

**ENGINEERING THE FUTURE
Of
CIVIL ENGINEERING**

REPORT

Of The

**TASK COMMITTEE
On The
FIRST PROFESSIONAL DEGREE**

To The

**EXECUTIVE COMMITTEE
BOARD OF DIRECTION
AMERICAN SOCIETY OF CIVIL ENGINEERING**

EXECUTIVE SUMMARY

ASCE Policy Statement 465 supports the concept of the master's degree as a prerequisite for the practice of civil engineering at the professional level.

Policy Statement 465 and Charge to and Approach of the Task Committee

The ASCE Board of Direction, in October 1998, adopted Policy Statement 465, which begins as follows: "The ASCE supports the concept of the masters degree as the First Professional Degree (FPD) for the practice of civil engineering (CE) at the professional level." This policy is explicitly supported in *Building ASCE's Future – Strategic Plan* adopted in 2000 by the Society. The ASCE Board formed the Task Committee (TC) for the FPD in October 1999 and charged it with "developing a vision of full realization of ASCE Policy Statement 465 ...and a strategy for achieving this vision."

The TC encouraged and achieved open, creative and broad ranging discussions within the group and solicited and considered stakeholder input. Internal tasks carried out by the TC included researching the education, experience, licensing and certification requirements of other professions; studying the history and forms of CE education in the U.S. and elsewhere; and reviewing current and future challenges to and opportunities for CE. Ways in which the TC interacted with ASCE members and other stakeholders included examining supportive and opposing resolutions and other communications, conducting interactive sessions with many groups, and presenting progress reports.

The Task Committee believes that the four-year bachelor's degree is inadequate formal education for the practice of civil engineering at the professional level in the 21st century.

The Task Committee believes that admission to the practice of civil engineering at the professional level occurs at licensure and requires a body of specialized knowledge as reflected by a combination of a baccalaureate degree and a masters degree or equivalent, appropriate experience, and a commitment to life long learning.

The Issue

The question is not, in the TC's view, what should be the first professional degree but instead what should be the educational prerequisite for the practice of CE at the professional level. The TC believes that the fundamental issue addressed by Policy Statement 465 is: ***The current four-year bachelor's degree is inadequate formal academic preparation for the practice of CE at the professional level in the 21st Century.*** This fundamental issue facing the CE profession has many facets and related concerns which are summarized as follows:

- Narrow formal education of civil engineers providing inadequate preparation for a rapidly changing work environment, changing production and delivery systems, and for leadership roles.
- Gradual historic reduction in credit hours required for the BSCE degree and "slippage" in the civil engineering education-experience-licensing-certification-continuing professional development process relative to other professions.
- Low compensation received by civil engineers relative to other engineering disciplines and other professions.
- Declining appeal of CE to highly motivated young people.

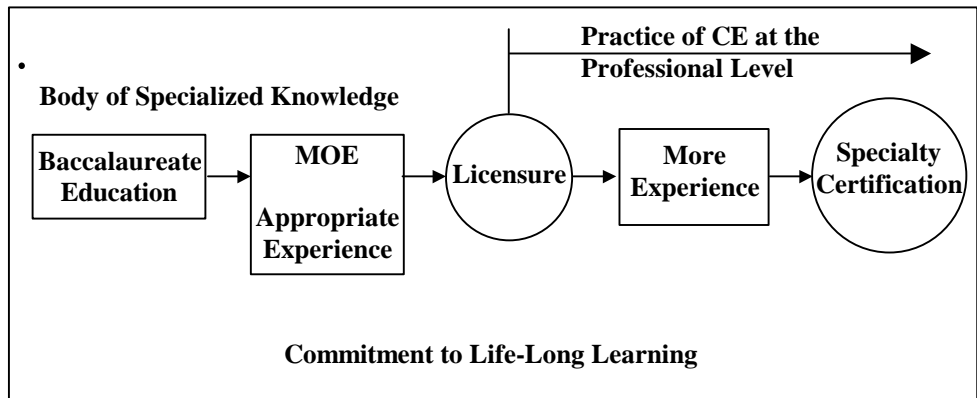
Vision of Full Realization of Policy Statement 465

Policy Statement 465, as currently written, focuses on the designation of a masters as the first professional degree for the practice of CE. The TC believes that the focus should be on establishing the prerequisite educational requirements for licensure and practice at the professional level and recommends that the Policy Statement 465 be retitled as *Academic Prerequisites for Licensure and Professional Practice* and the policy be revised to read: "The American Society of Civil Engineers (ASCE) supports the concept of the Master's Degree or Equivalent (MOE) as a prerequisite for licensure and the practice of civil engineering at the professional level."

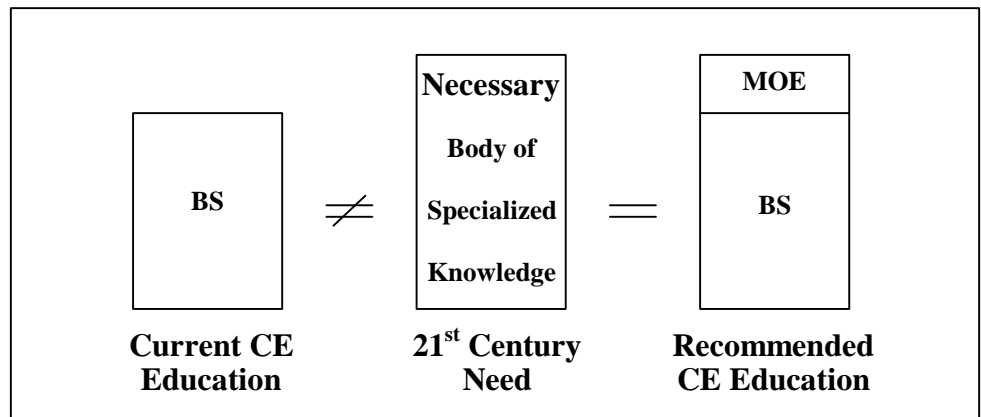
The practice of CE at the professional level means practice as a licensed professional engineer. Admission to the practice of CE at the professional level occurs at licensure which requires:

- 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 essence of this vision for CE, which incorporates current baccalaureate education and the current experience requirement, may be illustrated as follows:



The body of specialized knowledge includes four components. They are 1) a technical core, 2) a non-technical core, 3) technical electives, and 4) technical and non-technical courses to support an individual's career objectives. As illustrated in the following figure, and as previously noted, the body of specialized knowledge needed to practice CE at the professional level in the 21st Century can no longer be accommodated within a four year bachelor's degree. However, and as also illustrated in the following figure, the necessary body of specialized knowledge can be provided by the combination of a baccalaureate degree and a MOE.



ASCE recognizes attainment of the body of specialized knowledge as a prerequisite for licensure and entry into the practice of CE at a professional level. The MOE may be a traditional masters degree or an appropriate combination of courses whose content and quality are equivalent to or exceed a traditional masters degree. Besides civil engineers that currently practice at the professional level, that is, are licensed, the CE community includes CE technicians and technologists and non-licensed civil engineers. Some of the last category are in the process of seeking licensure and others have elected not to do so.

Strategies

The Task Committee identified strategies which were subsequently used to develop the recommended implementation plan.

Many strategies were identified by the TC to use as the basis for addressing the issue and achieving the vision. The TC subsequently used these strategies to construct the recommended implementation plan. The categorized strategies are:

Leadership Strategies

- Lead, don't wait.
- Identify and proactively work with stakeholders.
- Protect the current status of members of the CE profession.
- Coordinate with ASCE's sesquicentennial.
- Develop specialty certification.

CE Education Strategies

- Define masters or equivalent (MOE).
- Learn from engineering education practices in other countries.
- Utilize distance learning.
- Address concerns of and opportunities for exclusively or primarily undergraduate CE programs.
- Address concerns of and opportunities for masters degree programs.

*Strategies Involving Joint Efforts
with Other Professional Organizations*

- Learn from non-engineering professions that recently raised education standards.
- Recognize the supportive goals and policies of the Accreditation Board for Engineering and Technology (ABET).
- Build on the supportive aspects of the National Society of Professional Engineers' (NSPE's) new licensure model.
- Recognize the potential support of the National Council of Examiners of Engineering and Surveying (NCEES).
- Support the Fundamentals of Engineering Examination.

Implementation Plan

The implementation plan identifies principal participants, defines four key action items and 31 supporting tasks, and establishes a schedule.

While strategies are essential, an implementation plan with principal participants, action items, specific tasks, and definitive milestones is needed if concrete actions are to occur. Accordingly, a detailed implementation plan was developed as a way to proactively achieve full realization of ASCE Policy Statement 465. Three groups of principal participants in the plan are: 1) ASCE, its Institutes, the general membership and employers of members of the CE profession; 2) the NCEES and state licensing boards; and 3) the ABET, universities, other educational providers, and other professional societies serving civil engineers.

ASCE, working in partnership with NCEES and state licensing boards; ABET, universities and other educational providers; and other professional societies serving civil engineers should be able to substantially implement this report's recommendations within 20 years.

Four major action items, each with supporting tasks, should be completed over the next 20 years. ***All four action items should begin at the outset and proceed in parallel with appropriate inter-task communication and coordination.*** These action items are supported by a total of 31 specific tasks each of which is 1) assigned to one or more principal participants, 2) is given a scheduled duration, and 3) includes defined outputs. The four action items and the 31 supporting tasks are:

- Action Item A: ASCE leads through continuous interaction with other stakeholders.
 1. Approve refined Policy Statement 465
 2. Form Implementation Committee

3. Accept and endorse report
 4. Distribute report to leaders of NCEES, ABET, Founder Societies and others as appropriate
 5. Interact with stakeholders
 6. Ask the ASCE Committees on Professional Practice and Educational Activities and the ASCE Institutes to support the report's recommendations
 7. Ask professional societies and organizations to support the BS-MOE as a prerequisite for the practice of CE at the professional level
 8. Revisit ASCE membership grade requirements
- Action Item B: Licensing jurisdictions adopt the BS-MOE as a requirement for the practice of CE at the professional level.
 1. Review the change processes used by other professions
 2. Prioritize licensing jurisdictions
 3. Prepare fact sheets and guidelines
 4. Convince state legislators and regulators
 5. Refine the Model Licensure Law
 6. Pass legislation and/or adopt rules
 7. Encourage employees to obtain licensure
 8. Encourage users of CE services to more rigorously require licensed civil engineers to be responsible for CE projects
 - Action Item C: ABET, universities and others revise CE curricula, programs and culture.
 1. Obtain input from individual practitioners and employers

2. Emphasize role of employers in partnering with employees on MOE and continuing education
 3. Select BS-MOE model(s) and design curricula
 4. Develop BS-MOE certification criteria
 5. Provide faculty development
 6. Develop accreditation criteria including dual level accreditation
 7. Obtain accreditation
 8. Explore the professional school model
- Action Item D: ASCE Institutes lead the development of specialty certification
 1. Identify interested Institutes
 2. Explore relationships with other professional societies
 3. Prepare common criteria
 4. Pilot the specialty certification program with one institute
 5. Expand the specialty certification program with other institutes
 6. Encourage practitioners to obtain specialty certification
 7. Encourage users of specialized CE services to require participation by specialty certified civil engineers

While a “no action” option is possible, it would lead to a declining role for the civil engineering profession and its members. More importantly, society would gradually lose the benefit of the civil engineering profession’s long and caring tradition of placing the highest priority on protecting public safety, health and welfare.

The Task Committee urges the ASCE Board of Direction to quickly adopt and assertively implement the recommendations presented in this report.

Closing Thoughts

The TC offers a challenge in the form of respectful queries to those who oppose ASCE Policy 465 and the TC’s recommendations presented in this report. Given the dynamic changes within and around CE, if you do not support the BS-MOE as a prerequisite for licensure and practice at the professional level now, when will you support it? If you do not support the BS-MOE, regardless of when it would be implemented, what do you advocate so that CE can thrive, or at least survive, in the rapidly changing environment? How would you have our profession lead, or at least keep up, within the infrastructure and environmental arena and relative to other professions?

In the opinion of the TC, a “no action” option is possible, but not prudent; feasible but not future focused. “No action” would lead to a diminished role for the civil engineering profession and its members. Paralleling this declining role, society would gradually lose the benefit of the profession’s infrastructure and environmental competence and long and caring tradition of placing the highest priority on protecting public safety, health and welfare.

The TC thanks the ASCE Board of Direction for the opportunity to serve and offers this closing thought and its recommendation. Civil works will always be in demand—that is unquestionable. To be decided, however, is who will lead the planning, design, construction and operation of civil works in the U.S.; civil engineers or others? Our environment will increasingly need protection. Civil engineers could lead this effort, but will they? The CE profession can engineer its future or others will engineer it for us. The TC strongly endorses the former. ***With pride in the history and traditions of CE and confidence in the profession’s future, the TC urges the ASCE Board to quickly adopt and assertively implement the recommendations presented in this report.***