

# AMERICAN ENGINEER

A PUBLICATION OF THE AMERICAN ENGINEERING ASSOCIATION

## President's Column

Welcome to Volume 1, Issue 1 of the "American Engineer." Those of you who received our newsletter in the past will notice a striking difference between "American Engineer" and prior issues. This difference reflects the fact that we've become a broad-based organization to serve the technical professional community identified in the Editor's column. I know you will approve of the changes and the new publication.

I've appointed Bob Bruce Editor of "American Engineer" and I've charged him with the responsibility of making "American Engineer" the best and most credible publication dealing with our professional issues. Publication of the "American Engineer" is a high priority, but improving the career climate is our highest.

I want to thank each of you for taking the time to mark and return the ballots for the poll that Richard Tax coordinated. We have received several hundred responses with some ninety-five percent being in favor of the merger between AEA and the Committee of Concerned EE's (CCEE). I extend a warm welcome to our many new members and thank you for your confidence and trust. I also want you to know that AEA mailing lists and other records are confidential and will not be distributed or sold.

Article Four of the AEA Articles of Incorporation states "The purposes for which the corporation is organized are: to establish and maintain a national organization which will aid the progress and development of the engineering profession and related occupations; to enhance the status of members of the engineering profession and related occupations; to support activities for the employment of Americans in the engineering profession and related occupations; and to correlate and promote the various activities designed to further the varied interests of the engineering profession and related occupations."

AEA is and will continue to be a multi-discipline association. We intend to serve the technical community better in the areas of professional issues than any of the technical societies. We will maintain the minimum bureaucracy necessary to address the concerns of this community. We will be far more cost effective than any of the technical societies.

We are establishing committees corresponding to the columns you see in this publication. The editors of these columns will be the Chairmen of the committees. Each of these persons has a distinguished record of support for the working engineer on their particular issues. Each of them is nationally recognized in the engineering community, and each has a record of doing, not just saying. Their efforts and mine will be to seek results, not self-aggrandizement. We encourage AEA members with expertise in manpower, immigration, age discrimination, job shopping, or just plain writing, to pitch in and enhance our efforts. Contact the editor or myself.

We encourage you to continue your membership in your technical society to make it work for you. We also encourage you to join AEA, and participate in the process of turning technical professionals into

true professionals. Your participation at any level in your technical society, along with your membership and participation in AEA can exert a positive influence on that organization and on your career. Our goal is for 50,000 members in 1991. You can help us reach it. There's a membership form in this issue. If you're already a member, copy the form and circulate it. If not, fill it out, and return it with your check. For the near term, the main constraint on our activities will be funds. If you want to stay abreast of professional issues and participate in a growing professional organization, join now.

*Billy E. Reed, President*

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## Wake Up Engineers!

In June of 1960 an engineer whom we shall call Grad60 graduated from college with aspirations to utilize new-found knowledge. Grad60 obtained a job with a large stable company which offered a dual career path. The dual career path purported to provide opportunities for promotion to high level responsible positions for employees interested in being individual contributors as well as for those interested in and qualified for management.

At age 52 in 1990, Grad60 was a long-term conscientious and dedicated employee who had elected the individual contributor option and had received numerous patent awards over the past 30 years. Grad60 was looking forward to enjoying an early retirement in ten years.

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The utopian dream came to an end. In 1990 Grad60's company decided to enhance their technological expertise by one of two methods:

A) Retrain older long-term engineers via various courses and seminars.

B) Lay-off most long-term older engineers under the guise of a "legal" cost-justified reduction in force while gradually replacing laid off employees with new hires and promotions.

Unfortunately, the company elected option B and Grad60 has been unsuccessfully seeking meaningful employment for over six months while the ex-employer continued to advertise for engineers with three to five years experience.

Grad60, who has been classified as "over-qualified" by potential employers, has been depleting retirement savings to meet living costs and is seriously considering a full-time job as a plant security guard or a pizza truck driver until eligible for pension and social security benefits.

While the above "case history" is not true per se, each individual aspect of it has happened. Several pre-retirement aged IEEE members reported accepting full-time jobs as security guards and pizza truck drivers because of their inability to obtain engineering jobs. At least one Fortune 10 company that touted the dual career

path has laid-off older engineers while they continued to recruit less experienced (hence younger) engineers. Another Fortune 10 company has laid-off a 59 year old IEEE member with over a dozen patent credits and whose wife was confined to a wheel chair while they continued to recruit less experienced younger engineers.

Although both of the referenced major companies and numerous others have since corrected their age-biased ads after being informed by the IEEE-USA Anti-Discrimination Committee that they were discriminatory, it is my belief that many companies continue to practice method B outlined above.

Even though companies may now agree to interview older engineers, they can still refuse to hire qualified applicants. However, most of these companies realize that if they turn down older qualified job seekers who are willing to accept the salary offered, they may be at risk for a losing jury decision.

Engineers don't have a monopoly on the experience of employment discrimination, but they may be more susceptible than other professionals because of rapidly-changing technologies, vacillating defense budgets and recessionary business cycles. However, our country can ill afford to ignore the training, experience, capabilities and potential of older engineers if the U.S. expects to remain competitive in the world market.

My feeling is that engineers should be able to enjoy the dignity of full-time employment and financially viable retirement experienced by many other professionals. All engineers should be able to improve their employment status and retirement position by joining a power organization (similar to the AMA or the ABA) which will represent their best interests and lobby for their benefit. I believe the AEA can become such an organization provided we increase our membership sufficiently for Congressional Legislators to take us seriously. Your help is needed! Please urge your colleagues to join the AEA now, to help enhance your careers and theirs.

*Richard W. Plummer, P.E.*

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## Engineering Shortage?

**"The sources are not necessarily accurate..."**

*by Frank Lord, Senior Member IEEE*

You have probably noticed a great deal of material in the press lately about an engineering shortage. So what's new? What is somewhat different is that this material appears at the same time that there are articles about massive layoffs throughout industry, particularly in defense related industry. Engineering unemployment is at 2% and climbing while the general nationwide unemployment rate is at the relatively favorable 5.4% level (the transition unemployment level for engineers at times of full employment is 0.35%).

When one looks into these items in more detail, it turns out that none of the writers have enough information to determine if there is or will be a shortage or surplus of engineers. To do that one needs to compare supply and demand figures. There has not been one shortage story that seriously examines demand. That is not surprising, for to forecast accurately significantly far into the future is not possible. If it were, why do we have a rash of forecast articles at the beginning of each year? What these recent engineering related articles do is examine current and projected supply figures, compare them with something, and try to draw conclusions. This year's shortage articles compare present and projected supply figures with those of the last decade and seeing them to be smaller, conclude that there will be an engineering shortage. In times past when present figures were larger than past, they were compared with Japanese numbers and the conclusion made that we had to catch up. It was not mentioned that Japanese engineers are utilized

differently in their work environments than are ours. Prior to the severe Japanese competition, our engineer numbers were compared with those of the Soviet Union and we were told that if we did not produce more engineers, we would lose the cold war. It was not mentioned how much cruder Soviet technology was because of the flaws in their system of government and management.

Another thing that a reader will notice is that the supply numbers used in various articles look familiar. That is because they come from only one or two sources. The sources are not necessarily accurate or authoritative, but when the numbers are repeated enough by organizations that are generally thought to be responsible, the public starts to believe them. Even *Spectrum* fell into this trap by producing a short article which appears on page 23 of the January 1990 issue and is titled "Demand to exceed supply for engineers." The supply numbers in this case were questionable and taken from a National Science Foundation (NSF) report. There was no consideration of demand in the NSF report. So the end result was that a respected publication misinterpreted a questionable report of a respected organization and gave credibility to a misleading notion. This occurred in spite of an IEEE USA position paper, "Interpretation of Engineering Supply and Demand Surveys," which suggests extreme care in interpreting this type of material.

One of the safest wagers in the world would be to bet that in any year for which an engineering shortage is projected there will not be one. The historical precedent goes back to World War II, at least. This would be expected in most occupations in any free economy because, at least in theory, there is no such thing as a shortage in such an economy. Supply and demand come into equilibrium at some price. If the price (pay for the employee) is attractive, the supply increases. In the United States the supply of engineers is quite elastic because there are so many sources of them which include new engineering graduates, converts from mathematics and science, upgraded technicians, immigrant engineers, and people with engineering training and experience working in presently more attractive occupations. These short term sources would prevent the creation of any hardships in enterprises needing engineers until the college entrants, recognizing an attractive situation, could respond causing a rise in undergraduate enrollments and an eventual longer term adjustment.

A recent example of such forces in action was the avoidance of a shortage of petroleum engineers in the early eighties through the simple expedient of raising salary levels to about 15% above the average for all engineers. The attracted supply came in part from civil engineers who were experiencing a very soft job market, geologists, chemical engineers, mechanical engineers and upgraded technicians.

The first sign that the present surplus of engineers is being assimilated, will be the lack of headlines about more layoffs. Following that it will be easier for engineers seeking employment to cross rigid lines that exist around over-specified position descriptions. Then more engineering support positions will be created and you won't encounter as many of your colleagues at the copy machine. Employers will become concerned about maintaining the capability of the engineering staff. Engineers will notice that they are being managed and utilized better. Training and advancement opportunities will increase. The ultimate indication of an engineering shortage will be when no responsible bids are received to a responsible request for quotation for engineering work. I have never heard of that happening and don't believe that it ever will.

I hope this discussion will make the reader more skeptical about dire predictions related to our numbers or ability to meet the needs of the nation and its people. Question the sources of data. Analyze situations in fundamental economic terms. When engineer shortages are mentioned, ask "at what salary level?"

# Manpower Fluctuations Give Engineers Grief

The instability of the engineering profession is graphically represented in the Deutsch, Shea and Evans (DS&E) - High Technology Recruitment Index (HTRI) shown below. Every engineer or person considering engineering as a career should be familiar with this index and the dramatic fluctuations in the demand for engineers.

The HTRI is a national indicator of technical manpower demand and based on a monthly count of recruitment ads directed to four-year or more degreed engineers and scientists. DS&E is a national recruitment advertising agency that has been conducting research on employment, recruiting and other aspects of human resources since 1950. They have maintained the Index for 30 years.

We modified the Index to include the two additional reference lines at the 90 and 130 levels and the associated observations from studies by Robert Rivers. Rivers is a Fellow of the Institute of Electrical and Electronics Engineers, a past member of their Board of Directors and a member of IEEE's Manpower committee.

The comments by Robert Rivers highlight the periods of economic insecurity (unemployment) whenever the Index is below the 130 reference line. The curve also shows periods where our young engineering graduates are unable to find engineering employment because the demand is depressed. They may never be able to enter the profession for which they studied so hard.

However, since more engineering graduates are not getting engineering jobs and more engineers are being underutilized the original lines projected by Rivers may now be shifted by the influence of a greater supply of engineers. Rivers said, "The current recession may be worse than the recession from 1969 to 1973."

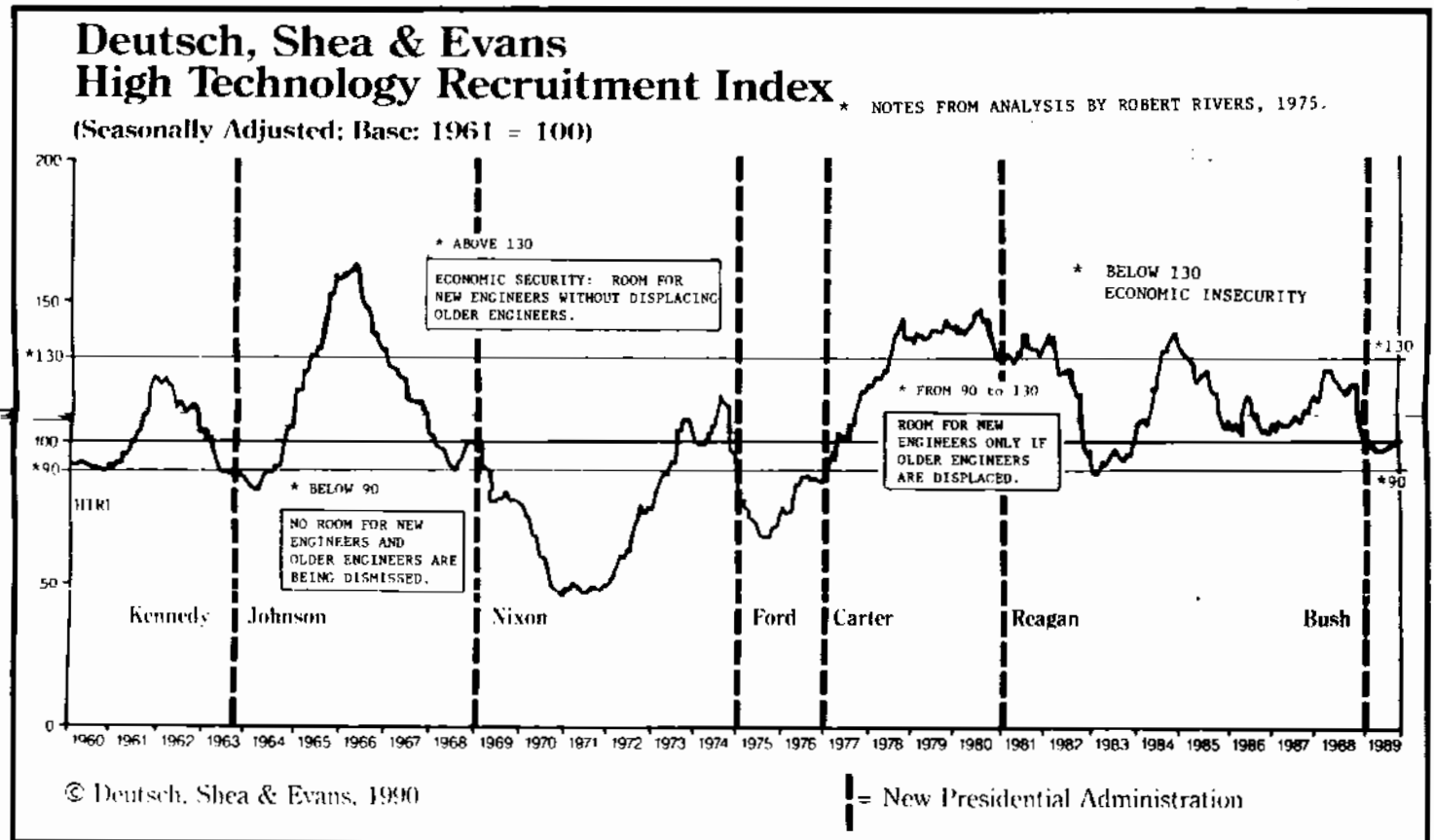
(See curve.) The increased supply is derived from the recruitment of foreign students by the U.S. engineering schools and the importation of foreign engineers. Both sources have been promoted by Engineer Shortage Propaganda (ESP) and erroneous mathematical models that only predict engineering manpower shortages. Drastic cutbacks in defense spending and the completion of engineering intensive programs such as the Space Telescope further inflates the surplus.

There are very good reasons for addressing the issue of fluctuating engineering manpower demand. First, this affects the lives and careers of all engineers, recent graduates and students who may choose engineering as their field of study. Second, this indicates that the engineer shortage reports were false and the shortage shouters were wrong. Third, this indicates priorities and budgets can be shifted from producing a surplus of engineers to investing in research and developments to maintain a fully utilized engineering community. Indeed, government R&D might be increased if it were known how many engineers are available.

The DS&E, High Technology Recruitment Index sheds light on the employment situation. Unemployed engineers and engineering graduates who cannot find engineering jobs may find some comfort in the assurance that they are unemployed for reasons beyond their control. They are facing these difficulties, not because they are poor engineers or students, but because there is a drastic manpower discrepancy between the supply and demand of engineers.

Richard F. Tax

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## Reader's Voice

We set aside this column in each issue of the "American Engineer" to allow readers to voice an opinion on any professional issue they choose. Material to be considered should be a maximum of 500 words, relevant to a current issue that affects the professional life of an engineer. It should be in good taste and not slanderous. Each submission must include the name, address, home and business phone of the writer. Except for short excerpts like those below we will include the writer's name, city and state in each published item (unless the writer requests anonymity). We reserve the right to edit each submission, as long as we don't change the gist of it, and to publish or not publish it. We assume that authors who send us material have accepted these conditions, unless they instruct us otherwise in writing.

We have a number of reader comments, from the December poll that was coordinated by Richard Tax. (See Editor's column.)

From NJ - "Great Idea to merge with AEA. If we talk it up with our associates at work, we can swell AEA membership to exceed IEEE. Let's go for it!"

From WI - "Great name, AEA - Good parallel with AMA and ABA."

From MO - "United we stand, divided we fall."

From MA - "AMA is a good model for engineers - professional organization with the interests of its members strongly advocated."

From PA - "I received this (application) from a friend. I made another dozen copies and handed them out to colleagues. Hope you don't mind." Ed. note - We don't.

From NJ - "American engineers must form (a) professional association and work together to achieve recognition and pay accorded Law and Medicine."

From NY - "In a democracy, power rests in the hands of those who participate. There are more engineers than physicians in the U.S. We can form a powerful voting block in Congress, more powerful than AMA or industry groups. I strongly support Billy Reed's efforts to 'legislate and litigate.' The objective of a professional society is to optimize the incomes of those in that profession. The objective of the engineering societies is to minimize the income of engineers. It's time to change that."

Ed. note: I agree partly. The objective of a professional society should be to optimize the environment in which the professionals earn their income. Remuneration will follow. The primary objective of existing engineering societies seems to be to optimize the position of those in control of the society and secondarily to benefit the general membership.

## Editor's Column

It had to come, and I wish it had come sooner. What? An organization that exclusively serves the professional needs of practicing, technical professionals, hereinafter referred to as "PTPs." Our organization will never be dominated by corporate executives and college professors as many other "professional" societies are at present.

Remember us (the PTPs)? We're the ones who do the technical work, plus sub-professional work like proof-reading, soldering, wiring, bench testing, expediting and standing in line at the copy machine. We were trained to be professionals, but nobody told us that we'd end up being a bunch of hired hands who do whatever we're told and get laid-off at the first sign of a recession.

The numerous other professional societies never seem to enable PTPs to obtain lifetime careers with professional treatment and adequate remuneration. (See Rivers' article.) A professional career is not one in which practitioners work their way into technical obsolescence and unemployment at the behest of the employer (because the employer gives them one year of professional work during a ten-year career span). Employers can afford to use engineers as expeditors, because they pay them so little. Adequately paid engineers would be used as professionals, with adequate sub-professional support.

The American Engineering Association (AEA) has been in existence since 1979 and was organized to serve contract engineers. In December 1990, Richard Tax, Professional Activities Chairman for the North Jersey Section IEEE, sent a ballot on behalf of AEA to the mailing lists of the late Irwin Feerst's Committee of Concerned Engineers (CCEE) and that of AEA. It asked if they would like to see a merger of AEA and CCEE. Billy Reed's column has the results which were affirmative.

As a consequence, AEA under the leadership of its president, Billy Reed, is broadening its goals to serve all PTPs. In those areas where AEA goals coincide with other professional groups or any group outside of PTPs we will, if possible, collaborate on projects of mutual benefit.

What you see in this issue are mostly articles about the problems of engineering careers, but what AEA does is what they've done since 1979, which is to expose such problems and work for improvements in careers. The persons whose names appear in this issue are on the editorial board of AEA and will also be working to secure for the technology community the careers they should have enjoyed in the first place. If you have letters or articles you'd like to publish in this bulletin, mail them to me at the address below. Our rules for publication are given in the Reader's Voice column. God speed our enterprise.

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## APPLICATION FORM

### AMERICAN ENGINEERING ASSOCIATION

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MEMBER (\$20.00)     PROFESSIONAL MEMBER (\$50.00)     SPONSORING MEMBER (\$100.00)

The difference between membership grades is the financial support and dedication to the issues. All members receive a copy of the AEA monthly publication.

SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_

Annual membership begins on receipt of Application  
Dues in the American Engineering Association are tax deductible.

## Friends Of Engineers Are In Short Supply

This is the 20th anniversary of my activity in promoting the interests of Engineer members of the Engineering Profession. It started when I was appointed Chairman of the IEEE Microwave Theory and Techniques Society and received a \$400 appropriation for a subdivision called Professional Action Committee. The activity of that Committee and many others resulted in an amendment to the IEEE Constitution that permitted IEEE to pursue professional goals of engineers and lobby in Congress. Previously it had been a purely technical society. The goals are stated in a 1985 IEEE document listing the professional needs of engineers. Two of the six needs are: 1. A lifetime career with adequate compensation and retirement benefits; 2. A positive work environment that provides technical challenges and incentives for creativity. We can give little credit to IEEE for success in meeting these goals.

Despite the goal of a lifetime career, we see significant numbers of engineers exiting the profession, starting at age 50, with a median age exit of 63. Adequate compensation has not been achieved, since salaries have been lagging the CPI adjusted figures, since the mid sixties. Retirement benefits, except for the establishment and then downscaling of IRA and some early retirement incentives to avoid age discrimination suits, have not been enhanced. Far from it, we see massive corporate recapture of retirement funds. The work environment has not been significantly enhanced, since we see continuing use of engineers in sub-professional tasks. Every effort to obtain incentives for creativity through patent reform has been stymied by industry resistance.

The above two items define areas of conflict between Engineers, the Government, Managers, Industry Leaders and Educators, where Engineers are defined as those DOING engineering. Government, through its National Science Foundation, has been a pro-

moter of engineering enrollment aimed at producing a supply of engineers "erring on the side of plenty," while other elements of NSF were promoters of gross SHORTAGE claims.

Managers and Industry Leaders are promoters of enrollments and excess supply, so that each can choose from the top 10% of any graduating class. Since most Managers and many Industry Leaders have only a 3 month optimization horizon, they have little concern for the effect of excess supply on the careers of those in the profession and those entering the profession. The need for 3 month optimization forces the decision to treat Engineers as commodities, to be selected and retained on the basis of optimum short-term price/performance. Through their membership and dominance of Engineering organization, they tend to prevent any action disturbing their desired optimization.

Educators are heavily represented in Engineering organizations. They tend to promote activities aimed at increasing engineering enrollments, even though their tenured status allows them to promote Professional goals of Engineers. Such enrollment promotes an excess supply of engineers and threatens those in the profession.

The friends of Engineers are not Government, Managers, Industry Leaders or Educators, but Engineers. And not all Engineers. Not the Engineers who get laid off, think "it must be my fault," and learn nothing from the experience. Not the Engineers whose overwhelming apathy precludes their doing anything for the profession. Not the new graduate Engineers who think "I'll keep my nose to the grindstone, and my innate genius will prevail." The friends of Engineers are in short supply.

*Robert A. Rivers*  
P.O. Box 129, Union, NH 03887.

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## SPECIAL MESSAGE - Future Issues

This is a special message to our readers. You know, we would like to keep all of you on our mailing list, keep you abreast of our activities and give you an opportunity to participate and grow with us. Unfortunately, in fairness to our membership, we can't afford the luxury of sustaining an extensive non-member mailing and provide a quality publication and progress in the professional arena. Therefore, for many of you this will be your first and last issue of the "AMERICAN ENGINEER."

To our members, we thank you for your support and your patience. We shall make every effort to make the "AMERICAN ENGINEER" a publication to be proud of. Not only will the AE keep you informed, but it shall be an important vehicle in the enhancement of the engineering profession. This is only the beginning.

Our other readers may continue to receive the "AMERICAN ENGINEER" by joining us and supporting the AEA. An application form is included in this issue. You may use this form or make a copy and return it with payment to the American Engineering Association.

## Goal — 50,000 Members in 1991

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