

## NCEES, ABET strengthen ties between education and licensure

**N**CEES and ABET are continuing to cooperate in addressing issues related to licensure and engineering education, as demonstrated by a presentation given by former ABET president William Clark, P.E., at the Board Presidents' Assembly February 20. Clark provided attendees with an overview of ABET and its accreditation activities.

"We've seen a positive effort being made by NCEES leaders to strengthen the relationship between the two organizations," said Clark. "I was happy to be able to address the assembly to explain ABET and hopefully demystify some of our processes."

### Accreditation process and criteria

ABET is a federation of 30 professional engineering and technical societies, one of which is NCEES. It accredits close to 2,800 degree programs at almost 600 colleges and universities. ABET uses an outcomes-based system to accredit programs; it does not accredit schools or entire departments but only individual degree programs. The process is voluntary, and an evaluation is initiated by the program seeking accreditation. Volunteers conduct the accreditations with support provided by a 30-member staff in Baltimore.

The criteria used in the accreditation process for engineering degree programs are developed by the Engineering Accreditation Commission (EAC) and approved by the board of directors. ABET describes it as an outcomes-based process. This means that rather than dictating a formula for allocating course credits, the commission looks for graduating students that have met requirements in 11 achievement areas as well as objectives set by the program.

In addition to critical technical competencies, outcomes include achievement in areas such as communications, ethics, and knowledge of contemporary issues. One of the technical outcomes includes the term "health and safety" in its description (see box on next page). All of the criteria and other information of interest can be found at [www.abet.org](http://www.abet.org).

Clark also showed figures during his presentation that indicated the majority of programs accredited by ABET fall under the EAC. Other commissions within ABET accredit engineering technology, applied science, and computing degree programs. More than 60 percent of all programs accredited by ABET are engineering programs.

### ABET structure and governance

Clark said some past misunderstandings between organizations such as NCEES and ABET possibly resulted from a misperception that decisions affecting engineering and surveying education, such as the formulation of the accreditation criteria, are made by people who do not work in those professions.

"ABET is governed by its society members, most of whom are from the engineering disciplines," said Clark.

The ABET board of directors is the governing body and determines the organization's policies, including approval of its accreditation criteria. The directors include representatives of the member societies. The number of directors representing a particular society relates to the number of degree programs within that society's discipline that are accredited by ABET.

The American Society of Civil Engineers, the American Society of Mechanical Engineers, and IEEE-USA—each of which exceeds a threshold of 300 accredited programs under their umbrella—have three representatives each on the board of directors. The American Institute of Chemical Engineers and the Institute of Industrial Engineers, which both have between 100 and 300 accredited programs, have two directors each. Fifteen other organizations with engineering or engineering technology interests, including NCEES, the National Society of Professional Engineers, and the American Society

(continued on page 2)

### **ABET Criterion 3. Program Outcomes**

Engineering programs must demonstrate that their students attain the following outcomes:

- (a) an ability to apply knowledge of mathematics, science, and engineering
- (b) an ability to design and conduct experiments, as well as to analyze and interpret data
- (c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health, and safety, manufacturability, and sustainability
- (d) an ability to function on multidisciplinary teams
- (e) an ability to identify, formulate, and solve engineering problems
- (f) an understanding of professional and ethical responsibility
- (g) an ability to communicate effectively
- (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- (i) a recognition of the need for, and an ability to engage in, life-long learning
- (j) a knowledge of contemporary issues
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Clark said that one recent development within ABET's accreditation rules could have an effect on the additional education requirement. In March 2008, the ABET board of directors changed its policy to allow dual-level accreditation: institutions may now seek concurrent accreditation for engineering programs that have the same name at both the bachelor's and master's level. The option for accrediting master's-level programs has always been in place, but until the policy change, these programs had to be distinguishable by name from an accredited undergraduate program in the same discipline. In practical terms, this means that a school can now have accredited bachelor's and master's degree programs in a single discipline such as mechanical engineering, for instance.

ABET leaders do not expect to see many requests for accreditation for these dual-level programs initially. But if the Council's additional education requirement begins to look more like a master's or equivalent, it is possible

that there could be an upswing in demand for such programs as more aspiring P.E.'s enroll in master's-level programs.

With regard to the concept of additional education as a requirement for engineering licensure, ABET has not adopted a position, although, according to Clark, "Generally speaking and aside from the licensure issue, ABET is all for more education (indeed, one of the criteria elements requires 'life-long learning') and would be happy to accredit additional master's-level programs if there is a demand for that."

Noting that ABET is concerned with ensuring the quality of the education underpinning the engineering profession, he said that ABET believes determination of licensure requirements, such as the amount of education or length of experience, appropriately belongs in the hands of NCEES and its constituents.

"We strongly support licensure and recognition of the high standards required for the P.E. and P.S. If the licensing boards think a master's is necessary, ABET remains prepared to evaluate any master's programs that request accreditation."

for Engineering Education, have one representative each on the board of directors.

"The ABET board is not unlike NCEES in its decision-making process," said Clark. "It also has to build a consensus across a diverse group of members—no single individual is making the decisions."

#### **ABET consulting role within engineering education task force**

Clark, who was ABET president in 2006–07, currently serves as a consultant to the NCEES Engineering Education Task Force, which is addressing issues related to an additional education requirement for licensed engineers. The requirement, which NCEES passed in 2006, has continued to be the subject of much discussion in the engineering community as the Council debates its specifics.

This year, the task force is addressing several issues raised by the Council, including the potential impacts of the requirement throughout the profession (see article, page 8). To ensure that a broad range of perspectives are taken into account in the deliberations, a large number of resources from affiliated engineering organizations have been included on the task force.

# UPDATE

## ELSEES restructured as division of NCEES

At its February meeting, the NCEES Board of Directors reviewed the structure of ELSEES, the NCEES exam administration affiliate. ELSEES was established as a limited liability company (LLC), separate from NCEES, in 2003 to reduce the potential liability arising from ELSEES operations. The Board weighed the costs and benefits of maintaining the separation and considered the advice of NCEES legal counsel. After this review, the Board decided that it was in the best interest of the Council to dissolve the LLC established for ELSEES and allow ELSEES to operate as a division of NCEES.

Bringing ELSEES under the NCEES umbrella will eliminate the cost and red tape associated with treating ELSEES as a separate entity, including the need for separate insurance and legal fees and the need for domestication in various jurisdictions and required annual fees and reports. Examinees and Member Boards will not see a difference in the services provided by ELSEES, but the change should clear candidates' and others' confusion about the connection between ELSEES and NCEES.

I will speak about this change at the zone meetings this spring and answer any questions concerning it.

### International exam administrations

This spring will also bring the first opportunity to offer the FE and PE exams at new foreign sites. NCEES exams will be administered for the first time through the American University in Cairo (AUC) in Cairo, Egypt, and the Korean Professional Engineers Association (KPEA) in Seoul, South Korea. ELSEES is assisting both organizations with exam registration and administration.

ELSEES is also now coordinating FE and PE exam registration for the Japan PE/FE Examiners Council and for two Canadian provincial authorities: the Association of Professional Engineers, Geologists, and Geophysicists of Alberta and the Association

of Professional Engineers and Geoscientists of New Brunswick.

Last month, I traveled with President Henn Rebane and President-Elect David Whitman to meet with the Saudi Engineers Council in Riyadh, Saudi Arabia, to discuss the possible future use of NCEES exams. We met with representatives from industry and academia, visited potential test sites, and discussed exam administration policies. We will present our findings at the June Board of Directors' meeting, and if deemed appropriate, the Board will move forward with seeking the Council's approval to enter into negotiations with the Saudi Engineers Council.

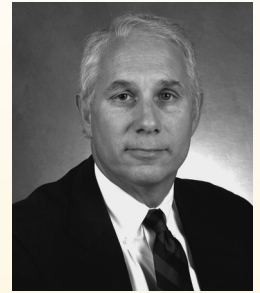
### Board Presidents' Assembly

Eighty-nine Member Board presidents and administrators, along with the NCEES Board of Directors and senior staff, met at the Board Presidents' Assembly in Atlanta on February 20–21. The meeting gave us a good opportunity to discuss current and upcoming Council initiatives. Thanks to everyone who completed the online survey following the BPA; the responses will be helpful in planning the next assembly (see results, page 15).

One of the topics at the BPA was the Council's new branding initiative. The marketing agency with whom we've been working gave a presentation on the brand development, including its work on a new logo and tagline to succinctly identify who NCEES is. The Board of Directors is currently reviewing additional taglines based on feedback we received at the meeting. We will give an update on the brand development at the interim zone meetings.

The Council is celebrating its 90th birthday next year, and its services have grown dramatically in that time, especially in the last decade. I am excited about this opportunity to give NCEES a contemporary, unified look and message that builds on the reputation the Council has built since 1920.

*Jerry T. Carter*  
NCEES Executive Director



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NCEES Executive Director

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# MESSAGE

## Inaugural NCEES Engineering Award raises campus exposure for licensure



Henn Rebane, P.E.  
NCEES President

As members of NCEES, we work toward an ideal in which all working engineers are licensed P.E.'s. Imagine the benefits for society if this were the case. The public and the profession would certainly benefit from the knowledge that all engineers in every engineering discipline had met the same standards in education, experience, and examination.

What are some of the ways we can increase the percentage of licensed engineers relative to the number of working engineers in this country? This is a question that has been on the strategic radar for the NCEES Board of Directors for years. One strategy for doing this is to increase awareness of licensure and its career benefits among college engineering students. With the NCEES Engineering Award, we have shown we are serious about doing this.

The NCEES Engineering Award recognizes ABET-accredited engineering schools that partner students with professional engineers on projects that help students transition their academic knowledge into practical know-how. This was the first year the award has been given. I'm happy to report that we received 28 entries from engineering schools throughout the country.

After a jury of distinguished professionals conducted a blind judging of the entries, the top award was given to the joint submission from Florida A&M University and Florida State University. The winning entry featured a senior capstone course that paired civil and environmental engineering students with professional engineers working with the U.S. Army Corps of Engineers on Everglades restoration projects. Other prize-winners included programs from the University of Arizona, the University of Missouri-Kansas City, Seattle University, the University of Tennessee at Chattanooga, and Virginia Tech.

### NCEES leaders meet with Saudi officials

The Council continues to be the subject of interest from foreign counterparts. Last month, President-Elect Dave Whitman, Executive Director Jerry Carter, and I made the long trip to Riyadh, Saudi Arabia, to discuss NCEES exams with officials from the Saudi Engineers Council, the group that oversees licensure in that country.



Executive Director Carter, President-Elect Whitman, and President Rebane were treated by their Saudi hosts to a traditional meal in a Bedouin tent on the last day of their trip.

Licensure for engineers is relatively new in the Saudi kingdom, and the officials there expressed interest in learning about the U.S. licensure model and NCEES exams in particular. We discussed the possibility of offering exams there while outlining the requirements we have in place to protect exam content.

For a part of the world that has some extraordinary engineering projects, it is a good sign that officials in Saudi Arabia view NCEES exams as fair and consistent measures of engineering ability. That is something all of us—Council members, volunteers, and license holders alike—can take pride in.

Henn Rebane, P.E.  
NCEES President

### MISSION

- Assist Member Boards in the promotion and promulgation of regulatory processes for engineering and surveying licensure which demonstrate high standards of knowledge, competence, professional development, and ethics.
- Provide to Member Boards services that promote uniform licensing procedures which emphasize quality education, examination, progressive qualifying experience, and continuing professional competency.
- Coordinate with domestic and international organizations to promote licensure of all engineers and surveyors.

NCEES Strategic Plan

# Licensure exemptions limit boards' ability to protect public

The introduction to the NCEES *Model Law* states, "In order to safeguard life, health, and property and to promote the public welfare, the practice of engineering and/or the practice of surveying in this jurisdiction is hereby declared to be subject to regulation in the public interest."

It continues with a straightforward warning to anyone who would practice—or offer to practice—engineering or surveying without holding a license: Doing so is illegal.

Similar language appears in many, if not most, of the state laws that govern the practice of the engineering and surveying professions. These are the laws that establish the member licensing boards that together form NCEES. They not only define the standards that must be met for licensure; they also limit the practice of these professions to the licensees. This is how the NCEES Member Boards fulfill their mission of protecting the public health, safety, and welfare.

This is a great statement, but then politics get involved and our noble objective becomes harder to achieve. There are many barriers that must be overcome at the state level to protect the public. Two examples are the budgeting process and the tendency in some states to combine boards responsible for dissimilar professions. But I would offer that the biggest obstacles to the fulfillment of this mission are the treatment of unlicensed practice and the industrial exemption to licensure.

It is totally illogical that some boards are not allowed to stop people who practice engineering or surveying without a license. In some cases, boards may need to determine whether it is a perception or a reality. If it is a reality that their practice laws limit their ability to pursue unlicensed practice, then they should do what a number of our boards are doing and attempt to change their laws.

In other states, boards are prevented from taking any direct action but have to go through the court system to prosecute illegal practice of the engineering or surveying profession. While cumbersome, this is better than no jurisdiction at all. A better situation is one in which the board can bring charges against the party breaking the law and then attempt

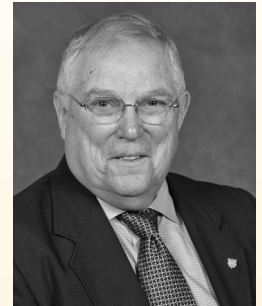
to reach a settlement and an agreement to discontinue the unlicensed practice. If a settlement can't be reached, then the board can hold hearings and reach a judgment. If the practice continues, the board can then seek a court injunction. There are a number of combinations of the above scenarios.

The other major barrier to safeguarding the public is the industrial exemption. Much has been written about this exemption, which allows unlicensed engineers working under the supervision of a P.E. to practice engineering. As a result of the industrial exemption, the design of the road you drive on requires an engineer's seal, but the car you drive doesn't. The airplane you fly in doesn't require an engineer's seal, but the runway does. If designed in-house, the addition to the chemical plant doesn't require a P.E.'s seal, yet we have seen a number of spectacular failures over the years.

Most of my professional life was spent as an employee in the pipeline industry. In all of the states in which we operated, the design of a new pipeline, measuring station or compressor state didn't require an engineer's seal, even though the public and employees could be exposed and the rights-of-way were not on owned property and could be easily accessed by the public.

The reason or excuse for the industrial exemption is that the company assumes the liability. In many cases, the people designing the plan are competent engineers (or technicians), but what about the ones who are not? I contend that liability and social responsibility are not the same thing. Our legislators, and we as engineers, should look at our responsibility to the employees of the companies—and to the public—and do all we can to ensure their safety.

The prevailing attitude seems to be that we can't overcome the lobbying efforts of the big industrial firms. We can't if we don't try. What are some of the things we can do? We as state boards cannot lobby, but we as individuals can educate the public and our legislators—many people think that to be a practicing engineer you have to be licensed. We can take our case to the National Society of Professional



Leonard (Joe) Timms Jr., P.E.  
Northeast Zone Vice  
President

(continued on page 6)

*Licensure exemptions limit boards' ability to protect public (continued from page 5)*

Engineers and the founder societies and demand as members that they become proactive in their lobbying efforts against these barriers. We can be prepared to press our case when failures occur, bringing this issue to the public's attention.

The strategy plan that the Board of Directors reviews at each of its meetings is attempting to address some of these concerns through action plans related to its "radar screen of strategic issues." Two of the issues are relevant. Issue 4 states, "The value and benefits of licensure are not being effectively communicated to the general public or to

potential candidates for licensure." Issue 6 says, "Proliferation of certification programs that address emerging technologies raises concerns over their potential impact on the value of and demand for licensure."

I encourage you to do what you can to address these issues as well. As a licensee and as a member of a state licensing board, your input is desired. Please share your thoughts with your zone vice president or members of the NCEES staff.

*Leonard (Joe) Timms Jr., P.E.  
Northeast Zone Vice President*

## NCEES revising structural exam

NCEES will introduce a new 16-hour Structural PE exam in April 2011. The exam will replace the current Structural I and Structural II exams, which will be administered for the last time in October 2010.

This change is based on action at the 2007 Annual Meeting, when the Council passed the following motion from the Structural Exam Task Force: "Move that the Committee on Examinations for Professional Engineers (EPE) be charged with modernizing the format of the SE I and SE II examinations to become a single structural engineering examination with two 8-hour components that will be put into use by April 2011."

NCEES Director of Exam Services Tim Miller, P.E., explained the need for the revision: "NCEES currently offers two 8-hour structural exams, and some licensing boards also use state-specific exams. NCEES wanted to provide one exam that could be used by any state requiring specialized structural licensure, even a state with high-seismic activity."

To develop the new exam, NCEES surveyed licensed structural engineers from across the United States to find out what knowledge areas are most relevant to current professional practice. NCEES brought together representatives from state licensing boards and national structural engineering organizations to analyze the survey results and set the specifications, or content areas, for the new examination.

"We've gone through a deliberate and rigorous process to develop the specifications, and the state boards that currently license structural

engineers have been included in this process," Miller said.

The new 16-hour Structural exam is divided into two 8-hour components, which will be offered on successive days. The Vertical Forces component focuses on gravity loads and incidental lateral loads. The Lateral Forces component focuses on wind and earthquake loads. Each component of the exam has a breadth module that contains questions covering a comprehensive range of structural engineering topics. Each component also has a depth module that focuses more closely on a single area of practice. Examinees will choose whether they want to concentrate on buildings or bridges for this module.

To pass the exam, examinees must pass both the Vertical Forces and Lateral Forces components, but these components may be taken and passed in different exam administrations.

The specifications for the new exam are available on the NCEES Web site ([www.ncees.org](http://www.ncees.org)). NCEES will also publish a book of sample questions and solutions in 2010 to familiarize examinees with the new exam's format and content areas.

"The changeover is still two years away, but it's an important transition," Miller said. "We want to give people as much advance notice as possible."

# Sustainable Building Design Task Force

President Henn Rebane, P.E., formed the Sustainable Building Design Task Force this year to address the growing trend toward sustainable building design in the engineering profession, particularly with regard to the U.S. Green Building Council's LEED certification program. LEED, which stands for Leadership in Energy and Environmental Design, has become the *de facto* standard for energy-conserving design. It provides standards for both new and existing construction and involves a ratings system that awards credits in such areas as site design, energy efficiency, water usage, and materials. According to USGBC, the number of LEED-registered projects doubled to more than 20,000 in 2008.

The task force is charged to study the criteria used in the LEED certification program to determine whether it prevents unlicensed practice with regard to engineering matters and also to consider ways NCEES could work with USGBC and similar organizations in developing standards. Bill Dean, P.E., the task force chair, recently provided an update on the group's activities.

*Q The LEED certification program is the most prominent standard dealing with energy conservation and sustainability. Does the LEED-certification process require the input of a professional engineer?*

*A* The U.S. Green Building Council's LEED initiative has found wide acceptance in the building community as one of the recognition programs for sustainability. There are many facets that determine a truly sustainable building, and USGBC has a weighting system for importance of each of the items that they determine to be of value in a sustainable building. A modest number of the items would require a licensed engineer to contribute in a significant way during the design process of the buildings that would be classified as a LEED-certified building.

*Q Why is it important that a P.E. be required to conduct green certification of a building? Would this fall under the Model Law definition for the practice of engineering?*

*A* In the process of the construction of a commercial building, the licensed engineer is responsible for many portions of the

design process. These activities where the professional engineer is currently mandated by law to function could be activities designated as contributing to part of the reason a building would be classified as a green building. This possibly would then be recognized by USGBC as a LEED-certified building.

USGBC recognizes many areas of the green community. One such area is in new building construction of various types such as homes, retail, healthcare, and commercial interiors. Another area is in improving the operations and maintenance of an existing building. Yet another is in the development of neighborhoods. All of these recognition programs could require a professional engineer to some degree or another.

*Q From the Member Board perspective, is unlicensed practice in the green building certification process enforceable?*

*A* The current design of buildings is sufficiently regulated by the various jurisdictions. These regulations are intact and require appropriate professional engineers to participate in the areas of their expertise. In the process of the design, the design team could elect to participate in one of the current green building recognition programs, such as the LEED certification program. If in the creation of the design, unlicensed individuals provide services that are not only outside their area of expertise but also unlawful to do so, then these unlicensed individuals would definitely be subject to some level of action that would be enforceable by a jurisdiction.

*Q Will the task force make any motions or recommendations for steps NCEES can take to strengthen existing green certification processes?*

*A* We have not identified any motions that would need to be put forward, but we want the engineering community to be aware of their need to remain active in the process of ensuring that professional engineers are still providing services where the health, safety, and welfare of the public are at risk. The absence of a professional engineer, without appropriate expertise, puts the public in a vulnerable position if the absence goes unchecked.



William W. Dean, P.E.  
Sustainable Building Design  
Task Force Chair

# UPDATE

## Education task force releases response to 2008 resolution

On March 19, the NCEES Engineering Education Task Force released its analysis of the potential impact of requiring additional education for engineering licensure. The paper is a response to the Southern Zone resolution passed by the Council at last year's Annual Meeting in Minneapolis.

The task force was charged with responding to the resolution prior to the first interim zone meetings so that Council members could discuss it within their zones before the 2009 Annual Meeting.

The full text of the analysis is available as a PDF for download at [www.ncees.org](http://www.ncees.org); the resolution is included as an appendix.

### Emphasis shifts toward master's degree requirement

As it currently stands, the additional education requirement calls for candidates for engineering licensure to acquire 30 credits beyond the bachelor's degree. The credits must meet certain standards and must include at least 15 credits in upper-level and/or graduate technical topic areas. The courses must also come from approved course providers.

The earliest date the requirement could go into effect is 2020. (In a separate charge, the task force worked with this year's Committee on Uniform Practice and Legislative Guidelines on *Model Law* and *Model Rules* language defining approved coursework and approved course providers; see page 11.)

The task force analysis refers to the requirement as the "master's or equivalent," which is a change from the previously used term "bachelor's plus 30." According to the report, this terminology changed because NCEES Member Boards have indicated that a requirement focusing on a master's degree would be more likely to be received favorably by state legislators than a requirement based on a formula of post-graduate courses.

### Report analyzes potential impacts of the requirement

The resolution asks the task force to consider the potential educational, professional, economic, and regulatory impacts of enacting the additional education requirement.

The task force analysis of the educational impact includes a list of potential paths for candidates seeking licensure after 2020, including those pursuing master's degrees as full-time and part-time graduate students and those without ABET-accredited bachelor's degrees who enroll in an ABET-accredited master's program (see table on facing page). In these scenarios, a candidate pursuing studies that do not culminate in a master's degree could still qualify as a Model Law Engineer under the "or equivalent" language.

In its discussion of the professional impact, the task force reported that the requirement would likely have a minimal effect on the number of precollege students enrolling in engineering programs. It reported that the requirement could adversely affect the number of already enrolled and bachelor's degree-holding engineers who decide to pursue licensure.

The report's analysis of the regulatory impact—that is, the ability of Member Boards to enact the requirement efficiently after the language is incorporated into state practice acts—says that a proposed national clearinghouse would mitigate any additional workload demands the requirement could impose on Member Boards. It states, "It is critical that a highly functioning clearinghouse be in place to facilitate uniformity in the application of the master's or equivalent requirements."

The proposed clearinghouse would be responsible for evaluating whether an applicant's course of study after being awarded an ABET-accredited bachelor's degree is equivalent to earning a master's degree in engineering.



**Pathways to meeting additional education requirements in 2020**

Path	Bachelor's Education	Additional Education	Years of Education (B.S. = 4 years)	Additional Years of Experience	Total Years
1	EAC/ABET	<ul style="list-style-type: none"> <li>• Engineering master's degree</li> <li>• Full-time student</li> </ul>	B.S. + 1–2 years	3	8–9
2	EAC/ABET	<ul style="list-style-type: none"> <li>• Engineering master's degree</li> <li>• Part-time student</li> <li>• Full-time employee</li> </ul>	B.S. + 4–6 years	0*	8–10
3	EAC/ABET	<ul style="list-style-type: none"> <li>• Engineering master's degree</li> <li>• Executive format or "weekend" format</li> <li>• Full-time employee</li> </ul>	B.S. + 2 years	2*	8
4**	EAC/ABET	<ul style="list-style-type: none"> <li>• Full-time student</li> </ul>	B.S. + 1–2 years	4	9–10
5**	EAC/ABET	<ul style="list-style-type: none"> <li>• Part-time student</li> <li>• Full-time employee</li> </ul>	B.S. + 4–6 years	0*	8–10
6	Non-EAC/ABET	<ul style="list-style-type: none"> <li>• EAC/ABET engineering master's degree (M-ABET)</li> </ul>	B.S. + 1–3 years	3	8–10

\*Accrues all or part of the experience requirement while completing the additional education requirement

\*\*B+30 option

In the table, it is assumed that all full-time employment is acceptable for engineering experience and that experience credit for graduate education cannot be counted if it is concurrent with employment experience.

The task force considered how many current candidates would have had to get additional education were the requirement already in effect. Based on the available information, the estimated portion of current engineers who would have been required to attain additional education for initial licensure if the requirement were already in effect is about 60 percent or somewhat higher.

**Report describes education costs and possible effect on earnings**

The report states that the cost of obtaining a master's degree in engineering varies widely based on the institution, delivery method, and program. It noted that many conventional master's engineering programs requiring a thesis may take an average of 18 months for full-time students. It also noted that project and course-only master's degrees, as well as accelerated "executive" M.S. degrees that can be completed in one year, are becoming more common. It also indicated that high-quality graduate engineering distance-learning options are now available in most engineering disciplines. With regard to cost of education, the report noted that there was substantial variation by program type and institution.

The task force also reported that, based on existing statistics, a P.E. with a master's degree can—over the course of a 30-year career—expect to earn 5.5 percent more than one with only a bachelor's degree. This translates to a 30-year increase in compensation of a present value of \$75,000 if the spread between salaries does not increase over time with inflation and of \$125,000 if the spread does increase with inflation.

**Task force explores alternatives to the master's or equivalent**

The 2008 Southern Zone resolution also asks the task force to provide a list of alternatives to the requirement that would potentially have less impact on candidates and the profession as a whole. These alternatives, which are based on deliberations within the task force and include a diverse range of opinions from academia, industry, and private practice, focus on expanding the existing continuing education structure, teaming candidates with licensed mentors, and enacting a dual-level licensing structure featuring a new class of "master professional engineer."

*NCEES staff*

# UPDATE



Henry V. Liles Jr., P.E.  
UPLG Committee Chair

## UPLG focuses on model language

The Committee on Uniform Procedures and Legislative Guidelines (UPLG) was established to strengthen the licensure process by reviewing and recommending changes to the NCEES *Model Law* and *Model Rules*. The committee relies on the input of board members of the Council as it seeks ways of improving the ability of Member Boards to serve their jurisdictions and licensees.

Henry Liles, P.E., the current UPLG chair, provided the following update on the committee's work in addressing its charges for 2008–09. The committee's full report will be distributed with the *Action Items and Conference Reports* prior to this year's Annual Meeting.

### Five-year review of Model Rules

The NCEES *Bylaws* requires that UPLG review both the *Model Law* and *Model Rules* every five years. The committee has developed numerous revisions to the *Model Rules* as a result of this comprehensive review of the document. Last year's review of the *Model Law* resulted in more than 40 motions for the Council's consideration, and this year's review of the *Model Rules* will result in a similar number of motions.

Like last year, though, most of the proposed revisions to the *Model Rules* are considered "housekeeping" changes that are not substantive. They are designed to resolve conflicts and confusion between the two model documents and make the language more consistent throughout. The committee did find several other items that could be considered more substantive changes and will therefore recommend that next year's UPLG Committee be charged with addressing them.

### Continued work on the additional education requirement

The committee has worked closely with the Engineering Education Task Force to craft language applicable to acceptable coursework and approved course providers (see facing page). Ultimately, an accrediting body such as a clearinghouse will need to provide uniformity in deciding whether particular providers or courses meet the requirement. The next step

in the evolutionary path is for NCEES to establish the ground rules for how such an accreditation process would operate.

The concept of "grandfathering" for current Model Law Engineers is an important one to consider as NCEES presses forward with the additional educational requirements for licensees. The UPLG Committee is conducting a thorough review of the *Model Law* and *Model Rules* to ensure that this group will retain their MLE status after the additional education requirement goes into effect. The initial year of licensure in one's home jurisdiction establishes the basis for comity and MLE status. Since the requirements for additional education will not take effect before the year 2020, comity and MLE status for current licensees will be protected.

### M-ABET and the engineering licensure process

Due to ABET's recent decision to allow dual-level accreditation, the UPLG Committee was charged with investigating how this could affect the paths to licensure for P.E. candidates. The committee regards a degree from an ABET-accredited master's program as an applicable engineering degree for licensure. The likelihood for alternate paths to licensure is an outcome anticipated by NCEES. This year's UPLG Committee developed revisions to the *Model Law* and *Model Rules* to recognize the alternative paths to licensure as impacted by the potential for M-ABET degrees as well as the dual levels of accreditation. The various experience requirements have also been considered and made a part of the revisions.

### Separation of firms and individuals in model documents

Many provisions of the *Model Law* and *Model Rules* apply to firms rather than individuals. Currently, the provisions related to the two groups are combined and as a result create a format that is not user friendly. This year's committee has separated the requirements applicable to firms and individuals. Even though this results in additional language, it will be much easier to reference the requirements for individuals versus firms.

# Approved course providers and acceptable coursework

At the 2008 Annual Meeting, the Council passed a motion from the Bachelor's Plus 30 Task Force to charge the appropriate committee with incorporating definitions of approved coursework and course providers into the *Model Rules*. The UPLG Committee was charged with doing this and worked closely with the Engineering Education Task Force to refine the language. It will propose motions to make the following changes as well as some related changes to the *Model Law*.

## **Model Rules 230 Candidates for Licensure**

### **230.10 Programs-Education Requirements Approved by the Board**

#### A. Undergraduate Engineering Program

The term “an engineering program of 4 years or more” used in Section 130.10 A in the *Model Law* is interpreted by this board to mean:

1. A baccalaureate degree program in engineering accredited by EAC/ABET<sup>1</sup> at the time of the awarding of the degree. (A board may accept the degree if accreditation is received within a prescribed period of time.)
2. A baccalaureate degree in engineering not accredited by ABET such as those programs recently developed or programs offered by foreign schools evaluated by the board as being substantially equivalent to those which have been accredited.

#### B. Post-Graduate Engineering Course Providers

The term “approved course provider” used in Section 130.10 C.1.c of the *Model Law* is interpreted to mean the following:

1. An institution that has an EAC/ABET-accredited program;
2. An institution or organization accredited by an NCEES-approved accrediting body<sup>1</sup>;  
or
3. An institution or organization that offers specifically approved courses that are individually approved by an NCEES-approved accrediting body.<sup>2</sup>

#### C. Post-Graduate Acceptable Coursework

The term “acceptable upper-level undergraduate and/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 upper-level undergraduate and/or graduate-level courses in engineering.
2. Other topic areas of acceptable coursework shall be upper-level undergraduate and/or graduate-level courses relevant to the practice of engineering and may include engineering-related science, mathematics, and/or professional practice topics such as business, communications, contract law, management, ethics, public policy, and quality control.

#### D. Post-Graduate Minimum Required Education

The term “acceptable amount of coursework” used in Section 130.10 C.1.c of the *Model Law* is interpreted to mean the following:

1. A minimum of an additional 30 credits of coursework, none of which were used to fulfill the bachelor's degree requirement
2. All 30 additional credits shall be equivalent in intellectual rigor and learning assessments to upper-level undergraduate and/or graduate courses offered at institutions that have a program accredited by EAC/ABET.
3. Of the minimum required 30 additional credits, a minimum of 15 credits must comply with 230.10 C.1.
4. The term “credit” is defined as a semester hour, or its equivalent, from an approved course provider defined in 230.10 B.

<sup>1</sup> This institution/organization would be approved to develop and offer courses that meet *Model Rules* 230.10 C. NCEES-approved accrediting bodies may include regional accreditation bodies and other appropriate discipline accreditations.

<sup>2</sup> This institution/organization would be approved to offer one or more specifically-approved courses that meet *Model Rules* 230.10 C.

## Bologna Accord promotes uniformity in European higher education

One result of European integration in the past few decades is increased mobility among students in higher education in these countries. Because Europe is made up of dozens of individual countries—each with its own cultures, languages, and political characteristics—higher education institutions have been challenged to find ways of determining whether a degree program in Country A is of the same rigor as a corresponding program in Country B.

To help increase uniformity among European higher education systems, a voluntary agreement known as the Bologna Accord was developed. In 1999, the ministers of education from 29 European nations signed the Bologna Accord with the intent of facilitating educational and professional mobility for graduates in these countries. Since then, the number of signatories has grown to 40 and now includes virtually all of Europe.

Among the various measures established to support this new paradigm was the implementation of a transfer credit system among signatories. Another was the restructuring of the higher education system to include a two-to-three-tier tertiary academic framework. Although many European nations are implementing the changes and full implementation is expected by 2010, participants are not legally bound by the agreement. The agreement does not represent a European region mandate to modify higher education.

In the accord's European Credit Transfer System, one academic year of study corresponds to 60 credits. This takes into account hours of attendance for lectures and laboratory sessions as well as class presentations and individual study hours. Therefore, the weight of the course appears significantly higher than the credit hours awarded in the U.S. system. In the United States, one year of academic study generally

compares to 32 semester hours of class and lab instruction. Therefore, European credits are prorated by one-half when the two are compared.

Traditionally, professional university education in Europe included at least five years of uninterrupted tertiary education leading to an academic degree bestowing on graduates all rights and privileges to practice a profession. In recent years, many countries have introduced two to three cycles of education. These include an intermediate diploma and a four-year bachelor's degree, which entitle the holder to progressively advance to higher levels of education. The introduction of this three-plus-two system has by no means eliminated the integrated five-year program, which in some instances is offered concurrently with the three-plus-two cycle. Full transition into this reformed two-tier program has not been achieved yet.

The traditional five-year degree in some places such as Germany requires completion of an intermediate-level examination taken after four semesters of education (in Germany, this is known as the *vordiplom*). Successful completion of this examination entitles the holder to proceed to advanced research studies totaling three more years and leading to the professional degree. In other instances—such as in the Netherlands—the five-year degree requires continuous enrollment in a five-year program leading to the professional academic degree.

Under the Bologna Accord, university students may opt to enroll in a three- or four-year cycle leading to the equivalent of a bachelor's degree. This represents completion of the U.S. equivalent of 90–120 hours. The second cycle requires completion of one or two additional years for a minimum of 30 to 60 additional credits. In this case, the end result is the specialist (after one year of study) or the magister (after two additional years) diploma.

In the former socialist republics of Eastern and Central Europe, the five-year program led to the specialist title in a professional area such as engineering. This degree is being phased out, and now the four-year bachelor's is considered the first university degree. When combined with a one- or two-year magister, it is considered to bring the applicant to a qualification that entitles the holder to enter a doctoral program.

The incorporation in Europe of a credit system and a four-year program leading to a bachelor's degree gives the appearance of greater convergence between the U.S. and European systems. However, the reality is that from a professional perspective European nations continue to consider the integrated five-year program, or a degree representing at least five years of academic research-oriented education, as the qualification required to enter the professional practice of engineering.

This is important to keep in mind because in Europe the term "engineer" is loosely used for qualifications offered at different levels by both research institutions and specialized institutions that offer a more practical approach to engineering education.

In many instances such as in Finland, the five-and-a-half-year *Diploma Insinööri* (professional engineering degree) has been modified into an intermediate qualification of technical candidate (bachelor's) and a two-year diploma of engineer (the equivalent of a master's). The master's-level degree represents the professional qualification in the field.

In addition, in many countries degree nomenclature has been modified. For instance, the title of *licenciatura* traditionally used for the five-year university degree in Portugal is now an intermediate qualification awarded after completion of a three-year intermediate qualification. The new three-year *licenciatura* is comparable to an associate's degree plus one

additional year of undergraduate education in the United States. The second cycle of studies leading to the master's degree, which represents a total of five years of study, is considered to be the professional engineering degree in Portugal.

Based on the standards developed in Europe in response to the Bologna Accord, educational programs of less than five years are deemed intermediate and are not necessarily considered by signatories to be a professional engineering degree. Such a degree is generally required to be supplemented by a post-bachelor's qualification, such as a master's degree, adding breadth and depth of knowledge and a higher level of training in analytical and critical skills and the application of scientific knowledge.

Because the process is still evolving, old degrees are being phased out and new countries are reconsidering the Bologna educational restructuring. From the Center's credentialing standpoint, these developments will require monitoring, since the Center will continue to review credentials earned in Europe during the pre- and post-Bologna reform periods as well as the current transition period.

When necessary, the Center will continue to provide the Council with updates on the implementation of the Bologna process, particularly with regard to how signatories of the Washington Accord are responding to the changes in European education systems. These developments could have implications for international comity among engineering professionals.

*Eva-Angela Adán*  
Center Director

- Alaska** ♦ Eric Eriksen, P.E., Richard Rearick, and Donald W. Shiesl are new appointees to the board. Terry Gorlick, Ken Maynard, and Mark Morris are no longer on the board.
- Arizona** ♦ Howell “Chip” Shay III and Claudia Perchinelli, P.E., are new appointees to the board. Richard Pawelko and Ronald Starling, P.E., are no longer on the board.
- California** ♦ Cindy Christenson is no longer the executive director of the board. Joanne Arnold has been named interim executive officer.
- Colorado** ♦ Debra A. Ellis is a new appointee to the board. Judy H. Scott is no longer on the board.
- Delaware PE** ♦ Alfred DeLuca, P.E., Thomas McGonigle, Annette Shine, P.E., and Richard Walsh, P.E., are new appointees to the board. Carmine Balascio, Ph.D., P.E., John Billingsley, P.E., Robert Cannon, P.E., and Paul Crawford are no longer on the board.  
♦ Frank A. Newton is the new board chair.
- District of Columbia** ♦ John McFarland is the new board representative for the District of Columbia. He replaces Theresa Ennis.
- Georgia** ♦ Doris I. Willmer, P.E., is no longer on the board.
- Illinois PE, LS, and SE** ♦ The new email address for the engineering, surveying, and structural engineering boards is [fpr.prfgroup02@illinois.gov](mailto:fpr.prfgroup02@illinois.gov). John McKinney, P.E., is no longer on the PE board.
- Indiana** ♦ Vincent P. Drnevich, Ph.D., P.E., is a new appointee to the board. Chris A. Gwaltney, P.E., is no longer on the board.
- Kansas** ♦ Murray L. Rhodes, L.S., has been appointed as a public member of the board. Donald E. Rathbone, Ph.D., P.E., is no longer on the board.
- Louisiana** ♦ M. Ernest Gammon, P.L.S., is a new appointee to the board. C.L. Jack Stelly, P.L.S., is no longer on the board.
- Nebraska LS** ♦ Mary Pro is a new appointee to the board. Sheryl Jordon is no longer on the board.
- North Carolina** ♦ Elizabeth Riley is a new appointee to the board. Joseph Monroe is no longer on the board.
- Pennsylvania** ♦ Tara Egan and George Roman, P.E., P.L.S., are no longer on the board.
- Puerto Rico** ♦ Board member Rafael A. Muñoz-González, P.E., is now the board’s secretary and administrator as well.
- Rhode Island (LS)** ♦ John Mensinger, P.L.S., is a new appointee to the board. James J. Reddington Jr., P.L.S., is no longer on the board.
- Virginia** ♦ The Virginia Board’s mailing address is: P.O. Box 29570, Richmond, VA 23242-0570

# BPA evaluation results

Thanks to everyone who completed the online survey following the Board Presidents' Assembly in February. The responses will be helpful in planning the next assembly. Part of the survey addressed whether the assembly is worthwhile to hold. The results for these questions on the usefulness of the BPA are shown below (actual number of responses shown in parentheses).

	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>
Overall, the 2009 BPA was relevant to my role on the board.	0% (0)	0% (0)	2% (1)	45% (18)	52% (21)
Overall, the 2009 BPA was worthwhile to attend.	0% (0)	2% (1)	5% (2)	32% (13)	60% (24)
The BPA should be held again in the future.	0% (0)	0% (0)	5% (2)	35% (14)	60% (24)

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**EVENTS**

<b>DATE</b>	<b>EVENT</b>	<b>LOCATION</b>
April 2–4 . . . . .	Central Zone Interim Meeting . . . . .	Des Moines, Iowa
April 16–18 . . . . .	Northeast Zone Interim Meeting . . . . .	Norfolk, Virginia
April 24–25 . . . . .	Exam Administration	
May 14–16 . . . . .	Southern Zone Interim Meeting . . . . .	New Orleans, Louisiana
May 28–30 . . . . .	Western Zone Interim Meeting . . . . .	Banff, Alberta, Canada
June 1–2 . . . . .	Board of Directors' Meeting . . . . .	Banff, Alberta, Canada
August 11 . . . . .	Board of Directors' Meeting . . . . .	Louisville, Kentucky
August 12–15 . . . . .	Annual Meeting . . . . .	Louisville, Kentucky

**Look for your NCEES 88th Annual Meeting registration materials in the mail in late April. The deadline to register is July 2.**

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