

**QUANTITY INSTEAD OF QUALITY: A SABOTAGE OF
ENGINEERING AND ITS EDUCATION By "Engineer
Shortage" Propaganda?
By Milton Alpern, F. ASCE**

Sabotage and Propaganda-Pretty strong words, and not chosen lightly. After you have read the following, perhaps you will conclude that they are most appropriate. This article presents evidence and analysis which indicates that the deterioration and impotence of our engineering profession, which most of us feel, is not an accidental phenomenon, but rather the result of a deliberate, long-term, concealed, but effective, "Trojan Horse" effort to produce an oversupply of engineers.

The evidence seems to implicate the Engineering Manpower Commission's "engineer shortage" propaganda as unwarranted and as spawning excessive recruitment of high school youngsters into engineering colleges, thereby producing this engineering oversupply syndrome. Working in our supply-and-demand economy, this has caused economic insecurity and shortened career spans for many engineers and a general professional impotence-which-of greatest importance-has hurt the general public. Analysis indicates that this "Trojan Horse" has effectively overwhelmed and negated most individual and societal efforts to upgrade the profession, and that it will continue to do so unless stopped by responsible engineers. Let's look at the details.

AN OBJECTIVE APPRAISAL OF WHERE WE ARE

Though we are proud to be a part of this engineering profession which has done so much to raise humanity out of the disease-ridden, uncomfortable, isolated and ignorant life-style of only a century or so ago, this pride should not prevent us from recognizing that our profession has begun to fall far short of its potential. Despite the fine work of many excellent engineers and engineering educators, it is now a fact that the public is disenchanted with engineering for many valid reasons. And it is a fact that the typical practicing engineer today, regardless of extent of dedication, is frustrated by the hypocrisy of many realistic constraints which virtually *prevent* his or her rendition of best professional service, whether in industry, consulting or education!

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If we take off our blinders, climb out of our apathy and really look at where our actions and lack of actions have led, we are faced with some embarrassing questions and paradoxes:

1. Why did so many of the recent ecologically motivated changes in engineering design criteria have to come from public and political pressure groups? Why didn't engineers, who had the knowledge, also have the *strength to insist* on these better criteria, before being forced to adapt them?
2. Why has it required citizen pressure groups to slow down the horsepower, chrome, gas-guzzling, high pollution and "unsafe at any speed" situation in the automobile industry? Why wouldn't or *couldn't* the knowledgeable automotive engineers do it themselves?
3. Why has it taken the newspapers to flush out some of the recent consulting engineer contract-buying and political payoff scandals? Where was the "selfpolicing" that our professional societies have been boasting about for so long? Why did consulting engineers, who had so much expertise to offer, think that they had to resort to such shoddy "hard-sell" practices *in order to Survive* in the engineering business world?
4. Why did the engineering community passively allow the firing of three engineers of the San Francisco BART system and the forced resigning of two engineers from B. F. Goodrich Co. (I1) (to name just a few of many such situations), for their very ethical acts of accurately reporting lack of safety in certain designs that they reviewed? Why didn't or *couldn't* we engineers or society prevent their punishment by the industrial and political forces involved?
5. Why has the income status of most engineers fallen to such relatively low levels? Is the work of a garbage collector, for instance, more important than that of a typical engineer-as salary levels are beginning to indicate? Is the hidden life saving technical design dedication of an engineer less important than the more publicized life saving medical dedication of the physician-as compensation levels indicate?

Why has the profession *been unable* to assure a proper financial return for engineers that is both commensurate with the significant public value of their work, and of a scale necessary to back up truly professional quality effort?

6. Why has it been possible for so many older engineers to have been laid off, during recent heavy engineer unemployment periods, to the accompaniment of statements to the effect that-such layoffs were *healthy*, since they weeded out the "incompetent" engineers?

If this were true, why were such so-called "incompetents" permitted to enter and stay in engineering for so long? Where was the responsibility of the profession (or of industry) to protect the public from such "incompetent" engineering during all the years that these "incompetents" practiced, prior to the "healthy" mass layoffs? Why did schools originally accept their tuition fees and permit them to graduate? What high school recruitment operations encouraged them into engineering?

These questions--or paradoxes-- and many more, are all embarrassing evidence of one basic common denominator, i.e., most engineers are economically insecure-with all the professional impotence thereunto pertaining. As a practical

matter, they simply cannot afford the personal financial risk of being completely professional-to insist on what they know to be right in engineering matters. The engineer's altruistic creed-"to place public welfare above all other considerations"-has become an economically impractical obligation for most engineers. Although some have transcended this reality and have been martyrs to their professional principles, to their credit, such martyrdom certainly should not be considered as a valid or reliable option on which to base the practicality of professional performance.

Despite some 50 years of efforts of individual dedicated engineers and of their societies, and despite the enormous contribution of engineering to the public, the typical engineer today has unreasonably little control over his own career potential.

We must wonder what has caused such a body of highly educated, altruistic, dedicated professionals, who know what conditions should be, as well described by Whitelaw (17), Markwalter (12) and others, to so lose control of their profession!

I too have wondered and have searched for the answer. My first understandings were published in articles written several years ago (2). Since then, based on subsequent work on various guidance type committees and on the NSPE Task Force on Engineering Manpower Supply and Demand, a full, coherent, explanation has evolved and is now presented herein. Some of this explanation is distasteful because of the apparent "Trojan Horse" aspects that have been found to exist. However, the surprising efforts that some have made to stop exposure of this explanation has been so consistent with the explanation, itself, that they have reinforced its credibility.

THE REASON

The basic reason that engineers can do so little to increase their economic security, despite their education and dedication, is that, as a practical matter, **there seems to always be another engineer waiting in the wings to take one's job, client or position!** It is the threat of displacement by that "extra" engineer that is the key to this problem of economic insecurity and resulting professional impotence. It is the apparently concealed fact that there has been a frequent condition of **oversupply of engineers** which explains, by the law of supply and demand, almost all of the inadequacies, inequities and impotence in our profession.

The economic law of supply and demand is a pretty firm one. Apropos of our problem, it indicates that if the supply of engineers is greater than the demand, the job security of those employed goes down (regardless of competence); if the supply of engineers is less than the demand, job security goes up (and competence is well recognized and rewarded).

There is an important corollary of this law in regard to engineers who, to be professional, must be objective regardless of the effect of such objectivity on their employer or client, i.e., if engineer oversupply conditions exist at all-whether they are mild, or severe; occasional, or frequent, their "Damocles' Sword" effect destroys any sense of economic security for all engineers-and for long time periods. Unless martyrdom is supposed to be a commonplace

valid option, such engineer oversupply conditions make real professionalism a practical impossibility.

That engineer oversupply conditions have existed, and been extensive, is shown subsequently herein. But even if you choose to contest the extent indicated there, the preceding corollary is applicable to any engineer oversupply condition.

EVIDENCE OF ENGINEER OVERSUPPLY

Look at the graph in Fig. 1. This shows the relative demand for engineers between 1961 and 1974, as measured and recorded by Deutsch, Shea and Evans, Inc. (D, S & E) (10). The D, S & E index values are indirect measurements of demand for engineers, based on measurement of employment want-ad space. Although indirectly based, the past values of this index have been shown to correlate very accurately with the actual demand, in numbers, as determined by employment census work of the U.S. Bureau of Labor Statistics. This very important correlation has been developed by an excellent and extensive statistical analysis of past engineer input-output data by Rivers (13). In his report, Rivers derived the following empirical formula:

$$Q \sim (D-90) \times 188 \quad (1)$$

in which Q = number of engineers per quarter: in demand = (+), and unemployed = (-); and D = the D, S & E index number for that quarterly period. For instance, Fig. 1 indicates that the D, S & E index for the first quarter of 1972 was 52.9. By the Rivers' formula:

$$Q = (52.9 - 90) \times 188 \sim -7000 \quad (2)$$

This indicates that there were about 7,000 unemployed engineers during the first quarter of 1972.

Besides being able to closely estimate, from the D, S & E index values, the number of engineers who were either unemployed or in demand at any particular time in the past, Rivers has developed and explained (7) some very important supplementary implications of the D, S & E curves:

1. If the D, S & E index was less than 90, this meant that more engineers were losing jobs than being hired. (I have added a 90 value guide line to the D, S & E plot in Fig. 1.)
2. If the D, S & E index was between 90 and 130, this meant that new graduates could only find jobs by displacing older, already employed engineers; and
3. If the D, S & E index was more than 130, this meant that new graduates could find employment without displacing older engineers. Note that only at such times would older engineers have something like job security related only to their competence. (I have added a 130 value guide line to the D, S & E plot.)

On this D, S & E chart in Fig. 1, I have shaded all the regions that show an index of less than 100, the D, S & E nominal value of "normal" demand. (By the aforementioned Rivers analysis, this meant a condition of some hiring, but only if supported by firing of older engineers.) The time extent of the

shaded areas indicates that for the 1961-1974 period, below "normal" demand for engineers existed for about 40% of the time!

Of even greater impact, if we apply the Rivers criterion of a D, S & E index of 130, to mean no engineer unemployment at all, it is seen that such complete job security for engineers existed for only about 23% of that 14-year time period! Or, stated another way: For about 77% of that time, all engineers felt vulnerable to discharge for reasons *beyond their* control! (For convenience the chart, Fig. 1., has also been shaded in the 130+ regions of the D, S & E curve.)

We have here a graphic illustration of the economic insecurity that has pervaded the engineering community in the past dozen or more years. It hasn't been just a "gut feeling", based on our personal sense of such insecurity, our personal loss of job or client, or our observations of other engineers' economic troubles-it has been a fact! This economic insecurity, combined with the "Damacles Sword" effect, explains the impotence of our profession. And its long-term existence without societal intervention explains why so many engineers talk of "Do-Nothing Societies."

Why have there been such protracted periods of engineer oversupply? Has there perhaps been some subtle manipulation of the economics of the profession?

THE EMC PREDICTIONS

The D, S & E values and their roller coaster indications of a "feast or famine" pattern of demand-including the substantial oversupply indications-have been available for consideration by all since 1961. They, plus Rivers' correlation, have had the benefit of an accuracy based on measurements and interpolations of past events. No predictions have been involved.

However, during the period from 1964 until 1974, while there were such ample indications of an oversupply of engineers for very much of the time, the many bulletins and other releases of the Engineering Manpower Commission (EMC), aimed at the high school guidance readership, repeatedly contained predictions of future shortages and only of shortages of engineers! In retrospect, based on this information, the indications are that the EMC was wrong for as much as 77% of the time!

That the EMC may have been wrong is not too disturbing in itself. In fact, most major reputable sources (4,5,15) have concluded, essentially, what anyone who studied history and reads the newspapers must conclude: that accurate predictions of demand for engineers are impossible, due to their intimate relation to the state of the whole economy, which is itself fundamentally unpredictable. No, the EMC being wrong wasn't the bad thing. What was disturbing about EMC's incorrect predictions was two-fold: (1) That EMC did not itself emphasize its unreliability, that it was only making guesses, that it didn't really know; and (2) that the EMC forecasts were always predictions of a shortage of engineers-never of an oversupply!

And the EMC has continued this "engineering shortage" seerage right up into the recent engineering layoff debacle.

But EMC's questionable credibility doesn't end there. As a member of the NSPE Task Force on Engineer Supply and Demand, I obtained and read some 32 releases of the EMC, which were put out to the "guidance" readership

from July 1964 through July 1973 (9). Reading these as would a high school guidance counselor, but with the added benefit of having them all available for cross-checking, I found some 60 statement or diagram items that appeared to me to indicate a concealed pattern of inconsistent, unsubstantiated, distorted or misleading information-all related to the repeated predictions of forthcoming shortages of engineers and designed to provide a cover-up of real conditions in the engineering field!

The following excerpts indicate just a few examples of the many:

Prediction.-In July 1964, EMC stated that (6) ". . . All sectors reported that their employment of engineers, . . . would rise steadily during the decade ahead . . .

Fact.-By the D, S & E index values, the measured demand during that "decade ahead" actually fluctuated substantially, with heavy unemployment conditions existing for at least half of the time. The prediction proved wrong and the substantiation of "all sectors" raises interesting questions.

Distortion.-Same reference, EMC stated: ". . . Separation rates for engineers have remained relatively unchanged except for an increase in the layoff rate."

Comment.-This statement actually means that more engineers were being *fired* but carefully avoids saying it! I submit that this was misleading.

Inconsistency.-in January 1969 (16), EMC provided a final paragraph with a bold type heading: "Demand for Engineering Executives Continues Strong."

However, down in the text, well under the heading, the following is found:

. . . The over-all demand for executives, however, was about 20% lower than a year ago."

Comment.-Was this technique, of providing a headline which was inconsistent with the following text, used in hope that busy people, like guidance counselors, may not read past the headlines? Misleading?

These are only several of the 60 odd examples found in those 1964-1973 EMC releases. [Note that all such questionable items found in those EMC releases were documented and presented to the NSPE Task Force on Engineer Supply and Demand as a 25 page draft report (8). *Though its facts were not contested*, this report has *not* been acted on or publicized by that Task Force, apparently for fear of offending the Engineering Manpower Commission! My concept of professional obligation says that this type of censorship is wrong! This, plus the general inaction of that Task Force on its supply and demand study charge for well over two years, has been one of the reasons for my writing this article. It may be considered as part of a "Minority Report"]

THE "TROJAN HORSE"

The importance of these highly questionable EMC predictions lies in the fact that they received wide publicity with the semblance of "authority". The EMC releases have formed the basis for most of the so-called "guidance" literature that reaches high school guidance personnel in quantity. They have been the basic reference source used by the colleges, as well as by ASEE, ECPD and EJC in their literature, to recruit youngsters into engineering! And since the EMC is a creature of the EJC, it has carried an aura of respectability as representative of the entire engineering profession. High School guidance people had no reason to doubt the objectivity of its work nor did any responsible

engineers in industry or education-as they used the EMC predictions for th(planning. However, in view of the questions raised previously by the apparent lack of credibility of the EMC output, since 1964, we must wonder about how many extra youngsters may have been lured into engineering and just how good anyone's planning has been based on such EMC output.

Since the widespread (and rational) viewpoint is that accuracy of engineer demand predictions is basically impossible, just what special insight did EMC think it had to justify its consistent predictions of engineer shortage? Reading; the EMC releases reveals that the primary basis for its predictions has been responses from questionnaires to industry hiring personnel, asking them how many engineers they will need in the future! There is so much that is nonobjective about this technique that one wonders if the EMC has been serious. (The effects have certainly been serious!):

1. Seemingly, EMC has not recognized that many of such industry hiring personnel would *want* a large supply of engineers to be always available for both their future hiring needs and for "Damacles Sword" control over their employed engineers. Their reply to the EMC questionnaire "predicting" high future needs could be reasonably counted upon to be used in "engineer shortage" shouting and thereby help generate the large future supply of engineers desired! Was this obvious source of error missed by EMC?
2. Seemingly, EMC has not recognized that more than one firm could honestly submit hiring estimates based on obtaining the same future contract, and thus cause a multiplying of engineer-need numbers. Was this source of error missed by EMC?
3. Seemingly, EMC has not recognized, to any appreciable extent, the other very important aspects and indirect measures of "demand" such as salary and fee levels, working conditions, extent of layoffs at the top while hiring at the bottom, etc. All of these could also have been subject to questionnaire surveys and to mathematical consideration for predicting. Since all of these have consistently indicated *low* demand for engineers-not high, did their avoidance by EMC imply something?
4. Seemingly, EMC has chosen to seldom acknowledge the essential impossibility of accuracy in any such predictions. However, it is interesting to note that there were some exceptions. These typically occurred only when very low demand (high unemployment) conditions existed. Then EMC seemingly had to acknowledge that things were bad and its past predictions may have been somewhat in error. But even for these occasions, while softly acknowledging a bad past prediction, EMC then proceeded to predict that future engineer shortages were coming!

In view of the very questionable record of accuracy, and the apparent lack of objectivity of the prediction methods used by the EMC, one must question the motivations behind these widely circulated EMC forecasts which seemingly could be *guaranteed* to predict a forthcoming "engineer shortage".

Could part of the answer lie in the fact (little known) that the EMC work is financed to a large extent by private industry? This is a very disturbing possibility since the EMC, as a creature of the EJC, is *also* supported by all members of its member technical societies. Its work should be as objective as possible and representative of the interests of all engineers. Its credibility

should be above reproach. But the preceding evidence indicates that this may not be the case.

As a final and particularly clear and recent example of this apparent credibility gap, consider the following.

In April 1975, the EMC put out a statement (4) for national circulation to the high school guidance readership. The first paragraph of this release says:

All indicators of future national societal needs support the conclusion that engineers and related professionals will be in strong demand over the long term. Government and private studies show a continued need for larger numbers of engineers than are currently being graduated from U.S. engineering schools

However, in July 1975-just 3 months later-John Alden, the Executive Secretary of EMC, presented a paper (1) to a conference on engineering manpower which was attended primarily by industrial and college leaders (note: not the high school guidance people). This talk included the following statements:

Our ability to project future manpower supply and demand is so poor that many past efforts have been more misleading than helpful . . . we do not know with meaningful accuracy, whether total engineering employment is growing or contracting, let alone the situation in particular specialties or industries . . . we do not know how many engineers, both experienced and new graduates, are unemployed or involuntarily under-employed . . . we have only a sketchy knowledge of employers' hiring plans . . .

These last remarks were certainly refreshing for their candor. But what about the startling difference between these candid remarks for the "in" crowd, and the prior "All indicators . . . conclude" remarks, for the "guidance" readership? The inconsistency appears to confirm all the doubts about the credibility of EMC to which I have referred previously.

Each of us must form our own opinion of this type of thing. My opinion is that the evidence indicates that a subtle but very effective control mechanism has been developed and in operation to keep engineers in line. Like the "Trojan Horse," a body of strategically publicized but unwarranted predictions of "engineer shortage," disguised as erudition, has been slipped through a credibility gap to sabotage the economic stability of the engineering profession. The effects of this sabotage have been deteriorating to the profession and to its potential for public service. What do you think!

If my findings are confirmed, then many fine engineers have reason to resent the interference with their careers that the apparently unwarranted EMC propaganda may have wrought. But if so, let's convert that resentment into constructive plans and action for the future. To this end other important ramifications of this apparent "Trojan Horse" situation are presented herein, and these are followed by remedial proposals.

THE PLOT THICKENS

The basic effect of the past many years of this apparently unsubstantiated

"engineer shortage" propaganda has been to lure too many youngsters into engineering careers, with only secondary regard for their quality, or sincerity of interest, *and to expand the engineering schools to receive them*. Besides the oversupply of engineers, the result has also been an overgrowth of engineering education facilities and staff.

This has caused the plot to thicken exponentially. The problem is now compounded by the real, understandable, economic needs of the overexpanded engineering schools to obtain enough students to support their overextended faculty and facility budgets. And this has led to the heavy high school recruiting that is currently going on. Each such school is striving for its own economic survival-and the possible profession-wide long-term damage is of secondary importance.

Unless some responsible constraint is applied to this present recruiting operation, we can top George Orwell and make our own prediction for 1984: It may be the year of the *really-great* engineering depression! And it may be the year that too many engineers, frustrated to the breaking point, decide that professionalism is "for the birds," and that *unionism* is the only way to go!

ENGINEERING EDUCATION SUFFERS TOO

The sabotage story is not yet complete. The erosive effects of engineer oversupply and resulting economic insecurity have also wrought their havoc in engineering education. Despite the best efforts of some fine engineer-educators, too much of engineering education is currently riddled with hypocrisy and inadequacies. This deterioration has developed and thrived only because engineer practitioners, in the throes of their own economic insecurity problems, *could not afford* the time and efforts to properly monitor or cooperate with professional education. For instance:

1. Just how professional is engineering education that is currently taught predominantly by Ph.D. educators who have had no real practical engineering experience; who have not been measured by licensing procedures and whose knowledge of the engineering field derives almost solely from similar inexperienced educators, from text books or from narrow research projects?

This situation could be improved by widespread faculty /practitioner interchange-if this could be afforded by the practitioners. But their fee schedules have been kept down by an oversupply of consultants in a supply/demand economy.

2. Where had engineering objectivity been in the ECPD college accreditation process, during the past 15 or 20 years, when over 90% of the accreditation visitors were the same inbred educators noted previously, while less than 10% were from engineering practice?

Maybe ECPD's voiced complaint of not enough available practitioners could be answered if the practitioners could afford to participate. But financial support for this hardly exists-again due to the low fee and salary status caused by the oversupply syndrome.

3. Where is the economic, professional or humanistic logic in the very high attrition rates that have been typical of engineering colleges? It has been harmful to the stability of the colleges, the careers of the dropped out students,

the efficiency of the faculties, the quality of the education, as well as the profession's public image.

The inhumanity as well as the dollar waste, of this long standing situation, could readily be avoided by a proper quality control filter at the college entrance level.

Such avoidable educational deficiencies are not consistent with a responsible profession's proper concern for preparation for its future practitioners. And the development and proliferation of these deficiencies are keyed to the same economic instability that plagues the practicing profession.

Maybe the answers also lie in some comments I have heard from some honest young Ph.D. educators. They state that the widespread problem of not being able to get practical experience exists because, to survive in engineering education, too many college administrators insist that they work on research only, and-as they say-"publish or perish." Any argument to the effect that the education of their students must thereby suffer from irrelevancy, is seemingly of little importance to such administrators. And if the young professors don't like it, there is always some other professor waiting in the wings to take one's position. Again, the same oversupply syndrome!

"A PAST TO REMEMBER-A FUTURE TO MOLD"

This emblem of our country's 200th birthday has, as a relevant corollary, the statement: *"Those who ignore history are condemned to relive it."*

Recent history indicates that predictions of future demand for engineers are essentially impossible due to many unpredictable economic and political factors. It indicates that the quality of recent engineering and engineering education has been far below potential and that the public and profession. have thereby been poorly served.

Objective analysis indicates that these inadequacies have been due to the widespread economic insecurity of engineers which has, as a practical matter, prevented them from being truly professional. It also pinpoints the cause of this economic insecurity as an oversupply of engineers-the "Damocles Sword" effect of the extra engineer always waiting in the wings. It provides strong evidence that this oversupply is not accidental but rather the result of apparently unjustified past engineering shortage propaganda, which may be part of a designed control mechanism to keep engineers from controlling their own profession.

In my opinion, this sad situation of economic insecurity and professional impotence has not just happened. We engineers have let it happen. The vast majority have abandoned societal efforts entirely and done nothing, while most of the rest of us have just "gone along to get along". While we have been developing our technological marvels, if we have thought of it at all, we have apparently assumed that some great, though undefined, moral force would work to assure appropriate recognition and protection for engineers for the unique and important work that we do.

That this has been a wrong assumption has been amply discussed herein. To that discussion could be added many other examples of professional impotence that has resulted from our neglect. Outstanding among these are the success of certain elements of industry in blocking attempts to remove the industrial

exemptions of PE licensure from state registration laws-obviously against the public interest; and the widespread refusal of industry to formally recognize the recently promulgated engineer employment guidelines-obviously against the economic security of engineers.

Do we want to relive this history? We don't have to. This is our profess We can mold its future as we choose-if we choose! But the molding has to be done by truly professional engineers of good will. If you are one these, and if you have looked for something concrete that you could do (rather than just talk about) for your profession, then you may want to consider and act on the following. Perhaps if such actions had been taken some 20 or years ago, we would have had a *real* profession today.

SUGGESTIONS FOR ACTION

1. I suggest that you contest at meetings, in publications, at guidance sessions and wherever else relevant, any continuation of the Engineering Manpower Commission's (or anyone else's) "engineer shortage" predictions. Demand that; objective substantiation of such predictions be provided or that they not be made!

2. I suggest that the present fast rolling recruiting bandwagon is not on for responsible professions to be on. Rather, we should get involved in honest guidance. Tell it like it is-economic and professional warts and all! Propaganda based on nonobjective statistics is not a valid foundation for a profession and, is not wanted by engineers of integrity, whether in industry, education or consulting-regardless of discipline.

3. I suggest that the proper guide post for high school student guidance should be that *quality* is far more important than *quantity*. We should speak out and work for profession-monitored, stiff, quality control entrance exams as prerequisites for engineering college-as they are for medicine and law. Such quality control filters should only pass the most motivated and potentially qualified youngsters. The perseverance of such youngsters will assure a future cadre of truly professional engineers, and the associated rational reduction in number will result in a proper economic climate which will enable true professional, engineering.

4. I suggest that we demand professionalism in the engineering schools. Until ECPD provides really objective and encompassing accreditation procedures, set up your own local balanced monitoring teams to evaluate the quality and relevancy of your local engineering schools. This has been constructively done in the New York metropolitan area (3) for civil engineering education. It can be done nationwide for all disciplines.

5. I suggest that we intensify efforts to legally establish the exclusivity of responsible licensed engineers by legislating the removal of all exemptions from the requirement of PE licensure for all engineering that affects public safety-in all states.

6. Finally, in all possible ways, let's stop acting like pawns on the economic chess board and begin acting like players. Start speaking out for what is right. Stop "going along to get along"-the diplomacy isn't worth the lost principle. Demand appropriate voting action by your representatives in NSPE and in other professional societies. Our concern for the public's interests will be best served,

not only by our own professional behavior, but by our efforts towards the economic stability of all engineers which will make professionalism a practicality for all.

One closing thought: Though I have worked hard and long in NSPE, ASCE, and other societies, and will try to continue to do so, it is my firm belief that all our societal efforts in any of the areas of employment guidelines, public relations, ethics, competitive bidding, legislative lobbying-or-you-name-it-could all be *Mickey Mouse* as long as engineers are prevented from doing their professional best by an unnecessary, pervading and seemingly manipulated status of economic insecurity. Such has been our past history. Shall we let it also be the future?

It's now your move!

See URL for the D,S & E curve mentioned.

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12501 QUANTITY INSTEAD OF QUALITY: "ENGINEER SHORTAGE"?

KEY WORDS: **Employment; Engineering;** Professional engineering;
Professional practice; Public benefits; Public opinion; Social needs; Social;
participation; Statistics

ABSTRACT: This article presents evidence and analysis which indicates that the deterioration and impotence of our engineering profession, which most of us feel, is not an accidental phenomenon, but rather the result of a deliberate, long-term, concealed, but effective, "Trojan Horse" effort to produce an oversupply of engineers. The evidence seems to implicate the Engineering Manpower Commission's "engineer shortage" propaganda as unwarranted and as spawning excessive recruitment of high school youngsters into engineering colleges, thereby producing this engineering oversupply syndrome. Working in our supply-and-demand economy, this has caused economic insecurity and shortened career spans for many engineers and a general professional impotence which - of greatest importance - has hurt the general public. Analysis indicates that this "Trojan Horse" effort has effectively overwhelmed and negated most individual and societal efforts to upgrade the profession, and that it will continue to do so unless stopped by responsible engineers.

REFERENCE: Alpern, Milton, "Quantity Instead of Quality: A Sabotage of Engineering and Its Education by "Engineer Shortage" Propaganda?," *Engineering Issues-Journal of Professional Activities*. ASCE, Vol. 102, No. E14, Proc. Paper 12501, October, 1976, pp. 457-469