

# TEXETHICS NEWSLETTER

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### Licensing Faculty: Changing the Shape of the Hole

By John Speed, P.E., Executive Director  
Texas Board of Professional Engineers

As a kid, I used to "help" my dad on his woodworking projects by drilling and sawing on scraps of pine while he worked. About the time I was finally old enough to use tools, Dad caught me trying to squeeze a chair leg with a half-inch *square* cross-section into a half-inch *diameter* dowel hole. In other words, I was trying to force the proverbial square peg into a round hole. I still remember the way he approached me. "There are two ways to get a square peg into a round hole: either change the peg or change the hole."

The process of licensing engineers is one where there are several minimum "hole" standards in which to place applicants. Engineers with industrial or consulting experience have very little trouble describing their projects, studies and reports. However, it has not always been so easy for engineering faculty. Professors and researchers are "pegs" that come in every imaginable cross-section. Research projects overlap with publications. Publications overlap with teaching. Teaching overlaps with research. The work experiences are often as complex as the individuals performing them, and the licensing application becomes difficult to complete.

Over the past few years, the Texas Board of Professional Engineers has recognized the disparity between faculty "pegs" and the Board's bureaucratic "holes". In response, the Board implemented new rules that recognize the unique nature of engineering education and research. In 1997, a revision to the Texas Engineering Practice Act clarified an existing passage

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### By Dave Dorchester, P.E., Member and Vice Chair Texas Board for Professional Engineers

The Texas Board for Professional Engineers voted to recognize Software Engineering as a distinct discipline of Engineering at its June 1998 Board meeting. There was some thought that the action was premature because there was no recognized Body of Knowledge, ABET had not voted to accredit Software Engineering as program and there was not a professional examination available. All of these items had been discussed and worked on for several years but there had been no significant progress.

The Texas Board believes, however, that its vote added an urgency to accomplishing some of these badly needed actions. For instance, the Board lobbied hard for ABET to vote to accredit Software Engineering programs once they were in place and eligible for accreditation. ABET did vote to recognize Software Engineering at the 1998 Board meeting in Seattle. ABET and CSAB (Computer Science Accreditation Board) reached an understanding to merge into one body at this same meeting. The details of the merger are to be completed later. This was a huge step forward to accrediting Software Engineering and bringing the two disciplines of Engineering and Computer Science together.

Most significantly, however, a new stand-alone committee, named the Software Engineering Coordinating Committee, has been formed to accomplish the work of developing a Body of Knowledge. This Body of Knowledge will be, then, the basis for developing a Professional Examination.

(Continued on page 2)

SOFTWARE ENGINEERING  
WHERE IS IT?

that defined the teaching of advanced engineering courses as the practice of engineering. In effect, this passage allows engineering educators to submit a much abbreviated experience description in their experience records. In many cases, the description will consist of a single paragraph listing the advanced engineering courses taught!

Most engineering faculty will be seeking tenure after about six years of experience. Not coincidentally, the Board has established rules that will allow a waiver of examinations after six years of teaching (or other) experience for those who hold certain types of PhDs. Further simplifying the process, an applicant will only need reference statements to verify the minimum amount of time needed under law.

Several board members -- including non-engineer public members -- are particularly interested in increasing the number of licensed engineering faculty. Some Board members are actively contacting university deans to better assess the current faculty awareness of professional licensing requirements. One public member has even expressed interest in how the Board might use a tenure application in place of parts of the licensing application. This topic may come before the Board as early as June 1999. Engineers should take special note of the fact that this issue is of special interest to *public* Board members. As representatives of the non-engineers of Texas, they are providing guidance to Texas engineers concerning the needs of the general public.

The Board strongly believes that all engineers have an obligation to the public we serve. The Board believes that those who teach engineering should acquire a professional license to practice engineering. Through example, teachers of engineering can then lead their students to an understanding of the professional, ethical and legal responsibilities represented in that license.

### **Interested in an Ethics Presentation?**

**For assistance in engineering ethics education or for information on ethics programs for companies, please contact The Murdough Center for Engineering Professionalism at: 806-742-3525, Fax 806-742-0444, or email: [ethics@coe.ttu.edu](mailto:ethics@coe.ttu.edu).**

**Dr. Jimmy Smith, P.E., and Mr. Bill Lawson, P.E. have conducted over 100 presentations, workshops, seminars, and/or courses resulting in Professional Development Hours for engineering and related societies, companies, state agencies, and engineering firms.**

**The Texas Board of Professional Engineers partially funds these programs when conducted in Texas**

This Committee has their own funding and is an independent committee. Their first organizational meeting was at the Texas Board office in January of 1999. They are, in effect, the successors to the joint task force from the IEEE Computer Society and the Association of Computer Machinery groups.

It is hoped this committee, after completing the Body of Knowledge study, will make specific recommendations for a task force, society or group to work with NCEES to develop a Professional Examination.

The Texas Board has already licensed several Software Engineers as Professional Engineers since the June Board vote. The basis for licensing Software Engineers, at this point in time, is that the applicant must have an engineering degree or other degree recognized by the Board and at least 12 years of creditable experience in the Software field. When an examination is available, the experience requirement will be four years as it is now for those fields that have an examination.

The Texas Board feels very significant progress has been made in advancing Software Engineering to maturity as a Professional field. Other states and nations are reviewing their options and many are waiting to see how the present activity generated by the Texas Board action plays out.

### **Engineering Ethics and Professionalism Courses** **Available by Correspondence**

Over 800 individuals have taken Ethics Courses from Texas Tech's Murdough Center for Engineering Professionalism by correspondence. Four courses in engineering ethics are offered:

A 3-hour academic credit course (ENGR 4092) awarding 3 academic credit hours, and

Three courses for continuing professional competency awarding Professional Development Hours (PDHs).

- ✂ ENGR 4092 – Engineering Ethics (academic credit)
- ✂ PDH 20 - Basic Studies in Engineering Ethics
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- ✂ PDH 60 - Advanced Studies in Engineering Ethics

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or email to:  
[ethics@coe.ttu.edu](mailto:ethics@coe.ttu.edu).

# NSPE/BER Case 96-4

## SOFTWARE DESIGN TESTING

### REFERENCE: NSPE Code of Ethics Sections

**II.1.a.** - Code of Ethics: Engineers shall hold paramount the safety, health and welfare of the public. If engineers' judgment is overruled under circumstances that endanger life or property, they shall notify their employer or client and such other authority as may be appropriate.

**II.1.b.** - Code of Ethics: Engineers shall approve only those engineering documents which are in conformity with applicable standards.

**II.4.a.** - Code of Ethics: Engineers shall act for each employer or client as faithful agents or trustees. Engineers shall disclose all known or potential conflicts of interest which could influence or appear to influence their judgment or the quality of their services.

**III.6.b.** - Code of Ethics: Engineers shall not attempt to obtain employment or advancement or professional engagements by untruthfully criticizing other engineers, or by other improper or questionable methods. Engineers in salaried positions shall accept part-time engineering work only to the extent consistent with policies of the employer and in accordance with ethical considerations.

### FACTS:

Engineer A is employed by a software company and is involved in the design of specialized software in connection with the operations of facilities affecting the public health and safety (i.e., nuclear, air quality control, water quality control). As part of the design of a particular software system, Engineer A conducts extensive testing, and although the tests demonstrate that the software is safe to use under existing standards, Engineer A is aware of new draft standards that are about to be released by a standard setting organization -- standards which the newly designed software may not meet. Testing is extremely costly and the company's clients are eager to begin to move forward.

The software company is eager to satisfy its clients, protect the software company's finances, and protect existing jobs; but at the same time, the management of the software company wants to be sure that the software is safe to use.

A series of tests proposed by Engineer A will likely result in a decision whether to move forward with the use of the software. The tests are costly and will delay the use of the software at least six months, which will put the company at a competitive disadvantage and cost the company a significant amount of money. Also, delaying implementation will mean the state public service commission utility rates will rise significantly during this time.

The company requests Engineer A's recommendation concerning the need for additional software testing.

### QUESTION:

Under the Code of Ethics, does Engineer A have a professional obligation to inform his company of the reasons for needed additional testing and his recommendations that it be undertaken?

### DISCUSSION:

Engineers are frequently faced with ethical dilemmas that balance the interests of the employer or client and the interests of the public health, safety, and welfare (see NSPE Code Sections II.1.a. and II.1.b.). While this is not a new or novel issue, with the increasing use of technological advances such as computers and specialty software, the decisions and judgments by engineers can have heightened importance in a wide variety of areas. The BER has discussed this issue on numerous occasions (see BER Cases 89-7, 90-5, 92-4, 92-6, 93-7).

With increasing frequency, new, innovative software and computerized solutions are being employed to instantaneously model and solve problems earlier performed over a lengthy period of time by individuals in teams. Experience has demonstrated that these efforts have played a key part in increasing the quality of the work being performed while reducing the overall long-term costs involved in performing these tasks. Clearly, an engineer's obligation to serve the interests of the client and the public are advanced by such efforts and activities.

While the use of these techniques have had a salutary effect on engineering practice and in many cases engineers have been able to more accurately measure the effects of their efforts on the public and the environment, there are obvious costs associated with the use of tests in evaluating the effects of some of the work performed by engineers in this area. While there is a strong bias in engineering toward design safety through the use of redundant systems to help assure the greatest degree of public protection possible, these considerations always must be balanced with the overall costs. As noted earlier, with advanced testing techniques, issues heretofore left unexamined are now equally subject to further testing, thus increasing the expense to the client and to the public.

Obviously, one of the most difficult questions facing engineers is how much testing is enough. This issue will always depend upon a careful assessment of all of the facts and circumstances in each individual case. Each individual engineer must make this determination based upon reasonable professional judgment.

Turning to the facts of the case, Engineer A must balance a variety of factors. Engineer A generally believes that the software designed by his company is safe but has become aware of a new testing procedure that is likely to demonstrate results that might cast a cloud over the software's viability. The financial pressures that exist, including the financial impact on his company, the client, and the public, as well as the potential loss of jobs and delays if additional testing is pursued, are clearly important factors and need to be addressed in some manner. However, it would seem that these nontechnical considerations are factors that need to be given weight separate and apart from the decision as to whether the additional testing should be recommended by Engineer A.

Engineer A would be well advised to prepare a technical report explaining the current testing analysis and results, as well as a reference to the new testing procedure that was recently reported in the professional literature so that the engineer's employer can make an informed decision regarding additional testing (reference Code Sections III.6.b. and II.4.a.). The nature of the industries using the software -- water, air, and nuclear -- clearly have an enormous impact upon the public health, safety, and welfare, and therefore, Engineer A should be certain that the information imparted to his employer and to the employer's clients is clear, accurate, and direct. Under the facts in this case, it is clear that the employer wants to have a significant degree of certainty that the products designed and manufactured have a high degree of reliability. Engineer A is in a strong position to assist his employer, and ultimately his employer's client, in carefully evaluating all of the appropriate facts and circumstances in order to take a course of action.

### CONCLUSION:

Engineer A has a professional obligation under the Code of Ethics to explain why additional testing is required and to recommend to his company that it be undertaken. By so doing, the company can make an informed decision about the need for additional testing and its effects on the public health, safety, and welfare.

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\* Note -- In regard to the question of application of the Code to corporations vis-a-vis real persons, business form or type should not negate nor influence conformance of individuals to the Code. The Code deals with professional services, which services must be performed by real persons. Real persons in turn establish and implement policies within business structures. The Code is clearly written to apply to the Engineer and it is incumbent on a member of NSPE to endeavor to live up to its provisions. This applies to all pertinent sections of the Code.

## PEPL Case of the Month – November 1998 - January 1999

From the Web Site of the "Ethics Case of the Month Club"  
<http://www.engr.washington.edu/~uw-epp/Pepl/Ethics/>

## **“The Plagiarized Proposal”**

(Case 1009)

You have been asked to submit a proposal and cost estimate for the foundation investigation for a proposed mid-rise condominium at First and Main Streets by a developer for whom your firm has done work previously at the site of the Hillside Court project.

You go to the developer's office to discuss the scope of the work in preparation for writing the proposal and note that in addition to the red BMW convertible and the steel gray Jaguar with gold trim parked in front of the one-story, single-office building, the lettered sign on the door indicates:

**Hillside Court Development, Inc.**  
**Grandview Enterprises, Ltd.**  
**First and Main Associates, Inc.**

As you enter the building, you note that there appears to be one secretary (who also acts as the receptionist) in a general office function area, plus two large executive offices. At the meeting in one of executive offices, the developer, Barry Young, indicates that he is retaining I. M. Strong, principal of Strong Engineers, as the structural engineer for the project. He also states that due to the peculiar architectural layout of the proposed building on the site, the structural engineer will be responsible for considerably more work than normal for this type of structure.

Nothing of any substance can be done on the structural design until the foundation report is received. You are familiar with the Strong structural engineering group, having worked with them on one or two projects recently, and know that they have a good reputation in the local engineering community.

Young indicates that he does not know what needs to be done regarding the foundation investigation and requests that you outline the specific items in your proposal to him for the work. You return to your office and prepare a detailed scope of work, including it in your proposal for the foundation investigation. You have the proposal delivered to Young's office and get on with other projects on your list of things to do. Three weeks later, having heard nothing from the developer, you call to ascertain the status of the project.

Mr. Young apologizes for not having called you, and explains that he gave your scope of work to one of your competitors, who agreed to do the work for the same price as your budget estimate, but also agreed to bill the developer for only the field work by the drilling contractor (about 25% of the total budget) until the condominium complex is completed and 80% occupied. In fact, the field work is scheduled to start in about two weeks.

**What, if anything, do you do?**

### **Alternate Approaches:**

1. Do nothing. Walk away and don't call this client again. It is a poor lesson to have to be learned; hopefully you will have enough sense to foresee such a situation in the future.
2. Call Young and tell him that his actions in using the scope of work you prepared to solicit a bid from someone else was disreputable. Then walk away from the project and don't pursue it further.

3. Call Young and explain that you really want this project, and if you had known price was that sensitive an issue, you would have been happy to match your competitor's offer, insisting that because it is your scope of work, you should get the project. Also, tell him that you have contacted the exploration drilling contractor and can get a 10% discount on his work if the project is given to you.

4. Write a letter to Young, telling him that while you understand his position, he has made a mistake. You have worked "behind" (as a follow-up to) the other firm on several occasions, and have found their work to be substandard. Encourage him to reconsider, because he really doesn't want the other firm on his project, and you would do a much better job.

5. You suspect your competitor actually has some sort of affiliation with the developer, so you should ask around to find out who else may have received a 'bid' package from the developer. If your suspicions are true (only your competitor received the package), contact Young and discuss your suspicions. If there is no satisfactory conclusion reached, go to Alternate # 9, below.

6. Sue the b----d! He (the developer) manipulated you into preparing a very detailed scope of work just so he could then copy it and present it to your competitor, or give your entire proposal to your competitor to use in bidding against you. Scum like this should be run out of the state on a rod back to where he came from (you saw the out-of-state plates on the Jaguar)!

7. Send a letter to your competitor explaining that engineers shall not use practices that denigrate the profession or are improper, misleading or unfairly coerce favorable business results. It was a breach of ethics to use another engineer's proposal to unfairly obtain favorable business.

8. Call your competitor and let him/her know what you think of their unprofessional behavior. Tell him/her that accepting work on a contingency basis (getting paid only if the project receives funding and is 80% occupied) is unethical. Also, you will be happy to tell everyone you know in the local engineering community what kind of non-professional they are to take your scope of work as their own!

9. File a complaint against your competitor for unethical behavior with the state Board of Registration for Professional Engineers, showing that the competitor used your work product (the detailed scope of work) as their own.

10. Send a letter to Young explaining that he violated copyright laws when he gave a copy of your proposal to another engineering firm to solicit a 'bid'. Include an invoice for preparing the original proposal and scope of work.

11. In the future, include a Proprietary Statement with your proposal alerting the reader that the information in the proposal is copyrighted. Then sue the developer if such a thing should happen again.

12. Work with this developer in the future, recognizing his previous behavior and be prepared to deal with it.

13. Accept the fact you are not going to work on the project, but call I. M. Strong to inform him of what has transpired, for his information, since he will be heavily involved in the project for a substantial fee.

**This is the most recent ethics case on the  
"Ethics Case of the Month Club"  
Web site:**

<http://www.engr.washington.edu/~uw-epp/Pepl/Ethics/>

**You will enjoy viewing this web site and vote on the alternate responses to this case. Also, you may see the voting results of previous ethics cases. Later, you will be able view the results of this current case.**

Remember,

"You are the best person that 'someone' knows."

### **A WISE WOMAN'S STONE**

A wise woman who was traveling in the mountains found a precious stone in a stream. The next day she met another traveler who was hungry, and the wise woman opened her bag to share her food. The hungry traveler saw the precious stone and asked the woman to give it to him. She did so without hesitation.

The traveler left rejoicing in his good fortune. He knew the stone was worth enough to give him security for a lifetime.

A few days later, he came back to return the stone to the wise woman. "I've been thinking," he said. "I know how valuable this stone is, but I give it back in the hope that you can give me something even more precious."

"Give me what you have within you that enabled you to give me this stone."

***Sometimes it not the wealth you have but what's inside you that others need.***

**An Excellent Web Site for Engineering Ethics is: [www.niee.org](http://www.niee.org)**

**This web site has an abundance of information related to engineering ethics, including over 130 Engineering Ethics Cases from NSPE/Board of Ethical Review.**

**It also has links to many other web sites and several links to Codes of Ethics and Ethics Centers.**

### **"Uses" of *TexethicS* and "Request for Input" for Future Issues**

This issue of *TexethicS* has been devoted primarily to educational materials that may be copied and used by faculty to present students some food-for-thought about ethical issues. Also, engineers in companies may want to copy the material and use it for discussions within their organization. This type of use is highly encouraged!

This philosophy of providing educational material will continue in future issues of *TexethicS*. If you have cases, articles, or materials of an educational nature that would be appropriate to include in the newsletter, please email the information to Jimmy Smith at [jhsmith@coe.ttu.edu](mailto:jhsmith@coe.ttu.edu). If you don't have the material in digital form, you may fax it to us at 806-742-0444. *Thanks in advance for your assistance and guidance!*

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<p><b>TO:</b></p>
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**Note to Readers:** *Articles on engineering ethics and/or professionalism, and suggestions for future topics for the "TexethicS" Newsletter will be welcomed.*