

Academic Prerequisites for Licensure and Professional Practice ASCE Policy Statement 465

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Policy

The American Society of Civil Engineers (ASCE) supports the concept of the Master's degree or Equivalent as a prerequisite for licensure and the practice of civil engineering at a professional level.

ASCE encourages institutions of higher education, governmental units, employers, civil engineers, and other appropriate organizations to endorse, support, and promote the concept of mandatory post-baccalaureate education for the practice of civil engineering at a professional level. The implementation of this effort should occur through establishing appropriate curricula in the formal education experience, appropriate recognition and compensation in the workplace, and congruent standards for licensure

Issue

The practice of civil engineering at the professional level means practice as a licensed professional engineer. Admission to the practice of civil engineering at the professional level means professional engineering licensing which requires:

- A body of specialized knowledge as reflected by a combination of a baccalaureate degree and a master's or equivalent (MOE)
- Appropriate experience
- Commitment to life long learning

The required body of specialized knowledge includes a technical core, technical electives, a non-technical core and technical and non-technical courses to support individual career objectives. The current baccalaureate civil engineering degree is an entry-level degree that may no longer be adequate preparation for the practice of civil engineering at the professional level.

The civil engineering profession is undergoing significant, rapid, and

revolutionary changes that have increased the body of knowledge required of the profession. These changes include the following:

- Globalization has challenged the worldwide geographic boundaries normally recognized in the past, primarily as a result of enhanced communication systems.
- Information technology has made, and continues to make, more information available; however, the analysis and application of this information is becoming more challenging.
- The diversity of society is challenging our traditional views and people skills.
- New technologies in engineering and construction are emerging at an accelerating rate.
- Enhanced public awareness of technical issues is creating more informed inquiry by the public of the technical, environmental, societal, political, legal, aesthetic, and financial implications of engineering projects.
- Civil infrastructure systems within the United States are rapidly changing from decades of development and operation to the renewal, maintenance and improvement of these systems.

These changes have created a market requiring civil engineers to have simultaneously greater breadth of capability and specialized technical competence than that required of previous generations. For example, many civil engineers must increasingly assume a different primary role from that of designer to that of team leader. The knowledge required to support this new market is found in the combination of an appropriate baccalaureate education and the completion of post-graduate courses sufficient to attain a master's degree or its equivalent.

Rationale

Requiring education beyond the baccalaureate degree for the practice of civil engineering at the professional level is consistent with other learned professions. The body of knowledge gained, and the skills developed in the formal civil engineering education process, are not significantly less than the comparable knowledge and skills required in these other professions. It is not reasonable in such complex and rapidly changing times to think that we can impart the specialized body of knowledge and skills required of professional engineers in four years of formal schooling while other learned professions take seven or

eight years. Four years of formal schooling were considered the standard for three professions (medicine, law, and engineering) 100 years ago, and while medicine and law education lengthened with the growing demands of their respective professions engineering education did not. Perhaps this retention of a four-year undergraduate engineering education has contributed to the lowered esteem of engineering in the eyes of society, and the commensurate decline in compensation of engineers relative to medical doctors and lawyers.

Current baccalaureate programs, while constantly undergoing review and revisions, still retain a nominal four-year education process. This length of time limits the ability of these programs to provide a formal education consistent with the increasing demands of the practice of civil engineering at the professional level. There are diametrically opposed forces trying to squeeze more content into the baccalaureate curriculum while at the same time reducing the credit hours necessary for the baccalaureate degree. The result is a production line baccalaureate civil engineering degree satisfactory for an entry-level position, but may be inadequate for the professional practice of civil engineering. The four-year internship period (engineer-in-training) after receipt of the BSCE degree cannot make up for the formal educational material that would be gained from a master's degree or equivalent program.

The implementation of this concept will not happen overnight. While ASCE cannot mandate that it be done in a specified time period or manner, ASCE will be an active partner with other groups and organizations to accomplish this policy. The ultimate full implementation may not occur for 20 or more years. Appropriate grandfathering for existing registered and degreed engineers would be a part of the implementation process. This concept is a legacy for future generations of civil engineers. However, perhaps the most important aspect of the implementation of this policy is already in place. Within the U.S. system of higher education, high quality, innovative and diverse master's degree programs currently exist in colleges and universities to support this concept. A growing number of organizations now offer high quality on-site and distance learning educational opportunities. The active support of this policy by all of the stakeholders in this process, such as the educational institutions, the registration boards, and the various employers of civil engineers, will be required to develop and promote the elements necessary to eventually implement this concept.