved education. In so doing, it underscores the initials IEEE.

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CHAIRMAN'S COLUMN



We engineers need continuous life long educational opportunities, better work environment and pleasant fellowship. We joined IEEE and formed a Section of IEEE at Hyderabad with a hope to fulfil the above

needs. In the recent Annual General Meeting of the Section we have set forth several plans to increase the activities for our professional development and advancement. Buying a hall at Ranigunj and building it up for our office and meetings, Library of Video tapes, IEEE Books/Journals, IEEE standards is our first priority. The goal is to make available to members more educational material, short application oriented lectures/courses. This involves identification of topics/suppliers/experts and distinguished lecturers and organising their delivery. The student members and student branches need our support in arranging industrial tours, unpaid industrial training in summer vacations, and members undertaking visits to colleges for giving lectures.

The successful implementation of these plans depends on the availability of several enthusiastic volunteers from

amongst us. Volunteers are required to look after:

- 1) Educational Activities
- 2) Student Branches
- 3) Newsletter and other Publications
- 4) Programme Organisation and
- 5) Membership Development.

We can work together to improve the quality of your activities and help to create new ones, where possible. You help the Section to help you for your and our professional development and advancement. If you can work as an IEEE volunteer, please write to me. I wish to hear from you soon indicating which function you wish to take up. Any ideas, suggestions or success stories you can share would be greatly appreciated.

The IEEE President and the IEEE Region 10 Director are planning to visit our Section in 1989. The IEEE Headquarters and Region 10 have several useful programmes resources for our benefit. If we have any project which benefits the members, Headquarters and Region 10 are willing to support the project financially if we show our contribution and commitment.

C. Satish

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THE INSTITUTE OF
ELECTRICAL AND
ELECTRONICS
ENGINEERS, INC.

VINCENT BENDIX AWARD OF ALLIED CORPORATION

is presented to
the
IEEE Student Branch
at

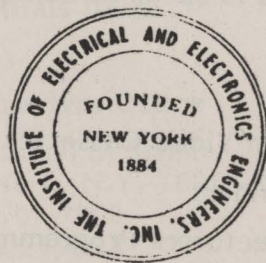
Sri Venkateswara University-Tirupati

in recognition of
its outstanding project proposal
entitled

Microprocessor Based 3KV- Surge Comparison Tester Portable Type

during the year

1988 - 89



Anderson W. Pugh
President

MICROPROCESSOR BASED 3KV SURGE

Tester-Portable Type

PROJECT PROPOSAL SUBMITTED

By

Ch. V. NARASIMHA RAO

SASMITH I. REDDI

ABSTRACT

In the highly competitive industrial world today, manufacturers give top priority to the standardisation of their product. For the manufacturers of transformers, motors or any type of windings, a Surge Comparison Tester (SCT) is the one best suited for this job, since it can detect and helps to locate turn-to-turn, coil-to-coil and phase-to-phase short circuit, open circuit, grounding, weak insulation and also reversed coil connections. In this project a μP is used to modernise the SCT to give a "Go-NoGo" declaration for the coil under test. The basic principle here is that a capacitor is charged to a very high voltage and is discharged simultaneously into a standard as well as test coil. The responses of these, for this surge input, are monitored with the help of a CRT. There will be a distinctive difference between the responses for different types of faults.

As the surge is of a very high voltage, each and every turn of the coil will be stressed to the maximum extent, thus effecting effective testing. But there will be no harmful effects for the coil due to this high voltage as the average power dissipated is very low, because of the very short duration of the surge pulse (10 to 300 μS).

But the conventional model is having its own limitations. One is because of fixed rate of application of surge due to which there will be some problems

while testing low inductance coils, low rating as well as high rating coils. This problem can be eliminated by changing the rate of application of the surge, which can be achieved by using a micro-processor.

The other problem is that to operate this a skilled person is necessary. To eliminate this problem the responses of the standard as well as test coils are stored in the μP , compared and a "Yes-No" signal is given out.

The major part of this project lies in storing the surge waveforms in μP . To convert this, microsecond and high transient bandwidth analog waveform, into digital mode needs superfast S/H amplifier, ADC's and a ultrafast μP . This makes the whole system highly uneconomical and impractical.

To eliminate this problem a different method is adopted where only one sample per cycle is taken. Since the cycle frequency is equal to the surge frequency (25Hz), taking a sample for every 40ms ($t=1/25 S$) does not require any sophisticated S/H amplifiers or ADC's. The next sample will be taken in the next cycle and it will be shifted by a finite amount of time from the previous one using a "timer". This is the method that is generally used in ultraspeed processors.

With the above modification the system becomes more reliable, compact and weildly, much to the convenience of the user.



NEWS RELEASE

THE INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC.

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FOR IMMEDIATE RELEASE

IEEE TOPS 300,000 MARK IN TOTAL MEMBERSHIP

Institute is World's Largest Technical Professional Organization

NEW YORK, NY, January 20: The Institute of Electrical and Electronics Engineers, Inc. (IEEE) has surpassed the 300,000 member mark. According to IEEE 1988 President Dr. Russell C. Drew, the Institute's membership as of December 9, 1988 stood at 300,226--more than twice the size of the next largest engineering society. The IEEE, with headquarters at the United Engineering Center in New York City, is a transnational organization with members in more than 130 countries involved in advancing the theory and practice of electrical, electronics and computer engineering, computer science and related arts and sciences.

"Surpassing the 300,000 level in total membership marks a major milestone for the IEEE," said Dr. Drew. "Since the formation of the IEEE in 1963 from the merger of the American Institute of Electrical Engineers and the Institute of Radio Engineers, IEEE membership has grown from 154,500 to the present level, effectively doubling during the past 25 years. During this time, the Institute has added almost 146,000 new members to its rolls, a figure surpassing the size of the next largest professional engineering society. This growth underscores the vitality of the organization and the success we have achieved in serving our profession and in meeting the needs of our individual members."

-more-

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WASHINGTON, D.C. • 1111 NINETEENTH STREET, N.W. 20036

IEEE/Surpasses 300,000 Membership Mark pg.2

Of its approximately 300,000 members, some 252,000 hold higher grade memberships while 48,000 are students who attend some 600 educational institutions throughout the world. Reflecting its transnational nature, 63,000 IEEE members reside outside of the United States.

The 300,000th member of the IEEE has been identified as Susan Rudy Sanicky of San Jose, California. Ms. Sanicky has a bachelor of science degree in electrical engineering from the University of California at Davis, and she is currently a senior engineer/manager at IBM following 16 years of professional practice. In addition to her Institute membership, she has also elected to join the IEEE Circuits and Systems Society.

To meet its objectives worldwide, the IEEE sponsors conferences and meetings, publishes a wide range of professional papers and provides educational programs. In addition, the Institute works to advance the professional standing of its members and carries out a voluntary standards program with some 600 published standards affecting all aspects of the electrical, electronics and computer industries. It also has a mandate to enhance the quality of life for all people through the application of its technologies, and to promote a better understanding of the influence of these technologies on the public welfare.

According to Dr. Drew, the growth of the IEEE has paralleled the pervasiveness of electrotechnology which now undergirds the economies of many of the developed nations. Reflecting this scope, the Institute has 36 individual Societies active at the cutting edge of technology in areas ranging from aerospace, computers and communications to biomedical technology, electric power and consumer electronics.

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MEETINGS ON TOPICS OF INTEREST TO ENGINEERS

1. Tenth Professor K. K. Nair commemoration lecture was given by Mr. U.D.N. Rao, C & M.D. of I.T.I. Bangalore on 18.1.89 at Osmania University, Hyderabad. He spoke on "Current Challenges before Indian Engineers". Mr. Rao told that India is not progressing as much as it should have in technology though it has good brains. In the last few decades the gap between India and other countries increased. Some of the views of Mr. Rao in the lecture are as follows:

Theory and practice must go hand in hand. To reduce production costs, Indian Industry has to use new tools like CAD/CAE. Automation is necessary. Glamour of imported goods must be removed. Imported technology has to be adapted to suit our conditions. The productivity of Indian Labour is as good as that of any other country. If a person says something can't be done, the people think that person is experienced. Whereas if he says it can be done, he is considered a crazy person. Often innovative ideas appear crazy. Innovation and technology can be the keys to India's development. Only 20% of the projects in Bell Labs are successful. If the percentage is more, it is thought projects are not innovative enough. The talent of Indian Engineers abroad is put to good use. But engineers in India though equally talented are not able to show good performance as in India we don't have the technological environment/infrastructure. Mr. Rao concluded his talk stating that Information Technology is going to be the major business in India in the next decade and asked the enterprising engineers to exploit the opportunities.

2. The 1989 C.C. Desai Memorial lecture was delivered by Professor Alex Inkles, Stanford University on 2.2.89 at the Administrative Staff College of India, Hyderabad. The title of the talk was "Modernisation in India and other developing countries. He has talked

of several characteristics of modernisation of any individual or organisation. These are:

- 1) Place value on education of self and family.
- 2) High opinion of science and technology.
- 3) Interested to get information (news on economic management of the country).
- 4) Political participation.
- 5) Relatively ambitious.
- 6) Stress individual responsibility, seek solution by self.
- 7) Planning of life and work.
- 8) Oriented to change, new experiences, new ways of doing.
- 9) Approach to authority (flexible, respectful but not submissive).
- 10) Self correcting.

Professor Inkles said India has problems for example in education particularly in Science & Technology in schools and factories. A common test was put to children in India and in the West to measure the basic knowledge of Science & Technology. Maximum marks are 40.

Performance Result

10 Year Old Boys:	West 17
	India 8 1/2
14 Year Old Boys:	West 22
	India 8 1/2

While there is a hue and cry over the declining knowledge in the U.S. boys vis-a-vis Japanese and European boys, we in India are quite complacent as far as education of Science & Technology is concerned. Japan recognised the importance of education 25 years ago when its Economic Council declared "Economic competition among nations is a technical competition, and technical competition has become an educational competition. The same commitment to education is shown in Europe, Soviet Union, South Korea and Singapore. There seems to be a positive correlation between education and manufacturing

productivity. Mr. Palkiwala in his speech on the budget in March 1989 indicated that only less than 2% of the total budgetary expenditure is spent on education. The literacy rate in South Korea is said to be 98% while in India it is around 35% only.

3. The 1989 Sarojini Naidu Memorial lecture was given by Dr. P.M. Bhargava, noted Biologist Director CCMB Hyderabad on 9.3.89 at the University of Hyderabad. The title of his lecture was "India, Indians and Science". Mr. Bhargava described India as a land of Contradictions. There is no uniformity in any facet of India's culture and history. In no other country one sees so much diversity and variety. This, he said, affects the perception of science in India. Indians are amazingly tolerant. They remain suppressed. Hierarchical authority is respected. Their nature is fatalistic They can't work effectively as a group. But science requires group effort. In ancient India there was a

great desire to learn Maths, Chemistry, Medicine, Metallurgy etc. It was however empirical knowledge. Unlike in Europe, systematic effort to understand natural phenomenon was not made in India. This led to a confusion between fact and fiction. Intellectual spirit/tradition existed in Europe for over 5 countries. While in India it started only in the last 100 years by establishing universities and research labs. The causes for the failure of science in India is negligence of excellence and growth of mediocrity. We have to contain and reduce the mediocrity. Mr. Bhargava said the frustration of scientists living in India is more dangerous than the brain drain to outside countries. They are treated as daughters-in-law while the NRI scientists are treated as sons-in-law. Our science policy lacks professionalism. It is only cosmetic and adhoc in nature. Only lip sympathy is paid to our biggest problem - education. 97% of Indians have no access to suitable education.

IEEE PRESIDENT TO VISIT INDIA



Mr. Emerson W. Pugh, IEEE President is planning to visit **TENCON '89** at Bombay during 22-24 November 1989. He is also planning to visit Sections in India and Pakistan during November 1989. The Hyderabad Section has requested the Region 10 Director to include Hyderabad in the President's tour. Mr. Pugh held a number of positions at IBM including group Director of Operational Memory, and Research Manager of Exploratory magnetics. His IEEE Fellow citation is "for contributions to information storage technology for digital computers". Dr. Pugh received his Ph.D. in 1956 from Carnegie-Mellon University. He was the IEEE Magnetism Society President in 1973-74. He was a distinguished Lecturer of this society in 1980 and also of IEEE Computer Society in 1984-87. The topic of his Distinguished Lecturer Programme was "Technology Assessment" of competing I.C. technologies in memory devices.

MINUTES OF A.G.M. HELD ON 4-3-89

1. About 23 members participated (Names in the Attendance Register). The following decisions were taken after the Secretary & Treasurer's report. (1) It was announced that as there are no petition candidates, the panel suggested by the nomination committee is elected to various Section Office for 1989 as follows:

C. Satish, Chairman
D V S Raju, Vice Chairman
R B Iyengar, Secretary
B S Nagaraja, Treasurer.

2. It was suggested that the election and A.G.M may be held around Dec./Jan. The Section Executive Committee will try to follow the above suggestion which is also there in the Section Bylaws.

3. IEEE President Emerson Pugh is planning to visit Bombay in Nov. 89. He is to visit a few Sections in India then. The Section Chairman will request Region 10 Director to arrange for the inclusion of Hyderabad Section in the President's tour preferably on a weekend.

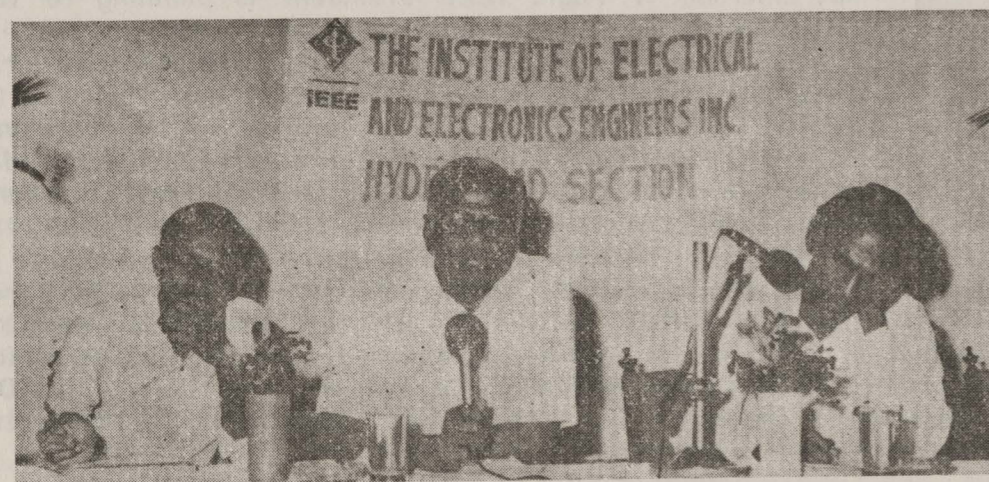
4. We must try to have some of the continuing education courses hereafter by engineers practising in industry who have application experience. The topics will be more practical and fundamental in nature. Industrial tours can be explored.

Members will be encouraged/supported to lecture at various student branches.

5. A hall at Al Karim Trade Centre (6th floor) Ranigunj will be purchased as the legal opinion is favourable for purchase. It is likely to cost about Rs. 1.5 lakhs. Members approved this step and felt that an identity and address is useful and necessary.

6. The Section can now implement the video library at the hall in Ranigunj. The video presentations will be available between 6 p.m. and 9 p.m. on Wednesday and between 2 p.m. and 5 p.m. on Sunday. Non members can charged for these programs. Efforts are to be made to share the tapes with other Sections to increase the topics at an affordable price to all. BBC, Open University, industries etc., are also likely to supply video courses. Members can identify the sources & titles and inform the Section officers. The selection must be based on practical utility and less academic. EPRI was cited as one more source if we can somehow manage to get them at a concessional rate. The video tapes will be circulated to student branches.

C. Satish
Chairman



L to R: B S Nagaraja, Treasurer; D V S Raju, Vice Chairman; C. Satish, Chairman, on the A.G.M. on 4-3-89

SECRETARY'S REPORT FOR THE A.G.M.

The last A.G.M. was held on February 20, 1988 and was attended by 13 members. The activities of the section for the past year are hereby highlighted.

- 1) Brain Drain - A Lecture by Professor M. Vidyasagar, Fellow IEEE, Canada February 20, 1988.
- 2) Seminar on Energy Conversion Systems - Speaker Prof. H.K. Messerle Fellow of IEEE, Australia, March 15, 1988.
- 3) Short Course on Computer Integrated Manufacturing - Dr. N. Viswanatham, IISC, Bangalore. Dr. N. Vidyasagar, University of Waterloo, Canada, April 13/14, 1988.
- 4) Lecture on A.I. and Expert Systems - Professor M. Vidyasagar, April 14, 1988.
- 5) Video Tutorial on A.I. Application in Manufacturing April 30, 1988.
- 6) Lecture on Artificial Neural Networks - An Introduction - Prof. Vemuri, University of California, July 02, 1988.

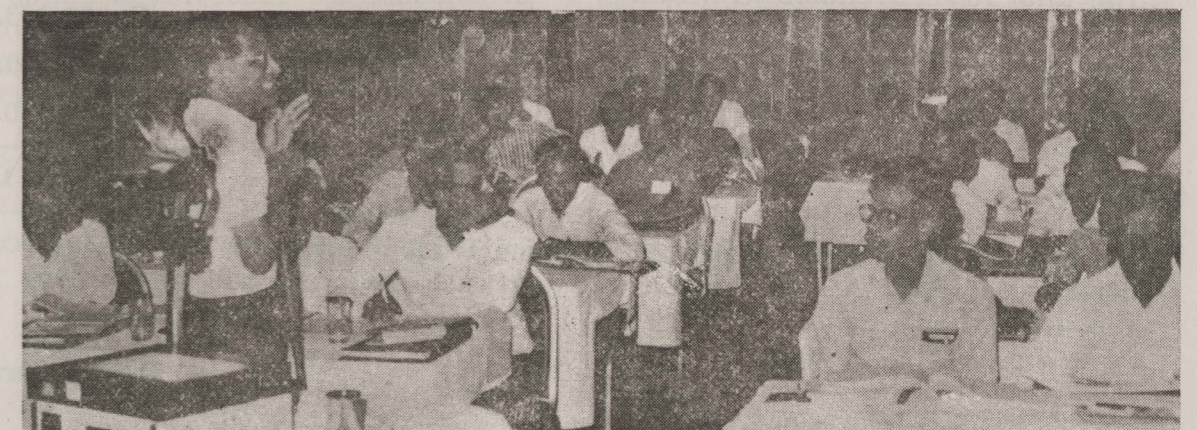
- 7) Short Courses on Local Area Networks and Neural Networks - Prof. Vemuri, University of California, July 02/04, 1988.
- 8) Lecture on Motion in Imaging Sequences by Dr. J.K. Sethi Detriot, August 18, 1988.
- 9) Lecture on Advance in Computer Vision Prof. Rama Chellappa, Los Angeles, December 17, 1988.

During the executive committee meetings, we felt the need for a permanent address for the Section and have been investigating the possibility of acquiring a small office with facility of a small library and some technical video cassettes.

We invite participation from our members in an Information Sharing series of lectures from among ourselves. Our student branches at Warangal, Tirupati, Cuddapah and Hyderabad are all active and have bagged some IEEE awards.

We invite suggestions from members towards improving our functioning and request more participation in the lectures/seminars arranged by the Section.

R B Iyengar



Prof. V. Vemuri, Univ. of California, conducting the short course on Local Area Networks organised by the Section in July 1988

TREASURER'S REPORT TO THE A.G.M.

Dear Members,

The opening balance as on January 1, 1988 was **Rs. 1,04,121.** During the year following amount was the Income:

Grant received for Newsletter	Rs. 13,980.40
Rebate received from IEEE HQ	Rs. 31,113.70
Interest Accrued	Rs. 12,980.60
Course Fee and Registration	Rs. 34,650.00
(FOR THREE COURSES)	Total <u>Rs. 92,724.70</u>

Total expenditure for the year was **Rs. 48,194. 02** with the following breakup:

Meetings and Course Expenditure	Rs. 24,930.07
Office Expenses Including Newsletter	Rs. 16,514.95
Travel and Honorarium	Rs. 3,929.00
Purchase of Video Cassettes	Rs. 2,764.00
Bank Charges	Rs. 56.00

Following amount was invested in Fixed Deposits:

State Bank of India	Rs. 40,350.00
Indian Bank (1988)	Rs. 50,000.00
Cash on hand as on 31.12.88:	
Indian Bank SB 6561	Rs. 68.05
Indian Bank SB 6307	Rs. 12,128.00
State Bank of India SB 35	Rs. 80,007.68
	<u>Rs. 92,203.73</u>

The total funds available with us now is:

	Rs. 92,203.73
	Rs. 40,350.00
	Rs. 50,000.00
	<u>Rs. 1,82,553.73</u>

We propose to acquire a Hall in Alkarim Trade Centre, M. G. Road, Secunderabad in 1989. A major portion of our cash resources will be invested for this acquisition.

B.S. Nagaraja

STUDENT BRANCH ACTIVITIES

1) Cuddapah

On February 25, 1989 our branch conducted a Novel Competition called **TECHNI-QUEST '89** under the supervision of our Counsellor Mr. G. Ravindranath. In fact we made this programme as an annual feature. This programme is mainly meant for tapping the talents of students. There are four types of questions. They are:

- 1) General Science Quiz
- 2) Find the Name - It's a Game
- 3) Reason Out
- 4) Check your I.Q.

Each programme is different from the other and has separate rules to follow. We have conducted this competition yearwise and awarded one prize per year. We look forward for the help of Hyderabad Section, to conduct more and more programmes in future.

P. Nalini Mohan
Chairman

G. Sudheer
Secretary

REPORT OF S-PAC 1989

Tirupati

- 2) S-PAC, students professional awareness conference was conducted by IEEE student branch of SV University (87201) on Saturday, 28th January 1989. It was aimed to introduce the students to orient them in the profession they are to enter on graduating from Engineering Colleges of Andhra Pradesh. It consisted of five talks by experienced speakers on the following topics:

- 1) Career Growth in an Organisation:
S. Sundara Murthy, NLC, Neyveli.

- 2) Person A Versus Profession:
D.V.S. Raju, ELICO Pvt. Ltd., Hyd.
- 3) Social Effects of Technology:
C. Satish, IDPL, Hyderabad.
- 4) Entrepreneurship - An Overview:
Chelvan, APSFC, Tirupati.
- 5) Problems faced in the Field and Legislation Concerning Engineers:
P.V.M. Surya Prasad, Voltarc Electrodes Pvt. Ltd., Tirupati.
- 6) A.I. in Leprosy Diagnosis:
Major S. Ramakrishnan,
CMC Ltd, Secunderabad.

The S-PAC was most successful one. More than 200 students from different Engineering Colleges of Andhra Pradesh State of India participated. This conference was conducted mostly from the funds of SV University, Tirupati IEEE student branch. Certificates have been distributed to all the participants. Momentos were given to all the speakers.

3) Visakhapatnam

A petition signed by 55 student members of "Andhra University College of Engineering, Visakhapatnam" for the formation of an IEEE student branch in their college was forwarded in March 1989 to the IEEE Service Centre, USA. Professor G. Madhusudana Rao will be the branch Counsellor and Mr. S.V.R. Sudhakar will be the interim branch Chairman. The Hyderabad Section assures its full support to this branch.

C. Satish
Chairman

MEMBERS GO ABROAD ON FELLOWSHIPS ETC.

Dr. S. Parthasarathy, CMC, Secunderabad is now in Ecole des Mines de St Etienne, Dept. Strategie du Developpement, France on a Post-Doctoral Fellowship for One Year. Dr. D. Raghurami Reddy, College of Engineering, Tirupathi is offered a Research Fellowship at Lehrstuhl fur allgemeine and Theoretische Elektrotechnik, West Germany for One Year. He will work on two-dimensional digital signal processing. B. Narasimha Rao, a former member of our Section has immigrated to Australia. He is working in the Computer Network Services for the Australian Bureau of Statistics, Canberra.

Mr. Hayat M Khan, Quli Qutub Shah Government Polytechnic, Hyderabad went to Italy on a Government Scholarship for a 7 month (March-Oct 1988) "Technic" Level Course in Industrial Electronics. He was taught to read,

write and speak Italian language in the first two months. The technical training included:

- 1) Digital Electronics and Introduction to Microprocessors
- 2) General Electronics and
- 3) Industrial Electronics

Theory was supported by laboratory work and visits to Industry. The trainees were from Africa, Asia and Latin America. He found an Italian language teacher and a trainee from Africa practice "Yoga". Books on Indian Culture and Yoga were found at all bookshops in Italy. Italian Prime Minister Mr. Craxi is a devotee of our Satya Sai Baba of Puttaparthi. Mr. Khan says the weather was pleasant and beaches were very popular places to relax in Italy.

MEMBERS INVITED TO SPEAK AT COLLEGES

Student branches are asking Section Members to visit their colleges and give lectures to the students. To encourage the members, Section Executive Committee has decided to fund from 1989 the First Class Train or Bus Fare for the members who are willing and are invited by the student branches. The local hospitality expenses will also be reimbursed where it is not provided by the student branches. An amount will be earmarked for this programme in this year's Section Budget. Members are urged to undertake these tours. Those who are willing may give the topics with abstracts in brief and number of hours of the lecture or seminar to the Section Secretary. The interaction between working engineers and students will be mutually beneficial. Also getting away from daily routine and the chance to see Lord Venkateswara, the incomparable temple art museum at Tirupati, visiting the grandeur of Ramappa temple sculpture near Warangal or the Alampur temple sculpture and the idyllic forest air and greenery around Mahanandi near Kurnool will give tranquillity and aesthetic pleasure to you.

Dear Colleague.

I am undertaking a small survey to know the practising engineer's views on the needs and ways to keep current in their fields. I shall be thankful if you can spend a few minutes filling in the Questionnaire below and returning it to me by 22.5.89. The purpose of this survey is to see whether we should (and how to) strengthen the con-

tinuing education programmes in our part of the world. A somewhat similar survey was attempted by me in 1987. If you have answered it, you may answer the new points. Your support is greatly appreciated. Reply to me at 10-5-3/2/6, Masab Tank, Hyderabad-500 028.

C. Satish
Section Chairman

QUESTIONNAIRE

Your age: Years Qualification:

Nature of your work: Research/Design/Operation & Maintenance

- | | | |
|---|---|------------|
| 1) Is it necessary to keep technical current | () Essential () Helpful
() Unnecessary | |
| 2) Do you think you have adequate opportunities for keeping technically current. | () Yes () No | |
| 3) How do you stay current (give relative % weight) | | |
| | a) Learning from job assignments/projects | % |
| | b) Technical publications | % |
| | c) Continuing educational courses/tutorials (1 day to a few weeks) | % |
| | d) Self study courses | % |
| | e) Conferences & Lectures | % |
| | f) Product application seminars by suppliers | % |
| | | Total 100% |
| 4) On an average how many hours in a month you may be spending on (b+c+d+e) under item 3 above. | | |
| 5) If you are not taking any or sufficient continuing courses or other ways of keeping current is it because of | () Not enough time
() No good courses/programmes education
() Not needed for my promotion other
() Too expensive | |
| 6) What for do you need continuous education | () Learning new Technology
() Prepare for new job, or for doing the present job better
() Intellectual stimulation | |

- 7) Preferences of the subjects
- | | |
|------------------------------|---|
| a) Your technical speciality | % |
| b) Overview of your field | % |
| c) Project Management | % |
| d) General Management | % |
| <hr/> Total 100% | |
- 8) Effective continuing education courses can be organised for working Engineers by (give the order of preference)
- | | |
|-------------------------------------|--|
| a) Universities | |
| b) In-house training depts. | |
| c) Professional Societies like IEEE | |
- 9) Do you get employer's support and encouragement for keeping current in the form of _____
- | |
|--|
| () Reimbursement of the fees |
| () Promotion/Increments |
| () Reimbursement of your professional society membership fees |
- 10) Learning Format Preferred:
- | |
|----------------------------|
| () Live discussion |
| () Video courses |
| () Theoretical |
| () Application oriented |
| () Less than a week long |
| () Upto a couple of weeks |
| () Evening courses |
- 11) Suggest venues, timings, type of instructors and topics for the continuing education programmes like lectures, video presentations, short courses, refresher courses.

CONFERENCES

Date	Name of the Conference	Sponsors	Information Contact
22-24 Nov 1989	TENCON '89 at Bombay "Information Technologies for the 90's "	IEEE Region 10 and IEEE Bombay Section	K.J. Sheth Hakotronics (P) Ltd. Victoria Gardens Bombay 400 027
23-24 Nov 1989	International Conference on A.I. in Industry and Government at Hyderabad	Institute of Public Enterprise Hyderabad and University of Endinburg, U.K.	Director Institute of Public Enterprise O.U. Campus Hyderabad-500 007
5-8 Sept 1989	1989 International Conference on Image Processing Singapore	IEEE Singapore Section and National Uni- versity of Singapore	Dr. K. N. Ngan Department of E.E. National University of Singapore 10 Kent Ridge, Crescent Singapore 0511

IEEE PRESS BOOKS

IEEE Hyderabad Section Member Dr. B.E. Prasad is one of the Editors of

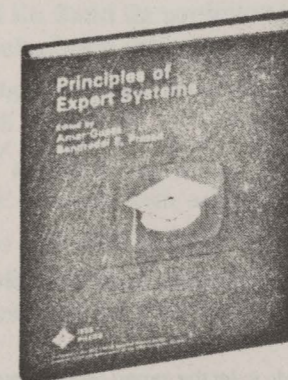
Two NEW Books on Expert Systems

Progress in the field of computer science continues to advance at a pace faster than in virtually any other field. Expert systems, which constitute a sub-field of computer science, are witnessing the fastest rate of growth in the area of microcomputer-based expert systems.

An emerging technology of the eighties, expert systems have surpassed the initial expectations of observers. Reality has proven that they are not only capable of providing coarse solutions, but also real solutions, meeting the standards of human experts. Already, there are a number of diverse applications, ranging from chess playing to mineral exploration, in which computer-based expert systems actually outperform their creators.

Expert systems are making an impact in practically all disciplines. PRINCIPLES OF EXPERT SYSTEMS and its companion volume, MICROCOMPUTER-BASED EXPERT SYSTEMS, consolidate a total of 75 research papers and specially written tutorial and transitional material to present a complete picture of what expert systems can and cannot do at this time.

Both volumes provide "must" reading for engineers, scientists, teachers and students interested in the design and implementation of expert systems within their areas of technical involvement.



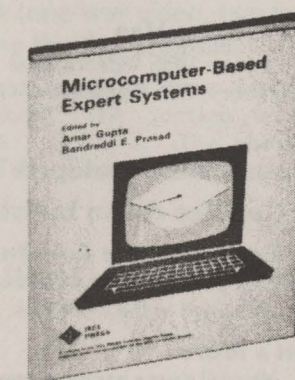
Principles of Expert Systems

Edited by Amar Gupta and Bandreddi E. Prasad, Sloan School of Management, M.I.T. 1988. 464 pages. ISBN—0-87942-220-3. A Book of Selected Reprints sponsored by the IEEE Computer Society.

PRINCIPLES OF EXPERT SYSTEMS focuses on the implementation of prototype systems in a microcomputer environment. It discusses expert systems in terms of general principles and covers the thoughts of the early proponents, the anatomy of expert systems, and the growing number of domains which will benefit from this rapidly progressing technology. A detailed description of each of the major components is included.

Contents: Preface; Foundations; Knowledge Representation; Inference Mechanisms; Knowledge Acquisition, Refinement and Maintenance; User Interface; Related Topics; Author Index; Subject Index; Editors' Biographies. A total of 39 reprinted papers.

Hardcover	Order No. PC02287	List \$69.95	Member \$52.45
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Microcomputer-Based Expert Systems

Edited by Amar Gupta and Bandreddi E. Prasad, Sloan School of Management, M.I.T. 1988. 352 pages. ISBN—0-87942-221-1. A Book of Selected Reprints sponsored by the IEEE Computer Society.

MICROCOMPUTER-BASED EXPERT SYSTEMS focuses on low-cost implementations of expert systems. Various developmental languages, tools, and customized options are considered along with a variety of example systems operating within widely different scenarios.

Contents: Preface; Introduction; Languages; Tools; Case Studies; Author Index; Subject Index; Editors' Biographies. A total of 36 reprinted papers.

Hardcover	Order No. PC02311	List \$44.95	Member \$33.70
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SPECIAL OFFER !!

Order Both EXPERT SYSTEMS Books For One Low Price:	Order No. PC02378	List \$103.40	Member \$77.99
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We are proud to note that Dr. Bandreddi E. Prasad, a member of the IEEE Hyderabad Section was chosen to be an editor of these prestigious IEEE books. Dr. B.E. Prasad is a faculty member in the School of Computer Science, University of Hyderabad and was a visiting faculty member in the Sloan School of Management, M.I.T. (USA). CONGRATULATIONS TO Dr. B.E. PRASAD.



IEEE

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IEEE Videoconferences— Seminars via Satellite

The IEEE presents one-day live videoconferences via satellite. All broadcasts originate live and are available to sites in Continental North America and the Caribbean via domestic C Band and Ku Band transmissions. An interactive network (one-way video, two-way audio) permits telephone interaction with the presenters during the live program.

"The Region 10 supplies copies of some of the video seminars from out of the following based on the demand from various Sections". The Section is shortly receiving 1) VC 7 2) VC 11 3) VC 13 4) VC 16 5) VC 6. The above were ordered in 1987. Members are requested to inform the Section Chairman about non IEEE sources with addresses and titles.

Topics for Fall 1988 include:

Photonic Switching, Superconductivity, Interdisciplinary World of Computing, and Supercomputers. Call for 1989 topics.

IEEE Satellite Program Videotapes

Videotapes of the broadcast of previous satellite seminars are available to purchase or rent. The format can be supplied on 1/2-inch VHS videocassette. Details of the programs follow:

VC 1 Introduction to project management

Explores the essential ingredients of bringing a program in on time, within a planned budget, based on adequate forecasting of manpower and materials.

		List	Member
Rental	#EV0300-4	\$400.00	\$300.00
Purchase	#EV0301-2	\$600.00	\$450.00

VC 2 Robotics: Research and business opportunities

Pinpoints current and future robot applications, trade-offs, basics of control, vision and touch sensing, programming, human interfacing, and economic considerations.

		List	Member
Rental	#EV0303-8	\$400.00	\$300.00
Purchase	#EV0304-6	\$800.00	\$600.00

VC 3 Robot sensing and intelligence

Covers sensing-based data-driven automation for industrial and other automated systems, including devices for the handicapped, medical, nuclear, underwater, agricultural, military, and space applications.

		List	Member
Rental	#EV0306-1	\$400.00	\$300.00
Purchase	#EV0307-9	\$800.00	\$600.00

VC 4 Technologies for the information age

Covers communications research at Bell Labs., including a discussion of original contributions in software, hardware, systems design and engineering.

		List	Member
Rental	#EV0309-5	\$400.00	\$300.00
Purchase	#EV0310-3	\$800.00	\$600.00

VC 6 Project management II—Team building and project leadership

Develops the professional approach to creating a project team, using a case study approach involving interpersonal relationship and psychological effects.

		List	Member
Rental	#EV0315-2	\$400.00	\$300.00
Purchase	#EV0316-0	\$800.00	\$600.00

VC 7 VLSI—Its impact on your career

Describes very large scale integration technology, its impact on the work of practicing engineers, as well as its potential for the future. Although designed primarily for practicing engineers, the program may be of interest to anyone concerned with societal implications of technology.

		List	Member
Rental	#EV0317-8	\$400.00	\$300.00
Purchase	#EV0318-6	\$1000.00	\$800.00

VC 8 Integrated manufacturing systems

Focuses on systems aspect of manufacturing and develops the concept of integration as a necessary step forward in today's industrial environment.

		List	Member
Rental	#EV0319-4	\$400.00	\$300.00
Purchase	#EV0320-2	\$800.00	\$600.00

VC 9 Robot dynamics and control

Emphasizes various dynamic methods for control of general purpose robotic manipulators and examines several different strategies for accomplishing accurate robot arm control in a practical environment.

		List	Member
Rental	#EV0321-0	\$400.00	\$300.00
Purchase	#EV0322-8	\$1400.00	\$1200.00

VC 10 Design for manufacturability

Describes some design processes being used by leading companies to address the changing manufacturing environment. Examples are given for minimization of parts count, ease of assembly, automatic assembly, and parts handling and feeding.

		List	Member
Rental	#EV0323-6	\$400.00	\$300.00
Purchase	#EV0324-4	\$800.00	\$600.00

VC 11 Fiber Optics: Technology and Applications

Optical fiber technology has emerged as a practical method of information transport, widely deployed in telecommunications applications, interconnects between computing devices, local area networks, wide band width telephone distribution networks, etc.

		List	Member
Rental	#EV0325-1	\$700.00	\$500.00
Purchase	#EV0326-9	\$1700.00	\$1100.00

VC 12 Expert Systems and Prolog

The nature and types of expert systems with examples from successful systems, and presents established design and implementation methodologies for expert systems. Prolog is introduced as a programming language with methods for using it and a case study.

		List	Member
Rental	#EV0327-7	\$400.00	\$300.00
Purchase	#EV0328-5	\$1000.00	\$800.00

VC 13 Applications of Artificial Intelligence

The goal of work in AI is to discover how to build computer systems that can be put to new uses: to duplicate human intelligence behavior. This seminar focused on four areas: Expert Systems, Natural Language, Understanding, Vision and Learning.

		List	Member
Rental	#EV0329-3	\$400.00	\$300.00
Purchase	#EV0330-1	\$1000.00	\$800.00

VC 14 High Technology Production: Strategies and Applications

A review of strategies associated with the implementation of high technology production and to suggest new ways of looking at the process which permits the efficient and effective implementation opportunities available today. It will shed light on the present international productivity, cost dilemmas, and on the potential social impacts of these new applications.

		List	Member
Rental	#EV0331-9	\$400.00	\$300.00
Purchase	#EV0332-7	\$1000.00	\$800.00

VC 15 In-Process Control for Manufacturing

The purpose of the videoconference is to make the participants familiar with the basic concepts for in-process control in manufacturing. Furthermore, specific applications on control of some manufacturing processes are discussed and demonstrated. The videoconference covers issues related to control parameters, sensing devices, control strategy, and hardware/software requirements for in-process control of manufacturing processes.

		List	Member
Rental	#EV0336-8	\$500.00	\$400.00
Purchase	#EV0335-0	\$1000.00	\$800.00

VC 16 Data Communications Systems

Data communications deals with the techniques by which machines communicate with their users and with each other. This very fast moving field offers significant benefits to users with its important advances each year and with the anticipation of still more changes and improvements to come. Each presentation covers some of the theoretical background, progress to date, sample commercial products, and a forecast of future developments.

		List	Member
Rental	#EV0333-5	\$500.00	\$400.00
Purchase	#EV0334-3	\$1000.00	\$800.00

NEW!

VC 17 Optical Discs—An Information Revolution

This video will acquaint viewers with the basics of optical disc technology and its potential impact on the marketplace. The primary focus of the program is the discussion of how and by whom discs are being used. The economics, technology, and application trends, as well as the opinion of experts in the field, are examined in detail.

		List	Member
Rental	#EV0339-2	\$800.00	\$350.00
Purchase	#EV0340-0	\$1200.00	\$600.00

NEW!

VC 18 Computer Integrated Manufacturing: Basic Architectural Models

This program introduces architectural framework models for CIM design and implementation and presents case studies for large, medium, and small companies. A special CIM system checklist is distributed for assisting developers and users to define the requirements and conditions for their own CIM system quickly and systematically.

		List	Member
Rental	#EV0343-4	\$800.00	\$350.00
Purchase	#EV0344-2	\$1200.00	\$600.00

NEW!

VC 19 High Performance Integrated Circuit Packaging

This program reviews the critical design problems and limitations of integrated circuits. It examines current IC packaging trends and presents ways of expanding the capabilities of integrated circuit chips. Particular emphasis is placed on thermal, electrical, and reliability issues. The current trade-offs between performance demands, applications, and chip limitations are discussed.

		List	Member
Rental	#EV0347-5	\$800.00	\$350.00
Purchase	#EV0348-3	\$1200.00	\$600.00

EDUCATIONAL COURSES

EDUCATIONAL COURSES

NEW!

VC 20 New Technologies in Biomedical Engineering

This video seminar examines electronic engineering's recent contributions to medical instrumentation and therapeutic devices and discusses the future of these technologies and their application in clinical medicine.

		List	Member
Rental	#EV0353-3	\$800.00	\$350.00
Purchase	#EV0354-1	\$1200.00	\$600.00

NEW!

VC 21 Microcontamination Control

This program covers the basic theory of particle motions in air and how particles are measured and removed. The video looks at the effects of contaminants on semiconductors and pharmaceuticals and methods of contaminant control in these industries. Finally, it gives a corporate perspective of microcontamination control, including the planning, implementation, and results of a microcontamination control program.

		List	Member
Rental	#EV0351-7	\$800.00	\$350.00
Purchase	#EV0352-5	\$1200.00	\$600.00

NEW!

VC 22 Practical Applications of Artificial Intelligence

This presentation describes the use of knowledge-based, expert system techniques in programs that are in production use in commercial environments. The specific focus is on programs that serve as engineering design aides. The first part of the presentation reviews common techniques for building knowledge-based systems and examines issues that should be considered in selecting task domains for which these techniques are appropriate. The final part consists of a summary discussion of several important issues that arise in the design implementation, validation, and maintenance of knowledge-based systems. The goal is a realistic portrayal of the strengths and the weaknesses of current knowledge-based system technology. Three case studies are presented.

		List	Member
Rental	#EV0355-8	\$800.00	\$350.00
Purchase	#EV0356-6	\$1200.00	\$600.00

NEW!

VC 23 Microprocessors, Microcontrollers, and ASIC

The first part of this course is concerned with the fundamentals behind the microprocessor, what it does and how. A review of architectural, software and I/O interrelationship behind the microcomputer is presented. The course treats the subject of the "Microcontroller", its characteristics and the areas of applications of 16- and 32-bit microprocessors. The final topic is ASIC and the rationale behind it.

		List	Member
Rental	#EV0357-4	\$800.00	\$350.00
Purchase	#EV0358-2	\$1200.00	\$600.00

NEW!

VC 24 Semiconductor Lasers & Light Emitting Diodes for Communications

This program is designed to acquaint you with the latest state-of-the-art developments and an outlook to rapidly developing advances. We cover fundamental operations of the laser, materials and technology, characteristics of LED's and Lasers, applications in telecommunications and future trends.

		List	Member
Rental	#EV0359-0	\$800.00	\$350.00
Purchase	#EV0360-8	\$1200.00	\$600.00

NEW!

VC 25 Photonic Switching in Communications and Computing (available after November 22, 1988). This course will analyze the advantages and future prospects of optical switching and explain the available devices, their capabilities and future trends. Its main thrust deals with applications to telecommunication switching and computer applications.

		List	Member
Rental	#EV0361-6	\$800.00	\$350.00
Purchase	#EV0362-4	\$1200.00	\$600.00

NEW!

VC 26 Applications of High Temperature Superconductivity (available after December 20, 1988). We begin with a summary of different new superconducting materials and their physical properties. We review some of the existing large scale, 4.2K applications of superconductivity and investigate the effect of them on HTS. Our third segment will focus on small-microelectronics applications.

		List	Member
Rental	#EV0363-2	\$800.00	\$350.00
Purchase	#EV0364-0	\$1200.00	\$600.00

NEW!

VC 27 Supercomputers (available after February 7, 1989). This program will define what a supercomputer is in technical and practical terms. Viewers will learn who builds them, where they are, and how they can be accessed. You will be exposed to the "ins and outs" of using supercomputers by examining relevant aspects of architecture, performance, vectorization, etc. The latest applications will be examined.

		List	Member
Rental	#EV0365-7	\$800.00	\$350.00
Purchase	#EV0366-5	\$1200.00	\$600.00

NEW! SPECIAL 5 hr program

The Interdisciplinary World of Computing (available after November 20, 1988). It begins with trends in the design of underlying VLSI components, moves into DESIGN AUTOMATION and on to TEST TECHNOLOGY, both involving methods widely applicable throughout computer design and applications. It shifts into SOFTWARE ENGINEERING; the common problems and tradeoffs, the innovations and solutions. Segments on PERSONAL COMPUTING and OFFICE AUTOMATION are covered along with MACHINE INTELLIGENCE AND VISION and ROBOTICS.

		List	Member
Rental	#EV0367-3	\$1200.00	\$600.00
Purchase	#EV0370-7	\$1800.00	\$1200.00

The Distinguished Lecturer Program

This month we are featuring the Distinguished Lecturer Program and our speakers, Dan Love, William McMurray, and Ray Stratford.

I have had the pleasure of meeting

Dan Love and have talked with both Bill McMurray and Ray Stratford many times on the phone. Our conversations have led to a stronger definition of our program and recogni-

The Distinguished Lecturer Program

Introduction

The Distinguished Lecturer Program is offered by the IEEE Industry Applications Society and administered through the Chapters Department. Resumes of the speakers are attached for your reference.

Our Distinguished Lecturers are members of our Society and have graciously agreed to forego the customary lecturer's fees to provide quality presentations for our Chapters. Please provide our speakers the same courtesy and attention you would provide a relative who is coming to visit you for the first time.

What the Chapters Department Does

The Chapters Department obtains the Distinguished Lecturer's agreement to a Chapter's request to speak. The Chapters Department provides airfare and miscellaneous expenses associated with traveling for the speaker. Domestic air travel within the Continental United States and parts of Canada would require travel the day before a meeting and returning the day after the meeting. Travel outside the U.S. may require additional time for visas, travel, etc.

What the Chapter Does

The Chapter must make a specific request (written or verbal), and provide an approximate date to the Chapters Department for one of the Distinguished Lecturers. The Chapter requesting the Distinguished Lecturer provides full accommodations for the Speaker for a maximum of three days and two nights lodging. Full accommodations consist of lodging, meals, local transportation (rental or personal auto), and miscellaneous expenses (audio visual equipment, photo copying, telephone charges, etc.). The requesting Chapter is required to coordinate with the speaker directly and obtain mutual agreement for all transportation, accommodations, and presentation.

What the Lecturer Does

The Distinguished Lecturer provides all lecturer's materials such as 35mm slides or overhead projector transparencies (but, no handouts should be expected). The Lecturer offers his or her services as mutually agreed at a sanctioned IAS afternoon or evening meeting at no extra cost to the individual IEEE members.

Changes to the Format or Itinerary

By mutual agreement between the requesting Chapter and the speaker, the transportation, accommodations, and presentation may be changed to suit the Chapter's and the speaker's needs. The Chapters Department must be informed of all changes to the speaker's itinerary.



Tom Kirsch

tion of how our speakers benefit the Chapters. The Program's requirements are printed in the accompanying sidebar. Please take a minute to read the program requirements.

Does the program sound interesting? It should. The cost to our Chapters is minimal. Dan Love's trip to Chicago last October cost the Chicago IAS-IES Chapter approximately \$230. The remainder of Dan's expenses are covered by the Society. To me, the DL Program is not a risk and it is not an expensive proposition for our Chapters, or as a budgeted item for the Section.

There is one aspect of our program I am worried about. There are over 1,000 (10 percent) of our IAS members throughout the world that are not represented by a Chapter in their area. The program is designed so that all members of our Society receive the benefit of having an expert in some discipline of IAS technology speak at one of your meetings; therefore, I have sent a letter to all Section Chairmen asking them to either encourage IAS Chapters participation in the program or offer a

Continued on page 21



Daniel J. Love

Topic: Reliable Industrial Power Systems

Mr. Love is well-traveled and brings a wealth of experiences about industrial power systems, their design and their analysis.

In his introduction to the subject of Reliable Industrial Power Systems, Mr. Love notes that the lack of new power plants and the need for more reliable power distribution coincides with increased plant capacity utilization that has jumped over five percent in the last few years. On the subject of "Where We Are Today," he stresses the important points of higher electrical costs, potential for brownouts, and the need for energy management. By comparing industrial systems of today versus those of 30-40 years ago, UPS, Adjustable Speed Drives, efficient lighting systems, motors, and transformers and co-generation are mentioned.

Mr. Love also includes:

- A review of a large industrial power system.
- Factors involved with an industrial plant's electrical system design.
- The relationship between transformer impedances and switchgear ratings.
- Fault currents and protective device ratings, and effects caused by a protective device failure.
- Ground fault protection - medium and low voltage systems.

Continued on next page

Chapter News (continued from page 20)

joint meeting to bring our Distinguished Lecturers to your area.

This program has strong and far reaching implications for our future. If this program becomes as popular as I believe it will become, there will be more lecturers added and more topics from which to choose.

Now, if you will, take another minute to read the resumes and the outline of our speaker's lecture, decide who you want to come to your Chapter to speak, and write me or give me a call.

Tom Kirsch

Chairman
Chapters Department

Kennedy/Jenks/Chilton
637 Howard Street
San Francisco, CA 94105
Tel 415-362-6065
FAX 415-896-0999

Daniel Love is an independent Consultant specializing in system design and protection for electric utility and industrial applications. He was associated with the Bechtel Power Corporation for the past 19 years. At Bechtel, Mr. Love worked in generating station electrical system design and protection, and also was responsible for fire protection engineering in the design of several nuclear power plants. He also served for three years as Bechtel's Chief Electrical and Control Systems Engineer for Western Europe.

Mr. Love received the BSEE (1951), and MSEE (1956) degrees at the Illinois Institute of Technology, and the MBA degree at California State University-Long Beach. He is a Fellow of the IEEE, his citation reading "For contributions to ground and phase fault protection for industrial and utility distribution systems." He is a recipient of the IEEE Centennial Medal.

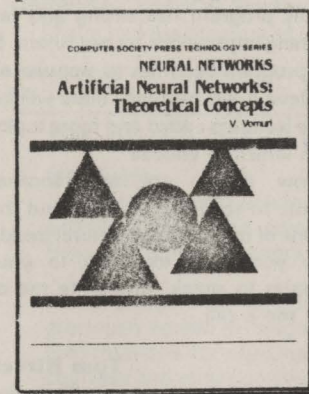
He is a member of the Instrument Society of America, National Society of Professional Engineers, Society of Fire Protection Engineers, and the National Fire Protection Association. He is a Registered Professional Engineer in the states of Arizona, California and Louisiana.

He has authored many papers on power system design and protection for presentation at conferences of the IEEE Power Engineering Society and Industry Application Society. He chaired the activity for Chapter 14 during the revision of the Buff Book, IEEE Standard 242, Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems.

He is active in the Industrial and Commercial Power Systems Department of the IAS, and is Secretary of the Power Systems Protection Committee.

Mr. Love has also been active in the IEEE at Section levels. He has served as Chairman of the Metropolitan Los Angeles Section and the Los Angeles Council.

Technology series are anthologies of reprints, each with a narrow focus on a subset of a particular discipline.



Technology Series on Neural Networks— Artificial Neural Networks: Theoretical Concepts by V. Vemuri

Focuses on the exciting field of artificial neural networks and their potential role in the emerging field of neurocomputing. Includes articles on Neurocomputing; Cognitive and Psychological Computation with Neural Models; Random Nets of Analog Neuron-Like Elements; Parallel Memory Storage; Simple "Neural" Optimization Networks; The Hopfield Model; HASP; Neocognitron.

Order No. FJ855

ISBN 0-8186-0855-2

July 1988, 160 pp.

(Dr. Vemuri has given the Hyderabad Section a Complimentary Copy of above Book)

DR. VEMURI GAVE SHORT COURSES IN JULY '88 AT IEEE HYDERABAD SECTION

MEET... Dr. V. Rao Vemuri

Emulating the brain

Is that squiggle on the seismogram caused by a natural earthquake, or is it the first hint of a distant (and clandestine) underground nuclear explosion? The major powers would dearly like to know; and there is no shortage of scientists trying out a trick or two to provide a fool-proof solution.

For five months now a small group of computer professionals at the University of California's Department of Applied Science at Davis, Livermore, has been looking at the problem from what they feel is a new and promising angle. The group is working on a neural computer — a machine that tries to replicate closer than ever before, the way a human brain, and its millions of nerve cells, or neurons, work.

Heading the research team is the department's Director of Computer Engineering, Prof. Venkateswara Rao Vemuri, now in India on a short visit.

He would call neural networks 'sixth gener-

ation' computing", says Dr. Vemuri, explaining that while quite a lot of theoretical work in the field was done prior to 1982, researchers in neural computers got scant attention (or funding) in the U.S. Artificial intelligence (AI) was stealing the thunder.

But 'fifth generation' techniques such as AI, Dr. Vemuri explains, still manipulate symbols, crunch numbers and follow rigid 'rules'. The human brain works differently — and neural computers attempt to emulate the brain learning and deduction. Millions of nerve cells — neurons — linked by dendrites, distribute among themselves the operations performed by



the human brain. And neural computers at the basic level are so many distributed processors

"A human being can recognise a familiar face in one fifth of a second", explains Dr. Vemuri. "The human eye can adjust itself to light intensities which vary over seven orders of magnitude. No computer can at present even approach this capability." Neural computers therefore are ideally suited for applications which call for learning speech, processing an image or recognising a pattern — like a seismogram of an earthquake.

So groups like Dr. Vemuri's working in this new field have attempted problem solving of a general nature — aircraft classification from long distances; recognition of underwater sonar signals from submarines — and inevitably the military are the main customers.

Is success round the corner then? "We can at best be said to be feeling our way".

A graduate of the Government College of Engineering at Kakinada, Andhra Pradesh, Dr. Vemuri got his master's degree in electrical engineering in the U.S. in 1963 and his doctorate from the University of California (Los Angeles) in 1966. Head of the same University's computer engineering programme at Davis since 1985, Dr. Vemuri put in a five year stint earlier with the defence products division of the electronics firm TRW.

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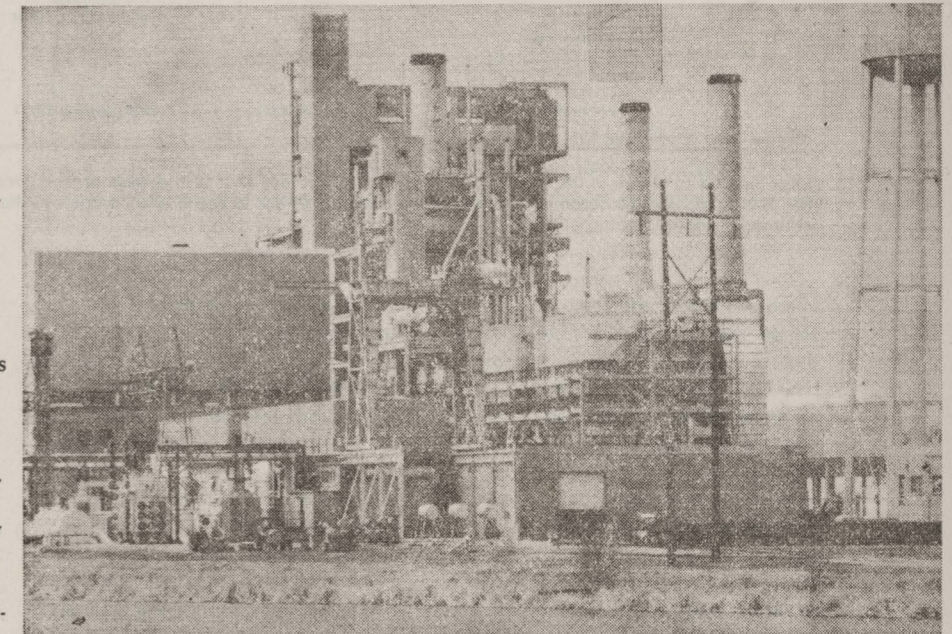
(Reprint)

July 1982

Energy Researcher

Power Plant Performance and Reliability

Reliable power plants are essential to economic electricity generation. New operating conditions and poorer fuel quality are marring the performance of many coal-fired plants.



Utility power plants are complex entities with intricate systems that must all work together. Problems that can cause outages occur at many sites in the plant.

Most people take electricity for granted. They flick a switch and the lights and appliances come on. To give consumers the energy they demand at the lowest possible price, utilities must produce electricity reliably and efficiently. This power is usually generated by large nuclear and coal-fired baseload plants, which operate continuously, generating electricity around the clock. These baseload plants are supplemented by oil- and natural-gas-fired plants, which are started up quickly and then shut down to meet daily fluctuations in electricity demand.

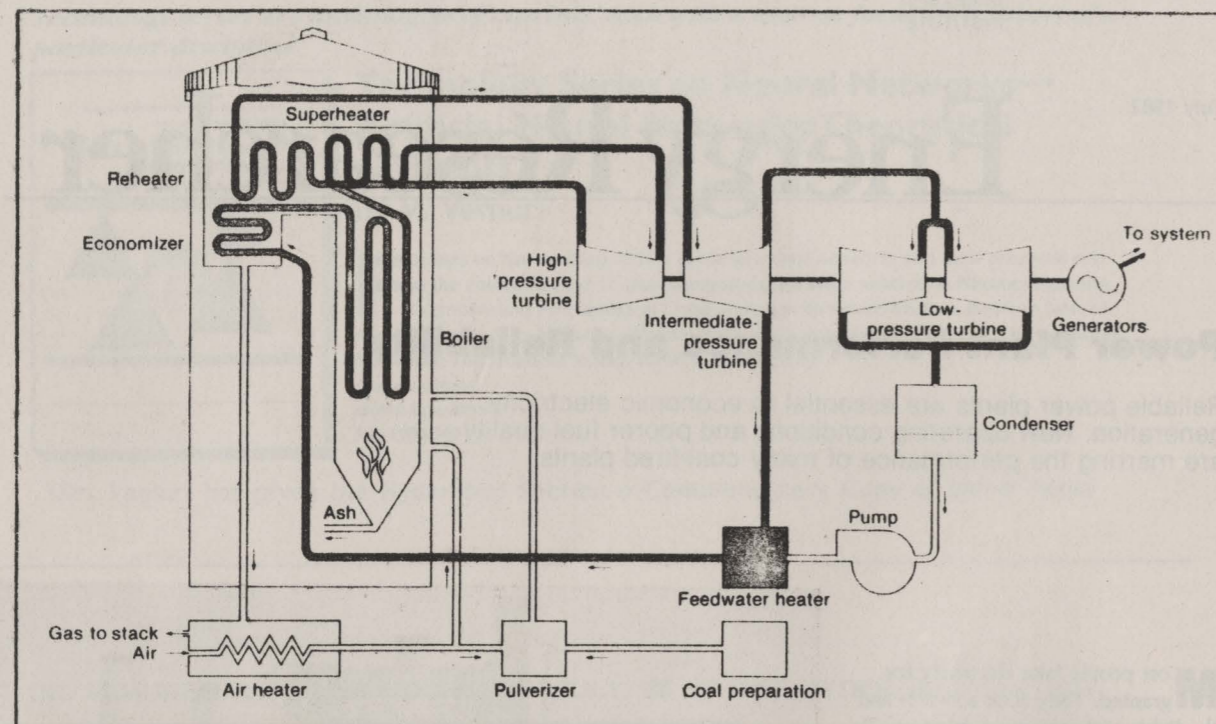
What happens when a baseload power plant is out of service? Not only does it not generate electricity, but the utility must continue to pay for the cost of owning it. And the needed electric power has to be generated by those backup units that require the more expensive oil and gas. Whether caused by equipment failure or scheduled maintenance, outages raise the price of electricity. So plant performance is a key element in reliable, economic electric power generation.

There are three important measures of power plant performance. *Availability* is the amount of time a plant is or could be generating electricity during the year. *Equivalent availability* is the

amount of time a plant is or could be available except for equipment failures or scheduled maintenance that may or may not shut down the plant completely. A plant's *capacity factor* is the ratio of electricity the plant actually produces to the amount it could produce if it operated continuously at full capacity. Even baseload plants are shut

down for scheduled maintenance as well as unexpected outages, so a plant's capacity factor is never 100 percent.

Statistical data show that power plant performance and reliability have deteriorated. Increasing outages are causing power plants—particularly larger, modern coal-fired ones that can generate over 600 megawatts—to be



Water, heated to steam in the boiler, spins a series of turbines that turn a magnet to induce an electric current in wire. Having lost its heat energy moving the turbines, the steam is condensed back to water and pumped to the boiler to repeat the process. The cycle is continuous during plant operation.

idle too much of the time. The reasons for the rise in outages are still speculative, but it appears that large, relatively new units have some problems that result from size, age, use, and fuel. Larger sizes mean greater stress on moving parts. New plants have not operated long enough to have undergone design adjustments that make them run in the most efficient way. And some coal-fired plants designed for steady baseload generation are being pressed into cycling service to meet daily swings in electricity demand.

Designed with automated systems and the latest, most complex environmental cleanup equipment, the big, new coal-fired power plants are not tolerant of the frequent manual intervention required in such stop-and-go operation. In addition, coal quality has deteriorated over the last decade. This deterioration reflects trends toward automated mining methods that remove more rock along with the coal, and toward lower-sulfur and often lower-grade coals used to comply with tougher emission standards. So solving design and operation problems is im-

portant in improving plant performance.

Power Plant Operation

A fossil-fuel-fired power plant converts the heat energy of a burning fuel into electric energy. The fuel—coal, oil, or natural gas—ignites and burns as it enters the boiler. Water circulating through tubes in the boiler is heated, and the resulting steam turns turbines, which are connected to the generator. The generator contains a magnet inside a ring wrapped with wire. As the turbines spin, they turn the magnet, and the rotating magnet induces an electric current in the wire.

In a coal-fired plant the coal is pulverized and mixed with heated air before it enters the boiler, where combustion occurs at temperatures exceeding 2000° Fahrenheit. The water moving into the boiler—called the feedwater—is heated before it actually reaches the vessel. The hotter the water is when it enters the boiler, the more efficient the plant will be. In the boiler, the water is flashed to steam by the tremendous heat of the burning

coal. The steam passes through a superheated region of the boiler, where it is heated even more, and under high pressure it is piped to the first of three turbines—the high-pressure turbine. The steam, which loses some of its heat moving the high-pressure turbine is heated again in the reheat section and continues through the system to propel the intermediate- and low-pressure turbines. By this time, the steam has lost much of its heat energy, and it is reconverted to water in the condenser. This cycle goes on continuously while the plant is operating.

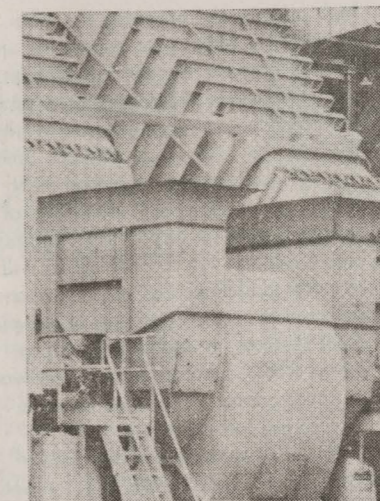
Of course, utility power plants are far more complex. In addition to boilers, turbines, auxiliary pumps, fans, pulverizers, and generators, plants have cooling, emissions, and waste systems. Each system has many parts, and problems that can result in outages occur at many sites in the plant. To solve these outage problems, the Electric Power Research Institute (EPRI), utilities, equipment manufacturers, and others are looking for ways to improve plant equivalent availability, reliability, and efficiency.

Turbines and Generators

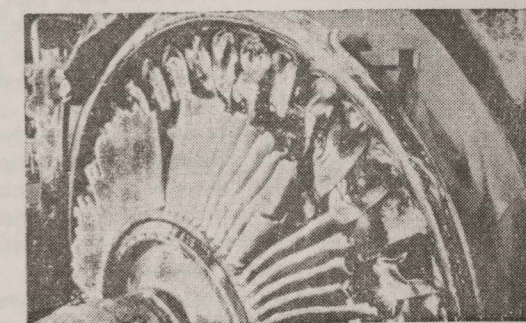
A turbine has many blades attached to a disk, which is mounted on the shaft connected to the generator. The steam from the boiler strikes the blades, causing the blades, disk, and shaft to spin. This equipment is in constant motion while the plant is operating and is susceptible to excessive mechanical, chemical, and thermal stresses. The turbine shaft turns on bearings, which are lubricated by an oil bath that is continuously circulated and cooled. Bearing failure is the leading cause of forced outages in turbines, and lubrication system design and performance problems generally bring about these failures. Researchers are analyzing past failures to determine operating conditions that can enhance bearing performance. Programs are also examining ways to improve hardware to reduce bearing failure. In addition, EPRI is establishing guidelines for more reliable designs. Research results should be available some time this year.

Turbine blades are vulnerable to stress corrosion, corrosion fatigue, water induction, and solid particle erosion. Many outages result from stress corrosion—corrosion accelerated by mechanical, thermal, or residual stresses—and from corrosion fatigue—cracking in the metal brought on by the combination of corrosion and stress, which can be catastrophic if blades or disks fail during operation. These problems result when small amounts of impurities carried in the steam are deposited on intermediate- and low-pressure turbine blades as the steam loses heat and begins to condense. Any surface irregularity can trap these impurities, and the deposits accumulate until those areas of the blades and other turbine components that are under stress begin to corrode. This corrosion, usually in the form of surface pitting, causes cracks that can result in the failure of the metal.

Researchers are pursuing solutions for both the causes and effects of corrosion. EPRI-sponsored projects study steam purity and operating conditions that may eliminate corrosion-causing impurities. To deal with corrosion effects, EPRI is investigating possible blade coatings that would protect the steel. In addition, EPRI has developed corrosion-resistant blades from titanium



1. Power plant fans.
2. Turbine.
3. Damaged turbine blades.



that would replace conventional steel blades. Although initially more expensive than standard ones, titanium blades may save substantial outage time.

Water induction is another major turbine problem. This phenomenon occurs when condensed steam (water) is drawn back into the turbine during operation. This water damages everything it comes into contact with, particularly the turbine's moving parts. Because this problem results from operating conditions, EPRI has developed an acoustic monitor that tells the plant operator when water is present in the turbine piping. Such a system will alert the operator to conditions that could allow water induction much faster than the temperature-sensing system currently used. The operator can take preventive action to keep water from entering the turbine.

One major turbine blade problem—solid particle erosion—actually begins in the boiler. The internal surfaces of the steam-carrying tubes oxidize. During the cooling and heating of normal boiler duty, oxidized particles flake off in a process called exfoliation and are carried in the steam to the turbine, where they erode the blades. EPRI is studying this problem in two ways. First, a chromate conversion treatment has been developed to inhibit exfoliation. Coating the tubes with a chromium compound almost eliminates the rapid oxidation process. Second, because this erosion process is thought to occur only when the plant is started up and may not be a continuous process, EPRI is evaluating turbine bypass systems that would eliminate the erosion problem. When the plant is started up,

the first blast of steam containing the eroding particles would be carried away without ever entering the turbine. These systems are currently installed in European units that are used in daily stop-and-go operation to meet peaks in electricity demand.

Boilers and Auxiliary Systems

Steam boilers have two major problem areas: tube failure and tube fouling and slugging. Tube failure results when the metal erodes, corrodes, or becomes brittle or when the welds between joined metals fail. The EPRI program concentrates on improving these welds and identifying causes of specific tube failure for improved operation and design. Investigators are developing techniques for predicting weld performance, as well as for improving welds. Work in this area began in 1981, and research results should be available by 1983.

Fouling and slugging result from burning pulverized coal, which produces vast amounts of ash. The ash collects on the tubes in the lower-temperature portions of the boiler—a process called slugging. Fouling—the fusion of elements in the ash into a glasslike substance—occurs at the higher temperatures that exist in the superheated region of the boiler. EPRI is approaching the solution to these problems in three ways. One long-range study is investigating the effect of air-fuel mixtures to control the amount of combustion by-products. Researchers are also examining combustion additives that prevent elements in the ash from fusing to the tubes and identifying coal types that accelerate fouling and slag-

ging. Precombustion coal cleaning is another way to reduce fouling and slagging. Rough impurities and waste materials that produce ash can be removed by physical crushing and separation or by chemical cleaning. Cleaning processes using water under high pressure are also being studied. One disadvantage of water cleaning, however, is the possible effect of repeated thermal shocks on boiler tubes.

Plant auxiliary systems, particularly pumps, fans, condensers, and pulverizers, are also vulnerable to performance problems. Feedwater pumps are subject to bearing failure, shaft breakage, instability caused by excessive vibration, and damage caused by loss of pressure that allows bubbles to form in the water—a condition known as cavitation. EPRI has published design guidelines based on analysis of 3000 documented pump failures. Researchers are also working on improved bearing systems.

Changes in pressure, erosion of components by combustion by-products, and vibrations resulting from certain fan foundation designs all affect fan performance, sometimes catastrophically if the fan is in operation. In addition, fan performance can be inhibited by slag formed in the boiler, which can reduce air flow. EPRI is developing design guidelines and analysis procedures for utility use. EPRI has also documented and analyzed more than 450 coal pulverizer failures and has produced design guidelines for this equipment as well as for condensers and boiler feedpumps.

Other Research

Because few new plants are being built today, the utility industry has given a

high priority to improving the reliability of the large main generating units already in place. But the industry is also developing technology to enhance the efficiency of new units and plants that may be added in the future. Some research emphasizes integrated plant performance, especially the effects of human factors on day-to-day operation and reliability. An EPRI program will develop guidelines that utility personnel can use in the operation of complex plant systems. In addition, EPRI programs study chemical processes at work in power plants. This work includes monitoring turbine steam, studying chemical cleaning of various components, and examining the effectiveness of feedwater additives. Plant performance is also being monitored by diagnostic alert devices. These devices will warn operators of impending failures before a forced outage occurs. This is accomplished through the analysis of vibrations and high-frequency signals that all materials, both moving and stationary, emit when stressed while in service.

Much of the technology being developed to improve reliability of plant equipment will improve efficiency as well. Improvements in heat exchange equipment, such as condensers, feedwater heaters, and boilers, lead to better heat transfer and less energy waste. In addition, an EPRI program has recently completed a conceptual design evaluation of an advanced, next-step fossil plant. The design combines the plant's environmental control systems for more efficient interaction. In addition, the plant would use higher-temperature, higher-pressure steam as its working fluid for increased electricity generation. Validation of materials nec-

essary for the improved steam conditions, which would improve electricity generation capability, is proceeding.

EPRI is also developing computer models that simulate fossil-fuel-fired plant operation. These simulations will show how various types and makes of equipment can be made to operate most efficiently together. Better understanding of equipment interface will help utilities determine appropriate equipment combinations for more effective power plant operation.

More About EPRI

Headquartered in Palo Alto, California, EPRI was organized in 1972 to fund and manage electric energy research and development. Through selection, funding, and management of research projects conducted by contracting organizations, EPRI promotes the development of new, improved, and environmentally acceptable technologies in the field of electric energy.

EPRI is voluntarily funded by more than 600 investor-owned, cooperative, federal, and municipal utilities representing approximately three-fourths of the electric power production capacity in the United States. The contribution of each utility is based on its kilowatt-hour sales. EPRI's research and development budget for 1982 is approximately \$310 million; it will spend about \$1.9 billion for research and development during the years 1982-86.

Resume Writing

Job wanted: Exciting, well-paying position . . . The dream job you envision while sitting through those boring classes. Depending on how realistic your dreams are, that job might be out there, or at least a reasonable facsimile of it. The only catch is making yourself the 'dream person' for that position. And that is where your resume, which summarizes you and why you are the person the company wants, comes in.

If you only pursue companies that recruit on your campus, you can avoid a great deal of the preparatory work involved in resume writing. You will still have to write a resume, but the format—what to leave out, what to put down, and how to organize it on paper—is provided to you in the shape of the school's or the recruiting company's standard job form. You must make sure you fully complete the form.

But anyone desiring to explore the career opportunities available at other companies, large and small, will need a resume. Resumes are needed to answer classified advertisements, to hand out at job fairs and career open houses, and to submit to companies that appeal to you. Whether your job campaign is done through the mail or through personal contacts, a written resume will most likely be required at some stage.

Steps to a Good Resume

Most important, a good resume takes time. Time to research the company's criteria so that the resume can show a good match between the employer and the would-be employee; time to gather all the pertinent information about yourself. The information should include dates and attended institutions' names, honors, a complete chronological record of every job you have held, with a list of professors, job supervisors, and personal acquaintances whose references will hold weight. Your school data should also include extracurricular activities. The more details you write down at this information-gathering stage, the better.

Next, consider what exactly your career objectives are in relationship to the job you are seeking. If you are exploring several fields, have several career objectives written down on paper. (You may want to state these in your cover letters, rather than in several resumes.)

Four general rules for composing a resume are:

- All data supplied in a resume should be relevant to and support your credentials for a specific job (if you are replying to an ad) or for the specific type of position you've selected for your next career step (if you are broadcasting your resume).
- The Realism Rule: Be realistic, specific and honest in stating your goals in the resume, or leave them out entirely.
- Hobbles Hurt or Help (H3) rule: Include personal data if it meshes with a known bias or need of the employer. But when in doubt, leave it out.
- The KISSIR rule: Keep it simple, spell it right.

Three format styles which can be used in a resume are chronological, functional, and synopsis/amplification. A chronological resume is designed to provide a comprehensive summary of all educational employment experience, ordered with the most recent activities first. A functional resume is designed to emphasize work experiences, placing the most valuable experiences and training for the position being sought first. A synopsis/amplification format provides a skeleton resume on the first page, which allows the employer to decide at a glance if he or she wants to know more; more detailed information in each of the given areas should be provided on the second page.

Resumes are generally organized in the following manner:

Identification. List name, address and phone—usually on top of the page and centered.

Job Objective.

Education. Be sure to include your degree, discipline, date and institution, concentration or related course work, grade point averages, class rank (if good), number of times on the dean's list, a special senior project (if any), publications or thesis if you are a graduate student, and academic honors—state the award's purpose—and scholarship.

Work experience. Place your work experience in chronological order, categorized according to career importance; highlight the career related jobs, such as co-op work in the field desired, a related summer internship, or supervising others in running the high school general supply store. State your position or title (avoid company lingo), the name of your department, the organization and its location, dates of employment (month/year to month/year), and give a brief job description. Clump together routine jobs, giving only generic job titles such as "cashier" so the company knows you can find and hold onto a job.

Research interests and publications. This is most important for graduate students.

Extracurricular activities and skills. This section may include professional society memberships, offices held, awards won, community service, school organizations (explain their functions if not readily apparent from the title), military service, and activities leadership or teamwork ability.

Personal data. Give your age, sex, health (always good to excellent; otherwise leave it out), willingness to relocate, willingness to travel, marital status, and citizenship. The last item is important to state if you are seeking a government job or a job in a company that does contract work for the government.

References. Simply write "available upon request," but be sure to line up three or four individuals who can comment on your work-related qualifications. For positions requiring security clearance, you will also need references.

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SECTION MEMBERSHIP DIRECTORY

Recently we have published our Section Membership Directory. It was mailed to the members. We were able to collect the data from most members and included them in the Directory. Those members whose names are not included may please send their bio-data to:

C. Satish

Section Chairman

10-5-3/2/6, Masab Tank

HYDERABAD-500 028.

We require their name, degrees, designation, organisation, address and telephone numbers, IEEE Membership Number and Grade, IEEE Society Membership, & Professional Interests. We want to include the data in the supplement to the Directory to be published around December 1989. Also if you have any suggestions on the Directory, please send them to the Section Chairman.

LETTERS AND ARTICLES INVITED

You can raise your concerns or points of view. You can share your knowledge/experience. Letters and Articles for the Section Newsletter are welcome from members. Send them to:

C. Satish

Section Chairman

10-5-3/2/6, Masab Tank

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MEMBERSHIP GROWTH AWARDS INSTITUTED BY INDIA COUNCIL

Hyderabad Section has won the first prize for 1986, second prize for 1987.

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