Licensure EXCHANGE
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UPLG continues mission to strengthen education requirements

At last year's Annual Meeting, the Council voted to require education beyond a bachelor's degree as a future requirement for engineering licensure. This year, the Committee on Uniform Procedures and Legislative Guidelines has been charged with proposing what that education should be. The committee's work will result in several motions to be presented at the Annual Meeting. Here are the answers to several questions related to the UPLG Committee's ongoing activities.

What has happened in the past few years to lead to the UPLG Committee's current activities?

The process began in 2001 with the creation of the Engineering Licensure Qualifications Task Force (ELQTF)—a group made up of representatives from NCEES as well as private practice, government, industry, and academia. ELQTF spent several years evaluating the licensure system in the United States. Its work included an evaluation of engineering education that pointed out "a persistent decrease in the credit hours required for an engineering degree" resulting in "a net national loss in the depth of engineering education in core subjects."

The ELQTF report coincided with two publications echoing its conclusions: *The Engineer of 2020: Visions of Engineering in the New Century*, published by the National Academy of Engineering, and *The Civil Engineering Body of Knowledge for the 21st Century*, published by the American Society of Civil Engineers. The National Academy of Engineering report expressed a need for future engineers to keep pace with "a bewildering array of new technologies" in an increasingly interconnected world. Pointing to a steady decline over several decades of required credit hours for engineering bachelor's degrees from an average of 150 to 128, the ASCE publication noted that coursework is increasingly being devoted to fulfilling degree requirements in subject areas that were both nontechnical in nature and not directly applicable to the practice of engineering.

The ELQTF findings led to the creation of the Licensure Qualifications Oversight Group (LQOG), which was made up of Council members who researched the education issue while gathering opinions and information from the Member Boards. Delegates at the 2005 Annual Meeting passed a motion presented by LQOG to charge the UPLG Committee with proposing revisions to the *Model Law* to require 30 credit hours in addition to a bachelor's degree as a prerequisite for engineering licensure.

In 2006, the UPLG Committee presented a motion to add language to the *Model Law* stating that beginning in 2015 engineer interns must have 30 credit hours in addition to the bachelor's degree in order to sit for the Principles and Practice of Engineering (PE) exam. This year, the UPLG Committee has been charged with further clarifying these new requirements.

How do the current UPLG charges relate to last year's addition of the "bachelor's degree plus 30" requirement for licensure?

Of the seven charges assigned to the UPLG Committee for 2006–07, two deal specifically with clarifying the new *Model Law* language strengthening the education requirements for engineering licensure. The first charge asks the committee to incorporate definitions for "acceptable coursework" and "approved course providers" into the *Model Rules*, while the second charge asks the committee to integrate the newly adopted education requirements into the definitions of Model Law Engineer and Model Law Structural Engineer.

In response to the first charge, the UPLG Committee has composed language for Section 230.15 of the *Model Rules* (see box on page 15) defining the terms "acceptable upper-level undergraduate or graduate level coursework" and "approved course providers."

Continued on page 14

Howard C. Harclerode II, P.E.
Chair, UPLG Committee

Michael J. Conzett, P.E.
Subcommittee Chair, UPLG Committee

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

The President's

MESSAGE

Council looks at strategic planning radar screen

As I wrote in my December letter, in 2005 the Board of Directors worked with a consultant to create a new document featuring a "radar screen" of issues affecting the Council. This radar screen is a way of presenting the strategic issues in a format indicating priority level. A few weeks ago, the Board Presidents' Assembly (BPA) gave Council leadership the opportunity to discuss this radar screen of strategic issues with leaders from the Member Boards.

At the BPA, strategy-planning consultant Jim Dalton explained the process of identifying strategic issues within an organization like NCEES. The process includes monitoring the environment for issues affecting our profession and then evaluating and appraising these issues to determine their strategic value. With that in mind, let's look at a few of the issues currently on the Council's radar screen.

The need for greater uniformity

The first issue on the radar screen involves the need for greater uniformity in comity, mobility, and continuing education across the NCEES Member Boards. There are three goals associated with addressing this issue:

- More Member Boards will need to adopt the *Model Law* provisions. Uniformity in licensure requirements would enhance the value of licensure while promoting comity across jurisdictions.
- The Records Program would need to be accepted as the means to comity for all boards. If all boards used this centralized recordkeeping service, interstate comity would be a much faster and more efficient process.
- Finally, a process for evaluating the qualifications of non-*Model Law* engineers would need to be established.

Courses of action for reaching these goals include updating the *Model Law* and *Model Rules* and creating a team of individuals capable of providing testimony on behalf of Member Board efforts to enact legislative changes.

Denigration of licensure

The perceived value of licensure is being lessened by several factors:

- There is a fading awareness of the positive effects licensure has on public safety and welfare.
- Increasingly, the P.E. and P.S. titles are perceived as a narrowly focused commodity serving merely as a seal rather than as a professional commitment to professional and ethical codes.
- We have yet to establish a clear brand identity indicating the value of licensure.
- Codes of conduct are not enforced in a standardized manner.
- Fewer people are seeking engineering and surveying licensure.

In response to this, we need to foster greater public awareness of licensure's importance. Plans for doing this include partnering with the American National Standards Institute and seeking to become an Accredited Standards Developer. Doing so would facilitate wider adoption of licensure requirements in government and industry while enhancing the profile of the Council internationally. Plans also include expanding efforts to reach K–12 students and promoting the virtues of the licensure process to professional and technical societies and state legislatures.

A third strategic issue facing the Council is the need to establish guidelines for international agreements in order to facilitate mobility for qualified, experienced professionals from other nations. You can read more about this on pages 6–7.

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

Wyoming governor signs anniversary proclamation

Wyoming's state board has accomplished yet another first in engineering licensure. The Wyoming board, which was established in 1907 when the state legislature passed the first engineering licensing law, became the first Member Board to secure a gubernatorial proclamation honoring the 100th anniversary of the occasion when Governor Dave Freudenthal signed a February 12 proclamation declaring February "Engineering Licensure Month" in Wyoming.

As part of its yearlong celebration of the anniversary, the Council has asked Member Boards to request proclamations from governors and other prominent elected officials honoring 100 years of engineering licensure. The proclamations will be on display during the Annual Meeting in Philadelphia August 22–25.

GOVERNOR'S PROCLAMATION

WHEREAS, this year, the National Council of Examiners for Engineering and Surveying and all U.S. engineering licensure boards are celebrating the 100th anniversary of engineering licensure in the United States. As part of this celebration, the Wyoming State Board of Registration for Professional Engineers and Professional Land Surveyors recognizes the work of NCEES in Wyoming as well as all of the United States; and

WHEREAS, the state of Wyoming, in particular, holds a special place in licensure's history when over a century ago, Clarence T. Johnston accepted the position of Wyoming State Engineer. He found that many individuals working as engineers lacked the training to competently carry out their duties. Johnston addressed the problem by preparing a bill to mandate registration and to create a board of examiners. In 1907, the Wyoming legislature turned that bill into law, creating the first U.S. engineering licensure law. Other states soon followed, and in 1920 they created the organization now known as NCEES; and

WHEREAS, today, NCEES provides leadership in licensure for its members—the licensure boards in all U.S. states and territories—through excellence in uniform laws, licensing standards, and professional ethics. This nonprofit organization develops, produces, and scores the only national engineering licensure examinations, guards against exam fraud, and works to facilitate state-to-state licensure mobility.

NOW THEREFORE, I DAVE FREUDENTHAL, Governor of the State of Wyoming, do hereby proclaim February as

ENGINEERING LICENSURE MONTH

in Wyoming to officially recognize a Century of Engineering Licensure, 1907–2007.

IN WITNESS THEREOF, I have hereunto set my hand and caused the Executive Seal of the Governor of Wyoming to be affixed this 12th day of February, 2007.

Dave Freudenthal,
Governor

UPDATE

Betsy Browne
NCEES Executive Director

Council discusses news, agenda at BPA

The February Board Presidents' Assembly in Atlanta gave many of us—Member Board presidents and administrators, the Board of Directors, and some headquarters staff—a chance to convene to discuss the state of the Council while also looking together at some of the larger, strategic initiatives for this year and beyond. I would like to take this opportunity to share with you some key takeaways from Atlanta.

Associate Executive Director Jerry Carter presented some valuable feedback we received from recent marketing surveys regarding our ongoing efforts to promote licensure to engineering students. Since 2002, the Council has introduced a series of initiatives designed to increase awareness of the licensure process while communicating the importance of the FE exam as the first step in the process of becoming a licensed professional.

Over the past five years, the number of FE exam candidates has steadily increased. To see whether this increase resulted from the Council's promotional efforts, we initiated a large research project consisting of surveys targeting three groups: professional engineers, engineers in training, and students who took the spring 2006 FE exam.

The surveys collected information about the decision process for choosing engineering as a profession. We found that 75 percent of respondents decided to become engineers while in high school, with most of that group deciding during their junior or senior years. Respondents also indicated the most helpful sources of information about engineering careers came from college professors and professionals, with school guidance counselors providing little to no helpful information.

These results indicate a strong need to connect with those in a position to influence students' career decisions prior to college, so that those who have an interest in and aptitude for math and science are encouraged to pursue engineering. This concern has been anticipated and will be addressed to some extent by the Council's more recent K–12 promotional efforts, which include its involvement with National Engineers Week and its Future City Competition, as well as the more recent sponsorship of *Design Squad*. The Council's plan is to further refine efforts in reaching students and influencers in middle and high school.

This marketing research provided several other key findings. Efforts to promote the FE exam to undergraduates as a first step toward licensure appear to be working. Over 80 percent of the FE candidates surveyed agreed that "the P.E. designation will significantly enhance my ability to advance my career"; 75 percent agreed that "the amount of work necessary to become a P.E. is well worth the effort."

Among the EITs surveyed, a sizeable majority of respondents indicated agreement that their college coursework prepared them well for the FE exam, while nearly half agreed that their coursework should have included more nontechnical but professionally useful courses such as contract law, ethics, and codes. Engineer interns also provided some heartening information with regard to the Council's university outreach efforts: two-thirds of respondents indicated that college professors were useful in helping them prepare for engineering careers.

With regard to the survey of professional engineers, respondents indicated the strongest motivations for taking the PE exam were professional prestige and more career opportunities. P.E.'s are participating in formal continuing education programs in greater numbers—58 percent compared to 45 percent in 2001. This supports the reasoning behind the creation of the Registered Continuing Education Providers Program (RCEPP)

last year. When asked about exam preparation, the majority of P.E. respondents indicated they used Council-published study materials, and 40 percent said they took a review course—usually one offered at a university—prior to sitting for the exam. This indicates a potential market for promoting NCEES study materials.

Other items presented at the BPA included an update on exam security and copying/collusion detection efforts presented by ELSES Director Susan Whitfield and Compliance and Security Manager Bob Whorton, P.E., a discussion of the Council's long-term strategic objectives with management consultant Jim Dalton, and a discussion of the Council's position on recognizing certain foreign engineering degrees led by Past President Martin Pedersen, L.S. You can read more about these topics in this issue of *Licensure Exchange*.

Reader poll results

The December 2006 issue of this newsletter contained a survey for our readers to provide feedback about themselves and about their content preferences for *Licensure Exchange*. Thanks to everyone who responded. It is important to us that we continue to shape this newsletter to meet the demands of our readership.

As always, we welcome your feedback. If you have ideas for articles in upcoming issues, or if you would like to contribute an article, feel free to contact our editors at dmcguirt@ncees.org.

Betsy Browne
NCEES Executive Director

NCEES OPERATING SUMMARY
For the Five Months Ended February 28, 2007

	Year-to-date	Budget Year-to-date	Budget Variance	2006–2007 Total Budget
INCOME				
Member Board Revenue	$ 271,024	$ 244,350	10.92%	$ 1,057,900
Examination Revenue	3,156,695	3,163,810	-0.22%	6,764,750
Study Materials Revenue	468,737	396,981	18.08%	948,900
Records Revenue	692,615	539,708	28.33%	1,351,700
ELSES Revenue	1,397,649	1,136,555	22.97%	3,229,800
Center Revenue	244,465	39,065	525.79%	93,750
Total Income	$ 6,231,185	$ 5,520,469	12.87%	$ 13,446,800
EXPENSES				
Member Board Expenses	$ 625,341	$ 833,461	-24.97%	$ 2,354,001
Examination Expenses	2,257,093	2,731,370	-17.36%	6,091,331
Study Materials Expenses	269,691	323,929	-16.74%	816,264
Records Expenses	231,160	270,661	-14.59%	704,774
ELSES Expenses	749,163	843,334	-11.17%	2,911,523
Center Expenses	273,949	370,716	-26.10%	913,357
Total Expenses	$ 4,406,397	$ 5,373,471	-18.00%	$ 13,791,250
NET OPERATING INCOME (DEFICIT)	**$1,824,788**	**$ 146,998**	**1141.37%**	**$(344,450)**

MISSION
The Mission of NCEES is to coordinate with domestic and international organizations to promote licensure of all engineers and surveyors.
NCEES Strategic Plan

Council debates comity for foreign professionals

Issues of international scope were the focus of Saturday morning's Board Presidents' Assembly. There, Council leadership and Member Board officials discussed licensure of foreign professionals seeking to practice in the United States.

Past President Martin Pedersen, L.S., led the discussion (see "Including Canada," *Licensure Exchange*, April 2006).

"Professional engineers in Canada, the United Kingdom, Australia, and other countries are highly educated and qualified professionals," said Pedersen. "If they have comparable education, extensive experience, and a clean record of practice, should they be granted a license to practice in the United States?"

Describing the Canadian system, Pedersen pointed out that Canada does not offer an exam comparable to the FE exam, although the country's four-year engineering degree programs are considered by many to be equivalent to ABET-accredited programs. He added that licensure requirements include four years' experience under a professional mentor along with a professional practice exam that focuses less on the technical proficiency characterized by the PE exam and more on professional practice topics such as contracts, business law, and ethics.

George Twiss, P.L.S., executive director of the Washington Board, described his state's long history of working with engineers from neighboring British Columbia. Pointing out that Washington waives the FE exam requirement for Canadians with 12 years' experience, Twiss said, "It might be productive to think in terms of outcome instead of process."

Other state boards, including Idaho and Alaska, waive the FE exam requirement for seasoned foreign professionals seeking licensure. Alaska requires 20 years' experience to waive the FE exam requirement, said board member Boyd Brownfield, P.E. He added the Alaska Board is cautious about what it does with regard to Canadian applicants because this could set a precedent for comity requests from other nations.

Idaho Board Executive Director David Curtis, P.E., said his state currently waives the FE exam requirement for exceptional individuals with 12 or more years' experience. Curtis also said the Idaho Board is pushing for state legislation that would allow reciprocity for certain foreign professionals of good standing with eight or more years' experience and who are licensed in jurisdictions with acceptably rigorous requirements.

In a phone interview conducted after the assembly, Curtis explained that the proposed legislation resulted from a meeting of the Pacific Northwest Economic Region, a group of elected officials and business leaders from U.S. states and Canadian provinces in the Pacific Northwest.

"The philosophy should be to look at outcomes rather than prescriptive steps toward licensure," said Curtis. "We should ask ourselves, 'Is it reasonable to require an experienced professional who is equally credentialed under a different system to take a fundamentals exam?'

"If the goal is to protect the public, it would not be fair to the public to deny these people licensure if they have just as much professionalism."

Texas Executive Director Dale Beebe-Farrow, P.E., said her board licenses certain foreign professionals without requiring them to pass the FE or the PE exam, but does so only temporarily in accordance with the North American Free Trade Agreement. Farrow pointed out it is common for many global companies to send foreign engineers to the U.S. to work on projects under an American P.E.'s authority.

In a phone interview conducted after the assembly, Farrow further explained how some global firms circumvent the licensure process for foreigners. "A lot of times, companies come in and they find the licensure process too cumbersome, so they bring in foreign engineers and have them work under a P.E. who might actually be less experienced than the foreign engineers."

Farrow indicated that Texas would likely not be opposed to the NCEES Board of Directors securing reciprocal arrangements with some foreign entities. "I think it would be beneficial at some point in the future," she said. Farrow added she would like to see the Member Boards work more closely together on issues related to comity both at the interstate and international levels. "At this point, it's hard enough for (Member Boards) to achieve comity with each other, much less with other nations," she said.

Other states represented at the meeting, including Michigan, Mississippi, and Rhode Island, voiced opposition to waiving examination requirements for experienced foreign professionals. Most of those present expressed reservations toward waiving the PE exam in particular.

Several states, including Idaho and South Carolina, expressed support for a system in which the Council would make recommendations to Member Boards regarding the equivalency of certain foreign licensure exams. Under this system, the Council would work through the United States Council for International Engineering Practice (USCIEP) to evaluate licensure exams in the nations—such as Australia and the United Kingdom—that are approaching Member Boards with requests for reciprocity.

Curtis said that although his state would reserve the right to make final decisions on foreign exam equivalency, the Council is in a good position to compare its exams to those from other nations. "A recommendation from the Council would carry a lot of weight" in determining whether a foreign exam would be accepted in lieu of the FE or PE exam, Curtis said.

Doug McGuirt
NCEES Editor

Committee

UPDATE

Nancy L. Gavlin, P.E., S.E. Chair, Structural Exam Task Force

Structural Task Force proposes exam uniformity

NCEES currently writes three structural engineering examinations. These examinations are known as the 4-hour structural module of the Civil examination, the 8-hour Structural Engineering I examination, and the 8-hour Structural Engineering II examination.

A survey of all of the NCEES licensing jurisdictions shows that the three NCEES structural engineering examinations used to qualify engineers for licensure are being applied in at least seven different combinations, depending on which jurisdiction is doing the licensure. Examples include:

- The civil/structural examination is used for P.E. licensure.
- The civil/structural examination is used for P.E. licensure with a structural engineering specialty.
- The SE I examination is used alone for P.E. licensure.
- The SE I examination is used alone for structural engineering specialty/area of expertise.
- The combination of the SE I examination and the SE II examination is used for S.E. licensure.
- The combination of the SE II examination and the California SE III examination is used for S.E. licensure.
- The combination of the SE II examination and the Washington SE III examination is used for S.E. licensure.

Additionally, in order to become an NCEES Model Law Structural Engineer an applicant must have passed 16 hours of structural engineering examinations. These 16 hours of examinations may consist of:

- A combination of SE I and SE II,
- A combination of SE II plus an 8-hour state-written structural engineering examination, or
- A 16-hour state-written structural engineering examination taken prior to 2004

As a result, questions and confusion arise:

- Why are there currently more than four different structural engineering examinations that are accepted for Model Law Structural Engineer qualification?
- Will an examination that has been developed for one purpose be effective in measuring minimum competence when applied to a different purpose?
- Should the measure of minimum competence needed to practice structural engineering vary from jurisdiction to jurisdiction?
- How many total hours of structural engineering examinations are required to test minimum competence for the practice of structural engineering?
- How did we get to have so many different combinations of structural engineering examinations?

Structural engineering licensure examination has been in existence since 1915, when Illinois first enacted its Structural Engineers' License Law. Since that time, many other states have enacted their own structural engineering licensing laws and, consequently, several states have developed their own structural engineering examinations.

Prior to 1985, Illinois wrote its own 16-hour structural engineering examination, California wrote its own 16-hour structural engineering examination, and Washington wrote its own 16-hour structural engineering examination. In the time period 1985–1987, NCEES wrote the first 8-hour SE I and the 8-hour SE II examinations. During this time, some states began to use the SE I and SE II examinations for their 16 hours of structural engineering examinations. By 1998, all of the jurisdictions, except California, that then required 16 hours of structural engineering examinations for SE licensure qualification used the SE I and SE II examinations. In 2004, California began using the SE II examination for 8 hours of its 16 hours of structural engineering examinations.

Today, 10 of the 13 jurisdictions that require passing 16 hours of structural engineering examinations for structural engineering licensure use the SE I and SE II examinations. The remaining three jurisdictions use the SE II examination for 8 hours of their structural engineering examinations but use different state-specific examinations for the additional 8-hour examination.

As can be noted in the paragraphs above, by 2004, almost all S.E. licensure jurisdictions used a common 16 hours of structural engineering examinations. Now, it appears that the jurisdictions are diverging in their SE examination usage once again.

The Structural Engineering Examination Task Force is composed of members from jurisdictions that have P.E. and S.E. licenses and from jurisdictions that have only generic P.E. licenses. The task force members also come from jurisdictions having great diversity of environmental conditions and, therefore, of structural load conditions. The task force has reviewed and evaluated the current status of structural engineering licensure examinations and has come to the following conclusion: **It is possible to write one 16-hour examination that can be used effectively by all jurisdictions for structural engineering licensure**. In support of this the task force makes the following recommendations:

- Sixteen hours is the appropriate number of hours of examinations for structural engineering licensure.
- The development of new building and bridge codes since the year 2000 has changed significantly the structural engineering design environment. Prior to 2000, different regions of the country used different building codes. Today, a single, common building code is used almost uniformly throughout the country. In addition, the role of the design and analysis of structures for lateral loading has increased significantly in the design process, regardless of where in the country the structure is located.
- The format and specifications for the 16 hours of examinations for the S.E. license should be modernized to be in step with the new building codes. The Structural Exam Committee already is modifying examination items to incorporate the requirements of the new codes. It is anticipated that most of the existing structural exam items will be able to be used in the modernized structural examinations.
- In order to accomplish the modernization of the structural engineering examination in a timely and appropriate manner, a new PAKS should be undertaken in 2008. This is one year earlier than the currently scheduled structural engineering PAKS.
- The 16 hours of structural engineering examinations should be a single examination with two 8-hour components given on consecutive days. The modernized 16-hour structural engineering examination should be a breadth and depth examination with integrated design, analysis, and detailing questions. The examination should contain a combination of multiple choice and essay questions. Passing a single, 8-hour component of the two-component 16-hour Structural Engineering examination would not be sufficient to demonstrate minimum competence to practice structural engineering.

The task force conclusion, that it is possible to write one 16-hour examination that can be used effectively by all jurisdictions for structural engineering licensure, is the key to the development of a rational, uniform, fair, and reliable examination of minimum competence for the practice of structural engineering. If we are all willing to work together, we can accomplish this goal.

Nancy L. Gavlin, P.E., S.E.
Chair, Structural Exam Task Force

Committee

UPDATE

A. J. P. "Sonny" Launey, P.E.
Chair, Item Difficulty Task Force

Task force sets standard for item difficulty

To effectively preserve the public safety and welfare, licensure exams must do two things: They must be difficult enough to ensure that those who pass are worthy of the public's trust, but they also must not be so difficult that worthy engineers who have achieved a certain level of competence are excluded from becoming licensed. Accomplishing both requires walking a thin line.

The Item Difficulty Task Force is charged with evaluating levels of difficulty and complexity for exam items relative to minimum competency. It also is charged with developing a standard that establishes a recognized level of difficulty that is psychometrically sound and tests for minimum competence.

The charges required us to build on the work done by several other committees, including the Committee on Examinations for Professional Engineers (EPE) and Committee on Examinations for Professional Surveyors (EPS). Because the members of our task force come from diverse professional backgrounds, we initially engaged in a broad survey of the exam development process. In addition to studying the item difficulty work done by the EPE and EPS committees, we looked at the Council's exam development procedures, item and exam performance data from past exam administrations, and psychometric analyses.

The Council's psychometrician provided background information on item difficulty, covering the fundamentals and general rules for item writing.

Based on psychometrics, we decided to exchange the terms "hard" and "difficult" for the more accurate term "poor performing." This reflects the fact that our goal is to create a system that separates the minimally competent from the incompetent. Therefore, "difficult" items that elicit incorrect responses from all but the very brightest (and a few lucky guessers) are considered poor-performing items for a professional licensing exam.

The process of developing an item difficulty standard required our task force to look at the work of last year's Cut Score Task Force, particularly its definitions for *basic knowledge* (familiarity with a concept), *fundamental understanding* (interpreting a concept or explaining it to someone else), and *working knowledge* (applying the concept to a new situation).

These definitions serve as effective guidelines for item writers. With all of this in mind, our task force's report will focus on the following:

General item writing

- Distinguishing items that test for mastery vs. those that test for minimum competence
- Linking basic, fundamental, and working levels of understanding to exam specifications
- Training and recruiting volunteers

New items

- Training, pretesting, and reviewing tested items, with good and bad examples of each
- Predicting and tracking performance of new items
- Quality control

Used items

- Monitoring/fixing poor-performing items in exam banks
- Evaluating reasons for poor performance
- Tracking performance of revised items

Training

- All levels of functions and activities

Our task was best summarized by one of our committee members who said, "After all, writing well-performing items is the most important thing we do."

A.J.P. "Sonny" Launey, P.E.
Chair, Item Difficulty Task Force

Q&A: Whitfield, Whorton discuss exam copying/collusion

Licensure Exchange *recently spoke with ELSES Director Susan Whitfield and NCEES Security and Compliance Manager Bob Whorton, P.E., about their efforts to combat copying/collusion on the Council's licensing examinations. Here is some of what they had to say.*

At the BPA, you presented statistics demonstrating that ELSES-administered exam sites are less likely to experience copying/collusion than non-ELSES sites. To what do you attribute this success?

Whitfield:
We have done a lot to increase awareness among both our proctors and our exam candidates.

To provide a little background, ELSES currently administers the PE and the FE exams for 40 of the Council's Member Boards. That includes 130 exam sites and about 23,000 examinees per exam administration. This translates to about 57 percent of examinees nationwide. We also employ around 1,300 proctors nationwide during each exam administration.

For the October 2006 administration, only 14 percent of the answer sheets flagged for suspected copying/collusion came from ELSES-administered sites. So despite administering exams to a majority of all candidates, our sites were responsible for only a small percentage of flagged answer sheets. Results indicate that we appear to be doing a good job of deterring copying and collusion, but we always try to keep the proctors aware of the challenges they will face at the exam sites.

Many of these candidates who will attempt to collude or copy during the exams are very good at what they are trying to do. Some exam sites present other challenges, such as auditorium seating in university classrooms that make it easy for candidates to look down onto the papers of candidates seated in front of them.

To prepare for the challenges involved in deterring copying and collusion, we have enhanced our proctor training. At the workshops for chief proctors—which are held prior to each exam administration—we put an emphasis on exam copying/collusion. We also distribute a newsletter called *Proctor Post* to all Member Boards, including those who do not administer their licensing exams through ELSES; this newsletter usually includes at least one article dealing with preventing copying and collusion during exams.

With the exam candidates themselves, we communicate to them the importance of keeping their answer sheets covered. Both the exam admission notices and the exam script contain warnings against exposing answer sheets and copying others' work. We also let candidates know about our copying/collusion analysis reports. We basically tell candidates, "Even if you copy and get by our proctors, the copying/collusion reports are going to identify you regardless."

What action does ELSES take when a particular candidate has been flagged by the copying/collusion analysis?

Whitfield:
When a candidate is identified as a suspect for copying/collusion, the first thing I do is contact the Member Board to offer my assistance in any way I can. I provide the board with the name of the chief proctor at the exam site where the copying/collusion appears to have occurred. After that, I also notify the chief proctor so that he or she can be aware of the situation and be available to assist the Member Board with the investigation.

How do Member Boards proceed once they have received a report indicating likely copying or collusion at one of their sites?

Whorton:
Each Member Board is contractually bound to conduct an investigation to determine whether a flagged candidate's results should be invalidated. Many boards have already established some type of procedure for investigating these cases. Investigations typically include gathering evidence, reviewing the background of the examinee in question, and obtaining a detailed account of the exam session from the examinee. These accounts can be written and mailed, gathered through face-to-face interviews, or both.

Continued on page 13

Susan Whitfield
Director of ELSES

Bob Whorton, P.E.,
Compliance and Security Manager

Member Board

NEWS

Delaware PE

- W. Zachary Crouch, Charles L. McAllister, and Gregory G. Pawlowski are new appointees to the board. The terms of David J. Athey, Michael Cotton, and Karen Maxson have expired.

Louisiana

- Roger D. Danzy is a new appointee to the board.

Massachusetts

- Susan E. Coco (susan.e.coco@state.ma.us) is now the Member Board Administrator.

Nebraska LS

- Administrative Assistant Kathy Martin has a new e-mail address: kmartin@sso.ne.gov.

New York

- Harvey J. Palmer is a new appointee to the board. The term of Rose Mary Wargo has expired.

Northern Mariana Islands

- Valerie M. Atalig and Gregorio Q. Castro are new appointees to the board.

South Carolina

- Preston M. Young is no longer on the board.

Upcoming

EVENTS

DATE	EVENT	LOCATION
April 12–15	Western Zone Meeting	Gleneden Beach, Ore.
April 20–21	Exam Administrations	
April 26–28	Southern Zone Meeting	Lexington, Ky.
May 3–5	Northeast Zone Meeting	Newport, R.I.
May 15–17	Board of Directors' Meeting	Rapid City, S. Dak.
May 17–19	Central Zone Meeting	Rapid City, S. Dak.
August 21	Board of Directors' Meeting	Philadelphia, Pa.
August 22–25	Annual Meeting	Philadelphia, Pa.
August 25	Board of Directors' Meeting	Philadelphia, Pa.

October's administration was the third time we have run the program to identify copying/collusion. Even though the Member Boards conduct their own investigations once they have received the information from us, I'm always available if they need assistance. Also, the Law Enforcement Committee is currently working on a charge that will provide recommendations for copying/collusion investigation procedure (see article below).

What do you recommend to a Member Board that has received a copying/collusion report with one or more pairs of flagged answer sheets?

Whorton:
I would recommend that Member Boards carefully review all the information we send them as they investigate the flagged candidates. In addition to the copying/collusion reports, we provide them with exam results, seating charts for the examinees, and a review of the work shown in the candidate's exam booklet. Based on the strength and credibility of this information, boards may be able to identify which person in a particular pair of flagged examinees was copying the answers. If there is significant statistical data suggesting an irregularity between a pair of candidates who were seated near one another, chances are very good that something went on.

There was one flagged candidate who advised that, after going through and answering the questions he thought he knew, he would assign a letter to each of his four beautiful children and guess the answer according to which of his children popped into his head first. Coincidentally, 39 out of 40 of his answers matched those of the examinee seated in front of him. That candidate's exam score was invalidated. If an investigation had not been conducted, that candidate would probably have become licensed.

Law Enforcement addresses charges

The members of the NCEES Law Enforcement Committee have had a lot on their plates since September.

The committee was given eight charges at the 2006 Annual Meeting, two of which will result in a combination of recommendations and motions to be presented at this year's Annual Meeting.

The first of these charges required committee members to examine forensic engineering and expert witness testimony to determine whether they should fall under the category of tasks the *Model Law* defines as "the practice of engineering." "The subcommittee that worked on the charge contacted Member Boards in reference to their experiences with these types of investigations and got feedback on what they felt worked and did not work," said Committee Chair Rick Huett.

The committee's report specified that most jurisdictions regard forensic engineering and expert witness testimony as two distinct functions. It adds that although only seven boards have statutes or rules requiring licensure in order to give expert testimony, most indicated that the reports and investigations associated with such testimony fall under the practice of engineering. A motion resulting from this charge will be presented to the Council in Philadelphia.

Another committee charge asked members to develop recommended guidelines for the investigation of candidates suspected of exam subversion. This charge resulted in a series of recommendations to be presented at the Annual Meeting.

The committee will recommend adding one new chapter and two appendices to the Council's *Investigation and Enforcement Guidelines*. The appendices will consist of a sample notice letter for candidates with flagged exam results and a list of questions to be used in interviews with suspected cheaters.

Huett said the list of suggested questions for investigators came about from research—conducted by the subcommittee responsible for the charge—of past exam subversion cases. "Although the list is not intended to be all-inclusive, the questions provide a quick reference for individuals conducting this type of investigation."

Doug McGuirt
NCEES Editor

According to the proposed language, what types of courses would be acceptable for fulfilling the new education requirements?

The new language divides the coursework required for the plus-30 requirement into two categories: technical and professional practice. This division reflects the committee's belief that the new education requirements must add to the depth and breadth of a candidate's body of knowledge.

Of the 30 additional credit hours, Section 230.15 B states that 20 or more of the credit hours must come from technical courses in engineering, mathematics, and the hard sciences, while the remaining 10 would be from professional-practice coursework. The committee proposes this 2:1 ratio of technical to professional-practice credit hours because many technical courses that were once required for undergraduate engineering degrees are no longer required and instead are offered as electives or in graduate degree programs. The new language also requires that, of the 20 hours of technical coursework, at least 10 must come from graduate-level courses.

Some of the reasoning behind this emphasis on technical education relates to the fact that many engineering employers now are finding it necessary to provide significant technical education to engineering graduates during their time as engineer interns. As the required body of knowledge becomes more complex and specialized, the need for these employers to educate their employees in technical subjects becomes greater. Finally, because employers approach this education in different ways, PE exam candidates have widely varying levels of understanding with regard to technical subject matter. By adopting the proposed technical education requirements into the *Model Rules*, all candidates for professional engineering licensure would be better equipped with the knowledge required to pass the PE exam.

In the professional-practice category, the committee's proposed *Model Rules* language stipulates in Section 230.15 A.2 that the coursework be "related to skills directly relevant to the individual's practice." It would include coursework in subjects such as communications, ethics, contract law, project management, and public policy. The types of courses listed in 230.15 A.2 should not be interpreted as an all-encompassing, exhaustive list. The proper courses to take to fulfill the professional-practice category requirements would in large part depend on the candidate's engineering discipline and the body of knowledge necessary to possess minimum competency in that discipline.

What types of institutions will be accepted by the Council as approved course providers for credits fulfilling the new education requirements?

The proposed language also indicates, in Section 230.15 A, that acceptable coursework must come from institutions that have at least one program of study accredited by EAC/ABET, or, if not, that the courses be "equivalent in intellectual rigor and learning assessment" to such courses in EAC/ABET-accredited programs. The benchmark of EAC/ABET accreditation is used to help ensure a high level of quality in the coursework. Section 230.15 C of the proposed language further defines an approved course provider as either an institution offering EAC/ABET-accredited programs or an organization offering courses accredited by an alternative, NCEES-approved accrediting body.

Who would decide whether a course is equivalent to one that would be offered by an academic institution with an EAC/ABET-accredited program?

In its definition of *approved course providers*, the UPLG Committee has taken into account the fact that a wide variety of organizations will be interested in and capable of providing the coursework needed to fulfill the technical and professional education requirements. The "alternative, NCEES-approved accrediting body" as such does not currently exist. However, the committee believes that such an accrediting entity may be created out of necessity in the future. The criteria for evaluating the classes that would be offered by such organizations should be a future charge for the UPLG Committee in the coming year.

How does the UPLG Committee propose to define the Model Law Engineer and Model Law Structural Engineer in light of last year's adoption of the "bachelor's degree plus 30 credits" requirement?

The UPLG Committee's second motion is to incorporate the plus-30 language into the *Model Rules* definitions of Model Law Engineer and Model Law Structural Engineer found in Section 210.20. The new language is found in 210.20 B.2 and 210.20 B.4, and is listed below the current definitions remaining in effect until 2015.

As of January 1, 2015, both the Model Law Engineer and Model Law Structural Engineer will have graduated from an engineering program accredited by EAC/ABET and will have completed an additional 30 credit hours of acceptable upper-level undergraduate or graduate coursework from approved course providers. These definitions are compatible with the requirements for "Licensure by Examination" now included in *Model Law* 130.10 C.1.

Does the UPLG Committee have any other recommendations related to the passage of either of these motions?

If the first motion passes, the UPLG Committee recommends that the appropriate committee be charged with reviewing *Model Rules* Section 230.40 dealing with examinations. The language, which the Council passed at last year's Annual Meeting, states that, beginning in 2015, a graduate with a bachelor's degree requiring more than 120 credit hours may request that credits earned in excess of 120 be applied to satisfy the plus-30 requirements.

UPLG's proposed language originally stated "from a five-year program" rather than "in excess of 120 credit hours," but it was amended from the floor. If this year's Motion 1 passes, this language would contradict the new language defining acceptable credits.

Howard "Skip" C. Harclerode II, P.E.
Chair, UPLG Committee

Michael J. Conzett, P.E.
Subcommittee Chair, UPLG Committee

New language for *Model Rules*

At this year's Annual Meeting, UPLG will propose adding the following language to Section 230.15 of the *Model Rules*, defining "acceptable coursework" and "approved course providers" for the new bachelor's plus-30 education requirements:

A. The term "acceptable upper-level undergraduate or graduate-level coursework" used in Section 130.10 C.1.c of the *Model Law* is interpreted to mean the following:
   1. In technical topic areas, acceptable coursework shall be
      a. A combination of upper-level undergraduate and graduate-level courses or all graduate-level courses in engineering, sciences, or mathematics at institutions that have a program or programs accredited by EAC/ABET; and/or
      b. Such courses that are equivalent in intellectual rigor and learning assessment to upper-level undergraduate and/or graduate-level courses offered at institutions that have a program or programs accredited by EAC/ABET.
   2. In professional practice topic areas, acceptable coursework shall be courses related to skills directly relevant to the individual's practice, including but not limited to the following: communications, contract law, economics, engineering management, ethics, finance, institutional management, physical asset management, project management, public policy, and quality management. Such courses shall be equivalent in intellectual rigor and learning assessment to upper-level undergraduate and/or graduate courses offered at institutions that have a program or programs accredited by EAC/ABET.

B. At least 20 of the 30 credits shall consist of coursework as defined in 230.15 A.1 above. At least 10 credits of the coursework in the technical topic area shall be graduate-level coursework.

C. The term "approved course provider" used in Section 130.10 C.1.c in the *Model Law* is interpreted to mean an institution or organization that offers courses meeting the definitions of acceptable coursework in Section 230.15 A.1 and/or Section 230.15 A.2 as defined above. Such institutions shall offer EAC/ABET-accredited programs. Such organizations shall offer courses accredited by an alternative NCEES-approved accrediting body.

D. The term "credit" as used above is defined as 1 semester hour or its equivalent.

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

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Betsy Browne, Executive Director and Publisher

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Doug McGuirt, Editor

Ragenia Thompson, Graphics and Print Coordinator

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Council represented at Future City Competition

People visiting Washington, D.C., recently may have noticed new lightning-containment capacitors, electromagnetic gondolas, and holographic communications networks. They were courtesy of some very imaginative—and talented—middle-school students visiting in conjunction with the finals of the Future City Competition, held February 19–21 as part of National Engineers Week.

NCEES Past President Robert Krebs, P.E., L.S., and EPS Committee Chair Jim Riney, P.E., P.L.S., judged entrants vying for the Best Land Surveying Practices special award, which was sponsored by NCEES. This year, the surveying award was given to the team from Farnsworth Middle School in Albany, N.Y., for its entry, "Playa del Sol."

Future City, first held in 1992, involves teams of middle-school students competing to design cities, using simulation software and scale models. The teams, each led by a teacher and a volunteer engineer mentor, write abstracts for their plans, as well as essays describing how their cities address a specific social need. The team from St. Thomas More School in Baton Rouge, La., was the 2006–2007 overall national champion for its entry, "Mwinda"; its prize is a paid trip to Space Camp in Huntsville, Ala.

Teams are given 5 minutes to present their models to each group of judges. Considering that more than 25 separate categories were judged, that added up to a very busy day for the finalists.

"It's a pretty intense 5 minutes for the kids, but they do a great job presenting their work," said Krebs. "They spend an incredible amount of extracurricular time working on their designs without a lot of money or resources."

"I was surprised by how well-prepared many of the students were," added Riney, a first-time judge at the competition.

For NCEES, Future City sponsorship provides an opportunity to promote the engineering profession to students who already may be considering careers in engineering and surveying. Krebs said, "It's hard to estimate the impact of promoting engineering to sixth and seventh graders, but every year at the finals they roll out alumni from the competition who are now engineers."

According to the Future City Web site (www.futurecity.org), some 30,000 students from 1,000 schools nationwide participated in 2006–2007.

National Council of Examiners
for Engineering and Surveying
PO Box 1686
Clemson, SC 29633-1686
(864) 654-6824
Fax (864) 654-6033
www.ncees.org

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