

## Strengthening the education leg of licensure

Education. Examinations. Experience. The soundness of licensure rests upon the strength of all three. But what happens when one leg of what we often call the three-legged stool of licensure is weakened? Does it lessen the effectiveness of licensure in protecting the health, safety, and welfare of the public? Absolutely.

NCEES has grappled with these issues for years with regard to education. Does a bachelor's of science degree in engineering still provide the breadth and depth of knowledge needed to practice competently? How much education should be required for licensure? At last year's Annual Meeting, the Council decided to increase education requirements when it passed a motion to charge the Committee on Uniform Procedures and Legislative Guidelines (UPLG) with incorporating into the *Model Law* and *Model Rules* language requiring additional engineering education for licensure. In September, the Council will vote on adopting this language.

### Support for change

Over the past five years, NCEES has devoted considerable time and resources to analyzing the adequacy of education requirements.

The Engineering Licensure Qualifications Task Force (ELQTF) was established in 2001 to evaluate the U.S. licensure system. It was made up of representatives from NCEES, engineering professional practice, government, industry, and education. At the 2003 Annual Meeting, ELQTF presented the following evaluation of education as part of its comprehensive report.

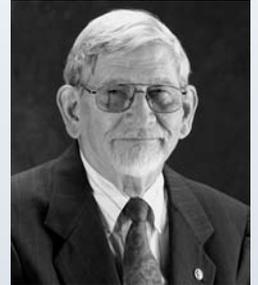
"Engineering education is falling behind other professions in preparing students for practice. There has been a persistent decrease in the credit hours required for an engineering degree over the past several decades. At present, the nominal (but nonuniform) requirement is

128 semester hours, corresponding to an 8-semester (4-year) program of 4 to 6 courses per semester. Based on national averages, 128 semester hours represent the low point on a downward trend—driven partly by a state-centered desire to make the educational process as cost-efficient as possible and to compete for students across state lines . . . This inexorable decrease in credit hours . . . represents a net national loss in the depth of engineering education in core subjects."

The task force concluded that additional education would be necessary in the future to prepare students for engineering practice at the professional level. (To view the entire ELQTF report, go to [www.ncees.org](http://www.ncees.org) and click on the "NCEES studies of the licensure process" link.)

About the same time ELQTF submitted its report, the American Society of Civil Engineers (ASCE) published similar conclusions in *Civil Engineering Body of Knowledge for the 21st Century*. For more than 10 years, ASCE has been implementing a program to encourage "raising the bar" in engineering education. The society adopted Policy Statement 465 to formally advocate additional education beyond the bachelor's degree as a prerequisite for professional licensure. It based its conclusions on the steady decline in credit hours for graduation, from 150 a few decades ago to about 128 today. ASCE pointed out that increased requirements in nontechnical areas have further reduced the number of technical subjects required. Moreover, while requirements are decreasing, the body of knowledge (BOK) required to practice engineering is exponentially growing, as much as doubling every 10 years.

In 2004, the Licensure Qualifications Oversight Group (LQOG) was formed to study the ELQTF report, assess the



Claude V. Baker, P.E., S.E., L.S.  
Chair, UPLG Committee

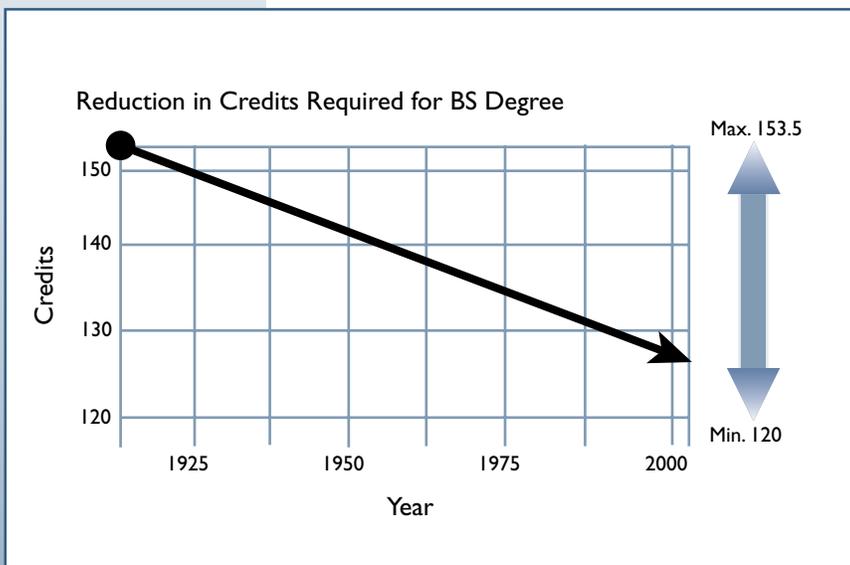


Howard C. Harclerode II, P.E.  
Subcommittee Chair, UPLG  
Committee

The number of credit hours required for an engineering bachelor's degree has steadily decreased over the years, and the curriculum emphasis has shifted. These changes have resulted in a decrease in core engineering courses, a decrease in technical breadth and depth, and an increase in general studies.

recommendations from the NCEES and Member Board perspectives, and prepare recommendations for consideration by the Council. LQOG supported the ELQTF conclusion that additional engineering education was needed and presented a motion at the 2005 Annual Meeting that UPLG be charged with incorporating recommended language requiring additional engineering education into the *Model Law*. The LQOG motion passed by a narrow margin.

This is where the work of this year's UPLG Committee began.



### Proposed changes to the *Model Law*

The UPLG recommendations are based on the research, conclusions, and recommendations of ELQTF and LQOG. The LQOG suggested language approved by the Council last year is as follows: “Graduation with a bachelor’s of science degree from an engineering program of 4 years or more accredited by EAC/ABET, or equivalent, plus 30 additional credits from an approved course provider(s) in upper-level undergraduate or graduate-level coursework in professional practice and/or technical topic areas.”

UPLG started with this wording and then looked for how to fit it in the *Model Law*. The most appropriate place is in *Model Law* Section 130.10, which describes the qualifications needed to sit for the PE exam.

Currently, the *Model Law* specifies that an “engineer intern or an individual with a doctorate in engineering acceptable to the board and with a specific record of an additional four years or more of progressive experience on engineering projects ...” may sit for the PE exam. (As defined by *Model Law* Section 130.10, to be qualified for certification as an engineer intern, you must be a graduate of an engineering program of four years or more accredited by EAC/ABET, or the equivalent, and have passed the FE exam.)

The subcommittee assigned to this charge studied the question of the distribution of credits and recommended to let the students choose the appropriate upper-level or graduate-level credits to best fit their areas of specialization. The change to the *Model Law* that UPLG will propose is to add a requirement for students with a bachelor’s degree in engineering to earn 30 additional credits to sit for the PE exam. The motion will also say that a master’s of science degree satisfies the requirements, as does a Ph.D.

Under the current *Model Law* and *Model Rules*, engineer interns who possess an M.S. may waive one year of the required four years’ experience. Engineer interns with Ph.D.’s may waive two years. But Ph.D.’s who are not engineer interns—that is, doctorates who waive the FE exam in qualifying to sit for the PE exam—must still have four years’ experience. Because of the possibility for confusion in interpreting experience requirements, the UPLG Committee feels that the new language should clearly describe all avenues for qualifying to sit for the PE exam, including master’s and doctoral degrees (see box on facing page).

### Approved course providers

The LQOG language gave us the term “approved course providers.” The UPLG Committee will recommend that an appropriate committee be charged with specifically defining what constitutes both “approved credits” and “approved course providers.”

The UPLG Committee’s intent behind this year’s proposed language is to leave the wording flexible enough to allow as many avenues as possible to the additional education without compromising the quality of that education.

In its investigations, the UPLG Committee determined that only a handful of institutions at this time offer distance learning that would qualify as approved. The committee does believe that in time, as demand for additional education increases, many providers will begin offering acceptable credits that are affordable and easily accessed via correspondence, the Internet, evening and part-time classes, as well as other forms of distance learning.

Committee members feel that most of the additional education would initially be taken as a part of the normal degree process, perhaps as part of a five-year program. For this reason, UPLG will also move to add language to the *Model Rules* stating that graduates with a bachelor's of science degree in engineering from a five-year program may request that credits earned as part of their undergraduate work be applied to satisfy the requirements.

### Timing

The LQOG motion as passed stated that the additional education requirement should go into effect no sooner than 2010. Assuming that a student starts a degree program in 2007 and takes additional courses to get the 30 additional required credits, he or she would graduate in 2011. Four years of experience would enable the graduate to take the PE exam in 2015 at the earliest. Therefore, UPLG decided on January 1, 2015, as the earliest practical date to make the requirements effective.

This year, UPLG will present these motions to put additional education requirements into the *Model Law*. The committee strongly recommends that the Council accept this proposal. If approved, the language will begin answering a question the Council has spent years discussing. It is not the last question that will have to be answered, but it will bring NCEES one step closer to strengthening the education leg of licensure.

*Claude V. Baker, P.E., S.E., L.S.  
Chair, Committee on Uniform  
Procedures and Legislative Guidelines  
and  
Howard C. "Skip" Harclerode II, P.E.  
Subcommittee Chair, Committee on Uniform  
Procedures and Legislative Guidelines*

## New language for *Model Law*

UPLG will propose adding the following wording to *Model Law* Section 130.10:

### Licensure by Examination (Effective January 1, 2015)

The following individuals shall be admitted to an 8-hour written examination in the principles and practice of engineering:

- (1) An engineer intern with a bachelor's degree, with an additional 30 credits of acceptable upper-level undergraduate or graduate-level coursework from approved course providers, and with a specific record of an additional 4 years or more of progressive experience on engineering projects of a grade and a character which indicate to the board that the applicant may be competent to practice engineering.
- (2) An engineer intern with a master's degree in engineering from an institution that offers EAC/ABET-accredited programs, or the equivalent, and with a specific record of an additional 3 years or more of progressive experience on engineering projects of a grade and a character which indicate to the board that the applicant may be competent to practice engineering.
- (3) An engineer intern with a doctorate in engineering acceptable to the board and with a specific record of an additional 2 years or more of progressive experience on engineering projects of a grade and a character which indicate to the board that the applicant may be competent to practice engineering.
- (4) An individual with a doctorate in engineering acceptable to the board and with a specific record of an additional 4 years or more of progressive experience on engineering projects of a grade and a character which indicate to the board that the applicant may be competent to practice engineering.