

Abstract

*Destiny is not a matter of chance,
it is a matter of choice.*

William Jennings Bryan, American statesman

Today's world is fundamentally challenging the way civil engineering is practiced. Complexity arises in every aspect of projects, from pre-project planning with varied stakeholders to building with minimum environmental and community disturbance. Addressing this increased complexity will require understanding and solving problems at the boundaries of traditional disciplines. At the same time, reductions in credit hours required for graduation are making the current four-year bachelor's degree inadequate formal academic preparation for the practice of civil engineering at a professional level in the 21st century. Recognizing the preceding, and in keeping with the leadership role of civil engineers in the infrastructure and environmental arena and in protecting safety, health and welfare, the ASCE Board of Direction acted.

The American Society of Civil Engineers (ASCE) Policy Statement 465, unanimously adopted by the Board of Direction in 2001, states that the Society "...supports the concept of the master's degree or equivalent as a prerequisite for licensure and the practice of civil engineering at the professional level." The ASCE created the Task Committee on Academic Prerequisites for Professional Practice (TCAP³) to "develop, organize and execute a detailed plan for full realization of Policy Statement 465." (In November 2003, in recognition of the long-term nature of implementing Policy Statement 465, TCAP³ was changed to the Committee on Academic Prerequisites for Professional Practice [CAP³], a permanent Board-level committee.)

TCAP³ developed an implementation master plan for which the Body of Knowledge (BOK) was the foundation. TCAP³ subsequently formed the Body of Knowledge Committee and its charge included defining the BOK, addressing the

ASCE's Board of Direction acted in recognition of increased complexity of civil engineering practice coupled with reductions in credit hours required for graduation.

The Body of Knowledge (BOK) Committee was charged with defining the BOK, addressing experience, and describing the roles of faculty, practitioners, and students.

The BOK has what, how and who elements.

Included in the 15 outcomes are the 11 outcomes currently used by the Accreditation Board for Engineering and Technology.

Attitudes are an essential part of the BOK.

The BOK will prepare tomorrow's licensed civil engineers to proactively function in the challenging national and global environment of the coming decades.

role of experience and describing the roles of faculty, practitioners, and students.

The BOK Committee conducted its deliberations and presents its recommendations in this report arranged by these three themes: 1) *what* should be taught to and learned by future civil engineering students; 2) *how* should it be taught and learned; and 3) *who* should teach and learn it. The Committee's primary focus was the *what*.

The *what* recommendations are cast in terms of 15 outcomes that, compared to today's bachelor's programs, include significant increases in technical depth and professional practice breadth. Included in the 15 outcomes are the 11 outcomes currently used by the Accreditation Board for Engineering and Technology (ABET). Each outcome is further described with a civil engineering commentary. The outcomes include recognition, understanding or ability competency levels in broad and deep areas essential to the future practice of civil engineering at the professional level.

Knowledge and skill, while necessary, are not sufficient to be a fully functioning professional civil engineer. A civil engineer's attitude, that is, the manner in which he or she approaches his or her work, will determine how effectively he or she uses hard-earned knowledge and skills. Accordingly, attitudes are an essential part of the BOK.

Stressed in the *how* recommendations are existing and new undergraduate/graduate tracks that help students fulfill the BOK, the growth of distance learning and non-traditional educational providers, the essential role of experience in fulfilling the BOK, and incorporating the BOK into the licensure process.

The *who* recommendations identify success factors for full and part-time faculty. Teachers should be scholars, teach effectively, have practical experience, and serve as positive role models. Also addressed in the *who* recommendations are student obligations and expectations and matching students to the civil engineering profession.

The preceding recommendations of the BOK Committee, combined with those of the parallel Accreditation, Curricula and Licensure Committees, are enabling CAP³ to move further ahead in carrying out its charge to implement ASCE Policy Statement 465. By so doing, we prepare the civil engineer for the future.

The empires of the future are the empires of the mind.

Winston Churchill, British Prime Minister