

# AMERICAN ENGINEER<sup>TM</sup>

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## Engineering Mostly Absent From List Of "Hottest Jobs"

A *Money* magazine article (March 1995, page 114) titled "The Fifty Hottest Jobs in America" lists the "50 skilled occupations that are projected to grow fastest by 2005." The article states, "to find the top contenders, we consulted Malcolm Cohen of the University of Minnesota, labor economist and author of the just-published "Labor Shortages: As America Approaches the Twenty-First Century" (University of Michigan, \$37.50). Cohen started with the 13,000 jobs recognized by the Bureau of Labor Statistics and then chopped that mammoth figure down by weeding out low-skill occupations and screening for fast growth and stability." Apparently he did not do a very good job of screening out low-skill occupations; the list includes baker, bread and pastry (1994 median annual earnings: \$17,368) and dental assistant (1994 median earnings: \$20,492), as well as some other occupations that might not be considered high-skill. Also, as we remember, Malcolm Cohen was recently commissioned by the U.S. Department of Labor to find shortages for the LMI (Labor Market Information) program's experimental blanket certification of alien workers; he made phony shortage findings for several categories of technical professionals in several states (fortunately, the blanket certification was blocked by loud protests from American technical professionals).

The article starts with the following gushing statements about a picture of a grinning man: "There's a good reason this man looks happy: Computer engineer Mark Haas, 35, senior software quality manager for Bell-Northern Research, the development arm of Northern Telecom, has the best career in America. Officially, a computer engineer develops and designs hardware and software, so the career's horizons figure to expand at something close to the speed of light ..... Talk about marketable skills: U.S. corporations will need about 447,000 computer engineers by the year 2005, more than twice the number in the country today. The pay is not bad, either: Engineers with 10 years' experience typically pull down \$70,000 a year, placing them in the top 6% of all U.S. full-time wage earners."

The occupation of "computer engineer" is very poorly defined in this article. The article states that a "computer engineer develops and designs hardware and software," but working with software does not necessarily involve real engineering. So-called "software engineer" can overlap the occupations of computer systems analyst and compu-

ter programmer, which are listed separately in the list of 50 occupations. This is just another example of the overly broad use of the title, "engineer." Also, the \$70,000 salary figure (the article's table calls this figure "1994 median earnings," and the article's text calls it "typical" for engineers with 10 years of experience) is too high.

This article rates jobs by projected demand only, without considering future supply. Conversely, the notorious shortage-shouting 1987 National Science Foundation report considered only projected supply and ignored future demand. Also, this article does not consider the impact of job-exportation on future demand for American computer professionals. And despite the appearance of the term "labor shortages" in the title of Cohen's book, this *Money* article presents no evidence that this book has anything to do with labor shortages.

It is especially noteworthy that no other occupation in this list of "50 hottest jobs" has "engineer" in the title, despite the fact that the relatively large number of highly-specialized engineering branches increases engineering's chances of making the list. Even electrical engineering, which has recently appeared in lists of occupations projected to grow rapidly, was absent.

*The Dissillusioned Engineer*

## Editor's Column

### JOBS TO ALIENS

Since I first took over as Editor, I've been both writing and reprinting articles complaining about U.S. jobs going to aliens, because I agreed with the complaints. This issue reprints a letter to the *Crosstalk* column of *EE Times*, which is different in that it represents another point of view. The letter to *EE Times* tries to rebut the contention that minorities suffer, when foreigners take U.S. jobs. Remarkably, the letter received almost two full columns in the *Times*. No, I haven't changed my point of view. But I thought I'd let the other side have its say.

### "THE CHRONICLE OF HIGHER EDUCATION"

This is apparently a journal that gives an overview of issues pertaining to college education. I just came across several articles clipped from back issues of this excellent journal, that a diligent reader mailed to me months ago. I comment on them here, because better late than never. Besides they all have a ring of currency.

*(Continued)*

### **"EXCESS PRODUCTION OF PH.D'S FOUND IN ENGINEERING AND SOME SCIENCES"**

is the title of an article in the 6/30/95 issue of *The Chronicle of Higher Education*. It mentions a study by William F. Massey, professor of education at Stanford University, which finds that "... American universities are producing far too many doctorates in engineering, mathematics, and some sciences." The study also finds that universities have awarded approximately 25% more Ph.D's in these fields than the economy can absorb, and this is no surprise to graduate students who find a bleak market for their skills. As a result, some students called on academic departments to start cutting back on the quantity of Ph.D's they produce. The author of the study noted that "... research is the ticket to mobility for scholars at such institutions, and they need help from graduate students." He further identified graduate students as an 'inexpensive labor pool,' and said "... faculties tend to be more focused on their needs and their department's needs for Ph.D's than on the job market." A \$250K grant from the Alfred P. Sloan Foundation supported the study.

### **LABOR DEPARTMENT POLICY REGARDING PAY TO NON-U.S. RESEARCHERS**

An article in the 7/14/95 issue of *The Chronicle of Higher Education* mentions that colleges and universities urged the Labor Department to revise a policy that forces them to increase wages to foreign-born researchers. The Labor Department told how the policy was drafted to prevent employers (including colleges) from having a cash incentive to hire foreign workers instead of U.S. citizens. Underlying this debate is another issue. Apparently state employment agencies calculate 'prevailing wages' for post-doctoral research positions, based on what universities pay foreigners. (Recall how this newsletter reprinted ads run by state employment agencies, just to call attention to this abuse of skilled technological talent.) The new Labor Department rules require the universities to factor in salaries of private companies, which most often pay better than universities.

### **"ENGLISH COMPETENCE OF CALIFORNIA PROFESSORS"**

The August 18 issue of this journal contained a news item about California Governor Pete Wilson signing a bill requiring the California State University System to insure that teaching faculty members be proficient in English. The law wouldn't force dismissal of teachers judged not proficient, but it would require the University to give them remedial classes in English. California State Senator Ray Hayes, sponsor of the bill, said it sends a message that this (English competency) should be a priority. Robert Gurian, legislative advocate for the California Faculty Association (a union representing California State faculty members) said the law was much better than the draft legislation, which would have allowed *students to sue the University if they had faculty members who were not competent in English.* (Emphasis mine.) The Association reduced its opposition, when the provision was removed from the final version. The law raised the anticipated wages for researchers between 30 and 50%, according to Cornelius J. Pings, president of the Association of American Universities. So the universities, far from being the ivory-tower entities they would have us believe, are in fact just another business.

### **"THE SMART 401(K)"**

is the title of a 7/3/95 *Business Week* cover-story article which analyzed the ins and outs of 401(k)'s. It mentioned that the Labor Department's 1994 rules, category 404(c), hold employers accountable for picking sound investment options and capable money managers. The rules suggest that the employer should offer at least three investment options, not including company stock, and should educate employees about these options. Yet according to Access Research Inc., a Connecticut consulting firm specializing in 401(k)'s, 23% of the money is in the stock of the employee's company. Meanwhile, two out of three managers of 1600 companies surveyed by Greenwich Associates believe their companies to be facing a legal risk, even if they comply with rule 404(c). They feel that it doesn't protect those of them with underfunded 401(k)'s from future lawsuits by employees. And why should it (editor's comment)?

The employers worry about the Labor Department's definition of what is adequate education. Thus many companies have begun to hold more frequent information sessions, aside from those offered on the day the plan is offered to employees. The *Business Week* article is much too long even to summarize. It does, however, describe a 'Smart 401(k) Plan,' which should offer: at least five investment choices, continuing education (where have I heard that phrase before?), no-load funds, daily valuation with a toll-free number the employee can call, freedom of movement of funds, borrowability of funds, and employer matching contributions. This to me is a description of long-term corporate prudence. Can we count on U.S. corporations to exhibit such prudence? If not, should a government agency make them?

### **CROWD-CONTROL ENGINEERS**

That's a phrase used in an article on page K22 of the magazine supplement to the *Daily Breeze*, August 4, 1995 issue. An alert reader sent me this short article. It says, in part, "Venues like the Los Angeles Sports Arena employ insurance-mandated crowd control engineers (ushers), who have little luck in trying to control things." The article is accompanied by a photo of almost out-of-control throngs of people at a sports event. So what? So why should ushers have the privilege of being called engineers? The answer is that anyone can confer any title on any person, if that title is not protected by law. I understand in Texas the title of engineer can not be assigned to or claimed by anyone not possessed of a P.E. license. So that sounds like a good argument for universal registration, or ending the industry exemption. The latter is a provision in engineering registration law that allows corporations which produce articles sold to the public to employ non-registered engineers to sign off drawings of these products. The only products whose drawings must (by law in all states) be signed off by P.E.'s are construction projects like highways, bridges, buildings, etc. These projects are not 'exempted' from the requirement to use P.E.'s. To end the industry exemption, we must either campaign to change the law in each of 50 states (a herculean task) or else campaign to pass a federal law that sets aside the 50-state industry exemption (a slightly-less-herculean task). I'm not a P.E., but I still think the profession and the public would benefit by universal registration. I've seen countless argu-

ments on this topic. Most of those opposed to ending the exemption were either managers who were afraid P.E.'s would ask for more salary, or else practicing engineers, who were afraid they would be out in the cold, by not having a P.E. Rest assured—changing the law is so difficult, that it would be no more difficult to incorporate grandfathering provisions in any new law. What do you think?

#### **CORRECTION**

The December '95 issue of AE contained a letter from Joan Campbell of Houston, about "CamTeck," a new online publication for contract professionals. The letter, as published, contained typos. Here is the correct E-mail information to use, when you communicate with CamTeck:

camteck@ix.netcom.com

The www address is:

<http://www.master.net/greenspot/joan.html>

Sorry about the typos

Robert Bruce, AE Editor

## **Editorial**

### **Preparing For The Worst**

*By John G. Falcioni, Editor-in-Chief*

Not even the experts can tell what the future of federal research and development spending will be. Ten months after the freshman class of the 104th Congress entered the political fray—and nearly a full year since these junior representatives were elected—their strategy on federal science and technology spending remains a mystery, even for those closest to the congressional epicenter.

The uncertainty makes preparing for the worst the prudent thing to do. That's why late last month the American Society of Mechanical Engineers' Committee on Issues Identification, along with the Board on Government Relations and others, met with congressional insiders to try to gain some insight that would help them determine a course of action. This action, in the form of a report titled "The Impact of Government Restructuring and Budget Changes on Engineering, ASME, and the Public," will serve as ASME's springboard activity to pre-empt the after-shock of what is seemingly inevitable: Congress's decision to cut science and technology spending. The final draft of the report will be released in early January.

Estimates show that this year a total of about \$130 billion will be spent on industrial R&D. Industry will provide \$107 billion, and \$23 billion will come from government.

Those in Congress bent on reducing the federal allocation argue that if the government apportionment drops, industry, which relies on much of this R&D for growth, will pick up the slack and support works in progress and future projects. The casual observer might agree, but a closer look tells a different story. Most at risk is work under way at small companies—which may not be able to afford continued research on their own—and at academic research departments that rely on government funds. As for academic research, industry initially could step up its support and help out—but certainly not at the necessary rate to fill the gaps.

There is no evidence that the private sector is either able or willing to step up funding sufficiently. Charles Larson of the

Industrial Research Institute, warned that if government funding is cut, the science and technology clock "could be turned back 10 or 15 years." R&D would likely increase abroad, making it imperative for domestic companies to begin monitoring, developing, and acquiring technology overseas. Successful corporations would have to view intellectual property and technology as strategic resources to be created, acquired, shared, and protected or otherwise traded to gain a worldwide market advantage.

Pressures for short-term results from U.S. industrial research laboratories would increase as well, and R&D managers would face growing challenges in retaining their best employees for long-term careers in technical roles. High-risk R&D, which many companies value, would likely be reduced.

Agencies affected by possible cuts include the Office of Technology Assessment, the National Institute of Standards and Technology, the Environmental Protection Agency, the National Science Foundation, and others. The mere threat of cuts has forced an unusually critical self-examination at these places and at all federal labs and universities.

What's happening in Washington is also unprecedented. Democrats and Republicans alike are feeling their way through a new situation brought on by the upheaval last November. Rep. George E. Brown Jr. (D-Calif.) put it best when he said, "If the whole priority is just reducing the budget, you're just crunching numbers and you don't have a guiding philosophy, and that's not governing."

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## **Reach Out**

Reach Out to the active volunteers that are making this publication possible. Tell them what you like or what you dislike. Provide them with questions, answers and information or just a hand written note of appreciation. Believe me when I tell you that it is important to let your volunteers know that you care.

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# Trudel To Form

By John D. Trudel

Please get copies of my last two columns (*Electronic Design*, Oct. 2 and Oct. 24) for the first parts of this story. The Clinton Administration has made promises to Japan that severely compromise the U.S. patent system. This has serious consequences for all knowledge-based business in the U.S.

My first column on this topic gave proof. There are four bills now in Congress—HR 1732, HR 1733, and HR 2235—that will complete U.S. Secretary of Commerce Ron Brown's patent sell out. And HR 1659 literally sells off the U.S. patent office. But there is a bill that may undo the damage—HR 359. Reportedly, the biggest problem in Congress for those trying to block this is "a lack of grass roots input from the districts." If you care, contact your Congressional representative. Mention that the issue is high-wage U.S. jobs.

Small groups of inventors have been trying to oppose Brown's steamroller. For information, contact The Alliance for American Innovation, 1100 Connecticut Avenue, N.W., Suite 1200, Washington, DC 20036-4104; (202) 293-1414, or Intellectual Property Creators, 146 Main St., Suite 404, Los Altos, CA 94022; (415) 948-8350. There are also some World Wide Web sites devoted to this topic. Point your browser at [www.best.com/~ipc/](http://www.best.com/~ipc/) or [www.nttc.edu/~aai](http://www.nttc.edu/~aai).

These groups were ecstatic when my columns started running, as the press has been closed to them. Much economic clout is employed and one does not cross the Japanese lightly. The mainstream press and engineering professional associations are strangely silent.

In my view, Brown's surrogate, Bruce A. Lehman, is in charge of the cover-up. He says that these are just "minor changes" to bring U.S. law into line with international practice.

Some patent lawyers know much, but that is like having foxes guard a henhouse. If Brown's promises pass into law, some lawyers stand to reap windfall profits from the increased level of legal contention over patents. I asked four patent lawyers what they thought about this situation. Two were unconcerned, one was alarmed, and the fourth conceded that this "proposed" legislation needed to be studied for its business implications.

Major damage has already been done. Since the 1700s, the term of U.S. patents has been 17 years after they were granted. That changed this past June. The new rules say that patents are valid for 20 years after the filing date. Brown said that this was to comply with NAFTA and GATT, but that is a lie. We could have complied without reducing the term of our patents.

Major patents take from six to ten years or longer to issue. The major revenue from a killer technology (like the CD-ROM, X86, VCR, or Windows) comes a decade or more after first product introduction. Therefore, that single change can significantly alter your patent protection. But HR 359 can undo this damage.

Brown also promised to make patent filings public information after 18 months. In that case, you might as well just mail your filings (and possibly their defense) to your competitors. If your patent never issues, your competitors get a free ride. One source reports that the Japanese have staffed over 15,000 engineers to start reading our patent filings as soon as they are made public.

Brown also promised the Japanese "broadened re-examination." Expect to have your patent filings jammed up. Expect to spend much more on lawyers, since you will, in effect, be in protracted litigation with firms with deep pockets who are only risking their legal fees.

Unless you contact Congress now, the future is dimmer. Brown and Lehman are systematically destroying our patent system, and are close to succeeding.

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## Immigration Does Not Hurt Minorities

### LETTER TO "EE TIMES"

In the article titled "Study: immigration hurts minorities" (see Nov. 6, page 133), the Washington-based Center for Immigration Studies tries to strike a blow against racism by claiming that American minorities are harmed by high immigration. Its proof is an equation that shows every immigrant engineer could hypothetically be replaced by producing minority engineers in proportion to their population. But it only manages to invent a perverse new form of racism. When the same study shows that 45 percent of immigrants are Asian, and 86 percent of Asian scientists are immigrants, what it is really saying is that the success of Asian Americans is to blame for the failure to educate America's underachieving minorities.

How can immigrants be shown to slow the impressive growth of minorities in engineering when the table presented clearly shows that whites were the only group to show a percentage decline, from 90 percent to 86 percent of engineers, between 1980 and 1990? The black's share increased from 2.5 percent to 3.4 percent, and rose in absolute numbers by 70 percent. That's nearly as large as the 90 percent Asian increase that was driven only by immigration. The only possible correlation that can be made is that increasing numbers of immigrants pushes numbers of blacks higher, not lower.

At America's best engineering schools, it is the Euro-Americans who have plummeted, from 90 percent in the 1970s to between 35 percent and 50 percent at UC Berkeley, Stanford and MIT, while blacks and Hispanics have been well-protected by affirmative action. The immigration study raises the question of, but produces no evidence of, a labor surplus. The study even absurdly sug-

*("Immigration Does Not..." continued)*

gests, without any supporting evidence, that blacks are steered away from engineering because wages have been lowered by immigrants. Yet, Asians flock to engineering precisely because it offers the highest return of undergraduate career majors, for the minor price of academic effort.

The study tosses away the mountain of data it builds on immigrant and native engineers by making its key conclusion hinge on a "hypothetical mathematical exercise." It might seem harmless to propose hiring minorities and women in numbers mirroring their population. But only an academic could be foolish enough to pretend that you can magically create a pool of equally qualified minorities with a stroke of a pen, and then use them to replace the now "unneeded" immigrant scientists, without a shred of evidence that such a brash assumption could ever be possible in real life.

In reality, desegregation, affirmative action and multiculturalism is already at the head of every education reform agenda. There are a few selective institutions that get so many applicants that they can easily recruit any racial proportions they wish, but it still hasn't fixed the problem of proportionality in the real world.

No "hypothetical exercise" will instantly equalize a four-year college graduation rate that is only half that of whites.

Disproportionality in achievement, not immigration, is to blame for this disparity. Preventing the entry of 2,000 Asians does absolutely nothing to create 2,000 equally qualified new minority or women scientists, nor create 2,000 jobs reserved for minorities or women. These jobs cannot be filled by people without measurably comparable math and science skills.

What nobody sees is the unprecedented integration of Asian American students into urban school systems abandoned by whites who could help solve this problem.

We must drive minority youth to compete head to head with immigrants. Asians are the only ethnic group that consistently excels in the same urban school systems that fail other minorities, with best test scores, grades, attendance rates, and lowest rates of dropout, teen pregnancy, drug use and expulsion. They are proof that poverty is not destiny. Asian students and their educational values should be studied and emulated, not banned or blamed.

*Arthur Hu is a Software Engineering Consultant, Rhotech Contributing Columnist with "Asian Week" in Kirkland, Wash.*

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## Dissident Engineer

### More Four Years?

No, this article's title is not an unintentional typographical spoonerism. It concerns the debate over lengthening the time required for the first engineering degree.

First, it should be stated at the outset that so-called "four-year" engineering programs are "four-year" in name only. Many—if not most—students do not finish in four years. Typical reasons for delay are: (1) lightening the load in a demanding program; (2) making up high school deficiencies; (3) losing units as a result of changing majors or changing schools; (4) difficulty in getting into required courses (as schools cut back, this problem is getting worse); (5) part-time work. Hence, the current four-year program is in reality often a five-year—or longer—program. And likewise, a nominal five-year program would probably in practice become a six-year or longer program, and so forth.

Four-year programs in engineering have long been tight, with little or no room to squeeze in additional material. However, as a result of new or growing demands being made on engineering curricula, the four-year program has now become a farce. Among these demands are the following:

- (1) Calls for giving engineers more knowledge of the ethical, social, and environmental ramifications of technology.
- (2) Calls for improving engineers' verbal skills. (The need for this is questionable. Most engineers actually have above-average verbal skills; in general, their verbal skills look bad only in comparison to their superior technical skills.)
- (3) Growth in the importance of computers. The study of computers was not even an important part of most engineering curricula until the '60's; now an engineering student could easily devote a full year—or more—just to learning what every engineer should know about using computers. And in most cases computers have *not* eliminated the need for familiarity with earlier manual methods of engineering.
- (4) Growth of technology. In many cases, it is necessary to learn both *old* and *new* technology (there are exceptions; for example, probably most electrical engineers could get by today without a good knowledge of vacuum tubes). Also, as technologies mature, the level of knowledge required to advance those technologies often becomes higher.
- (5) Growing importance of interdisciplinary knowledge. For example, electronic components are of growing importance in automobiles, and so it may be advantageous for an automotive engineer to be expert in *both* mechanical and electrical engineering. Also, some new or growing engineering fields, like biomedical engineering, often make use of knowledge outside the traditional fields of engineering.

In addition to the above-described increase in the educational demands on engineering curricula, there are other good reasons for lengthening the entry-level engineering program:

- (1) —it would improve the professional status of engineering in comparison to the many professions—such as medi-

("Dissident Engineer" continued)

—in which a postgraduate degree is now the minimum for entry. Indeed, one of the suggested alternatives to lengthening the undergraduate program is a proposal to copy medicine, law, etc. by having a four-year "pre-engineering" undergraduate program followed by a postgraduate degree. A similar proposal is to make the master's degree the new minimum entry-level for the engineering profession.

(2) —it would place American engineers more on a par with professional engineers in certain other countries, particularly some European countries, where the first engineering degree now takes longer than four years or where beginning engineering students may have better high-school preparation.

(3) —it could force employers to make engineering more attractive as a career—particularly as a *long-term* career—than it is now.

(4) —it could reduce the annual numbers of engineering graduates, resulting in fewer—but probably better—engineers and higher morale in the profession.

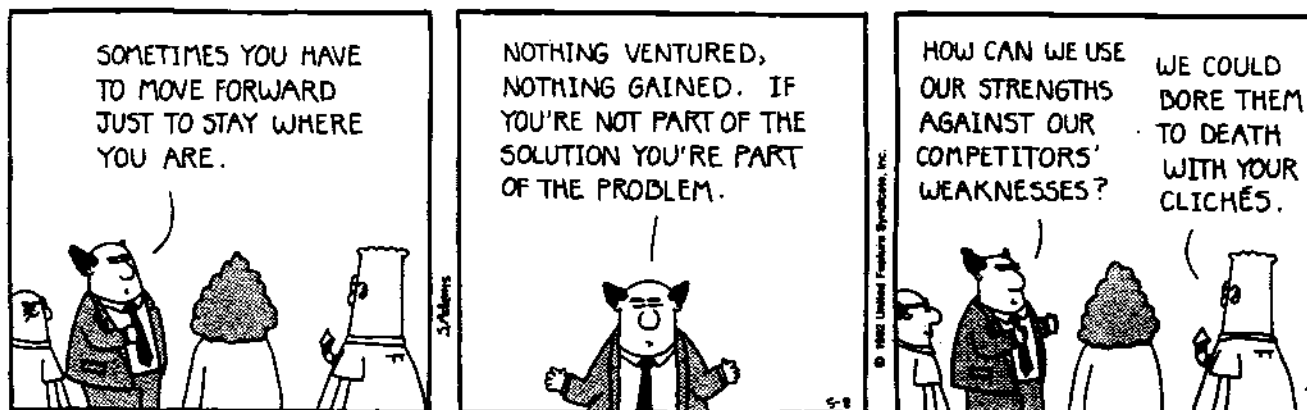
This article will now examine the attitudes of engineering professors, employers, and working engineers toward the four-year question, starting with the professors. The professors have inordinate clout in the engineering profession. Among the reasons for this are the following facts: (a) Among the professions, engineering has an unusually high difference between the educational attainments of teachers and typical practitioners. In medicine, nursing, and law, for example, teachers and practitioners are roughly on a par educationally, but in engineering, most professors have Ph.D's while most working engineers have only B.S. degrees (not coincidentally, engineering is also unusual in that practical experience is not a requirement for teaching). As a result of this big difference in educational attainments, working engineers are often contemptuously regarded as peasants who do not know what is good for the profession; (b) Professors use their long vacations—or paid time-off generously provided by the universities—to infest and tyrannize the old-line engineering societies.

Engineering professors, only a few years ago the pampered prima donnas of academia, are in bad shape now; they are no longer among the highest paid faculty members (among the significantly better-paid faculty members now are professors of business), they no longer get special favors like quick promotions or early tenure, and some are even threatened with layoff. Therefore, the engineering professors' highest priority now is keeping their classrooms full, not maintaining or improving the quality of engineering education. The professors know that the main attraction of the engineering profession now is a fast buck, not a long and satisfying career. They also know that with sky-high engineering unemployment and sagging engineering incomes that were mediocre to begin with, student interest in engineering is gravely threatened. The professors are keenly aware that any new demands for added sacrifice of time from engineering students (indeed, as noted above, many engineering students already take longer than four years to graduate) may be the straw that would finally break the back of engineering enrollments. And finally, the arrogant and narcissistic engineering professors are not about to approve any curricular changes that would narrow the yawning gulf in professional status that exists between themselves and working engineers. Thus, it should come as no surprise that large numbers of engineering professors are opposed to increasing the entry-level engineering program beyond four years.

What about employers? One fairly astute observer claimed that employers would have put more emphasis on the master's degree if they thought that the four-year B.S. degree was inadequate. This claim appears to be supported by the fact that, despite the frequent bellyaching that not enough engineers go on to graduate school, the job market for engineers with postgraduate degrees is, if anything, even worse than that for B.S. engineers. However, the bad job market for postgraduate engineers is simply attributable to their oversupply rather than overeducation. Furthermore, the question of whether B.S. level training is adequate for *real* engineering work is irrelevant in the case of the many

(Continued)

## DILBERT® by Scott Adams



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B.S. level engineers who are hired to work as glorified technicians. Thus, employers' lack of emphasis on the master's degree does not prove that a B.S. degree is generally adequate for *real* engineering work. Furthermore, employers have a good motive for not emphasizing the master's degree or otherwise supporting an increase in the length of engineering education: such an increase might reduce the surplus of engineers by discouraging people from studying engineering.

Another fairly astute observer said that increasing the time required for the first engineering degree would be futile because employers would then simply hire non-degreed people to save money. However, probably few people would study engineering with no intention of getting a degree. Hence, employers might be forced to go along with an increase in the time required for the first engineering degree.

Unfortunately, some of the greatest opposition toward lengthening the entry-level program comes from working engineers themselves. The degree-level of the majority of degreed American engineers is the B.S.: page 208 of the 1987 issue of *The World Almanac and Book of Facts* (source cited: National Science Foundation, *U.S. Scientists and Engineers*, 1986) gives the following degree distribution for American engineers: bachelor's 59.9%; master's, 23.0%; doctorate, 4.3%; and "other," 12.8%. Presumably many engineers with just four-year B.S. degrees—particularly those who have never taken continuing education courses—feel that increasing the minimum educational requirements for entry would hurt their own professional status (indeed, some engineers are even trying to inflate the value of the four-year engineering degree by proposing that it be made the minimum educational requirement for professional engineering registration; under this scheme, someone with just a four-year engineering degree would be eligible for registration, but someone with, say, a Ph.D. in physics would not). And

presumably many of the large number of non-degreed engineers (the 12.8% in the above "other" category is lower than estimates from some other sources) feel that such an increase would further erode their already somewhat shaky professional status.

There are certainly good reasons for increasing the length of entry-level engineering education. And certainly, in terms of how long typical engineering careers should be—in contrast to what they are today—an extra year or two for more study is not a long time (just ask any doctor or lawyer). However, because of sheer inertia and widespread opposition, the prospects for such an increase are now very dim.

## Reader's Voice

*This column in the "American Engineer" is for readers to voice an opinion about issues that affect the professional life of an engineer or other technical professional. Readers are encouraged to write AEA with their professional concerns. Each submission should include the name, address and phone number of the writer. Except for short excerpts, we'll publish the writer's name, city and state (unless the writer requests anonymity). In that case, we'll publish initials, city and state. Let's hear from you.*

**From L.F. of L.A.** - A *Science* magazine article (from page 358 of the April 21, 1995 issue), "Report Advocates 'Value-Added' Ph.D." described a report titled "Reshaping the Graduate Education of Scientists and Engineers." (The report is available from the National Academy Press; call 1-800/624-6242.) The report was prepared by a panel of the National Academy of Sciences (NAS) Committee on Science, Engineering and Public Policy (COSEPUP). The article stated, "the panel has rejected the idea, floating around since the 1970's, of modifying Ph.D. training to abbreviate research requirements for scientists not planning academic research careers. [Editor's note: a tiny minority of universities, among them MIT, Caltech, Stanford, Colum-  
(Continued)

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(Reader's Voice continued)

bia, and the University of Southern California, do offer a post-masters engineering degree—called the "Engineer" or "Professional" degree—which does eliminate or abbreviate the research requirements of the Ph.D.] The group also rejected the idea of imposing controls on graduate enrollments." In the words of the article, the report did advocate the following: "training Ph.D.'s in a broader range of skills to make them more flexible in an uncertain job market"; giving students "access to timely information about the job market as they make their educational decisions"; and "de-emphasizing research assistantships

in favor of training grants in order to give students more flexibility." (The article did not describe the difference between the two.) However, the article added, "despite these tweaks, the COSEPUP panel is basically defending the status quo, says David Goodstein, vice provost of the California Institute of Technology. What they propose may be right," Goodstein says, "but I can't escape the feeling that this is a committee of the winners, and what they are saying is 'Don't change the rules.'"

Robert Bruce, AE Editor  
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## Do We Need An American Engineering Association?

In our previous publication of the "American Engineer" I posed the title question; Do we need an American Engineering Association? This prompted the following enthusiastic response from an AEA member, published below.

We are presently moving along on a budget of less than \$30K per year. Can you imagine what we might be able to accomplish with a membership of 100,000?

Richard F. Tax

Do we need an American Engineering Association (AEA)?

The answer to this question is most assuredly yes for several reasons:

1. The American Engineering Association (AEA) is an American organization that addresses the professional problems and situations of American practicing engineers. No other organization even comes close to devoting itself to this worth cause. Let the college educated, practicing engineer be defined as not the entrepreneur, the manager, nor the educator, but the person directly involved in the day to day design, manufacturing, and testing of technology components and systems.

2. The American Engineering Association is primarily organized and operated to serve the interests of American practicing engineers. It is primarily composed of, and operated by American working engineers. While other engineering organizations should, and perhaps do, have those interests at heart, it is only a group of actual American working engineers who possess first hand knowledge of and an appreciation of these needs.

3. The American Engineering Association operating with mostly volunteer help and a minimal budget is responsible for a significant portion of the attention the practicing engineer has received relative to his professional needs. The AEA is an established organization operating to enhance the professional future of the practicing engineer. It is important that those entering the field of engineering do so with reasonable expectations of a full and fulfilling career. By establishing and ensuring that an engineering career is rewarding and enduring, the economic and national security interests of this country is also safe guarded. The American Engineering Association is the organization that can best fulfill this mission.

T.J., Beavercreek, OH.

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