

Continual progress in a changing world

Martin A. Pedersen, L.S., accepted the position of NCEES president with a stirring speech before the delegates of the NCEES 2005 Annual Meeting. The following is a condensed version of his speech.

We are doing a wonderful job of licensing professionals. In fact we are doing such a good job that many legislators don't think we are necessary anymore. Much of the public doesn't see what we do and, therefore, doesn't see us as necessary. Even many members of our profession do not see the necessity of licensure.

A major emphasis for the coming years must be the promotion of the value of licensure, not only to those eligible for licensure but also to the public. Licensure will be 100 years old in 2007. It needs a grand birthday party, not a burial.

We must reeducate people on the necessity and value of licensure in regard to public health, safety, and welfare. Educating the public will also help instruct the legislators that we are an absolutely necessary part of government. We must also inform graduate engineers of the value of being licensed. Decreasing numbers directly affect the relevance and cost of the Group II exams and our overall budget.

Supporting leadership

We have strived to get younger people into our leadership ranks, but many of the ones who have the necessary experience and knowledge to be appointed to a licensure board are still in the process of raising a family and don't want to commit to service for the profession. Or they are trying to build a business and don't feel they can take the time away to commit to board or Council service. One of the sessions at this Annual Meeting was on Council leadership. It was designed to give board members the opportunity to see what is required to be active leaders in the Council. We need to promote

participation because we cannot turn the regulation of our profession over to the public.

We lose many experienced and potential leaders to the problems of term limits and the political-appointment process. This year I have asked the Advisory Committee on Council Activities to look at a possible change in our *Bylaws* to allow individuals serving on the board as vice president or treasurer and who have the support of their state board to run for president-elect one time even if their term on the state board expired before they became eligible to run.

Advancing technology

The world is changing, and with it, the engineering and surveying professions. Most of you have been witness to the most dramatic change in lifestyle and technology in the shortest span of time ever recorded. And the pace of technological advance is getting exponentially faster. Not all changes, however, have benefited the Council. Wireless communication, miniature scanners and cameras, cell phones, and the Internet have all had an impact on exam security.

Our work world is becoming smaller and more easily accessed through rapid travel, satellite photography and communications, and electronic transmission of data. Our disciplines continue to develop new subdisciplines. But aren't they still engineering at the core? Don't these areas still use the basic concepts of engineering? Can we not still license people in these subdisciplines as engineers and add certifications for the subspecialties as the medical profession does? Doctors become MDs, and then they become board certified in surgery, cardiology, internal medicine, and diseases. On the other hand, maybe we also need to determine if some of the

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*Martin A. Pedersen, L.S.
 NCEES President*



Louis A. Raimondi, P.E., L.S.
NCEES President-Elect

Welcome to the Council

Congratulations, you have been appointed by the governor to your state's board of licensure for professional engineering or professional surveying. This is indeed an honor and an important position to be in. As a respected professional, you have been given the responsibility of monitoring the licensing of individuals who have proved their qualifications through education, experience, and examination. You have also been charged with the enforcement of your state's regulations and statutes concerning these professions.

These are certainly serious and arduous tasks, but there is one further

responsibility that a member of a state licensure board must consider: contributing to the National Council of Examiners for Engineering and Surveying (NCEES). You might ask, "Why NCEES? What connection do I have with this national organization?" All of the engineering and surveying boards in the United States and its territories, some 70 boards in all, rely upon NCEES exams. The

Council prepares and grades these exams, and in some cases its subsidiary ELSEES administers them. While you may not have had direct contact with NCEES in the past, you have been guided by the Council throughout the entire licensing process. In addition to exam preparation, administration, and scoring, NCEES also assists Member Boards by developing model licensure laws and rules.

One licensure issue currently under debate is the possibility of comity licensees receiving continuing-education credits by comity. Another issue is the movement to change the licensing process considerably from what it has been over the past years. These and many other issues will

be discussed and determined in 2005–2006. Because of your position as part of a Member Board, NCEES looks to you to serve on its committees and represent the Member Boards in the overall licensing process. Your opinions and voice must be heard so that NCEES can be certain that any changes will still accomplish the primary goal of protecting public health, safety, and welfare.

All too often we hear that board members become interested and involved in NCEES only at the end of their terms. I highly recommend that you become involved in NCEES at the beginning of your career with your board. This

involvement could be as simple as serving on a subcommittee or an exam-writing committee. Depending on your level of interest, such involvement could lead to a more substantive role in NCEES. Yes, this will require a commitment of your time and energy and may even entail monetary expenditures to cover your out-of-state travel, but the benefits are worth the effort.

It is essential that our Member Boards remain engaged in the activities of NCEES, participate

in the debate, and vote on the motions that will impact the future of the engineering and surveying professions. I ask you simply to stop and reflect on what your profession has given you over the years and what it has allowed you to do and become. This is your opportunity to give something back to the profession. Once you get involved in the activities of the Council, you will be surprised by how much licensure touches all aspects of engineering and surveying, and you will be rewarded in both your personal and professional growth.

Louis A. Raimondi, P.E., L.S.
NCEES President-Elect

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Annual Meeting draws a crowd

The 84th NCEES Annual Meeting attracted a record turnout, with more than 500 people—delegates, guests, the Board of Directors, and staff—gathering in Memphis August 24–27. Member Board delegates debated and voted on many issues, including additional education requirements for licensure, ELSEs as a sole-source administrator, and limits to the number of reference materials allowed inside the exam room. You will find motion highlights and how the Council voted on the following page. All Council members will also soon receive the *2005 Annual Meeting Minutes*, which provides more detail about Council action at the meeting.

Award winners

The Annual Meeting also provided the Council an opportunity to recognize some of the people who have made noteworthy contributions to their professions, Member Boards, and NCEES. The following award recipients were honored at an awards luncheon on August 26:

Distinguished Service with Special Commendation Award

Kenneth White, Ph.D., P.E., New Mexico

Distinguished Service Award

Bill Dickerson, P.E., Oklahoma

George Gibson, P.E., Oklahoma

Donald Hiatte, P.E., Missouri

Monte Phillips, Ph.D., P.E., Minnesota

Clyde Porter, P.L.S., Idaho

Meritorious Service Award

Carrie Flynn, Florida

October exam administration

The fall 2005 examinations will be administered on Friday, October 28, and Saturday, October 29. This administration brings with it some changes in procedure. Here are a few important ones to remember.

- ◆ One of the biggest procedural changes results from the FE exam moving in-house to NCEES headquarters. Member Boards and testing services will now order from and return all examinations to one location.

The FE exam will no longer be ordered from or returned to ACT.

- ◆ When the exam is over, boards should destroy the *FE Supplied-Reference Handbooks* or distribute them later to future FE examinees. Current examinees may not keep the books. The handbooks should not be returned to the printer or NCEES.
- ◆ Examinees are being required to provide their Social Security number on the answer sheet. They may provide their Canadian Social Insurance, passport, or Individual Taxpayer Identification numbers instead for this administration if they do not have a Social Security number.
- ◆ Examinees are allowed to open their exam books in the morning to complete the answer sheets. They may need to reread the Candidate Information Packet on pages 1 and 2 of the exam before signing their answer sheet, and the PE and surveying examinees will need to look up their school codes on the list beginning on page 3. School codes for FE examinees are in the back of the *FE Supplied-Reference Handbook*, as they have been for several years. In the exam book, the pages of the Candidate Information Packet and the school codes have a heavy vertical line on the outside edge. Examinees must not proceed beyond these pages until the exam begins.

In addition, NCEES Examination Administration Policy 3, Release and Return of Examinations, states, “All examination booklets must be returned to NCEES, using the NCEES designated shipper, within 10 business days of the examination administration.” If your board needs to retain a specific exam booklet as a part of some legal action, please contact Bob Whorton, P.E., NCEES Compliance and Security Manager, to arrange for the return and storage of the booklet. NCEES will segregate and securely store this booklet until the board needs further access to it.

Finally, due to Hurricane Katrina and the flood devastation, the exam administrations for



Betsy Browne
NCEES Executive Director

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Annual Meeting draws a crowd
(continued from page 3)

Baton Rouge and New Orleans have been relocated to Alexandria, Louisiana. ELSEES is doing what it can to assist displaced exam candidates by extending the exam registration deadline for Louisiana applicants. The number of Record transmittal requests has increased for Louisiana and Mississippi, and NCEES staff is working to process the additional applications promptly. The Council has also contributed to the Red Cross relief efforts

and to the American Society for Engineering Education's fund for the rebuilding of engineering colleges at Tulane and New Orleans. Combined Council and NCEES staff donations currently total more than \$6,000. We plan to continue contributing to our engineering and surveying community in such a desperate time of need.

Betsy Browne
NCEES Executive Director

Debate and discussion thrive at Annual Meeting



Above: Member Board delegates discuss and vote on important Council business at the Annual Meeting. Below are some highlights from the Annual Meeting business sessions on August 25 and 26.

Council activities

- ◆ Approved a motion to create a Board Audit Committee, after it was amended to remove the NCEES executive director position from the language. The committee will consist of the president, president-elect, and treasurer.
- ◆ Approved, after limited discussion, a motion concerning how amendments may be sent to the Committee on Constitution and Bylaws. The president, either upon his or her initiative or by Council action, will send proposed amendments to the C&B Committee. The committee will receive proposed amendments from the president in advance and will then send its recommendations to the Member Boards at the previously allotted time.
- ◆ One motion proposed changing the language of the *Constitution and Bylaws* to read that only members of Member Boards shall be entitled to vote. The motion, which



generated a great deal of discussion and debate both here and at the zone meetings this year, was defeated.

Finances

- ◆ Approved a motion that the collection and disbursement of all funds be the responsibility of NCEES. Instead of zones collecting funds, NCEES will collect and then distribute funds upon the presentation of proper documentation. This change will allow for greater control and accountability and will better protect the Council's tax exempt status. The zone leadership will continue to decide how zone funds are budgeted and spent.

Licensure

- ◆ One motion that generated lengthy debate proposed adding language to the *Model Law* and *Model Rules* requiring additional engineering education. After being amended to clarify the language, the motion narrowly passed. As a result, the 2005–2006 Committee on Uniform Procedures and Legislative Guidelines is charged with recommending

revisions to the *Model Law* to require additional education as a base requirement for P.E. licensure. The committee will consider language recommended by the 2004–2005 Licensure Qualifications Oversight Group, including a requirement to raise the current educational requirements by 30 additional hours, and will make its recommendations to the Council in 2006. The increased education requirements would be implemented no sooner than 2010.

- ◆ Another motion that caused extensive debate proposed that the Council endorse a new licensure model. The motion underwent a number of amendments, one of which rejected the title of *Associate Engineer* for a designation still to be decided. Another amendment changed the wording to indicate that “the Council would continue to develop the NCEES licensure model.” The Council voted to study the matter further for consideration at the 2006 Annual Meeting.
- ◆ Approved a motion that NCEES adopt a position statement on the equivalency of foreign professional engineers applying for licensure in the United States.
- ◆ Approved, after brief discussion, a motion to revise the “Suggested Guidelines for Progressive Engineering and Surveying Experience.” The president will assign this to the appropriate committee.

Education

- ◆ Adopted two new position statements concerning education and accreditation. One states the necessity of engineering education that includes instruction about ethical expectations and codes of conduct in industrial, governmental, and educational settings. In the other statement, NCEES encourages ABET to consider using more inclusive language such as *practitioner* since the term *industry* does not apply to the entire spectrum of engineering practice.
- ◆ Approved a motion to revise a position statement regarding educational programs to state that NCEES recommends that engineering programs be accredited only by EAC/ABET.
- ◆ After some discussion, approved a motion to waive the FE examination for any licensure candidate with a doctorate in engineering acceptable to the board.



Exams and administration

- ◆ Approved a motion that the Council conduct a feasibility study and task analysis for an engineering professional practice exam.
- ◆ Authorized an exception that would allow NCEES to contract directly with the Japan PE/FE Examiners Council (JPEC) through and until the October 2008 administration. According to Exam Administration Policy (EAP) 10, NCEES may contract to provide examinations to an appropriately sanctioned licensing body of a foreign government. Although JPEC is not currently sanctioned by the Japanese government, it is actively pursuing recognition with the appropriate Japanese ministry. Another reason for the exception is that the FE exam has been offered to candidates of JPEC through the Oregon Board. This was accomplished under the provisions of EAP 5, which authorizes a Member Board to offer NCEES examinations at a university or a foreign site as long as administration and security policies are maintained. When the Oregon Board contracted with ELSESES in 2005, the board asked NCEES to consider the possibility of contracting directly with JPEC.
- ◆ Approved an addition to Exam Development Policy 14, Reporting of Scores, stating that examination scores should be used only for licensure purposes. Scores should not, for example, “be used to rank-order or differentiate among passing candidates.”
- ◆ A motion that the Council designate ELSESES, LLC, as the sole-source administrator for all NCEES exams was the focus of much debate. A similar motion passed last year but then was rescinded due to legal issues. This year the Board of Directors presented a modified motion, but the motion was defeated.

At the leadership workshop, past and current leaders shared their experiences and knowledge of what is required to serve in an NCEES leadership role.

2005 Annual Meeting Survey

Each year, NCEES staff asks delegates at the Annual Meeting to complete a survey of meeting activities, food, outings, and staff support. Staff members use the survey results when planning for the following year's meeting. Delegates rated items on a scale of 1–5, with 5 being Excellent and 1 being Unacceptable. This year we held a drawing for those who returned their surveys by 2:00 p.m. on Saturday, August 27. The winner, South Dakota Board Executive Director Ann Whipple, will receive complimentary hotel accommodations at the Hilton Anchorage for the 2006 Annual Meeting.

Annual Meeting Program

Workshops, Forums, and Sessions

ABET Training	4.76
Computer-Based Testing Update	4.50
Cut Scores	4.67
Engineers' Forum	3.68
Ethics for Professional Engineers and Surveyors	4.75
Forensic Engineering and P.E./L.S. Licensure	4.79
Laser Scanners and Software	4.67
Leadership in NCEES	4.50
New Member Board Administrator Training	4.67
New-Member Orientation	4.44
Promotion of the Professions	4.73
Surveyors' Forum	4.35
Test Piracy and Cheating	3.80

Business Session

Thursday Morning Business Session	4.32
Thursday Afternoon Business Session	4.40
Friday Morning Business Session	4.36
Friday Afternoon Business Session	4.23

Annual Meeting Materials

Brochure and Registration Form	4.56
Action Items and Conference Reports	4.52
Delegate Registration Packet	4.57
Pocket Schedule	4.66
Daily Newsletter	4.42
Awards Brochure	4.66

Peabody Hotel

Location	4.59
Room Rate	4.11
Check-in, Check-out Procedures	4.21
Guest Rooms	4.27
Meeting Rooms	4.36
Hotel Staff	4.51
Overall Rating of Hotel	4.38

Quality of the Food

Welcome Reception	4.32
Thursday Breakfast	4.26
Thursday Deli Buffet	4.11
Friday Breakfast	4.21
Awards Luncheon	4.34
Saturday Breakfast	3.64
Saturday Luncheon	4.00
Saturday Banquet	3.98

Social Activities

Welcome Reception	4.37
Pat O'Brien's	3.96
Annual Awards Luncheon	4.37
Farewell Reception	4.25
Farewell Banquet	4.36
Farewell After Party	4.33

Guest Services

Hospitality Suite

Hours	4.17
Refreshments	4.11
Materials	4.16

Sounds of Memphis Music Tour

Tour	4.00
Tour Guide	4.11
Quality of Food	3.30
Transportation	4.20

Graceland Tour

Tour	4.69
Tour Guide	4.69
Quality of Food	4.23
Transportation	4.61

NCEES Staff

Availability	4.84
Support	4.87
Courtesy	4.86
Knowledge	4.80
Professionalism	4.87

Expert witness testimony: the question of licensure continues

Licensing boards routinely deal with cases of unlicensed practice. One area that has received recent attention is that of unlicensed engineers and surveyors acting as expert witnesses in a court of law. In today's litigation, it is common for one or more parties to seek expert witnesses to support their respective positions. In cases where opinions about engineering and surveying are necessary, experts will often not be licensed by the state in which the litigation is taking place. Should these expert witnesses be licensed in that state to testify? This is the question posed to both courts and licensing boards.

The stated purpose of licensing boards is to protect public health, safety, and welfare. To that end, boards license individuals as a means of establishing a standard for competency in the profession. Engineers and surveyors who have not been licensed in a particular state have not demonstrated their competency to that licensing board, and the board is not fulfilling its purpose if it allows such individuals to practice unlicensed.

On the other hand, the courts allow expert testimony from individuals if scientific, technical, or other specialized knowledge will assist the jury in understanding the evidence or determining a fact in issue. The judge is the one who decides whether or not a proposed witness is qualified by knowledge, skill, experience, training, or education. Once the judge approves a witness's qualifications, the witness is permitted to testify as an expert in that court.

Courts in several states have addressed the necessity of licensure when expert witnesses have been challenged because they were not licensed in the state in which they testified.

Recent court decisions have taken the position that an expert does not necessarily need to be licensed to testify. The courts do not defer to the licensing boards to determine who is qualified to testify as an expert. Instead, the judges make

their own examination of the individual witness's knowledge, skill, experience, training, and education to decide the proposed expert's competence.

One engineer licensed in California but not in Iowa was to testify in an Iowa case involving alleged safety defects in a forage blower. The judge allowed the engineer to testify, stating that evaluating certain facts and information solely for the purpose of testimony was not the practice of engineering. The Iowa Engineering and Land Surveying Examining board then charged and disciplined the engineer for practicing without a license. An appeals court reversed the decision of the Iowa Board. It reasoned that under the board's argument, no witness could testify to even the most elementary of physical principles if those principles involved the application of what are arguably concepts of engineering. The court said that regulating testimony regarding the wheel and the lever was not the purpose of the statute.

A Michigan trial court examined an unlicensed architect's qualifications and concluded that they were sufficient for him to testify as an expert. The appeals court affirmed that decision and noted that the express purpose of the licensing board's statute was to safeguard public health, safety, and welfare. The court said it was not the intent of the licensing statute to protect the court against misleading or unqualified testimony.

In Rhode Island, an engineer licensed only in Massachusetts was retained to advise an insurance company regarding claims of damages from blasting for a highway. He reviewed blasting logs and provided opinions as to the cause of damages. The engineers for the claimants were licensed in Rhode Island, and they filed a complaint with the Rhode Island Board. The state board determined that the work of the expert could be considered engineering practice and disciplined the unlicensed engineer. On appeal, the

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*Expert witness testimony: the question of licensure continues
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Rhode Island court ruled that the definition of the practice of engineering did not include the giving of expert testimony or serving as an engineering expert to a litigant or interested party in anticipation of litigation. The court remarked that under the contentions of the board, even Wernher von Braun, the father of our national space program, would be excluded from testifying about rocketry in Rhode Island until he got a Rhode Island license.

It is clear that the courts believe that they are in a position to protect themselves without any help from the licensing boards. The question of whether the courts' decisions in approving unlicensed experts can adversely affect the public was not addressed in any of the rulings. The courts apparently believe that they protect the public by substituting their reasoned judgment for that of the licensing board.

The definition of the practice of engineering is broad enough in many states to cover expert testimony. Certain states define it as any service involving public health, safety, and welfare, the adequate performance of which requires engineering education, training, and experience in the application of special knowledge of the mathematical, physical, and engineering sciences.

Does the expert testimony in question involve a situation that requires safeguarding the public

welfare? This is the question that must be answered by a licensing board before it attempts to discipline an expert witness for practicing without being licensed. The courts have taken the position that when it comes to expert testimony, they are the protectors of the public. This does not mean that the licensing boards should abdicate their responsibility to the courts, but it does mean that discretion must be exercised in making decisions regarding prosecutions and penalties in such cases. Most experts want to become licensed if the subject of licensure is called to their attention. In cases where unlicensed experts improperly advertise their positions or qualifications as engineers or surveyors, however, discipline will still be upheld by the courts.

Currently, expert witnesses do not have to be licensed to testify in court because the judges decide who qualifies as an expert. This does not mean that testifying as an expert is not the practice of engineering or surveying. That decision is left to the licensing boards and should be made on a case-by-case basis, keeping in mind how the testimony of the unlicensed expert may adversely affect public health, safety, or welfare.

*Michael Belanger, Attorney
Consultant to the Committee
on Law Enforcement*

Awards Committee seeks nominations

The Committee on Awards is accepting nominations for the Distinguished Service Award, the Distinguished Service Award with Special Commendation, and the Meritorious Service Award. These awards will be presented at the 2006 Annual Meeting in Anchorage, Alaska. Nominations materials will be mailed to members of Member Boards, emeritus members, board presidents, and Member

Board administrators by October 1. They are also available on CouncilNet or by contacting Julie Parnell at jparnell@ncees.org. MBAs, board staff, members of Member Boards, NCEES emeritus members, and any other individual whom the Awards Committee believes to be directly related to NCEES may submit a nomination. Nominations are due by January 31, 2006.

PAKS

A word on PAKS

The October 2005 exam administration marks the culmination of yet another cycle of exam development. This administration is especially important for the Fundamentals of Engineering (FE), the Fundamentals of Surveying (FS), and the Principles and Practice of Surveying (PS) exams, which are all based on new specifications this year. The Principles and Practice of Industrial Engineering exam also has new specifications for this administration.

On October 28 and 29, examinees will open their booklets with little thought about the effort that goes into creating the exam. Even many professionals may not realize that every exam administration requires thousands of hours of work, many of which are voluntarily contributed by committee members.

But volunteer committee members and NCEES staff are not the only people who play a role in exam development. The first step in determining the content of a potential exam and the beginning of the continuous cycle to ensure that NCEES exams are relevant and valid is largely performed by random professional engineers and surveyors. This vital part of exam development is the Professional Activities and Knowledge Study (PAKS).

Immense scope and diversity

These studies have determined the content of NCEES exams for decades. Even in the 1970s, the Council used this type of analysis to form the first surveying exams. The current studies include questionnaires that request feedback from thousands of professionals. To update the FS and PS exams, for example, more than 5,000 surveys were distributed randomly to professional surveyors in each jurisdiction, accounting for approximately 10 percent of all surveyors in the United States. The Principles and Practice of Engineering PAKS for the civil module alone included 10,000 surveys. Typically an average of 30–35 percent of recipients respond to the survey, a good proportion according to analysts. NCEES is continuing to look for ways to encourage more professionals to respond.

The Council is also dedicated to ensuring diversity by sending surveys to professionals from a variety of locations, ethnic backgrounds, and age groups. This effort guarantees that the exams will be relevant even for a diverse set of examinees from locations in all states and U.S. territories.

The foundation for exam development

The PAKS for each exam is normally conducted at six- to eight-year intervals. In 2002 NCEES began the process of a new PAKS for both surveying exams. The Special Committee on PAKS—Land Surveying, working in conjunction with the Committee on Examinations for Professional Surveyors (EPS), worked for almost a year designing and piloting a survey. Then in 2003 the final product was released. Questionnaires were distributed, asking recipients to rate the importance of statements describing tasks and knowledge required of a newly licensed surveyor. Those who completed the survey could also recommend examination content.

Using psychometric analysis of the survey results, the PAKS—Land Surveying Committee determined which knowledge areas should be tested, linking them to required tasks. The committee then developed new specifications and presented them to the EPS Committee for approval and prepared a plan for implementing the necessary changes. Exam committees are continually adding to the current test bank, editing and clarifying items as necessary, but PAKS usually necessitate additional item creation and reorganization for new specifications.

Changes in the specifications for the FS exam were minimal. Many of the topics were consolidated: the 20 previous subject areas were consolidated into 15. There was an increased emphasis on practice-related changes, but for the most part, the PAKS validated the 1999 transition to a knowledge-based exam.

The PS exam, on the other hand, experienced more updates. The existing knowledge areas were reorganized although most content remained in the new specifications. In an effort to update relevant knowledge areas, greater emphasis was given to new technologies such as GPS measurement and data-reduction analysis.

The specifications for these exams, which are included on the NCEES Web site for candidates to review, list the percentage of exam questions for each subject area. When specifications change, the change may be only a matter of a few percentage points. In the FS exam, for example, the number of questions pertaining to algebra and trigonometry increased by 5 percent. Even this seemingly small

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A word on PAKS
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increase requires that new questions be added to the test bank, creating new work for exam committee members.

FE content review

The above procedure applies to most NCEES exams. The FE exam, however, follows a slightly different process. Instead of using a PAKS, the Committee on Examinations for Professional Engineers (EPE) works with other volunteers to conduct the FE exam content review.

This process begins with a group of subject-matter experts who review the current specifications and determine a tentative list of subject areas for the updated specifications. This group consists of experts with backgrounds in academia, industry, government, private practice, and technical societies, with representatives from NCEES, ABET, the American Society for Engineering Education, the National Society of Professional Engineers, and each technical society represented by a discipline-specific module.

These experts work to determine not only what accredited programs are teaching but also what knowledge is required of a newly graduated engineer. They then compile a survey that is distributed to a group of professional engineers, again a balanced representation of the different disciplines and jurisdictions. Surveys are also sent to the department heads and deans of each ABET-accredited engineering program. This group completes the survey, indicating the importance of

the proposed subject areas and suggesting additional topics. Finally, subject-matter experts assist the FE committee in developing or modifying the specifications for the exam.

The 2002 FE exam content review survey went out to more than 1,200 members of academia and more than 2,700 professional engineers. About 30 percent of those surveyed responded, with a higher percentage coming from academia. This particular survey applied to all of the discipline-specific segments of the FE exam except for the environmental module, which had been added for the April 2002 administration. Most of the subject areas had slight modifications. (A comparison of the old and new specifications appears in the white paper on outcomes assessment, entitled "Using the Fundamentals of Engineering [FE] Examination to Assess Academic Programs.")

The general afternoon (PM) module experienced the greatest alterations. Previously, it paralleled the general morning (AM) portion, which all examinees take. With the new specifications, however, the general PM module includes more advanced subjects. Rather than merely sampling topics covered in lower-level engineering courses, it now covers those usually taken by students in their junior or senior years. The other modules already cover these topics, approaching them on a more focused, discipline-specific level.

*Desiree Talbert
NCEES Editor*

NCEES seeking volunteers for standard-setting study

In December 2005, NCEES will conduct three important studies relating to the FE, the FS, and the PS exams. They will be standard-setting studies conducted to establish the passing score for the respective examinations.

NCEES is seeking more than 100 engineers and 30 surveyors to be involved in these studies. The panels must be diverse in terms of geographic locale, age, gender, ethnicity, and area of practice (academia, government, industry, and private practice).

The panels must be composed of newly licensed professionals as well as professionals who supervise or manage newly licensed engineers or surveyors.

Each time an examination undergoes a specification change, NCEES conducts a standard-setting study to set a passing score for the exam. Participants develop a standard of minimal

competence and then actually work the exam and rate the difficulty of each question. Panelists will be asked to devote either one day or two days to the study, depending on their assignments. Travel and lodging expenses will be paid by NCEES in accordance with the NCEES travel policy.

Please contact NCEES if you would like to participate in the study or if you would like to recommend someone to participate. For more information, contact the following NCEES staff:

FE Examination

Davy McDowell, P.E.
Technical Assistant
800-250-3196,
ext. 465
dmcdowel@ncees.org

FS or PS Examinations

Chuck Wallace, P.E.
Director of
Exam Development
800-250-3196, ext. 483
cwallace@ncees.org

Getting ready for a major audit

As the October 2005 exam administration approaches, the Committee on Examination Audit is preparing to accomplish the most comprehensive of its charges for the 2005–2006 term. The charge directs the committee to audit seven exams, and this year's list includes the FE exam, a major task alone with its seven different modules. This and our other charges are all a vital part of the immense cyclical process of checks and balances to ensure the highest quality of examinations.

Checking

The purpose of the audit is to determine whether examinations are being prepared in compliance with policies and procedures relevant to the specific examination being audited. The committee audits the exam itself and is not charged with determining the usefulness or growth of each exam. We look for areas of improvement, using a checklist and recently developed Audit Procedures to determine if the exam development followed the correct procedures, and then make suggestions to improve the overall process. We begin by considering the previous audit's recommendations for a particular exam to determine if the recommendations were appropriately addressed. At this point we also note areas of improvement in the exam development process since the last audit, recognizing the changes that have made it a better exam.

As part of the checklist we also validate that a Professional Activities and Knowledge Study (PAKS) has been recently performed, confirm that the item bank consists of the appropriate number of questions for each subject area in the specifications, and verify that different individuals did item writing and pretesting for each question. We check these and many other things in a multistep process to ensure that there are controls in the quality of exam development. To accomplish this goal, we also continue to revise the audit procedure, adding things to look for and refining the existing tasks.

Balancing

One of our other objectives is to determine if an exam's content is properly balanced. There should be a balance of new and old questions in each

exam administration, and they should be written at an appropriate level of difficulty. All of the questions should be solvable in a reasonable amount of time, and the distracters should be plausible. As part of the exam audit, we look over the most recent psychometric analysis of the questions as well as the pretesters' comments to determine if sufficient changes were made to, or appropriate actions were taken with, questions that received negative feedback.

To maintain a balanced perspective on the vast areas of knowledge that are tested, we ensure that all of the groups involved—the PAKS members, the item writers, the cut-score panel, and the standard-setting study committee—consist of diverse sets of people. We also determine if item writing is evenly distributed, specifically that questions in each topic area are authored by a diverse group of experts. If, for example, one exam committee member wrote all of the questions for a certain area, the questions might lack scope and objectivity.

Maintaining and improving

As part of their work, exam committee members make appropriate documentation during the examination development process. Pretesters' comments and item writers' rationales are examined during the audit to ascertain if procedures were followed properly. For example, has the committee executed due diligence to determine the root cause of a question's poor performance? We check that committees follow procedures and supply necessary documentation so that, ultimately, the exam development process is legally defensible in a court of law.

Audit findings go back to the various exam committees so that they can discuss what actions will be taken to improve the exam development process. Audits are not an end, but part of a continuously evolving process. What we find during an audit is fed back to the beginning of the exam development process so that future exams will be even better and more psychometrically sound. The audit is part of the continual refinement process necessary to ensure that our exams are relevant.

*Thomas J. Kiefer, P.E.
Chair, Committee on
Examination Audit*



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Chair, Committee on
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subdisciplines are no longer what can truly be called engineering. Even surveying is splintering, with differing emphasis on land surveying, geodesy, photogrammetry, and remote sensing.

Many of you have read the book published by the National Academy of Engineering titled *The Engineer of 2020*, which says of the information explosion, "Today, in an age of specialization, an individual's area of expertise continues to diminish in relation to the total body of technical knowledge." This will create a greater need for interdisciplinary engineering, where no one engineer will know everything about a specific job. Instead, a team will be responsible for it. Where will licensure and enforcement fit in this?

The book goes on to say that "scientific and engineering knowledge doubles every 10 years... The comfortable notion that a person learns all that he or she needs to know in a four-year engineering program just is not true and never was. Not even the 'fundamentals' are fixed, as new technologies enter the engineer's toolkit." Every one of these statements is also true of surveying, where equipment and methods are changing daily.

We are about licensure, for the health, safety, and welfare of the public, and certainly some of the new disciplines affect the public's well-being. Computer programs that manage stoplights, direct railroad engines going across the country, regulate the flow of oil and gas, and control the opening and closing of prison doors definitely affect our health and safety. Should software designers and programmers be licensed?

Promoting professions

Someone once said, "Even if you are on the right track, you are going to get run over if you just sit there." Are we going to play catch-up, or can we get ahead of the game? Your Board of Directors has spent many hours trying to look at where NCEES needs to be. A new part of every board meeting will include looking at where we are in relation to where we think we ought to be and then fine-tuning the process to get there. At the next Board Presidents' Assembly, the Council will be tackling more of the planning and achieving process.

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The Council has said that we are to promote licensure, not the profession. But if we as individuals, we as state boards, and we as the Council don't help promote the profession, who are we going to license? We need to work with the societies to promote engineering and surveying as careers. We worked with the National Society of Professional Surveyors to prepare the Speaker's Kit to promote surveying as a career. Now we need to work as individuals to see that this message gets into the junior high and early high school math and science classes.

We participate with National Society of Professional Engineers (NSPE) in National Engineers' Week and the Future Cities Competition to promote engineering and surveying as careers, where we sponsor the Best Surveying Practices Award. At last year's Future Cities Competition, out of the more than 30 teams that Past President Bob Krebs and I interviewed, only one or two knew what the titles P.E. or L.S. stood for. One young lady said, "Well, my dad is one, but I don't remember what it stands for."

One of our goals for the coming years is to advocate a Future Cities award that would promote the protection of public health, safety, and welfare through the use of licensure in a team's design planning. At the Future Cities Competition the ratio of girls to boys was about one to one. By the time college graduation comes, the ratio has changed to mostly male. Our young women need to be encouraged to make engineering a lifelong career. They need to learn through hands-on experience that engineering is not just for the guys. Engineering summer programs and engineering demonstrations in high schools can help in this effort.

We need to continue to promote licensure as going hand in hand with the professions. I ask all of you to emphasize the use of the Speaker's Kit on licensure in your colleges and universities. Become a member of the Speakers' Bureau and give this presentation.

Continuing education and comity

Some of the professional societies are asking for an increase in educational requirements prior to licensure. We need to work with societies,

educators, and ABET to ensure that we reach a common goal for the body of knowledge necessary for licensure. We are working with ABET, NSPE, and the American Society of Civil Engineers this year on a position statement on the value of licensure that ABET can adopt.

We will work this year toward rectifying the problems with continuing professional competency (CPC) and license renewal. Continuing education that meets certain educational criteria should be recognized from all qualified providers, not just those from specific states or institutions. The Council has begun the process of evaluating CPC providers to encourage all states requiring CPC to recognize these providers in their programs. We recognize that states have individuality, but we are asking each of you to work toward better CPC recognition within your board and state.

We will continue to work on national and international mobility. Multistate practice now happens with only the click of a computer mouse. Huge portions of our world still don't have basic infrastructure, and, as the third world countries develop, more and more of you will have an opportunity to offer your services across borders. As our profession changes, the Council and the Member Boards also need to change. Are the terms *national engineer* or *international surveyor* really so distant and unimaginable anymore? Our Canadian neighbors have an excellent system of education and experience and produce outstanding engineers and surveyors. We need to work harder on bilateral agreements

on education and licensing. One of our goals is to get Council approval to begin the process of negotiating with Canada.

Because we graduate less than 10 percent of the international engineering class each year, more and more foreign engineers will be seeking licensure in the United States. We need to be certain that their education and experience are carefully validated prior to being granted a license.

We have spent a great deal of time and money trying to define what the licensure model and licensed engineer will look like in the future. We won't drop this initiative.

Volunteering effort

The Council is a wonderful organization filled with great people. As I went through the committee-appointment procedure this year, I found that we had well over 200 volunteers to fill about 120 committee positions, and I was struck by the amount of giving that all of you do. The amount of donated time and effort to help our profession and our Council is staggering. Board members, Member Board administrators, law enforcement staff, and others all are willing to donate time to the good of the profession and a better Council.

I look forward to working with all of you in the coming year, and I thank you for your support.

Martin A. Pedersen, L.S.
NCEES President

Send letters to *Licensure Exchange* editor at NCEES, P.O. Box 1686, Clemson, SC 29633 or dalbert@ncees.org.

Please include your name and state of residence on the letter. Letters may be edited for clarity, brevity, and readability.

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NEWS

ALASKA

◆ Ginger Morton (ginger_morton@dced.state.ak.us) is the new executive administrator.

ARKANSAS

◆ William Ruck is a new appointee to the board. The term of Ken Cotter has expired.

FLORIDA PE

◆ Christian S. Bauer and David O. Charland are new appointees to the board.

ILLINOIS

◆ The board's phone number is 217-524-3211. Its Web site address is www.idfpr.com, and its e-mail address is dbrim@idfpr.com.

INDIANA

◆ Gloria Keating is no longer the board director. Angela Smith Jones (ajones@pla.in.gov) is now in that position. The board's address is now 402 West Washington Street, Room W072, Indianapolis, IN 46204. The board's new phone number is 317-234-3022.

IOWA

◆ Gary L. Benjamin is a new appointee to the board. The term of Randall Beavers has expired.

NEVADA

◆ The term of Roland D. Westergard has expired, and Dennis Anderson has been reappointed for another term.

SOUTH CAROLINA

◆ The board's mailing address is 110 Centerview Drive, Kingstree Building, Suite 201, Columbia, SC 29211-1597.

SOUTH DAKOTA

◆ Randy D. Bacon, David B. Stafford, and Leonard C. Neugebauer are new appointees to the board.

TEXAS PE

◆ The board's e-mail address is peboard@tbpe.state.tx.us.

VERMONT PE

◆ The board's phone number is now 802-828-1635.

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I certify that all information stated above is true and correct.
Desiree Talbert

2005–2006 NCEES

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Introducing the 2005–2006 Board of Directors



Seated, left to right: Tietjen, Pedersen, Nelson; Standing, left to right: Raimondi, Sutherland, Brandow, Smith, Tibshirany.

At the NCEES 2005 Annual Meeting, Martin Pedersen, L.S., accepted the position of president, and Jon Nelson, P.E., stepped into the role of immediate past president. L. "Larry" Robert Smith, P.E., was commissioned Northeast Zone vice president, and Mitchell Tibshirany Jr., P.E., was commissioned Southern Zone vice president. Bill Sutherland, P.E., and Jill Tietjen, P.E., began their second year as Central Zone vice president and Western Zone vice president, respectively.

Delegates voted for a new president-elect and a new treasurer. After serving a term as Northeast Zone vice president, Louis Raimondi, P.E., L.S., of New Jersey was elected president-elect. Gregg Brandow, Ph.D., P.E., S.E., of California was elected to a full two-year term as treasurer. He served for one year in the same position as a result of a special election held at last year's Annual Meeting to fill the second year of the vacant treasurer position.

Licensure

EXCHANGE

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