

## Implementing ASCE's "Masters" Policy

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### Abstract

ASCE is committed to implementing its Policy Statement 465, which "supports the concept of the Masters Degree or Equivalent (MOE) as a prerequisite for licensure and the practice of civil engineering at a professional level." Described in this paper is the manner in which ASCE is working with stakeholders to develop, organize, and execute a detailed implementation process. Curriculum, accreditation, licensing, and specialty certification are the four broad fronts across which implementation is proceeding.

### Introduction: A Problem Facing the Civil Engineering Profession

Under the auspices of ASCE, individual civil engineers and civil engineering groups have increasingly reviewed the profession's status and examined possible improvements.<sup>1</sup> Prominent among these efforts are the six ASCE education conferences convened at approximately five-year intervals from 1960 to 1995. While all the conferences arrived at similar conclusions and recommendations, including advocating more formal education, the last<sup>2</sup> was the catalyst for an ASCE Board of Direction policy change.

In October 1998, the ASCE Board of Direction adopted Policy Statement 465, which began as follows: "The ASCE supports the concept of the masters degree as the First Professional Degree (FPD) for the practice of civil engineering at the professional level." ASCE is the first of the founder and other engineering societies to officially call for more formal education as a condition of practicing the discipline at the professional level. The current version of Policy 465 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 concluded that the fundamental issue addressed by Policy Statement 465 was: The current four-year bachelor's degree is becoming inadequate formal academic preparation for the practice of CE at the professional level in the 21<sup>st</sup> Century. The TC explained that the 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 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 and declining appeal of CE to highly motivated young people.

The preceding facets of the fundamental issue may be viewed as a **major, primarily education-based problem facing the civil engineering profession**. These facets are discussed in detail in the first half of the TC’s report *Engineering the Future of Civil Engineering*,<sup>3</sup> and are also addressed by Russell et al.,<sup>4</sup> TCAP<sup>3,5</sup> and Walesh.<sup>6</sup>

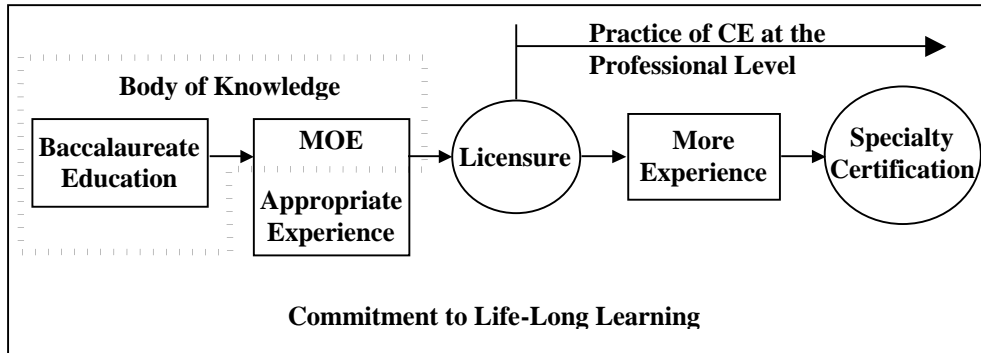
### **Solution to the Civil Engineering Problem: Raise the Bar**

The TC presented its findings and recommendations<sup>3</sup> to the ASCE Board of Direction in October 2001. The report was well received and a refined policy, recommended by the TC, was unanimously adopted by the Board. The essence of the refined policy reads “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 a professional level.**” This refined policy drops the problematic “first professional degree” language and puts added emphasis on establishing the prerequisite educational requirements for licensure and practice at the professional level.

The TC’s report to the Board stated that 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 occurs at licensure, which requires:

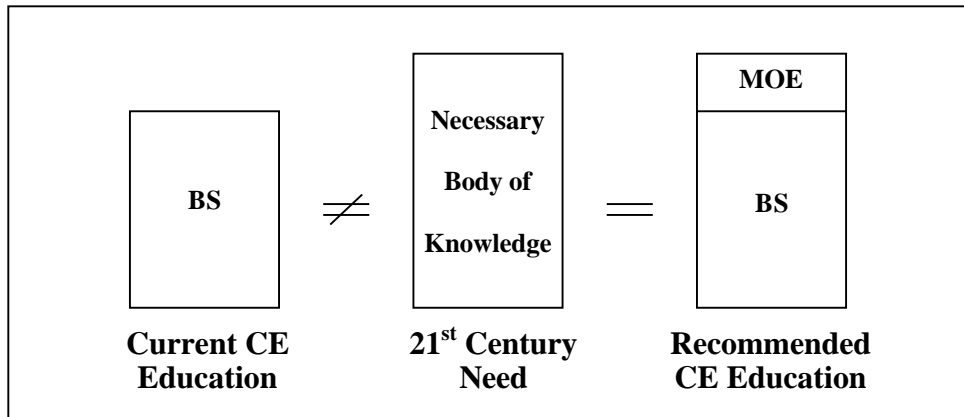
- A body of knowledge (BOK) as reflected by a combination of a baccalaureate degree and a master’s or equivalent (MOE). The MOE may be a traditional masters degree, possibly a non-engineering graduate degree, or an acceptable appropriate combination of courses whose content and quality are equivalent to or exceed a graduate level program. The MOE requirement may be satisfied in several ways including via web-based learning.
- Appropriate experience as presently required.

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



One way of viewing the BOK is to think of it as including 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. Clearly, other models are possible.

As illustrated in the following figure, and as previously noted, the BOK needed to practice CE at the professional level in the 21<sup>st</sup> Century can no longer be accommodated within a four year bachelor’s degree. However, and as also illustrated in the following figure, the necessary BOK can be provided by the combination of a baccalaureate degree and a MOE.



The TC determined that an implementation plan identifying principal participants, action items, specific tasks, and definitive milestones was needed if concrete actions are to occur. Accordingly, a detailed implementation plan was developed<sup>3</sup> as a way to proactively achieve full realization of ASCE Policy Statement 465.

## No Harm

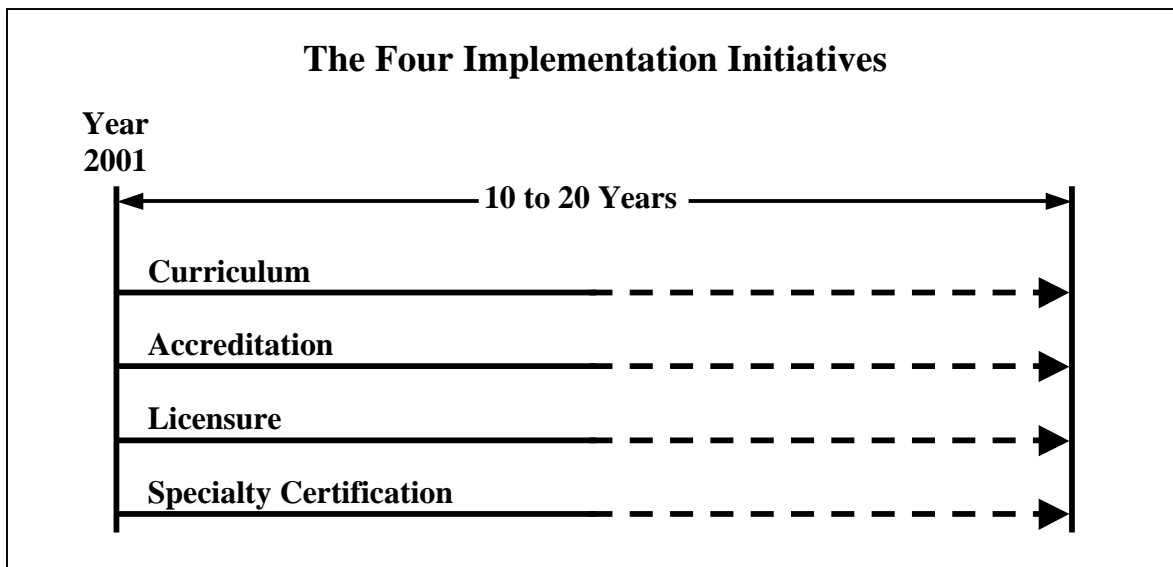
Inherent in ASCE's future oriented Policy 465 is the "no harm" intent. Currently licensed CEs will not be affected as the policy is implemented. CEs who do not have an MOE will not be required to obtain one to retain their licenses. Licensing jurisdictions will probably select a future date after which the MOE will be required as a prerequisite for taking the PE examination. Finally, CE students in the education pipeline will not be affected.

## Transition from Study to Implementation

With study of the problem largely concluded, and a comprehensive solution outlined, ASCE's incoming President acted in late 2001 to form the Task Committee on Academic Prerequisites for Professional Practice (TCAP<sup>3</sup>, see Attachment A). TCAP<sup>3</sup>'s charge is to "develop, organize, and execute a detailed plan for the full realization of ASCE Policy Statement 465 (Academic Prerequisites for Licensure and Professional Practice) dated October 9, 2001." The TC was expected to use the recommendations outlined in its report<sup>2</sup> as the foundation for its implementation activities.

## TCAP<sup>3</sup> Initial Efforts

TCAP<sup>3</sup> began bi-weekly conference call meetings and occasional face-to-face meetings in October 2001. In keeping with its charge, TCAP<sup>3</sup> structured its work across the four parallel fronts or initiatives of curriculum, accreditation, licensure, and specialty certification as illustrated in the following figure.



One implication of the four pronged approach is the near future formation of four subcommittees corresponding to each of the fronts. Each subcommittee will be chaired by a TC member and invited members will encompass a wide spectrum of stakeholders.

Initially, TCAP<sup>3</sup> is being guided by the previously mentioned implementation plan set forth in the predecessor TC's report. Included in that plan are major action items and specific supporting tasks. Included in the remainder of this paper are descriptions of various planned and underway implementation actions. Given the large number of probable actions, the variety of stakeholders and the complexity of the implementation process, the situation is dynamic. Planned and underway efforts noted in this paper are as of mid-March 2002. Readers interested in the current implementation status are urged to contact the author.

## **The Curriculum Initiative**

Given that this paper was written for presentation at an engineering education conference, more extensive discussion of the first of the four parallel fronts—curriculum—is warranted. TCAP<sup>3</sup> seeks effective working relationships with curriculum stakeholders including CE faculty, CE department heads/chairs, CE students, engineering deans and other university administrators, and practitioners.

### *Issues and Concerns*

Faced with Policy 465, many issues and concerns are likely to be understandably raised by curriculum stakeholders. Some possible issues and concerns are noted here. The purpose of listing the issues and concerns is to solicit academia's input so that TCAP<sup>3</sup> can work with the academic and practice communities. Likely issues and concerns are:

1. Need for more evidence, preferably quantitative, that CE educational reform is necessary: Shouldn't we study this more?
2. Added institutional costs (faculty and staff, equipment, space) to accommodate students in traditional MS programs and/or students in new MOE programs: What if a department incurs costs and "no one comes?"
3. Reduced CE enrollment as a result of added time and monetary cost as viewed by counselors, prospective students, and their parents: Other engineering disciplines will appear "easier."
4. Fear that this is another false start: Concern that those educators who lead will not have the CE profession's ongoing support. Time and energy will be wasted. "They" tried this before and it didn't work.
5. CE doing something different than EE, ME, ChE, and other disciplines: Leads to the argument "Let's wait until everyone (all disciplines) are on board."
6. One or a few institutions doing something different: Let's wait until other institutions pave the way. Why put ourselves at a competitive disadvantage?

7. Excessive additional demands/work: We are already asked to do too much.
8. Exclusively undergraduate CE programs may fear loss of legitimacy: Would no longer provide the entire required formal education.
9. Concern that employers would hesitate to hire bachelor degree holders: Why employ someone who has not completed the formal education required for the licensing examination?
10. Difficulty in obtaining agreement on the appropriate BOK to be included in the BS-MOE. If the BOK is too broad licensed civil engineers will not share a common tradition. A very narrow BOK would stifle creativity in undergraduate and graduate program emphasis and content.
11. CE programs that offer MS degrees will feel pressure to lower entrance standards: We'll be pressured to admit most of our BSCE graduates to at least one of our MS programs? This conflicts with the traditional "B or better" requirement for graduate program admission.
12. Reluctance to embrace more non-technical topics in existing courses or consider adding non-technical courses. ("Non-technical" means management/leadership/business/communication and humanities and social sciences.)
13. Desire to "load up" on technical topics and courses: Some CE faculty will support the BS-MOE and then strongly advocate "filling" the extra credit slots with only or mostly technical content. This is counter to the broadening intent of Policy 465.
14. Interference with research programs, especially revenue generated and prestige gained: Why? Because some faculty may want to devote more effort to improving the curriculum.
15. Fear of change: Shared by many of us!

### *Strategies*

Three strategies are being employed by TCAP<sup>3</sup> to address issues and concerns like the preceding. Strategy 1 is inclusiveness. TCAP<sup>3</sup> commits to welcoming input from, soliciting ideas from and sharing ideas with anyone having a bona fide interest in the BS-MOE. While university faculty and administrators and practicing civil engineers may not necessarily support or at least initially support ASCE Policy 465, they may collectively have many concerns, ideas, and aspirations compatible with raising the formal education bar for civil engineers. TCAP<sup>3</sup> wants to learn more about those concerns, ideas, and aspirations. Sharing interests stimulates creativity and synergism.

Strategy 2 is facilitation. TCAP<sup>3</sup> will respond to, look for, and create opportunities for faculty, administrators and others to come together to discuss, study, brainstorm and experiment with the BS-MOE. Strategy 3 is focus, that is, TCAP<sup>3</sup> is searching for a core group of individuals/departments/institutions that want to lead the BS-MOE effort. TCAP<sup>3</sup> intends to expend a disproportionately large effort (time, \$) on them to enable them to be successful. Their efforts will be recognized and publicized.

### *Actions: Underway and Planned*

Recognizing issues and concerns like those outlined above, and in keeping with the three strategies, TCAP<sup>3</sup> has begun to employ various methods and take various actions to work effectively with the academic and practitioner communities. Some of those methods and actions are noted here, with parenthetical comments about their status as of mid-March 2002.

1. Create a subcommittee/task group. Include educators (respected CE's, supportive of BS-MOE, "movers"), practitioners (respected CE's, demonstrated interest in CE education), and education savvy members of other professions (e.g., architecture, accounting, pharmacy) that have raised and/or are "raising the bar." (Searching for members)
2. Arrange for an ASCE staff person to provide support, recognizing that a major commitment/effort is required. (Done)
3. Define the CE BOK. (A white paper is being prepared as a starting point.)
4. Send letters and/or emails to deans, CE Chairs/Heads, and possibly CE faculty and students. The purpose is to inform, obtain input (ideas, concerns) and find supporters.
5. Utilize ASCE's established communication links with CE Department Heads Council. Offer to attend/present at the six annual regional meetings and the two meetings each year of the Department Heads Council Executive Committee. Monitor and contribute to the Department Heads Listserv on the ASCE website. (Made presentations to six regional Department Heads meetings in 2002.)
6. Establish and publicize a threaded list serve on the ASCE website dedicated to BS-MOE curricula and related topics and make it accessible to students, faculty and practitioners.
7. Create and maintain an easily accessible electronic information/data base. Include bibliographies, papers and articles, minutes of subcommittee meetings, frequently asked questions about education and accreditation aspects of BS-MOE, BS-MOE proposals/plans/projects, and network members (names, with contact information, of faculty members and practitioners with interest in CE curricula).

8. Seek endorsement of and active support from ASCE Educational Activities Committee (EdAC), because EdAC's charge includes enhancing CE education. (Met with EdAC in January 2002)
9. Write articles/pieces for ASCE and non-ASCE publications whose readers are likely to have interest in education reform. (Articles have been or will be published in *BSCES News*, *CE News*, *Civil Engineering*, *Environmental Engineer*,<sup>4</sup> and *The Military Engineer*.)
10. Encourage CE faculty to seek input from practitioners.
11. Analyze a cross-section of undergraduate CE programs and search for and document undergraduate-graduate program combinations that are consistent with the BS-MOE as envisioned by Policy 465. (Underway)
12. Identify potential funding sources for BS-MOE curricular development, inform interested CE heads and faculty, and encourage them to apply.
13. Arrange and facilitate brainstorming sessions, workshops, and seminars for various groups of faculty, administrators, and other stakeholders. Document and share the results.
14. Explore distance education providers, including traditional universities and private sector entities, and their offerings for possible use in the "OE."
15. Arrange/support conference sessions devoted to BS-MOE. Target conferences such as the ASEE and ASCE annual conferences. (Presentations were made at a CE Division session at the 2002 ASEE Annual Conference and Exposition.)
16. Communicate with ASCE student chapters and faculty and practitioner advisors. (During 2002, presentations were made at the four ASCE zonal conferences.)

### **The Accreditation Initiative**

TCAP<sup>3</sup> began to interact with ABET in February 2002 by briefing that organization's Executive Committee on ASCE Policy 465. An introductory article will appear in *Communications Link*, ABET's quarterly newsletter. Critical to full implementation of the policy is availability of dual level accreditation of CE programs. As part of the accreditation initiative, TCAP<sup>3</sup> will request meetings with engineering societies represented in ABET.



## **The Licensure Initiative**

Full implementation of Policy 465 will require changes in the laws, codes and processes of 55 U.S. engineering licensing jurisdictions. Accomplishing these changes is likely to be the most challenging aspect of achieving the Policy 465 vision.

In an encouraging early development, the Board of Directors of the National Society of Professional Engineers (NSPE) adopted a very supportive professional policy in January 2002. The NSPE policy reads, in part: “NSPE supports the concept of engineering students meeting additional academic requirements as a prerequisite for licensure and practice of engineering at the professional level. Possible additional requirements could include a master’s degree or equivalent.”

As of mid-March 2002, TCAP<sup>3</sup> members and leaders of ASCE began dialogue with the National Council of Examiners of Engineering and Surveying (NCEES). One goal is NCEES adoption of a model law, for referral to licensing jurisdictions, that would support ASCE Policy 465 for CEs. TCAP<sup>3</sup> will soon identify one or a few licensing jurisdictions that are likely to be receptive to raising the formal education bar for CEs. Candidates are likely to be found among those states and other jurisdictions that license engineers by discipline.

## **The Specialty Certification Initiative**

As noted earlier in the section of this paper titled “Solution to the Civil Engineering Problem: Raise the Bar,” specialty certification is part of the vision. It is seen as the crowning accomplishment for a CE on a technical track and is exemplified by the American Academy of Environmental Engineers (AAEE) which provides Board Certification for CEs in the environmental discipline. As envisioned by ASCE and practiced by AAEE, specialty certification would require licensure, additional experience, and oral and written examinations.

Although specialty certification is not explicitly mentioned in Policy 465, its inclusion in the report<sup>3</sup> of the TC on the FPD served as a catalyst for action. As of mid-March 2002, ASCE’s President was forming a Board-level task committee to develop specialty certification within ASCE under the Society’s Institutes and in cooperation with other professional organizations.

## **Summary**

ASCE is committed to implementing the concept of the Masters Degree or Equivalent (MOE) as a prerequisite for licensure and practice of civil engineering at a professional level. The ASCE Task Committee on Academic Prerequisites for Professional Practice (TCAP<sup>3</sup>) is in the early stages of developing, organizing and executing a detailed plan. The effort is proceeding across the four parallel initiatives of curriculum, accreditation, licensing, and specialty certification.

With respect to the first initiative, TCAP<sup>3</sup> desires to work effectively with CE faculty, CE department heads/chairs, CE students, engineering deans and other university administrators, and practitioners. Inclusiveness, facilitation, and focus are the three strategies being used by TCAP<sup>3</sup> to advance the curriculum initiative.

**Attachment A: Task Committee on Academic Prerequisites for Professional Practice (TCAP<sup>3</sup>)**

Richard O. Anderson: Past President of Somat Engineering and ASCE representative to ABET

Norman L. Buehring: Director of Resource Conservation, Las Virgenes Municipal Water District – California, ASCE leader, including former Board member

Angela L. Desoto: Structural Engineer, USACE

John E. Durrant: ASCE staff, Executive Director of Institutes

Jonathan C. Esslinger: ASCE staff, Managing Director for Professional and Technical Activities

Gerald S. Galloway, Jr.: Secretary, U.S. Section, International Joint Commission, U.S. and Canada

Thomas A. Lenox: ASCE staff contact, Managing Director for Education, Geographic Services, and Diversity

Brook Maples: Civil Engineer at KPFF Consulting Engineers, Past President of Los Angeles Section Younger Member Forum and Chair of Western Regional Younger Member Council

Brian K. Parsons: ASCE staff, Executive Director of Environmental and Water Resources Institute

Bobby E. Price: NSPE Vice President, Chair of NSPE Licensure and Qualifications for Practice Committee, and Member of Louisiana Professional Engineering and Land Surveying Board

Jeffrey S. Russell: Professor, Department of Civil and Environmental Engineering, University of Wisconsin – Madison (Chair)

Stuart G. Walesh: Consultant and Author (Vice-Chair)

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## **Biography**

Independent consultant STUART G. WALES, PhD, PE ([stuwalesh@aol.com](mailto:stuwalesh@aol.com)) provides leadership, management and engineering services to private and public organizations drawing on his experience as project manager, department head, discipline manager, marketer, professor and engineering dean. He authored many papers and several books including *Engineering Your Future*, ASCE Press, 2000 and *Flying Solo*, Hannah Publishing, 2000.

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