



## The Future of Structural Engineering Education

By Jon A. Schmidt, P.E., SECB

At its 2006 Annual Business Meeting, the National Council of Examiners for Engineering and Surveying (NCEES), whose members are the licensing boards in all 55 United States jurisdictions, adopted a modification to its Model Law. It now states that, beginning in 2015, the minimum education for licensure as a professional engineer is a bachelor's degree plus 30 additional credits of acceptable upper-level undergraduate or graduate-level coursework from approved providers. This is consistent with the formal policy adopted by ASCE in 2004 on "Academic Prerequisites for Licensure and Professional Practice".

It is probably just a matter of time before the states and territories begin implementing this new requirement, and there is little doubt that it will have a profound impact on education in all disciplines of engineering. However, the effect on practicing structural engineers may not actually be all that significant. It is a fact of life in our profession that virtually all of us received our bachelor's degrees in a field other than structural engineering — in most cases, civil or architectural engineering. However, many of us went on to graduate school and received master's degrees in structural engineering. In fact, this has become effectively a prerequisite for employment in many cases.

In 2002, the NCSEA Basic Education Committee published a recommended course curriculum that it believed would adequately equip a new graduate to enter the field of structural engineering. Based on a survey of firms around the country, that curriculum consists of 36 semester hours beyond elementary strength of materials in nine specific subjects: analysis, matrix methods, steel, concrete, timber, masonry, dynamics, foundations, and technical writing. There are very few institutions in the United States that now offer all of these classes. In an effort to encourage more widespread adoption of this curriculum in its entirety, SECB will require it for certification applicants who graduate in 2010 and beyond, as explained in this space by Craig Barnes in the April 2006 issue.

Many have bemoaned the steady and substantial reduction in the number of credits needed to graduate with an engineering bachelor's degree over the last few decades. The NCEES, ASCE, and NCSEA initiatives mentioned above are intended to address this by augment-

ing and clarifying the technical foundation that entry-level structural engineers need to have upon the completion of their formal schooling. Others have called for greater emphasis on non-technical coursework because of the need for engineers of all disciplines to take a leadership role in society at large.

One such voice is that of Samuel C. Florman, Chairman of Kreisler Borg Florman General Construction Company in Scarsdale, New York. In books such as *The Existential Pleasures of Engineering* (1976), *The Civilized Engineer* (1987), and *The Introspective Engineer* (1996), Florman advocates well-roundedness, arguing that the need for creative technological solutions to humanity's problems cries out for engineers who are immersed not only in "hard" subjects such as mathematics and science, but also in the arts.

When I was in college, I remember being annoyed at having to take at least six courses in the humanities and social sciences. I had no intention of moving to Germany or becoming an economist, so I chafed under the mandate to study these kinds of subjects instead of ones that seemed, at least at the time, to be more "relevant". In retrospect, part of me wishes that I could have taken, or perhaps even had been forced to take, an even greater number of "liberal arts" classes. In fact, I now wonder if engineers would be better off with an education model similar to that of doctors and lawyers, involving a bachelor of arts degree with only fundamental technical content, followed by a three- or four-year professional school program.

This is probably too radical an idea to take hold within my lifetime, especially since the market currently seems to be dictating that a bachelor's degree still be considered adequate for most entry-level engineers. However, I cannot help but wonder if the "commodification" of engineering services is inevitable if we do not significantly raise the bar of entry into the profession. The moves toward specialty certification and, eventually, separate licensure are certainly steps in the right direction, but may not be enough in the end.

The NCSEA Basic Education Committee is now developing several interesting articles on various aspects of this subject for a special pull-out section that will appear in the April issue. For a taste of what is to come, see the article on page 10 about failure-based education. STRUCTURE® magazine welcomes your feedback and input on how best to prepare the next generation of structural engineers to practice our profession. ■

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