

The American Association of Concerned Engineers, Inc. is a national organization of engineers formed in 1990 to carry on the advocacy for improved working conditions and status of engineers as initiated by Irwin Feerst and the CCEE from 1973 through 1989.

AACE, Inc. publishes a newsletter (11 issues per year) to update engineers on important non-technical matters, to provide a forum for discussion of the issues, and to help develop responsible solutions.

AACE believes it is important to elevate the image of engineers in the eyes of society by pointing out with examples how much of our military superiority, communications, rapid transportation, efficient agriculture, low cost electronics, advances in medical techniques, banking convenience services, etc., are largely a result of American engineering ingenuity and dedication.

AACE is not affiliated with the IEEE, NSPE, or other societies. AACE recognizes the strengths as well as the weaknesses of such groups and will cooperate as appropriate but will also propose reform measures as appropriate.

Membership is \$10 per year and is open to anyone, but voting membership is restricted to engineers and scientists holding a BS degree. See coupon in last column.

SPECIFIC GOALS of AACE are to:

<> Provide a forum for the non-technical problems of engineers and scientists, and generate responsible solutions.

<> Dispel the "shortage" myth and provide evidence of the surplus and the current severe unemployment problems to outsiders.

<> Discourage the immigration of foreign engineers, especially at substandard pay levels, and also discourage the transfer of engineering, software, and manufacturing work to foreign countries.

<> Insure that the providing of professional services is directly compensated for. This means no more involuntary unpaid overtime.

<> Improve the professionalism, stature, and compensation of engineers by eliminating the industrial exemption for the P.E. license.

<> Require employment contracts for all professionals with ample notice before any termination of employment.

<> Oppose age discrimination in any form.

<> Provide portable pensions and benefits.

<> Make patent agreements equitable.

<> Place members into positions of influence in government to protect our interests.

<> Require all instructors to be fluent in English, technically competent, and have good teaching skills.

AACE is run by and for its members, engineers and scientists, particularly those working in industry and government. Members vote on officers and directors, and on changes to the bylaws. Proposing new or changed bylaws for vote takes only 10 members.

1303

Comments from readers are welcome.
Short articles (400 words max.) are invited in any format and on any subject dealing with professional issues or technology.

On all letters or articles please indicate if the material can be used for publication, and if your name may be used for attribution.

Ads from members for equipment or services are accepted at \$10. per column inch.

A complete copy of the corporate bylaws is available for \$2.

An "American ACE" tricolor button is available for \$1.

AACE, Inc. is a non-profit corporation.

TO: AACE, Inc. PO Box 667, Trilby, FL 33593.

Yes, I want to be a member of AACE, Inc.
Enclosed is \$10. for my dues for one year. If I am not satisfied, my dues will be returned.
(Life membership is available for \$200.)

I qualify for voting membership.

My degree is _____ from _____

Name _____

Address _____

City _____ State _____ Zip _____

ACE NEWS

American Association of Concerned Engineers, Inc.

\$2.00 per copy

P.O. Box 667 Trilby, FL 33593

FAX (904) 567-0433

No. 13
March 1992

ACE NEWS is for engineers and scientists who want to keep up with events and opinions on professional issues such as unemployment, immigration, pensions, licensing, and exporting of design, software, and manufacturing.

READER'S COMMENTS

Please find the renewal fee for AACE enclosed. Last year I was laid off for the second time and nearly used up my six months of unemployment compensation before I found a job that is more than 60 miles from home. I find although I am only 32 I am less attractive to companies due to an anticipated higher asking wage.

In today's marketplace, the most important thing to cost-sensitive management is what a person costs per hour with little regard to overall experience. A newcomer to industry is much less expensive. Experience is replaced with new help rather than training the experienced worker. Short-term costs are lower with little regard to long term implications.

Our lack of competitiveness through short term investment leads to fewer jobs and a deteriorating tax base. Red ink in the Federal government causes cuts to be made in education, medical initiatives, etc. Reducing interest rates [reduces] government interest income [from the income tax]. Banks are [not loaning money]. Manufacturing industries rely more on the infusion of foreign capital and technologies to make them competitive. We are losing our ability to manufacture things.

More needs to be done to inspire investment in manufacturing. Manufacturing means more decent jobs that can be moderately taxed to create a more solvent government as well as better share the medical insurance burden. Manufacturing jobs spur creativity of real products which make the U.S. a powerful force in the world.

As a source of long-term low-interest funds, full deduction of the IRA would create a supply of funding that must be used for manufacturing within U.S. borders only. The lost IRA revenue [lost to the Gov't] could be replaced with an additional charge at the gasoline pump (another nickel per gallon).

If we continue to shrink our demand for engineers and scientists, and push the service industries, why should we bother advocating a science and math education for these types of jobs? Certainly they will be disappointed when they graduate and find a lackluster job market with no support base in manufacturing!!

If our government continues to claim "free market" and ignore the consequences of an uneven "playing field", the export of US jobs, and the diminishing middle class, then our government is neglecting some of its basic missions: "to PROMOTE THE GENERAL WELFARE" and "INSURE DOMESTIC TRANQUILITY"!

Joseph T. Cioletti, P.E., Pittsburgh, PA

[The above was abstracted from an 8-page paper on the subject which was sent to various political leaders by Mr. Cioletti.]

[Excerpts from a copy of a letter sent to a TV station by M. Sosa].

I watched your show [Caucus New Jersey] of Sunday, Jan 5, with amazement. In this show, in which you discussed the shortage of engineers and scientists in USA, you did not respect engineering enough to invite a working engineer to the panel. I do not mean a board member from organizations which claim to represent engineers (but do not) such as the IEEE. I mean members of organizations that truly represent engineers such as (AEA) and (AACE).

How can anyone, of any intelligence at all, believe that we have a shortage of engineers when all you have to do is open the newspapers. On a daily basis you will read about hundreds and thousands of engineers being laid off.

Students will start picking engineering careers when engineers are not laid off after age 40, when salary growth is not flat after 10 years, engineers are treated with respect by managers and executives, engineering opinions are respected in corporate decision-making, engineers are not treated like cattle, and engineers are paid commensurate with the difficulty of the course work involved. Miguel A. Sosa, Tinton Falls, NJ.

Last year there was a layoff at our division. We noted that most of us were in our 50s and 60s. We put together a list of those laid off and found that over 90% of the group was over age 40 and the mean age of our group was 54. We then consulted a legal firm which specializes in employment law. They have taken our case on a contingent fee basis. They will receive one-third of any settlement. Since this case will end up in court, I cannot permit use of my name. [ACE NEWS has the name; this was not an anonymous letter.]

A C E N E W S

American Association of Concerned Engineers, Inc.



P.O. Box 667 Trilby, FL 33593
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The AACE newsletter is aimed at engineers and scientists who want to keep up with events and opinions dealing with employment such as immigration, licensing, portable pensions, overtime compensation, unemployment and layoff data, also loss of jobs and loss of future industrial capability due to exporting design and manufacturing work. AACE also provides occasional technical articles and tutorial material.

Reader's Comments

My husband was laid off in Jan after 19 years as a M.E. He is 48 years old and we have 4 children ages 9 to 17. Presently he is stacking shelves at a local supermarket at \$4.50 per hour. All the companies want young men that they think would work for less. However what they are offering young men would be more in some cases than what his salary was. I feel we need to lobby for some sort of job insurance after so many years of service. N.W., OH

I see absolutely no evidence of a shortage of engineers. Ask some engineers in Massachusetts about this - their ranks have been devastated. Every engineer who is still working has an empty desk next to him. I am so sick of the "employer paid ads" placed by state agencies. many of these list every detail of the immigrant's resume' as a "job requirement" so that almost no one else can qualify, then listing a salary so low that nobody would bother to try. Some of the worst of these ads appear in the IEEE Spectrum.

I have taken a position at reduced salary in order to keep a job. I expect to be replaced with someone younger and less cost within the next two years. They will get what they pay for. The customers will suffer and the quality goes down. [Name withheld]

From a letter by F.S. to *The Institute*, a publication of the IEEE.
"Are we the dues paying members of the IEEE not entitled to an appropriation of another \$120,000 of our money ... to buy equal space ... for advertisements to demonstrate... that **'There Are No Shortages of Engineers of Any Skills in the United States.'** ... For whom does the USAB speak, ... who does it serve? Why not serve its members needs? Should we make the USAB assessment optional? Without it our dues would be \$24. less come January, 1992." Frank Smerke, CA.

ACE NEWS

American Association of Concerned Engineers, Inc.

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P.O. Box 667 Trilby, FL 33593

FAX (904) 567-0433

Vol. 2, No. 1

Jan. 1992

ACE News is for engineers and scientists who want to keep up with events and opinions on professional issues such as unemployment, immigration, pensions, licensing, and exporting of design, software, and manufacturing.

Bad news from Mass.: April '91 - 2400 engineers were collecting unemployment. In Sept. this has increased to 3449! From an estimated base of 66,000 engineers, 5.2% unemployment rate! We are beginning to get low price labor certification ads. (BS in Computer Science + 2 yrs, \$28,500). Did you see Frontline "Losing the War with Japan"? Its very disturbing! John Densler, MA

On Oct. 20, 1991 I responded to a "Help Wanted" ad in the Cleveland Plain Dealer. By degree and 26 years experience I qualified. In the response the company stated "___this position is for entry level personnel only. This assignment is for a person with lesser ability than yourself." I wrote back that "I want to emphasize that I am ready and willing to accept an entry level position." My latest letter has not been answered. AARP believes that claiming overqualification as grounds for refusal to hire is a pretext for age discrimination. [From a letter by Robert Rich, OH, to his Congresswoman.]

I have been out of work now for 16 months. I have a BS degree in EE and after 20 years at the defense firm I was laid off. Since then I have mailed out 300+ resumes and taken classes in nearly a dozen computer and job broadening skills. I can count on one hand the number of interviews this has brought me. I have applied for everything from a photo delivery man's job to a zoo keeper, to a RF design engineer; so you can't say I've been too picky. I have had classes in resume writing and interviewing skills. I have a neat appearance, good verbal skills, do not smoke, drink or take drugs, have a spotless arrest and driving record and am within 10 pounds of my correct weight. - So what's wrong?

It would appear that it is a crime in this country to be over 45 years of age! Just last week someone from the U.S. Justice Dept. called my outplacement center and requested the names of persons under 37 years of age to interview for clerical jobs they had open. - I thought this was illegal. It is inconceivable that any clerical job would be too strenuous or stressful for someone over 37! (This by the way is the FAA's excuse for not hiring anyone over 35 to be an air traffic controller - but its OK for a 60 year old to pilot a jet with 300 people on board to a landing in a thunderstorm, or a 49 year old to pilot the Space Shuttle.) In July a large local electronics firm announced a layoff of 3200 within 90 days, while offering employees over 50 with 15 years of service an early retirement package. To date 2000 people took it and have retired. These 2000 will not show up on any layoff or unemployment statistic. The company will save \$15 million in unemployment benefits, and gets to announce that only 300 were laid off.

Jobs for people 45-65 are being dumped because employers don't want them in their health care plans. Layoffs are disguised as "early" retirement to get around age discrimination laws. People 45-62 who have lost their jobs are being strangled by high health insurance premiums or refused coverage for preexisting conditions. When I lost my job my medical insurance premium went from \$28 to \$302 a month, at a time when I could least afford it and at an age when it could mean financial ruin or death not to have it.

I think much of age discrimination is rooted in the health care issue. A national health care plan would help a lot but this is years down the road. Wayne Montgomery, Richardson, TX.

You should make the ACE News available to all politicians in DC including the President, so that they are made well aware of the plight of the engineers in the great USA.

I personally experienced 10 layoffs over a 35 year career, and thus do not have a pension. Several years ago one of my employers advocated giving preference in hiring to "Orientals Engineers". This was even implemented by a memo to make sure everyone was aware of the situation.

Another employer censored incoming mail. Letters were opened by the secretary to the General Manager, and whenever anything including trade magazines was not agreeable to the management, it quietly disappeared. At the same company engineer's reports were edited to make sure anything published was politically correct with the General Manager who was mainly interested to hush and flush embarrassing statements.

Another employer expressly forbade engineers to talk to vendors and reps under the threat of firing.

Corporate America is in need of a great reorganization if we are going to compete on the world market.

John Renault, Indianapolis, IN.

* * * * *

The shortage of scientists and engineers: crisis or hype? By Dennis Chamot in *Interface* Fall, '91 [Brief excerpts given here]

The number of US scientists and engineers in 1988 was 5.3M according to the NSF. The BLS (Bureau of Labor Statistics) using a different definition of those employed, counted 2.25M. [Quite a difference!] In any event, the number has doubled over the past decade. Even so, various leaders in education and the technical communities including the NSF itself have raised the specter of a looming shortage of technical professionals. If a shortage exists, one would expect to see an effect on salaries. [But] real salaries corrected for inflation did not increase at all from 1972 to 1990. If anything there was a slight drop.

Foreign students received about 8% of the BS engineering degrees, 29% of the MS degrees, and 49% of the Ph.D degrees in 1990.

In 1988, the NSF counted 193,000 new BS grads in engineering, physical, and biological sciences; 49,700 MS degrees, and 15,100 Ph.D degrees, for a total of 258,000 new degrees.

In the year 2000, the BLS (Bureau of Labor Statistics) projects employment of 2.9M engineers and scientists. That's 25% or 700,000 more than they counted in 1988. Assuming 1/40 of the work force will retire annually, we will need (by 2000) 800,000 additional professionals. Yet, during this period two million will have been awarded degrees. Furthermore, we can also anticipate 100,000 immigrants to enter the work force as well. (This number could increase substantially under the newly revised immigration law.)

[Actually, about 100,000 per year are expected, for a total of 800,000 by the year 2000. This is not counting illegal immigrants from Central America and Asia. Neither does it count the 5% unemployed engineers and scientists, about 110,000 good people.

From the above, the expected demand is 800,000. The supply to meet that demand is 2M new grads, 0.8M immigrants, and 0.11M unemployed, for a total of 2.9M. The demand of 0.8M is met with 2.9M available! There will be 3.6 engineers and scientists available for each opening! This correlates with my article in NL#6 in which I showed that there were 3 engineers available for each opening. Ed.] So where is the concern about shortages coming from? Who benefits from the surplus? Clearly not the scientists and engineers. I suggest two sources. One is certain elements of the business community who want to pay low salaries and want to convince the Department of Labor that shortages exist so they can hire foreign engineers at less than going rates of pay.

The other source of complaint, and by far the most vocal, is the university establishment, which is having trouble attracting American students and are relying heavily on foreign talent for new faculty. The problem is the universities and NSF have generalized their view of [what they claim is] the "crisis".

I'm convinced there is no general shortage today. I don't believe there will be one in the foreseeable future. Lets look at the evidence and concentrate on the real problems. [Write to R. Jones, Immigration Task Force, Dept. Labor, 200 Constitution Av, Washington, DC 20210. To get more detailed info on immigration, write for a sample copy of the *Immigration Report* to FAIR, Box 96452, Washington, DC 20077.]

ACE NEWS

American Association of Concerned Engineers, Inc.

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The ACE newsletter is aimed at engineers and scientists who want to keep up with events and opinions dealing with employment, such as overtime compensation, licensing, portable pensions, immigration, unemployment, and loss of future industrial capability due to exporting design and manufacturing work. ACE also provides tutorial material and occasional technical articles.

Reader's Comments

The above *Forbes* article was answered by one of our members, Nathan Aron of Laguna Hills, CA. In his reply, he pointed out that:

"Industry and academia have perpetually complained of a shortage, even as engineers were undergoing lay-offs by the thousands. ...industry never treated the engineer as a professional and the program lost its luster to medicine, law and later the MBA.... Engineering exhibited a cyclical employment pattern over the years which disenchanted many engineers to the point where few parents encouraged their offspring to study engineering.... The influx of foreign students helped alleviate the classroom shortage.... The colleges ...found the lower paying teaching positions acceptable to the foreign graduate who now fill many of these positions on our engineering and science college faculties. Industry too, suddenly discovered a trained technologist who was willing to work at a lesser salary.... Your article ... is an injustice to our engineering technologists. We need to encourage, not discourage our young students to consider engineering.... your conclusions are not consistent with the statistics shown on p2 of the enclosed article from the *ACE News* of May, 1991... For a demand of 100,000 engineers we have a supply of 273,000, almost 3 engineers available for each opening."

Editor: Thanks to Mr. Aron for his rebuttal letter to *Forbes*. We need more of you to take pen in hand and reply to these outrageous articles. The idea of a "shortage" is beneficial to academia and to industry because it reduces their labor costs by taking advantage of low cost immigrant labor at the expense of our own citizens. We don't need to import more engineers, either for academia or industry. We need better utilization of those employed: we need jobs for the unemployed among us: we need to maintain the U.S. culture and ethical standards: and we need to reduce the costs of overpopulation which is only made worse with vast numbers of immigrants each year.

From D. Boye, Orlando, FL. "There is a crisis in engineering education originating from the anti-intellectualism of American society, demotivation of student interest in the sciences, industry's tendency to not cross train its existing engineering talent, and government inaction in programs to enhance engineering careers.

Engineers need to be encouraged to teach math and science in the schools. Corporations need to cross train their engineering staff as technology changes. Professional societies need to promote the engineering professions. A team of government, industry, and academic representatives should develop policies to address the above issues and create programs that are reasonable."

From G. B., MD. "Since mid-March 1990 I have been walking the streets. There are so many qualifications that I have that are, at the same time, unique that no one wants to interview me let alone hire. I have a three inch thick binder full of rejection letters, none of which say overqualified, over-age, over-paid, or the like. These types of replies are never put in the letters but the effect is the same; no interview, no job opportunity regardless of the willingness of the individual to work for less salary or benefits. I have tried virtually every method to convince a prospective employer of my cost effectiveness. Whatever has happened to the idea that older workers are more productive, less frequently absent, and require fewer training hours? Is it that the MBA's have taken over? Are they going to be the ones who direct the use of certain 'O' rings for the space shuttle? Bitter? You bet!"

From S.T., OH. "I am 36 and after several successful years in industry I went back to school for my PhD in EE. While there, I noticed that the department was overrun with foreign students, many of dubious quality, and most want to stay.

I graduated last year. I could not find a job even with a 3.67 average and a world class advisor. I noticed most foreign students had an easier time of it, albeit at lower pay. After nearly a year, my department hired me at 26k mainly to help a foreign student finish his MS. He wants to stay even though he's the WORST student I've ever seen. (I have since obtained a reasonable job in my field).

As long as Washington encourages an open door immigration policy, all Americans, especially engineers, will suffer. Since the mainstream engineering societies are not making this a major issue, it seems that other groups, such as yours will have to pick up the slack. Count me in."



No Shortage in Research except for Dollars

(From remarks by R. White, President National Academy of Sciences)

"On the basis of NSF data, the average professor has five doctoral students under his tutelage at any given time. If only two complete their work each year, and only one third go into academic research, then there is about a 15-fold replication over 20 years of those seeking research careers in academia. Increases in R&D expenditures, generous by any standard, have not been able to sustain the resulting increases in the academic R&D population.

This situation is at variance with the conventional view of supply and demand for scientists and engineers. That view projects a mounting 'shortfall' of gargantuan proportions - based on NSF estimates.

It [shortages] is clearly not true today for R&D investigators in academia taken as a whole - predictions of shortages notwithstanding.

In the past decade the number of scientists and engineers in the U.S. nearly doubled to 4.6 million.

The most pressing shortage is of money to support academic research, not of scientists and engineers. The fact is that there are just too many science and engineering investigators chasing too few dollars. The inevitable is taking place - pleas for more funds; a speeding up of the proposal treadmill; and the growth of political lobbying by scientific groups, each seeking its own ends.



ACE NEWS



American Association of Concerned Engineers, Inc.

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July, 1991
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The ACE newsletter is aimed at engineers and scientists who want to keep up with events and opinions dealing with employment such as overtime compensation, licensing, portable pensions, immigration, unemployment and layoff data, also loss of jobs and loss of future industrial capability due to exporting design and manufacturing work. ACE also provides tutorial material and occasional technical articles.

Survey Results

This is an update on the survey in newsletter #7 to obtain information on the Immigration Act of 1990. The survey and follow up is being done by Cynthia Walsh of Albuquerque. Note: this data is copyrighted.

The results show that 100% of respondents favored having the Department of Labor hold public hearings on the "shortage" and on their rules to allow the hiring of aliens. 100% of the replies said that there is no shortage of engineers and scientists. 92% said they are willing to take additional courses or training. 58% said that they had foreign instructors and rated them as "poor" or "very poor". 94% believe that companies that have been downsizing should not be allowed to hire aliens under the Immigration Act of 1990. However, in Cynthia's conversations with the Dept. of Labor, they said that downsizing of companies would not have any effect on that company's hiring of aliens!

A more complete report is in preparation. We need more survey replies. If you haven't sent in the form in NL #7, please do it soon. Cynthia Walsh can utilize the information in her report to the Dept. of Labor since the Dept has slipped their schedule several months. Copyright, AACE, Inc., 1991
Thanks again to Cynthia Walsh for her outstanding efforts on this subject.

On a related topic, if you have experience in government regulations, please call Cynthia at 505-298-0632 after 6PM MST to help prepare guidelines for the Dept. of Labor on enforcing immigration laws. She will get you started.

"Over the past 20 years in the medical equipment field I have seen the term "Field Service Engineer" at first creep into our language & then explode as it became an accepted part of our business. Anyone who could pass a 2 year technical course, use a screwdriver and learn to read a digital voltmeter could become a Field Service Engineer. Over a number of years these "engineers" learned to service a specific line of equipment and proudly sport the name Service Engineer. The hospitals and doctors now call these maintenance men "engineers". They have significantly degraded our image. In many hospitals the maintenance department has been termed Engineering. A large majority of the personnel in these departments have not taken any engineering courses and only in the larger hospitals will the manager have any familiarization with engineering studies. I am very much for legally limiting the use of the term "engineer" to a person graduating from a recognized university. I have been concerned about this matter for a number of years but knew of no one previously that was seriously trying to do something about it."
E.H., FL

"I recently read the newspaper article about companies forcing experienced engineers to retire early. I believe I fall into that category. I am an EE who was forced to "retire" after 29 years of service with one company. I was caught up in a series of business contractions, each of which resulted in a downgrading of responsibilities. Finally I was released because my salary and job responsibility didn't fit the position. It has been a year since I was laid off, and I am still looking for work. Once senior employees are on the job market nobody seems to be interested. I am sure you know that as well as I do."
D.K., NM

"I read an article in the *Atlanta Journal Constitution* this week about your association. It's great to hear that someone has finally become concerned about the plight of engineering, and especially the older engineer in this country. I am a 41 year old BSChE, with 20 years experience in the chemical process industry. I am presently working on contract, but have been recently laid off from a design firm, like many other engineers."
M.G., GA

"At 48, having been thrown out on the street with 4 hours notice to 'clean out my desk' after saving the corporation \$3,000,000 in raw costs, you can rest assured I have adequate motivation to support AACE membership growth any reasonable way possible." D.D., MN

"After reading about 'throw away engineers' in the *St. Pete Times*, I felt compelled to add my story to the ever-growing list. With 22 years experience in communication systems, and 12 years exemplary service with XX Co, I was told my services were no longer needed in March 1990. Two other engineers not let go had 1 year and 4 years with the company. I was the only engineer trained and familiar with every piece of equipment on site. I was assured by management that it was purely a business decision and did not in any way reflect on my job performance. There was no offer of relocation which they offered to others on previous lay-offs. Although the severance allowance was generous, I was not allowed to take my retirement or savings and they offered no help with a placement service. Loyalty is dead in America and I now seek employment with foreign (read Japanese) telecommunications companies. My search has been long and as yet unsuccessful and would appreciate any help the organization ~~could~~ give. I would certainly be interested in any information concerning companies hiring for the reconstruction in Kuwait." C.S., FL

From *Engineering Education* May/June 1991, p.454, an article by Mac Van Valkenburg.

"There is a great exaggeration in the media about the future shortage of engineers," according to a news release from the American Association of Engineering Societies. As an example, it cites a small city newspaper as saying, "The US could experience a shortage of 750,000 scientists and engineers by the year 2000." The AAES Engineering Manpower Bulletin (Oct '90) traces this statistic to an unpublished report by the National Science Foundation. In the case cited, the wrong assumptions about demand has led to serious errors.

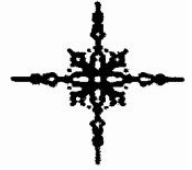
We often claim that engineering education is the liberal education of the present. Some believe that we should, for this reason, deliberately educate more engineers than industry needs.

From *The Scientist*. April 29, '91 Analysts Debunk Idea of Scientist Shortage. Citing Defects in Current Economic Models

The popular notion that the US is on the brink of a huge shortage of scientists is not correct, according to many statisticians and labor economists. Predicting a shortage, they say, requires the ability to estimate both the demand for and the supply of scientists. And that's beyond the capability of existing economic models. "We hold that forecasting and projecting supply and demand for scientists and engineers is largely a wasted effort," report U. AZ researchers Leslie and Oaxaca in a recent study funded by the NSF. "Even if you knew all the factors that affect supply and demand, which we don't, there is a randomness about the data that you can't eliminate. And it gets worse the farther out you go."



ACE NEWS



American Association of Concerned Engineers, Inc.

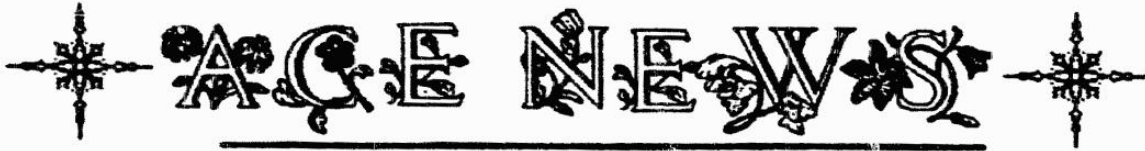
Vol. 1, No. 7

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June, 1991
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The ACE newsletter is aimed at engineers and scientists who want to keep up with events and opinions dealing with employment such as overtime compensation, licensing, portable pensions, immigration, un-employment and layoff data, also loss of jobs and loss of future industrial capability due to exporting design and manufacturing work. ACE also provides tutorial material and occasional technical articles.

Math Ph.D.s looking for work are finding that economic factors have created a glut of applicants. In other words, a surplus. In addition, political factors, mainly the influx of mathematicians from Russia and Eastern Europe, plus the large number of Chinese students who remain in the U.S., are combining to generate a large surplus. The immigration Act of 1990 will add to the chaos starting Oct. 1, 1991. Not only math is in trouble. The physicists, chemists, and biologists (PCBs), and the zoologists, anthropologists, and geologists (ZAG), as well as engineers, are hurting.



American Association of Concerned Engineers, Inc.

Vol. 1, No.6

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May, 1991
\$3.00 per copy

The AACE newsletter is aimed at engineers and scientists who want to keep up with events and opinions dealing with employment, such as overtime compensation, licensing, portable pensions, immigration, unemployment, and loss of future industrial capability due to exporting design and manufacturing work. AACE also provides tutorial material and occasional technical articles.

Competition for Jobs

THE DEMAND. In 1989 there were 1.8M working engineers plus 850K in math and computer science. (U.S. Dept. Labor, JAN 1990). Assuming a career lifetime of 35 years, this equals an annual replacement rate of 3% which is 80,000. To this add about 20,000 new engineering jobs created annually, and the total demand is about 100,000 per year.

THE SUPPLY (a) During the 89-90 school year, there were 73,000 foreign students in engineering, and 36,000 in math and computer science, for a total of 109,000 foreign technology students. Assume 20% (22,000) of these students remain in the U.S.

(b) The new immigration bill (SS359) will bring in 120,000 more engineers and computer scientists each year.

(c) There are about 150,000 new grads in engineering each year (Engineering Educ. Oct '90). The number for math and computer science is not available.

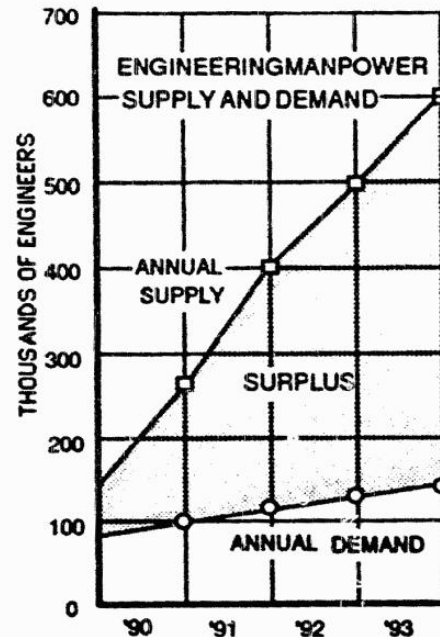
(d) Since the current unemployment rate among engineers is at least 3%, that means there are now about 54,000 engineers idle and available.

Therefore, we have 22,000 foreign students, 120,000 immigrants, 77,000 new grads, (150k-73k) and 54,000 unemployed available as the supply, total 273,000.

The demand is 100,000, the supply is 273,000. There are 3 engineers available for each opening. The situation is the same for physicists, mathematicians, etc.

THERE IS A SURPLUS. THERE IS NO SHORTAGE!

Next year the demand will be about the same, but the supply will increase to 400,000, the next year to 500,000, etc. Each year will see a larger supply, the average salaries will decrease, and the unemployment will increase. This is the law of supply and demand.



The graph above shows how the surplus is increasing each year. Send this article to anyone who claims there is a shortage or there "will be" a shortage.

THERE IS NOT GOING TO BE A SHORTAGE!

There are two other factors operating against any future shortage: the European common market which will reduce the demand for U.S. goods; and the Bush Free Trade plan which will result in many more jobs going to the low labor rate areas of Mexico, including design and manufacturing.

The overall effect of the surplus will be to discourage U.S. students from entering engineering or science. They will go into the "service" occupations such as law or business administration or banking. As we turn over our design and manufacturing to others (Japan, Mexico), and turn over engineering to immigrants, many with loyalties elsewhere, we will become weak industrially and financially, and increasingly dependent on foreign labor. You should write your congressmen about this. Include a clipping of this article.

SUGGESTIONS

Obviously, many highly competent engineers and scientists will be out of a job and will have to go into other fields of endeavor, such as teaching, writing, medicine, or one of the trades. If you are one of the unemployed, offer to work part time, or on a job basis, or as a consultant. You may have to work for peanuts, too, at least initially, to get a foot in the door. Consider starting your own business, or going into another line of work. Investigate contract engineering. If you now have a job, make yourself indispensable at work. Stay ahead technically. Assume more responsibility. Cultivate relationships. Blow your horn. Let your boss know all the things you did last month, especially the things which will help him to blow his horn, too.

At the same time, assume you will be terminated. Prepare for the worst, and do it NOW. Build up savings. Eliminate all non-essential spending. Collect samples of your work. Be aware of the competition, you may someday want to apply to them for a job.

MORE ACTION SUGGESTIONS

Write to your politicians and offer suggestions. Such as reducing immigration. Such as requiring foreign students to return home. Such as reducing the export of jobs, and reducing the import of foreign products. Such as encouraging the states to eliminate the industrial exemption for P.E.s. Such as publicizing the surplus of engineers. Such as improving the public image of engineers.

STILL MORE ACTION SUGGESTIONS

Eng the IEEE to become active in these professional areas. So far they have not achieved much of anything, although some of the leaders are getting concerned about their \$\$ ties to corporations vs their duties to their members. Join with others like yourself to gain strength through numbers. Join us. We are member-driven. We are non-profit. We are growing. Join us. We need you and your ideas. AACE, Inc. PO Box 667, Trilby, FL 33593

Out of work?

Repeating the note in NL #5: Keats Pullen, a director of AACF, is collecting data on those out of work. Send him your brief resume and info on your layoff situation. Also, he is looking for material for technical monographs which we will make available to members to extend our technical half-life. His address is 2807 Jerusalem Rd. Kingsville, MD 21087

The Shortage Situation

Too often we think of the shortage and unemployment situation in abstract terms and statistics. Here are excerpts from a letter giving some of the details of the problem in real life. Thanks to Cynthia Schneider, NM, for her letter about her husband's efforts to find work.

"My husband has a PhD in plasma and atomic physics with background in space, astrophysics, non-linear optics, math, and computer science. He graduated with a 3.9 GPA out of 4.0. Since graduating in 1984 he has been laid off, but friends helped him obtain employment at another company, but this position is in great uncertainty. At his current position he was required to purchase his own computer to do his work. We spent over \$4000 one year trying to find ANY employment ANYWHERE in the U.S.!

"Why would any sane American student want to enter the sciences? The -----labs in New Mexico have been closed to hirings over a year and they have been terminating hundreds of scientific jobs with hundreds more yet to come. What are we to do with our scientists and engineers who cannot find employment? And when the floodgates open this October under the 1990 Immigration Act what a total nightmare for American scientists and engineers. (Congressman Jack Brooks of Texas stated on the house floor Oct 26, '90 that the American public would be outraged if they knew what Congress was trying to sneak past them..)

"I know three MSEE's unable to find employment for over a year and have since returned to college to retrain out of engineering. Many engineers that I know have applied for employment in France, Japan, and Hong Kong. Others are applying to work for the FBI, GAO, etc. I can name well over a dozen student engineers who are changing to law because of the non-existence of engineering jobs.

"Computer programmers I know are also losing their jobs, some because of the economy and others because of "outsourcing" of programming jobs to third world countries.

"NASA runs FIVE page recruitment announcements on college campuses. The problem is that NASA does not have the funds to hire anyone. The _____ company runs massive ads but has terminated 20,000 jobs in 12 months! The _____ company runs 2-page ads but hiring has been frozen for over a year, and it has terminated some 230 jobs in the past 15 months.

"Perhaps you think there are faculty teaching positions. Well, colleges are getting hit with tremendous numbers of unemployed scientists and engineers, with 200 to 800 applicants per job announcement. This situation should get worse this October when the Immigration Act allows the recruitment of aliens for faculty positions.

"My husband, while working for the U.S. government as a PhD, was "requested" to paint his own office, the government provided the paint and brushes.

"Dr. Allan Bromley, the national science advisor to President Bush, stated that he had companies beating down his door looking for PhD scientists. We wrote to his office asking for a list of those companies and never received a response. Others who have written to Dr. Bromley have found that his office is finally realizing that there are not those alleged jobs after all. Slowly, his office is coming to realize what the real world is like for America's scientists and engineers.

"I recently attended my university's National Engineering Week. It was a depressing experience. By far most of the senior engineering students have received NO job prospects.

"Recently a company was found to have developed an in-house computer program to kick-out names of employees to be fired before they were fully vested in their retirement plans.

"The _____ Company was asked why it was recruiting just after it had terminated so many employees. The company said that those with 5 or more years of experience were unwilling to re-train for new positions - at HALF their salary. Companies want loyalty from their professionals but at the drop of a hat they will replace them with inexperienced persons."

More Comments from Readers

In these comments I have made extractions and minor changes for brevity. Names are used unless requested otherwise. The * denotes a new comment start.

* I would like to join your organization and receive your newsletter. (Check enclosed). As an architect for over 33 years I can assure you that your organization is truly needed. Both architects and engineers are being taken advantage of with lower wages, loss of benefits, no future. There also appears to be no one group that really represents their mutual interest. The so called professional societies, (NSPE, AIA, etc.) although they claim mass membership, only represent the interests of the owners of the firms.

Age discrimination is a real problem. It can be demonstrated in many ways, including lower wages, lack of promotions and just general poor treatment. If there is anyone in the Cleveland area who represents your association, please advise me, that is if you'll take an Architect.

The Federal Government is the biggest offender of the registration laws, in that they don't require licensing and employ thousands of people who are "titled" both as engineers and architects. These people often lack any formal training or experience. R. G. T., OH

* For at least the past 10 years the various technical and professional organizations such as IEEE and NSPE have ignored the underemployment problems facing the working engineer. Rather than aid their members, these organizations have spent their resources supporting the needs of corporations and special interests. The working engineers, realizing that their interests are not being represented, have dropped out of these organizations. Working engineers still need representation. To date there has been no organization which meets these needs. AACE is a coalition of desperate engineers who are very discouraged with the present surplus situation. The hope engineers have is for such an AMA type organization to develop and lead the engineering profession to a new era of prosperity. R.J. Town, Houston, TX

The following is from a letter by D.F., MA, to the Editor of R&D magazine, Robert Cassidy. Mr. Cassidy had an editorial in R&D stating that there would be a "Shortfall of as many as 750,000 [technical professionals] by the end of the decade." Mr. D.F. replies: * I regret you have chosen to perpetuate the myth that there is an engineering shortage either now or looming in the near future. I refer to the editorial in the Jan '91 issue of your magazine. There is no shortage of engineers, there never was one and there isn't going to be one for decades to come, if ever. If you don't believe that, pick up the classified section of any newspaper in this country. Days go by without a single ad for any engineering job from any company. High tech development work is being lost to overseas competition, and defense R&D is down. The influx of foreign graduate students provides a ready supply of engineering manpower that undercuts domestic employment and more than meets the demand for new engineers.

The following is from a letter sent to John Densler, by an engineer. John is a member of AACE and is very active in the Boston IEEE PACE. John forwarded the letter to Michael Myers, Subcommittee on Immigration and Refugee Affairs, 520 Dirkson Bldg., Wash, D.C. 20510. This is another good address to use for your letters on the "shortage".

* There is a certain group in the WANG Laboratories ___ department which contains 8 full time software engineers and 10 engineers from India under a one year contract. Wang has laid off [U.S.] engineers and kept the contractors. The only reason I can figure why they are retained is they must be paid substantially less. When I have 5 close senior software friends out of work for over a year each, I cannot see allowing this displacement to occur. For reasons of fear and retribution I am remaining anonymous. I am still working at Wang. (Name withheld by request).

Comments from Readers

The following comments are taken from letters received by Keats Pullen in response to the Joyce Lain Kennedy article on AACE which requested comments on employment problems.

1. I was intimidated into taking early retirement from ____ at age 53 in 1985. My engineering contributions are considerable and can be documented. Essentially everyone over the age of 48 was eventually driven out of the company over a two year period. To add insult to injury, I was denied health benefits. I seriously considered contesting in court, but the legal costs would be prohibitive. Many of the displaced engineers were replaced by foreign immigrants. Their ability to perform certainly can be questioned.

2. I am a 55 year old M.E. with about 25 years experience in the plastics industry. Six years ago, I took a job with ____ Corp., a manufacturer of vinyl siding, building a new plant. My title was plant engineer and for the first three years I was the only engineer on site. During these years this plant became the production and quality leader of the company. During the fourth year of operation, the plant was sold. Personnel replacement and downsizing began. I was given 6 months severance with benefits in return for my resignation. I believe my age was a big factor in my layoff.

3. I am 49 years old. My job as chief engineer was eliminated. I had to sign a separation agreement to receive any severance pay. The company retained an India born tool engineer who recently became a U.S. citizen.

4. I lost my job this Jan 16 due to a reduction in force. I am 50. The thing that bothers me the most is our government's lack of concern. Similarly our news media is totally unconcerned. Major technology is being dispersed or lost. Yet we are behind the Russians in space physiology, behind the French in launch capability, behind the Japanese in electronics and auto production (and who knows what else), and behind the Germans in general research. Our schools are a mess. We can't make a TV or VCR. We are selling our country to foreign interests at a horrible speed. Now we are killing the technology base and no one cares!

5. I read about your organization in the Minneapolis Star. I am 44 years old, a software engineer, and have now virtually finished a MS degree in software design. I have been out of work for 18 months. The degree seems to make no difference. I cannot find any work, much less that commensurate with a M.S. degree.

6. I am presently unemployed. My former company hired two untested engineers for about the same price as a seasoned veteran. I had at least 10 years seniority, but was laid off at age 58, two months after the two replacements were hired.

The same thing happened to a few of my friends. Some sued the company and have been awarded good settlements by the courts. I decided not to sue within the 180 day period because my background allows me to get contract jobs once in a while, and a good reference helps. However, there are no benefits in the job shop circuit, and I do not have health insurance or retirement benefits. The waste of our most desperately needed resources -- intelligence, skill, dedication, experience and creativity -- is a national disgrace and will surely turn this nation into a third world country. Please keep me informed of your progress in countering this collective stupidity.

7. I am a BSME, 42 years old, with 20 years of experience. I was laid off in Aug, 1988. Since then I have not been able to find a decent full time job. If a company is hiring, they hire new graduates or those with their degree within the past 5 years. My jobless situation could be related to being over forty.

THE PROFESSION

WEPAN: count on women to fill

By MARGARET RYAN

Women in the United States are expected to fill the gap. The number of women enrolled in engineering courses steadily increased during the ear-

schools and universities to produce more women engineers.

The number of white males is expected to decline over the next 10 years, leaving women, along with minorities, as prime future sources of science and engineering talent.

Women have begun to fill the gap. The number of women enrolled in engineering courses steadily increased during the ear-

late pre-college programs to educate young women about engineering. Also, young women don't realize that is important to continue science and math studies in high school and college, Malcolm said.

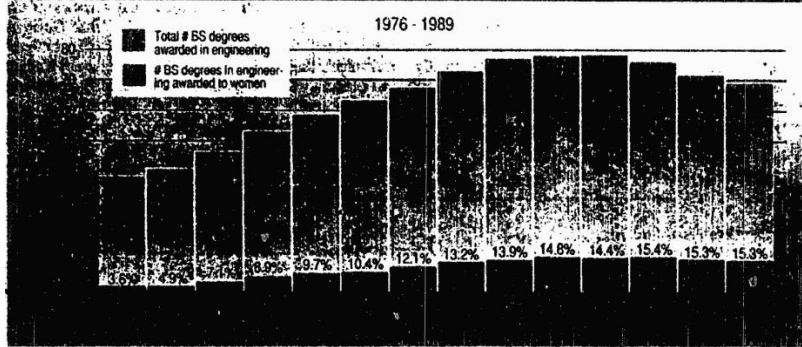
"You either get people in engineering in the beginning, or you don't get them at all," she continued. "People don't transfer into engineering."

They coordinate activities geared to help women engineering students with their studies and career development.

Nancy Bottone Hellman, assistant dean and director of the Women in Engineering program at the University of Massachusetts at Amherst, said her program has been successful. In the corporate mentoring program, professional role models assist women with career choices or act as the student's adviser.

In the "Shadow an Engineer" program, students spend a day with working engineers. There's also a Graduate Women's Network at the University of Massachusetts and a chapter of the Society of Women Engineers, which coordinates big sister/little sister networks between upperclassmen and freshmen and backs support groups for women engineering students in dorms.

Despite gains made by women, engineering remains a male-dominated field



That was the theme of the Women in Engineering Program Administrators Network (WEPAN) conference held in Washington last month. University administrators gave workshops on how to recruit women into engineering and retain them once they get there, despite social and cultural barriers.

Formed last year by administrators of Purdue University, Stevens Institute of Technology and the University of Washington, WEPAN is a national network of individuals interested in the recruitment, admission, retention and graduation of women engineering students. WEPAN assists and encourages engineering schools in establishing and expanding programs for women in engineering.

Continuous funding

WEPAN got its start through funding from the National Science Foundation's 1989 Career Access program. The NSF is currently considering a proposal for continued funding for 1990-91.

Harold J. Raveche, president of Stevens Institute, set the tone of the conference in his welcome speech. Referring to the need for the United States to regain its technical preeminence in the face of increased competition from Japan and Europe, he said it was an "absolute national necessity" for the country's

ly to mid-1980s. The percentage of women among full-time engineering students rose from 3.2 percent in 1973 and peaked at 17 percent in 1983.

Stuck for years

But the number was 16.1 percent in 1989. It's been stuck at the 14-to-15-percent level for the last four years, according to the Engineering Manpower Commission of the American Association of Engineering Societies. The number of undergraduate women enrolled full-time in engineering dropped from 64,649 in 1983 to 54,538 in 1989, a 15.6-percent decline. Even though the number of men in engineering has also decreased, it is still a male-dominated profession; only about 4 percent of America's 2,615,500 working engineers are women.

Of all the white-collar professions, engineering attracts the lowest percentage of women. According to figures compiled by the Women's Bureau of the U.S. Department of Labor, women doctors make up 18 percent of their profession, while women lawyers account for 20 percent of practicing lawyers.

Shirley Malcolm, head of the Directorate for Education and Human Resources at the American Association for the Advancement of Science, said women don't become engineers because "few young women know what an engineer is and how one gets to be one." She urged colleges to ini-

Once in, women must be encouraged to stay. Malcolm said women students need help overcoming discouragement from engineering professors who discriminate against female students. And many women feel isolated because they are a minority in classes of all men.

To keep women in engineering, many universities have established Women in Engineering programs, which serve as watchdog and support groups.

Back to school

Some colleges try to get working women to return to college for an engineering degree. For the last five years, Northeastern University's Women in Engineering program has offered re-entry master's degree programs in information systems and electrical and computer engineering for working women of any age.

The program has allowed women in nontechnical jobs to make career transitions and boost their annual earning potential \$14,000 to \$16,000, according to Paula G. Leventman, director of the program at Northeastern's Graduate School of Engineering.

Other schools focus on the so

KEYNOTE ADDRESS

Merrill W. Buckley, Jr.

IEEE President-Elect

It is a pleasure to speak to you this morning on the subject of professional activities. USAB and PACE have always been a big interest of mine. This is my ninth or tenth PACE Conference, and I always find them invigorating. What we do here is very important for our members.

What I say today is my own opinion. I'm representing myself, not speaking as President-Elect. You may not agree with some of the things I'm going to say. That's fine. The purpose of this meeting is discussion. I've been known to change my mind, and I hope you have too. What follows is my assessment of some aspects of professional activities.

Let me begin on a positive note and talk about pensions. We've been working on the pension issue for 20 years in IEEE-USA. Pensions have been the number-one interest of our members. In all honesty, we've had only limited success. We had minor success a few years ago in establishing IRAs, and some of this was taken away from us. I believe we are now in a good position to accomplish our long-term goals, but it's not going to be easy. We're going to need a lot of help, from USAB staff and specifically from you. Keep in mind that there are going to be elections for Congress, and Congressmen respond mainly to their constituents.

The problem with pensions is the fact that we are a mobile profession. The average time for changing jobs is somewhere around seven years. I don't think this is going to change; in fact it may go down. Industry tells us that it has decreasing interest in long-term employment. So, unless we do something, it looks as if we're stuck with the present five-year vesting and losing money through lack of pension portability when we change jobs. Corporations aren't interested in doing anything, because if you improve our situation, it could take money from them. That's the crux, by the way, of getting this thing through successfully: finding a win-win solution.

What do we want? We want to reduce vesting to one-year. There's no reason to have to wait five years to become vested in a pension plan after taking a job. We also want portability without penalty, so we won't lose money when we change jobs. That's a key issue, and we've been pushing hard for it.

How do we get there? Timing is very important. There is a good deal of interest in pension reform right now. Our last two Secretaries of Labor have shown considerable interest in the subject. They admit there is a problem and it must be addressed. So the subject has a high profile. There are many bills in Congress--more than 70, sponsored by different legislators. That, of course, creates a complicated situation.

Our strategy is to introduce our own bill, containing what we want. We have hired professional consultants and lobbyists, which is what you have to do in Washington. We have written our own bill, and we have found Congressional leaders to sponsor it. The chances of getting exactly what we've proposed are rather slim, but it certainly indicates that the engineering profession is taking the lead, and it will help in the long run.

What we need are alliances. That's what really makes the people in Congress react. We're working with the other engineering societies through AAES [American Association of Engineering Societies], which is the umbrella organization in this country for engineers. We must also get organizations like AARP [American Association of Retired People] behind it. AARP is the biggest lobby of all, with over 30 million people. We're beginning to work with them. Its going to be a big issue.

The key point is that the Administration and Congress look at this mostly from a revenue point of view. When a bill is introduced, the first question asked is whether it's revenue neutral. This means that, if you're proposing something that's going to cost money, you have to show some way to get the money back so it will balance out. That's difficult to do with pensions, but there are arguments that can be made. The IRS is very concerned, because when there's less money they can tax, it's less income. So they certainly are not going to jump on the band wagon for a bill unless somebody can convince them of its merits.

Now there are people who argue that, if we do accomplish what we want, we could end up with pensions being a sort of company-paid savings plan for engineers who, when they leave a job after five or six years, use the money to go out and buy a car or something. Well, that's not what this is all about. We're talking about pensions. We have to insist that the money stay in the pension plan until retirement and that the savings can be used for industrial investment, which we desperately need.

I think that investment really is the bottom line. We have to convince Congress and the others who make these decisions that, if they support what we recommend, there will be a great deal of money available through pension plans for investments, specifically in high technology and research. We don't save enough money in this country. The average person saves only three or four percent [of his income]. In Japan it's closer to 15 percent, and that money is used to drive Japan's industrial technology. We don't have that level of savings available for investment, so increased pension funds would be a great alternative.

So--these are USAB's plans, and we're going to need your help as we go along.

Now let me change the subject to employment. This is another big issue in IEEE-USA. It's an increasing problem. The percentage of unemployed engineers is rising. It goes back to the problems reported up in the Boston area, Route 128, several years ago. Long Island is in bad shape and has been for a number of years. I've been told that the situation is worse now than it was in 1971. St. Louis and Los Angeles indicate problems. Here in Philadelphia we have problems; two military

bases that employ a lot of our members are going to close. So there definitely is a concern about employment.

What's in back of the unemployment problem? Supply and demand, of course. There's been a major buildup of engineers in this country in the last decade. The number of scientists and engineers has doubled. That's a lot of people, but there were reasons for the increase. We've had a long period of economic expansion--over ten years before the current recession. We had a great deal of buildup in the economy. We had a major buildup in defense. President Reagan did that, and of course it meant a lot of jobs for us. We had an expanding technology, electronics bursting out in all directions--computers, communications, industrial electronics. This created many jobs.

To fuel this expanding market, many people have come into the profession from engineering schools and graduate programs, There are still many in the pipeline. Immigration has also been a big source of people. The result is a lot of engineers, both in place and in preparation.

Let's look at some of the factors that will influence whether these engineers stay employed. Number one is the supply. Some people still insist that there will be big shortages of engineers and scientists in this country. As far as I can tell, there's no engineering shortage, and I don't think there's going to be one in the foreseeable future. We definitely have to make that point. The people making these predictions have all kinds of models that show this or that. But it's very difficult to predict with any precision what's going to happen in terms of the supply of engineers. Bob Rivers, Frank Lloyd, and other IEEE members did a good analysis on this subject. Who knows when defense is going to go up or down, or what the state of the economy will be? We have to make sure that we indicate that the models aren't that accurate.

Also, the supply of engineers in this country is very flexible. People with physics and math degrees gravitate to the jobs that are available, and they usually are successful in making the transition [to engineering]. There's a great deal of flexibility. So, even if there should be a developing shortage of engineers and scientists, we can handle it without a marked large increase of people through the educational system and immigration.

What should USAB do? First of all, we have to refute these predictions. We must do it in a professional but direct way. We also need good statistics of our own. We must have our statistics about what we think the situation is--the number of people employed and what we think is going to happen. We also have to be honest with potential engineering students. I'm against trying to hold back students who really want to be engineers. We have to search for them. But we have to tell them that our profession has its ups and downs; it's not all rosy. There are engineers out there now looking for jobs. We must be honest with them and let them make their own decisions.

As for immigration, we've had a loose sieve immigration system for a long time, and IEEE-USA has expressed its concern. Many of the new entrants in our profession originally came to the United States for their education. We have the greatest engineering education system in the world, so naturally they want to come here. They came with the idea that they would go home, but many of them never did. I guess you can't really fault them for that, when they see the possibilities here and recognize how the system can let them stay. But if this practice continues at the current rate, the employment situation is going to deteriorate. So we have to take issue with it.

Also, and this devastates me, a new immigration law was passed in 1990. It permits professional people to come to the U.S. through several new channels. As many as 40,000 to 100,000 people could be admitted to look for engineering jobs. I don't know how this ever got through without a major objection by IEEE-USA. I guess the proponents were very clever about it. It's not too late to take serious issue with it. We have to make sure that this

But there are still people who say there's going to be an engineering shortage. Adam Smith's TV program not too long ago favored enticing students who come here for their education to stay here. Also, there was an article in *Forbes* magazine by the people who pushed the new immigration law. They were proud of how they did it. They said that for years they had tried to get the measure approved, using the theme that there were lots of jobs here to fill. It never worked, so they changed their strategy to, "We need [immigrants] here to be competitive in world competition." They say that's what passed the immigration law. Well, it's on the books, and it's going to affect us. I think we have to take a strong stand on it. Senator Moynihan, who seems to be no friend of ours, has another bill that he intends to try to get passed; it would permit students who are here in engineering programs to stay.

Another factor in supply and demand is defense and aerospace. My whole career was in the area of defense electronics. I went into electronics in the service and made a career of it, and I'm very happy I did. It's a very important part of our economy. But defense spending is going down. In 1989 it was \$315 billion. In 1994 it will be down to \$242 billion. By the end of this century, 1999, predictions are that it will fall to \$213 billion. That will affect a lot of jobs. Fortunately, 40 percent of the Department of Defense budget that goes into research and development and into procurement is in electronics and is considered essential. So that's a help to us. We will not suffer as much as other people from the defense downsizing, but I think we will be affected.

What can USAB do? That's a tough one, but there are things we can do. First, we have to take advantage of the great publicity from Desert Storm. Desert Storm really focused attention on our technology--what it can do and how it can help the country. The ad we ran in the *Wall Street Journal* was a good idea. It wasn't cheap, but it made the point to the business community and the public that our technology was in large part responsible for the campaign's success. This same technology can help us be more competitive. In my view, defense electronics is a great resource that hasn't been used as much as it should be for commercial benefit.

In the past defense was considered a separate industry. We funded it because it was necessary. Technologies were developed specifically for weapons systems, defense communications, etc. There were aspects of the technology that trickled over to the commercial side. It helped television get here earlier and a few other things. The situation is changing now. In many cases defense electronics is looking for the capabilities of the commercial markets, specifically in computers, signal processing, semiconductors, etc. Unfortunately, some of this technology is coming from outside the U.S. I think that's bad. When we spend our money for defense and other aerospace programs, you'd think that funds for research and development would be spent on companies here. IEEE-USA should take a stand on that.

This whole idea of integrating the defense and commercial areas to make us more competitive is a great challenge. You have to look at defense electronics as a natural resource that should be integrated with the commercial sector. We also ought to stress making it easier for people working on defense to switch into commercial activity. If we were permitted to go back and forth, it would help in jobs. It is very difficult for people who have been in aerospace all their lives to go out and look for a job commercially. That's tough; it's a different world. But the worlds are coming together, and this should help the U.S. We ought to stress that.

We need more mileage out of defense research and development in other ways. There was an interesting article in *Spectrum* about parts. We were worried about not having parts during Desert Storm. Those parts should be built here, and the research and development money should be spent here. We also should take more positions on selected government programs. We took a position on the \$30 billion space station. We suggested a smaller \$10 billion approach. It was rather controversial. I was asked to introduce it at a press conference, and to be honest with you, I was concerned. We knew some members were not going to be happy about it. But I feel it was the right decision because in the long run the difference in funding could be used for other programs with much higher electronic engineering content and commercial possibilities.

These are the types of programs we have to look at for our own benefit. Not all of them are going to benefit everybody, but in the balance it's to our advantage to be aggressive. You have to do it on a case-by-case basis. Remember, Japan dedicates only one percent of its economy to defense. We spend a lot more, and we should get more mileage out of it by being more competitive, which is my next subject.

This is, I believe, the big issue of the decade. The number of jobs is going to be dependent directly on how competitive we can be. Electronics, by the way, is the leading manufacturing industry in the United States. One out of nine manufacturing jobs is in electronics. One out of 25 jobs is related to electronics. Electronics employment is three times that of the automobile industry, and it's nine times that of the basic steel industry. So electronics is the largest manufacturing industry. But it is in trouble, and it's serious. There has been a loss of 150,000 employees in electronics in the last year

and a half. We seem to be following the same path as the automobile industry. We must look at this closely.

Let me remind you of the auto industry's situation. Japan sells more cars in the United States in 48 hours than we sell in Japan in one year. Japan has eight automobile factories in the United States; we have none in Japan. There are 19,000 big-three auto dealers in the United States that sell Japanese cars. There are no big-three auto dealers selling American cars in Japan. No wonder the automobile industry is in trouble. Lee Iacocca keeps yelling about this. I take issue with Lee on some things, but in this case I think he's right. There is no level playing field. The Japanese have not opened up their markets; they haven't opened up in other fields. We have big problems in electronics and chips. We try to negotiate, but we don't seem to make out too well.

The semiconductor industry is a basic industry that was created here. Shockley, Brattain, and Bardeen invented the transistor. Royce and Kilby invented integrated electronics. It was all done here. A lot of money was invested to develop this whole new industry. We had 90 percent of the business at one time. The Japanese saw the possibilities and mounted a major effort to get in on it. They were very clever about it. They picked out the products and components that were the easiest and best bet for major profit. They invested heavily in selected targets. We are now number two in the business.

The semiconductor industry is vital to being a world power. If you don't have it, you can't be a world power. It's vital to the U.S. military; Desert Storm showed us that. It's vital to our economic security. Everything from personal computers to defense requires integrated solid-state electronics. I think the semiconductor industry is in trouble, and main frame computers are not far behind. IBM is in trouble. The Japanese are looking at hardware and computers, and they're going to go after them. Following that is software. You people in software have said, "Gee, that's too bad for the hardware guys; they're not going to get after us." They are. They will use the same tactics, because software is big part of the economy.

If you go down one step further and focus on the equipment that's used to make our semiconductor components and chips, this is a very interesting area. The Department of Commerce just made a major study of the companies that create the capability to make these chips--the equipment for microlithography, deposition etching, ion-implantation, and all of the other high-tech equipment that is used for this marvelous technology. It was developed here; it was created here, often by small companies. There has been a drastic loss of this capability in the last decade. We had a major share; now we do not. It has drifted and migrated to Japan, through, I believe, a conscious effort on Japan's part.

The problem is serious because most of these companies are small. A lot of them were relatively small ventures. There is a big capital investment to do this, and companies have problems if the market goes down or stagnates for some time--a problem staying in business and certainly a problem

with major funding for the next level of equipment. A lot of these companies are being bought out by Japanese money. Some of the technology is being transferred, and some of it still is being built here. But in the long run the segment of the economy that helps us build these chips is drifting away from us.

This should be a major concern. Congress is supposed to keep track of all this [foreign investment], but by and large it shows little interest. We have to take issue with that. This whole business of foreign investment is a problem. There seems to be no database that anyone can look at. A Congressman from Texas was trying to set up a database so we would know where the investment is coming from, so we could see how it is being used and its impact on market share. We don't have that. It's basic to the country and IEEE's U.S. members. We have to be concerned about this type of activity.

President Bush has said, "We will not make winning and losing decisions in the market place," a quote that he may live to regret. I don't know who told him to make that statement, whether it was Richard Darman, Alan Greenspan, Pat Buchanan (who provides input for some of his speeches), or perhaps Peggy Noonan (who wrote the famous "Read my lips, no new taxes" line). I don't know who gave it to him. If he means that government should stay out of the market place in terms of competition within this country--General Motors versus Chrysler versus Ford, or IBM versus DEC versus Apple--I guess most of us would agree with him. Competition of this type is good. But when it goes beyond that, when whole industries go down the drain because of foreign competition, predatory grabs for market share, unlevel playing fields because of closed markets, industrial collusion abroad, that's another story. We have to be more concerned. IEEE-USA should be in the center of this battle because it's basically our profession that's at risk.

Another factor in competitiveness is company takeovers, leveraged buyouts (LBO's), etc. The decade of the 1980s saw us playing a kind of monopoly in this country with financial people, lawyers, MBA's, and so forth, buying and swapping companies back and forth, and these people in the process were making a lot of money. Meantime, what were they doing over in the Pacific Rim countries? They were building up their industries, their manufacturing and other capabilities. Their companies are now large, mature, stable, and profitable.

The people who do all this [financial maneuvering] justify it. They say it will make us more efficient. "We've got to get rid of the inefficient people in these companies, so we'll buy them out. We'll take care of it." I don't think that's at the bottom of it at all. What was at the bottom of the whole LBO business was greed, quick profits, green mail, and that sort of thing. A lot of the companies ended up in debt; it costs a lot of money to do this. The whole junk bond industry was created to permit us to do it. Michael Milliken is now in jail. He made \$500 million in one year. Where did that money come from? It came from a lot of his financial manipulating, and it's certainly money that's not going to be used for research and development to help us be more competitive. You can bet on that.

So that was a serious problem in the '80s. There was less money for R&D. It also pushed a short-term focus. People who worked at the top levels of these companies were looking over their shoulders with much trepidation. "They're going to buy us out. I have to have a good bottom line for the next quarter so we can meet our short-term target." Nobody was looking ten years ahead, which is exactly what we need to develop new products. So this whole business is no friend of the engineering profession or of the country, in my opinion.

Well, some people say it's over. But is it? These people will keep doing it as long as they can make money. What can USAB do? We ought to take a stand. Some people say it's none of our business. It is our business. We should make it known that it affects us, and we're none too happy about it. It should be more difficult to cause all this disruption.

Pennsylvania is the most difficult state in which to do it. I give credit to our Governor Casey for that. He saw the possibility of outside companies, foreign companies, coming into Pennsylvania, buying up old-line, good companies. (Armstrong Corporation, I think, is the classic example. It supports a whole lot of people and smaller companies in the Lancaster area.) If these people are going to come in here and grab the resources and the technology, who knows what they would do next. We didn't want that. We passed a law in Pennsylvania that makes it darn tough. If you're going to try a leveraged buyout, don't come to Pennsylvania. Some people say the law is extreme. I don't know; it seems to be working here. Maybe some of the other states should look at it.

We need a healthy electronics industry in this country. To be competitive we need large, deep-pocket, multi-product, patient-capital, competitive, well managed companies. That's what's going to make us competitive. The Japanese have that. We are losing our position here. We need big companies because a lot of the investment is big money. You have to have big investments to stay in a business that makes chips and the like, and that cannot come from small enterprises. We have to be able to afford to take risks. Small companies can't do that. Big companies can do it, and if they lose, well, they are still making money someplace else. RCA did that, by the way, for many years. It required 15 years to create television. Where did that money come from? It came from a large company and a Board of Directors and a Chairman who were willing to spend it. You don't see much of that anymore. That's the key to new products, and we are falling behind.

We also need small and medium-sized companies to be competitive. That's a major part of our economy. We must encourage them also. We also need the venture companies. We're good at creating, setting up small companies, spin-offs. It's the American way, and we have to protect that. But, for those that are successful, we have to be careful that somebody else doesn't capitalize on their efforts. They may do all the investing and innovating, then somebody else can come in and buy them out, and we lose the technology. Venture companies should either become part of a larger corporation or be successful on their own. We must keep the technology and the engineers here.

This also relates to corporate leadership. I have great concern about many of the people running our companies. There are too many MBAs and lawyers. You look at the 500 largest corporations and who's running them? You don't see very many engineers. They're mostly financial people, business people; they went to Harvard, Stanford, or the Wharton School. It is doubtful that such people can provide the future leadership for high technology. Everybody agrees that the future is going to be based on high-technology industry. We need better leadership, and more of it should come from the engineering profession.

That's a direct challenge to the IEEE. We're an engineering society. At least 50% of our people end up in supervision and management. We'd like to see more of them become chief executive officers, not three levels down. It's the people at the top, the MBAs created in business schools, who are being trained to become chief executive officers. That's their goal. They're not going to give leadership up easily, by the way. They don't want us to come in and take over. But it's necessary for the leadership of technology, and it's something USAB should be concerned about.

I mentioned foreign investment in the United States. Everybody talks about the trade deficit. Well, it's a national issue. You have to remember that when a deficit develops, other countries are selling more to the United States than we sell to them. That means they have a lot more money to do things with. They're going to invest it in something. They could invest it in other countries, but a lot of it is invested here. I guess if they're going to invest it in treasury notes, that's not too bad. In the long run, however, even this may mean trouble. But a lot is not being invested that way. It's being invested in plants that build cars and electronic gear in our country and in high technology. We created these industries, and deficit spending helps us lose them. We ought to be against investments of that sort. We should support databases that relate to this problem, and we should protect our critical technologies.

A word about executive salaries. I think that they are too high. Some would say that executive salaries are not the business of IEEE. I think they are our business because they make us less competitive. High executive salaries make for fewer jobs. Top executive compensation in this country is 53 times that of the average worker. In other countries you don't find that. There's no relationship between salaries and company performance. Top executives seem to make money whether the company is doing well or not. That's because setting executive salaries is a closed business--the president of General Motors doesn't want to make less than the president of Ford, and that sort of thing. Also there are companies that specialize in deciding what executive salaries should be. They are called in to make a study of how much executives should be making. They come back with an answer that the executives want to hear: "You should be making more money." And salaries go up and up, in a spiral. There's not much to do about it unless the Board of Directors steps in and does something, and they rarely do that.

Interestingly, Lee Iacocca in 1986 made \$20.6 million in salary, bonuses, and stock options. He was listed number one that year. And in that year Chrysler's performance was lackluster at best. When

someone pointed out the discrepancy between his salary and the average salary of the workers at Chrysler, he shrugged it off, saying, "That's the American way. If little kids don't aspire to make money like I did, what the hell good is this country? You've got to give them a role model." Well, when you have that sort of attitude, you're in trouble. I hope he was kidding. What can USAB do? We ought to take a position on this subject.

Let me summarize this whole competitiveness business. We need an industrial policy. George Bush doesn't want to talk about it. He thinks the government should stay out of the market place. But we need a national industrial policy, and the country deserves one. Every other country has one. What should an industrial policy do? We need trade and tax policies that foster strong U.S. electrical and electronic computer industries. We need special emphasis on high-definition television, supercomputers, semiconductors, communications, superconductivity, electrical generation distribution, and certainly military critical components. We need defense spending that stays in the United States. We don't want to transfer our technology overseas; it should stay here. Sell products, don't transfer industry. Protect U.S. software. I think this is coming. Keep manufacturing here. When manufacturing goes overseas, engineering can easily follow. I think you can make a strong case for engineering as essential to a leading economy.

Basically these are the things I'm concerned about. You get into a lot of issues with competitiveness; you can make a list of over 100. I picked the ones that to me seem most important. I think this is the business of USAB and the business of PACE, and I hope there will be a lot of discussion of this sort of thing here in the next two or three days.

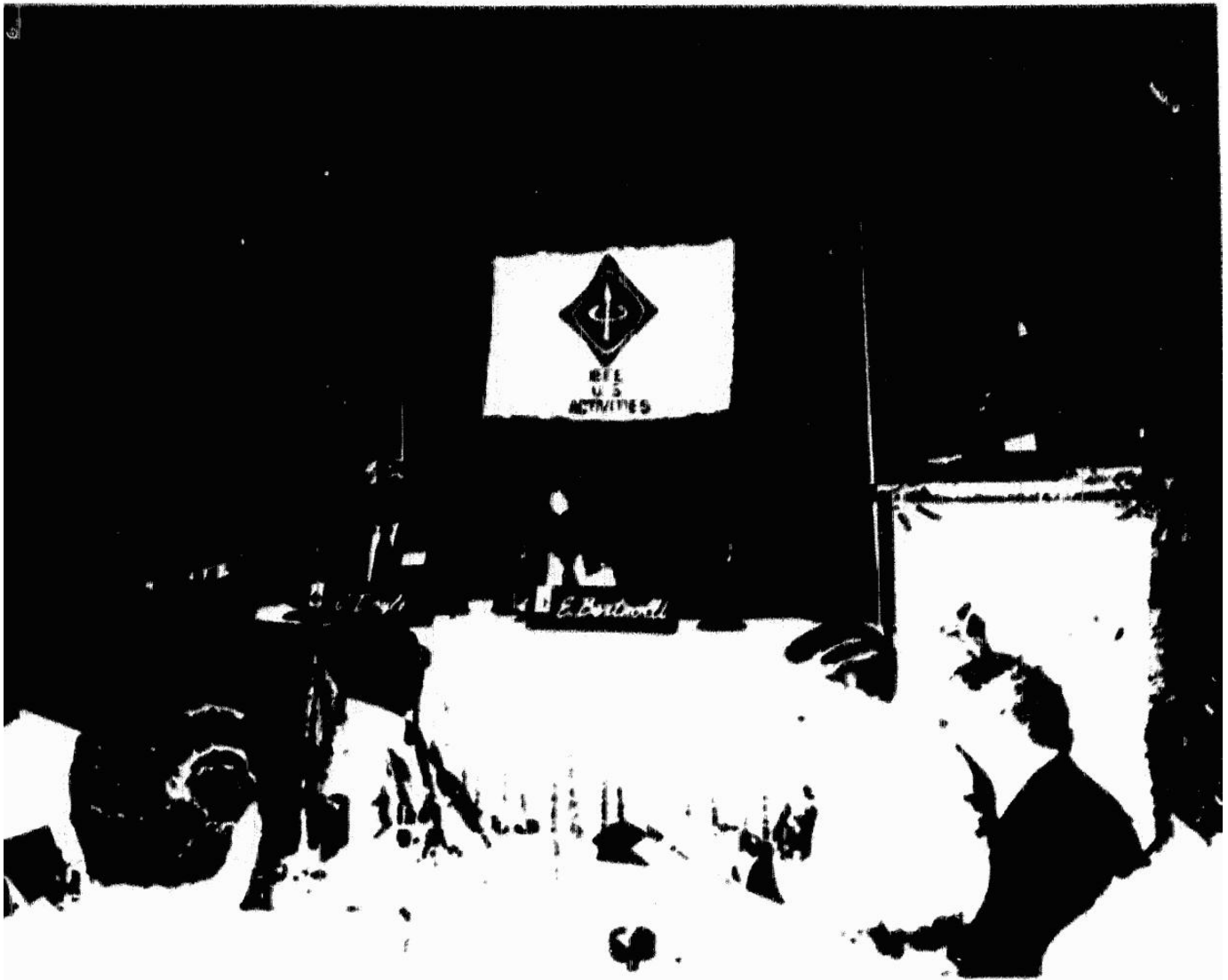
Let me make just a few comments about age discrimination. The average retirement age for engineers in this country is going down. Do you want it to go down? A lot of people don't. They like what they're doing. They like engineering. They would like to keep practicing until they are 70 or 75 or older, but it's going to be difficult to do. The emphasis is on youth. The law says you cannot discriminate by age, but there are many ways that it happens. A lot of people are leaving our profession in their early 50s. They don't want to sit in a rocking chair. They don't want to start a new business or invest in McDonalds. They should be able to do what they like. We need to keep our engineers active. There's a great talent that we're not capturing. We've got to figure out how to do that.

Something is happening in IEEE that I'm very encouraged about. There's an engineer, Ted Fishman, sitting out in the hall collecting signatures for what he would like to call a Professional Consultants Society, a new society in IEEE. Doesn't that sound like a good idea? I think more and more of our people are going to be operating separately, whether they've retired or not. We need to help them acquire the expertise to do that, give them some business background. Ted thinks a society should be set up. We have a Society on the Social Implications Technology, so why not a society for those who want to practice consulting engineering? If you're like minded, please sign this petition. Get involved. It could be one of our most useful successful societies. They have to get approved and they need the signatures.

Just one other subject. I want to say a little bit about AAES, an acronym that some of you may not have even heard of. There's the American Medical Association (AMA) in this country, and there's the ABA (American Bar Association). They are well recognized. Certainly the AMA is. But there is no single society in the United States that we can say represents engineering, all engineering. It's been a dream for many years. Ten years ago we created AAES, the American Association of Engineering Societies. I was on the IEEE Board when it happened. To be honest, I was very concerned about it, because it could be very weak. It has struggled for ten years, and it has been weak. But, I think in the long run it's a real hope for us to speak as one profession in this country.

I'm spending some of my time on AAES to make it stronger. I hope you hear more about this in the future and take an interest in it. There are problems. The other engineering professions are not interested in a lot of the things we are. We're interested in pensions, competitiveness, and high technology, and they're interested in buildings, chemicals, structures, mining, or whatever. So there is no question that there is a limited number of common elements. But the principal common element is that we're all engineers, and we ought to search out those things that do hold us together. We ought to speak, when we can, with one voice, and we ought to be able to say to the government that we, AAES, represent all the engineers on a given position. This is what we think. And maybe the government will listen to us. The people in Congress and others keep saying, "Who speaks for engineers? You people are speaking for electrical and electronic engineers." It's a problem. So I hope in the future we can change that. I'm going to try, and I'll need your help.

Thank you very much for listening to me.



Saturday's luncheon featured a panel on the IEEE-USA Legislative Initiative. GAC Council Chairman Jack Lubowsky chaired the panel; speakers were Edward C. Bertnolli, Edward J. Doyle, and George C. McClure.

April 17, 1989 Electronic Engineering Times

FILE COPY

Panel raps NSF's EE surveys

By ROBERT BELLENGER

Washington — One of the prime sources for information on supply and demand of engineers has come under attack from a government panel for "ambiguous" data.

A panel of experts has issued a report that is critical of the way the National Science Foundation (NSF) keeps track of engineers and scientists.

The panel, part of the Committee on National Statistics and gathered at the request of the NSF, found "weaknesses in the system greatly impair the value of the information for the purposes it is intended to serve." NSF's estimates "turn out to be ambiguous, subject to misinterpretation by users and very difficult to relate to estimates produced by other data systems."

For instance, in 1984, the NSF estimated that there are 3.7 million scientists and engineers in the United States. However, that figure was almost double Bureau of Labor Statistics (BLS) estimates of employed scientists and engineers.

"Hooray! It's about time!" said Dick Ellis, director of manpower studies for the American Association of Engineering Societies, about the report. The AAES's Engineering Manpower Commission issues a series of predictions on engineering supply and demand, based on BLS figures and its own data. Ellis called the NSF's data "peculiar results."

He cited two fundamental problems with the NSF figures:

- The NSF does not give its readers any clue to how it defines "engineers." Its definition is extremely broad, including "people with engineering degrees who may be operating elevators," said Ellis. "People are badly misled." What NSF is really measuring is the potential pool of engineers and scientists. The panel's report confirms Ellis's view.

- When the total numbers are broken down into subgroups, the data fall apart, said Ellis. For instance, the NSF has concluded

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that mechanical engineers are the largest group of engineers. "That's nuts," said Ellis. The EMC has been tracking engineering disciplines since 1967, and "in not one of those years have mechanicals ever been close to electricals." There's no way that's the case. "It doesn't make sense," observed Ellis, when compared to the number of degrees that have been awarded. EEs have led all the engineering fields for years.

Under its charter, the NSF is the prime source of information on the status of scientists and engineers. Consequently, its surveys have carried a lot of weight with other government agencies and with at least some technology companies. But the wide variations among the estimates of the BLS and groups like the AAES have undermined NSF surveys in recent years.

There's been a furious ruckus within the engineering community over whether there are "shortages" of engineers. Critics have maintained none exists, and self-serving groups have promoted the idea of engineering shortages to flood the market and keep salaries down.

Of the NSF flap on its supply and demand surveys, Ellis acknowledged. "The effect is to prolong the debate. It undercuts all numbers.

It plays into the hands of people like Irwin Feerst."

Feerst, head of the Committee of Concerned EEs, said of the survey report, "NSF has been pumping to get more engineers that we don't need." The unemployment rate, said Feerst, "is very, very high." Feerst repeated a call for a cut in NSF funding.

The panel was chaired by Graham Kalton of the Institute For Social Research at the University of Michigan (Ann Arbor).

Other weaknesses the panel found included:

- Failure to represent scientists and engineers with degrees from foreign institutions who came to the United States after 1980.

- Low survey response rates.
- Measurement problems that bias the estimates.

- A flawed sample design.

The panel concluded that "major changes are required if the NSF system is to prove an adequate resource for understanding the nation's supply of scientists and engineers in the future."

EDITOR'S PAGE

Where will we get them?

EXCUSE THE NAME CHANGE
ENGINEERING MAY BE
A BIT LATE!
I AM NOT SURE ABOUT THIS



I remember back in the late sixties the "dark ages" according to my classification when it was quite fashionable to expect to maintain an engineering staff. Many firms had been told that there would be a shortage of engineers in the future and that those who were not in the field would be in a very bad position. I remember that many firms were in a very bad position at that time.

Maybe it was the simplicity of it and back in those good old days that allowed us to get into the engineering business and from there we got into the through technology. Perhaps we were not as fortunate with technology back then. I remember that that young people don't have the highest idea when they want to do things. Whatever the reason, the demand for engineers is growing. And the supply is shrinking.

WHAT IS YOUR PROBLEM?
An article in the July 16, 1968, *Time* magazine indicated that we may have more of a problem than just attracting people to engineering. There may not be anybody to attract. The article stated, "The relatively small baby bust (1946-54) class grows up poorly indoctrinated by secondary school teachers. But as the baby-boom offspring adults begin those prime working years, they have suddenly become far more intelligent. Modern American needs them. Today's young adults are to blame for their lack of numbers could result in serious labor shortages in the coming decade."

The construction industry has traditionally competed with nuclear energy for the best and the brightest out of engineering schools. With fewer young people and less quality talent in engineering, that competition will get fiercer.

Most of the engineering programs we know are fully concerned about their graduates. They are usually learning with pride when they show us some basic system they designed. I can remember a time that they delight in special challenges, and they are systems that have many of the same problems as that. They really cherish projects that require special techniques or unique systems. They are not pleased about what they do for a living.

Now comes the tough part... finding that mechanical genius in the present... replacement of the

before. The engineering industry has not done well and the present situation of the profession is like those of a few years ago.

The industry has not done well and the present situation of the profession is like those of a few years ago. The industry has not done well and the present situation of the profession is like those of a few years ago.

The industry has not done well and the present situation of the profession is like those of a few years ago. The industry has not done well and the present situation of the profession is like those of a few years ago.

I know that we have been good programs and that every firm has to employ engineers. I applied these thoughts to recruitment. But there just haven't been enough to get the job done. What is needed now is a new generation of engineers, nationwide programs that would be a real step in the right direction. I know what it is that engineers do and why it is important. Engineers should show young people the challenge of the profession. The greatest honor in engineering.

I still remember that look of amazement and the joy of achievement when my branch and I got a job back together out of a job. It's the same sense of accomplishment I get from engineers when I talk to them today about a successful project or design. Looking at babies may not have and does to babies with that they know more about technology than we did and maybe it will only take a little bit of encouragement to steer them into engineering.

What kind of programs would encourage it? Maybe a program where we show them about these things. It would be a chance to show them about these things. It would be a chance to show them about these things. It would be a chance to show them about these things.

Robert S. Schwartz
100 My 100th Avenue

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