# Proposed Legislation

After consulting with many groups, the Board finalized proposed legislation that provides for a limited period of time a license pathway for individuals who hold an engineering technology degree and who have a certain number of years of experience. This is only one of the goals of the legislation. We invite you to review the proposed language on the Board's Web site along with the "InfoSheet" that explains the changes being proposed. S. 633 is the Senate bill number; H. 3722 is the House bill.

Board member Mitchell Tibshrany worked closely with the Board of Trustees of South Carolina State University and President Hugine to reach a consensus on a fair and equitable alternative licensing procedure for engineering technology graduates. Please see Section 40-22-222 of the legislation for the proposed procedure.

Other changes proposed in the bill:

- Throughout the statute, the word "land" has been deleted to reflect the expansion of the practice of surveying to areas beyond the identification and marking of land boundaries. In certain instances, the word "land" is retained for clarity when describing land boundary surveying as opposed to other surveying activities.

- Clarifies the definition of "direct supervision," "direct supervisory control," "direct responsibility," and similar terms

- Until June 30, 2020, provides for review of credentials by a committee of engineers to determine if work performed by engineering technology graduates is of sufficient rigor in its scope and depth that they can be deemed to meet established standards of engineering practice.

- Adds a license as "Emeritus" engineer and surveyor for individuals who retire.

- Adds a “Good Samaritan” clause (40-22-75).
- Increases the fines limit to $1,000 per violation and caps total fines at $20,000.
- Changes qualifications for EITs so that they may be certified immediately upon graduation .
- Creates a fund using a portion of renewal fees for the purpose of education and research (40-22-245).
- Allows firms to designate one employee licensed in S.C. as the professional in charge of the firm’s work in S.C. rather than requiring it to be a corporate officer or principal owner of the firm.
- Updates reference to International Code Series rather than Standard Building Code.

There are several small changes for clarity, updating and “clean up.” We welcome your comments by e-mail to Administrator Jan Simpson.

# Disciplinary Actions

Final disciplinary actions taken by the Board since publication of the last newsletter may be viewed on the Board's Web site. While the Board staff makes every effort to include all final actions, some may have inadvertently been omitted. Documents on the Web site are in PDF format; if you need a "true copy," or if you need a copy of an action not posted on the Web site, please contact Susan Hicks. Please note that disciplinary actions taken prior to January 2003 are not on the Web site, but copies may be obtained by contacting Hicks.

# Change of Address

It is very important that you notify the Board office if your address changes. Please remember it is your responsibility to keep our records current. You may e-mail the change directly to Susan Hicks or access online services. You may send the changes by fax to 803-896-4427 or mail them to us. We cannot take address changes over the phone.

**REMINDER:** You may use Licensee Lookup on this Web site to make sure we have your current address or to find another licensee's address. Want to know if someone is currently licensed in South Carolina? Check Licensee Lookup. (Only licenses in ACTIVE status will be on Licensee Lookup.) If that person is not listed, he/she is probably not licensed. One word of caution: make sure you have the correct spelling of the names. If you are unsure of the spelling, use as few letters as possible. If in doubt about someone's license, please contact the Board office.

# The Effects of Advancing Technology on PE Practice and Regulation

Board Member Gaye Garrison Sprague recently gave an address on the topic of technology and its impact on the practice of engineering and surveying. Reprinted below is the text of her speech.

## The Effects of Advancing Technology on PE Practice and Regulation

## Introduction

Advances in technology have brought many benefits to the practice of engineering, but they also have brought some challenges to all of us and particularly to those of us involved in the regulation of the profession. The purpose of this talk today is not to be an official statement of Registration Board policy because my fellow Board members have not reviewed what I am saying today. The purpose is to raise some issues, shares some thoughts, and get your thoughts on some of these challenges.

A couple of times during this presentation, I'm going to refer to proposed legislation. That is legislation now in the House and Senate which would make changes to the engineering and surveying statutes and which primarily addresses phasing out the existing Category B engineer in South Carolina. There are a few other changes here and there, such as the definition of "direct supervision," which is one of the issues I'll address today.

## Advances in Technology

I hate to date myself, but in my first job we did not have word processing. In order to make changes on a typed page, the secretaries would retype the revised paragraph, cut it out, and paste it over the original paragraph on the original page. That's quite a different idea of cut and paste from the cut and paste in today's word processing programs in which we highlight sentence, paragraphs, or even entire documents and with two or three clicks, insert them seamlessly into the revised original.

At my second job, I designed bridges and drew individual rebar at a drawing table with a cross bar,

scale, and pencil. Excruciating does not describe the tediousness of that task. Today's CADD programs accomplish the same task with the click of a mouse.

Our drafting classes in college taught us to draw three dimensional perspectives that now, with the entering of a few coordinates, are drawn by the computer. Also, the people operating the computers are not always engineers. They are often CADD specialists much like the drafters of my early career.

The capacity analyses that I did in my third job were pretty simplistic because the calculations were done by hand. Today, we consider factors such as the interference of pedestrians crossing the cross street, the effect of upstream signals, and clearance times down to the tenths of seconds because the calculations are done by computer programs. The incredible computing abilities of today's machines allow us to more accurately reflect the interaction of the variables that go into engineering analyses.

We have the ability to be more productive, to be more detailed in our analyses, and to give more emphasis to design issues than to drawing and document production. Whether we are more productive, more detailed, and more attuned to engineering issues is another matter for another day. The point is that advances in technology have given us the ability to better assure the health, safety and welfare of the public we serve.

With those advances, however, have come challenges to the practice and regulation of our profession. At every turn there seems to be a new issue regarding the application of a new technology. While some of the issues seem too complex to address, the bottom line is insisting on the accountability of the engineer in safeguarding the public's health safety and welfare.

## Direct Supervision

With the current capabilities of electronic transmissions, engineering drawings can be worked on at remote locations, emailed to the responsible engineer, commented on by that engineer, and emailed back to the production people. So, here's the question. Can an engineer in Greenville, South Carolina, really directly supervise work being done in India? Can an engineer in Greenville, South Carolina, directly supervise work done in Columbia? For that matter, can an engineer on the 10th floor of a corporate office directly supervise work done on the second floor?

The answer is, "It depends." What it depends on, of course, is the engineer supervising the work. The engineer must maintain "direct responsibility," direct supervisory control," "direct supervision," or "responsible charge,"—terms used interchangeably in South Carolina. They all mean that the licensee exercises sufficient personal supervision, direct control, and final decision making that he or she can be and is held responsible for the professional quality of work. The definition we have used in the proposed legislation is "a clear-cut personal connection to the project or employee supervised, marked by first hand knowledge and direct control and assumption of professional responsibility for the work." So, the answer is, an engineer can directly supervise work if the supervision given meets this definition. We have to be consistent in the answer whether the person being supervised is downstairs or across the

ocean.

## Using Drawings Produced by Others

Today many clients insist that drawings be submitted electronically, and clients have the ability to scan and print out entire drawings. This availability of an engineer's work in electronic form raises the challenge of how to use drawings that have been paid for by the client but which contain work by other engineers.

May you scan a drawing owned by your client and make changes as long as you are sure that the original engineer was paid for his services? May you use an electronic drawing as the base of a new drawing?

Once again, the emphatic answer is, "It depends." It the drawing represents a project which has been built, you may use the drawing as a representation of existing conditions as long as you confirm that the conditions shown on the plan are existing. For good measure, some reference to the source of the original drawing should be made.

If the drawing is of a project which has not been built, sorry, the new engineer just can't use it. The new engineer has to generate a new drawing and new design if any changes are made. Of course there will be nuances to every rule, but in general, you have to start over if the element of the project shown on the plan is not built and has to be changed.

Here's the latest wrinkle: Just last week, a fabricator asked an engineer for CAD drawings to use as background for their erection drawings. We were asked if it is acceptable practice to give fabricators or other vendors such copies for their use. We have not yet responded.

## Electronic Signature

South Carolina has enacted the Uniform Electronic Transactions Act. It generally recognizes the legality of electronic signatures between private parties—if they both agree to recognize them. It also authorizes government agencies to recognize electronic signatures based upon satisfactory security procedures. In the proposed legislation, one of the changes considered was allowing electronic signatures for surveys. The pros and cons will not be discussed here, but suffice it to say that the surveying community would have none of that. They feel that it is still important that records of land boundaries be as secure as possible – that means that even with today's technology, records of land boundaries will be on paper, signed, and sealed.

The proposed legislation does not speak to engineering drawings and reports, therefore, the Uniform Electronic Transaction Act rules and allows these documents and the signatures on them to be exchanged electronically if supported by proper security technology.

## What is Surveying and What is Not?

The advent of the handheld GPS unit is a great benefit to many in our society. My son takes his out on Hartwell Lake in his little fishing boat and he can leave virtual breadcrumbs to find his way back from anywhere he may roam on that big expanse of water. However, when someone who is not a registered surveyor uses a handheld GPS unit to note coordinates of, say, the outline of a wetlands area, can that person expect a registered surveyor to use those coordinates to generate a plat of those wetlands? No. A plat is a plat and it has to be surveyed by a registered surveyor. To ask a surveyor to used coordinates generated by somebody not under this direct supervision is to ask that surveyor to break the law.

Today's earth moving machinery is also equipped with GPS units, and the elevation of the bucket of a backhoe can be read in the cab of the backhoe in the field. Can the read outs of these units be used for construction staking? Here's what the North Carolina Board said:

The development of electronic data such as templates, cross sections, Digital Terrain Models, etc;, to be used for the purposes of earthwork grading and stake-out is within the definition of the practice of land surveying and engineering and shall be done under the responsible charge of a Professional Engineer or Professional Land Surveyor."

One of our dedicated Board members polled several other states and found that they generally had not been confronted with the issue or had generally agreed with the North Carolina opinion. He found that our regulations supported these opinions:

1. Data acquisition and development of topographical data (a 3D Model) in South Carolina is a function of the engineer and surveyor.

2. Development of design of a site grading plan (topographical date or 3D Model) is also the functions of an engineer and/or surveyor.

3. Therefore, in South Carolina, the engineer and/or surveyor should be the ones in responsible charge putting these on the ground—construction staking.

## Electronic Newsletters

This is a minor point, but worth noting in a discussion of changes in regulating the profession. The S.C. Department of Labor, Licensing and Regulation, under which our Board falls, no longer allows paper newsletters to licensees. The newsletter is posted on the Web site only. Therefore, matters of discipline and changes in regulation are no longer presented directly to you via a paper newsletter in your mailbox. You must go to the Web site and get the newsletter to get this information.

# Testing Security

When I took the PE exam, we worked four problems in the morning and four in the afternoon. Each problem was worked out on the answer sheet and graded individually. It would have been difficult to see enough of another person's work to cheat on the exam. For instance, when I took the exam, the young man seated next to me asked me after lunch, "Was there anything written on your paper when you turned it in this morning?" To which I replied, "Well, of course. Why." He said, "Because I think you erased more than you wrote." He obviously could not see my paper because I did have something written there and did pass the exam although there was not one single traffic engineering problem on the test. I am still pouting about that.

Under that format, every solution of a single problem was graded by a limited number of graders. Therefore, there was some human check of the potential for cheating on the exams. Today, however, both the FE and the PE are multiple choice exams, taking advantage of the efficiencies of scanner grading. Unfortunately, the potential for cheating on these exams is higher than the potential on the former format.

The foundation of any engineering and surveying licensure act is that three-legged stool: education, experience, and exam. Although there is some room for misrepresentation of a candidate's education and experience, these two efforts take several years and involve multiple references and supervisors/ educators, and it is unlikely that out and out cheating can occur in these areas. For the exam requirement for licensure, however, the opportunity for cheating and collusion is there. Those who pass an exam because they cheated and not because they are minimally competent may obtain registration without being minimally competent and are a threat to the health, safety, and welfare of the public. Here's the cliché question: Would you want a doctor who cheated on his Boards to do your open heart surgery?

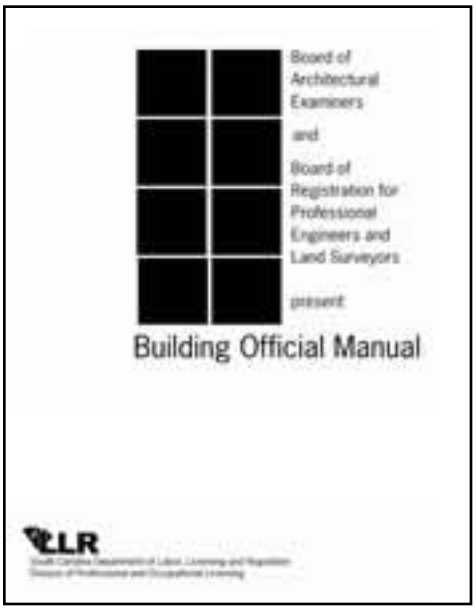
Although there are other important issues regarding exam security which can be discussed in another article, the issue of minimum competence is the most important, and it is this minimum competence that should be tested in the FE and PE. To that end, the National Council of Engineering Examiners has sought ways to identify those who have not passed these tests with their own knowledge. The latest tool the Council has developed is a computer program which compares the right and wrong answers of test takers and determines with three different methods when there is a high probability that there was cheating. These comparisons can only be made cost effectively with the sophisticated abilities of today's computers.

When state boards receive information that certain candidates MAY have cheated, the Board members must investigate and make a determination based on evidence and testimony by the exam candidates, and perhaps by the proctors and others. This can be a gut-wrenching situation as it often involves one guilty party and one innocent, oblivious party. Initially, both have to be treated the same, and it is a difficult situation for all involved. It is necessary to identify these pairs of test takers who have potentially colluded on the exam, but it stinks. In the end, however, the overarching concern is for the public's health, safety, and welfare, and the regulator's responsibility to only license those with

minimum competence to provide engineering services that provide for that health, safety and welfare.

## Conclusion

While I am certainly not known as a technology whiz, I am grateful for the many advantages that advances in technology have brought to our profession. I simply could not do my work effectively without some of them. However, these advances require us to be even more vigilant than ever in how we conduct our work, how we present and share our work, and, in the end, how we take responsibility for our work.




# Building Officials Manual

The revised Building Officials Manual is now posted on this Web site. Jointly authored and published by the Board of Engineers and Land Surveyors and the Board of Architectural Examiners, the manual is a valuable resource for code officials and plans examiners. Licensees will also find answers to many questions in the Frequently Asked Questions appendix and in the text of the Manual. Because the manual is in electronic format, it will be updated as needed.

For timely information about codes adopted for use in South Carolina and notices of upcoming adoption procedures, see the S.C. Building Codes Council's Web site at www.llr.state.sc.us/pol/bcc. Under "Board Information," click on Building Codes information.

# Board Staff

Jan B. Simpson
Administrator

Susan Hicks, Web site management, FOIA requests, individual renewals

Miriam Berry, COA and Temporary COA (firm Licenses)
Temporary Permits for Engineers, firm renewals

Stacy Johnson, Engineer applications, EIT Certifications

Tiffany Conelly, Land Surveyors Program, Engineer applications, verifications

Melissa Jones, Hearings, Legislation, Newsletters

# Control Systems and Systems Integration

In recent months, questions have been raised with the Board regarding licensure and registration requirements for control systems design and systems integration activities. The Board has determined that designing control systems is considered the practice of engineering and requires professional engineer licensure.Assembling or constructing control systems from an engineer’s design is not considered to be the practice of engineering.

Companies that provide systems integration services that include the design of control systems and selection of system components are considered to be providing engineering services and must have a Certificate of Authorization from the Board. Therefore, those firms must also have licensed engineers who are in responsible charge of that work.

# Investigation and Enforcement Procedures

In July 2004, the Department of Labor, Licensing and Regulation created the Office of Investigations and Enforcement for processing complaints against all licensees. Charlie Ido, longtime investigator for the Board, now serves in an administrative position in that Office. He supervises investigations relating to engineers and surveyors as well as other boards' licensees. Todd Bond has assumed primary investigative responsibility for engineers and surveyors as well as architects. Todd can be reached at bondt@llr.sc.gov or by phone at 803-896-4411.

Download a complaint form (pdf)

# Investigation and Enforcement Procedures

Todd Bond has primary investigative responsibility for engineers and surveyors by email or by phone at 803-896-4411. A complaint form is available on this Web site should you need to file a complaint.

# Licensing Ceremonies

The Board of Registration for Engineers and Surveyors and the South Carolina Society of Professional Engineers continue to sponsor licensing ceremonies twice annually for individuals who passed the PE and LS examinations. The most recent ceremony was held on January 18, 2007, in the State House, where 25 newly licensed engineers and surveyors received their wall certificate presented by Board members (with much picture-taking by relatives and friends).

The Board offers congratulations to everyone who passed the October 2006 exams and encourages them to become involved in the profession as a way of giving back and mentoring others. While the ceremony and reception that follows are proud moments for parents, spouses, friends and others who helped along the way, it is a fitting tribute to the newest Professional Engineers and Land Surveyors who worked so hard to achieve the goal of becoming licensed. Congratulations to all new licensees!

# Board Policies

In response to inquiries, we take this opportunity to reprint a policy jointly adopted in July 1962 by the Board of Registration for Engineers and Surveyors and the Board of Architecture regarding “overlap” or “incidental” practice.

# Policy

In order to clarify the necessary overlap of the practice of Architecture and the practice of Engineering, the S.C. State Board of Architectural Examiners and the S.C. State Board of Engineering Examiners held a joint conference in Columbia, S.C., on July 25, 1962, at which they agreed upon and adopted the following resolution covering rules of procedure in connection with the interpretation and enforcement of the Code of Laws of South Carolina, 1976, Chapter 3, Sections 40-3-05 to 40-3-310, governing the practice of Architecture; and Chapter 22, Sections 40-22-10 to 40-22-470, as amended, governing the practice of Engineering in the State of South Carolina.

# Resolution

No Registered Engineer shall undertake a project which is primarily architectural and no Registered Architect shall undertake a project which is primarily engineering; however, no provision of the State Laws referred to above shall be so construed as to prevent any Registered Architect from doing such engineering work, for which he is qualified, as may be incidental and necessary to the completion of any architectural work lawfully undertaken by such Architect; nor so construed as to prevent any Registered Engineer from doing such architectural work, for which he is qualified, as may be incidental and necessary to the completion of any engineering work lawfully undertaken by such Engineer, as defined in the Code of Laws of South Carolina listed above.

The two Boards must be guided and controlled by the definitions contained in their respective registration laws but may use discretion in interpreting them.

If engineering or architectural work is performed by persons who are not full-time employees of the Registered Engineer or Registered Architect employed by the client for the project, those persons shall be registered in the profession concerned and the registered person’s name shall appear on all documents, plans, etc., prepared by them, when issued for that particular project.

# Guidelines for Licensure Applicants Submitting Work Experience

One of the areas of greatest inconsistency in applications to the Board for licensure by either comity or

by examination is the description of qualifying experience. The following guidelines should help applicants provide appropriate documentation to enable an expedited review and are provided as a supplement to the statutes and regulations.

- All periods of time following graduation from an approved engineering program must be accounted for.

- Descriptions of work performed must be in sufficient detail to enable the reviewer to evaluate the nature and complexity of the engineering work performed. Generic statements such as “Prepared design documents and specifications” are not sufficient. Documentation should include a description of specific and significant representative projects and specific engineering decisions or actions taken by the applicant in completion of those projects.

- Use of the same description of work experience for multiple periods of time is not acceptable.

- Where no engineering work was performed during a specific period of time, the applicant should so state and sign the sheet verifying what he/she did during that period. Example: “unemployed” or “worked at Wal-Mart.”

- Since qualifying work for approval to take the PE exam requires supervision by a licensed engineer, the person verifying the experience should be licensed and should so indicate on the verification form. For applications for licensure by comity, the person verifying the experience should preferably be licensed, but could also be someone who was closely involved in the work and can verify that the description of the work is accurate. An example would be a contractor, owner, or governmental agency.

- For periods of time where the applicant is unable to find someone who can verify the experience, the applicant should state on the form that he/she has made a good faith effort to find someone who could verify the work and personally sign the experience verification form for that period of time. This situation sometimes occurs when many years have passed and prior employers are out of business or are deceased. The documentation of work performed during the period should be as detailed as for other periods of time. Please refer to Regulation 49-200(B)(2)(c): “Experience should be gained by working under the supervision of a registered professional engineer. If the experience was not gained under the direct supervision of a registered professional engineer, then the indirect supervision should be explained with clarification of the degree of supervision received.”

- Where possible, verification of experience should not be by individuals who are related to the applicant, who are subordinate to the applicant in their current organization, or who have other alliances that could compromise the individual’s independence as an evaluator. Verification by a clerical or administrative person who works for the applicant is not acceptable.

# License Renewal

In the Board's August 2006 newsletter, the Administrator noted that "Change can be scary or it can be exhilarating. If you look for the positive effects of change, life is a bit easier…we live with change on a daily basis…."

In 2008, we will offer online renewal for all individual licenses, and we hope you will think this is a positive change. With online renewals, you may renew your license at any time of day, at your convenience, and pay for it with a credit card. There is no processing fee.

Well in advance of the renewal deadline, we will mail you a reminder that the renewal deadline is June 30, outline information about how the process works, give you your password, and explain how to renew if you cannot renew online. You will hear much more about it in 2008, but we just wanted you to know we are making it easier to renew your license.

Don't forget that you will need 30 hours of continuing education by June 30, 2008, in order to renew. Here are some tips to ensure you have what you need at renewal time:

- Insist that the continuing education sponsor give you a certificate of attendance (or other acceptable documentation) with all relevant information on it: your name, name of sponsor, title of the course, date of the activity, and the number of hours of CE credit.

- Maintain a file of certificates or other proof that you attended a continuing education activity. If necessary, include information on the nature of the course, descriptive brochures, etc.

- Check the Regulations for acceptable activities and number of hours credit you may claim. On this Web site, click on "Education" and "FAQ" for information and answers to your questions. Melissa, can you hyperlink Education and FAQ.

## Southern Zone Leadership Changes

Board member Mitchell S. Tibshrany, Jr. will complete his term as Vice President of the Southern Zone in August 2007. He has served the National Council of Examiners for Engineers and Surveyors (NCEES) for many years, unselfishly giving of his time as a volunteer on committees and in elected office. His service to NCEES and to the Board has been exemplary, and we salute him!

At the Southern Zone meeting held in Lexington, KY, April 26-28, 2007, Board member Gene Dinkins was elected Zone Vice-President. His term of office will begin in August after the Annual Meeting. Mr. Dinkins represents the surveying profession on the South Carolina Board, but he is also licensed as a Professional Engineer. He holds a BS degree in Civil Engineering and a Masters degree in Environmental Engineering and Water Resources from the University of South Carolina as well as a BS degree in Chemical Engineering from Clemson University.