Abstract

Engineering Students in their senior year, especially those in the field of civil engineering, sit for the EIT/FE examination. Though, it may not be their program requirement, majority of seniors do generally opt to take the examination. Construction students, however, seldom have had the same opportunity to take a national examination to qualify as a certified professional constructor. With the recent push from the American Institute of Constructors (AIC), the scenario may change in the near future. This paper addresses the issues related to professional credentialing of college seniors enrolled in construction engineering and technology programs as Associate Constructors (AC). The AIC's certification of construction professionals may become the construction industry's equivalent of engineering profession's EIT/PE. Fundamentals of AIC certification program are discussed along with some pros and cons of the student certification process in the overall context of constructor certification in the continental United States.

Introduction

Since the 1980s, there has been a great push from the construction industry to recognize construction as a distinct discipline separate from civil engineering. The term 'Constructor' is now a widely-used and a well-recognized term. If design is the domain of engineers, building is that of the constructors. Though design and building (constructing) can not be separated from each other as only when the two act in concert with each other that a physical structure can be created, yet design and construction are different in their content, form, and shape.

In comparison to the term 'engineer', which has long existed in the dictionary, the word 'constructor' has only been added in the dictionary in recent times. The Associated General Contractors of America has gone a step further and done a great service to the construction profession by calling its monthly magazine by the title, 'CONSTRUCTOR.' This publication has given much exposure and credence to the profession of construction.

Construction engineering, like civil engineering, is a very broad profession and has undefined limits. Like civil engineering, it has its own code of ethics. According to the American Society of Civil Engineers (ASCE), "a profession is the pursuit of a learned art in a spirit of public service. A profession is a calling in which special knowledge and skill are used in a distinctly intellectual plane in the service of humanity, and in which the successful expression of creative ability and application of professional knowledge are the primary rewards……Also implied is the conscious recognition of the profession's obligation to society to advance its standards and to prescribe the conduct of its members."
People often ask, "Why the Engineering License is so important?" The goal of the licensing process is to ensure that an engineer who is responsible for a given project will not jeopardize the health, safety, or well-being of the general public. Therefore, when a state awards a professional license to an engineer, it legally acknowledges that the licensee has demonstrated an acceptable level of overall competence to practice as a professional engineer. The majority of states have enacted legislation that virtually prohibits non-licensed engineers from engaging in private practice, providing engineering consultation, performing engineering services, entering into contracts, or submitting original designs, plans, or specifications for approval.2

Licensing is becoming an equally important issue for the construction profession. Since 1970s, management of construction has changed dramatically. These changes have resulted in increased responsibilities, and obligations for the constructor. Professional Constructors have readily accepted these changes and have responded by developing additional skills and acquiring more technical and managerial knowledge necessary to execute the responsibilities and obligations in a professional manner. The Certified Professional Constructor (CPC) process provides the Constructor with formal recognition of the education and experience that defines the Constructor as a professional.3

To accomplish the goal of certification of construction professionals employed in the construction industry, it is eminently appropriate to utilize a model similar to EIT/FE/PE examination that is used for engineering students and engineering personnel. The EIT/FE/PE model of engineering examinations is a time-tested evolving model. The examination model used by the American Institute of Constructors to certify construction students and construction personnel is similar to EIT/FE/PE examinations, and is discussed in this paper. It is recommended that more and more schools of construction should use the AIC test for assessment of their learning outcomes and educational objectives, and provide students with an opportunity to achieve professional credentials.

Fundamentals of Certified Professional Constructor Credentials

The 'Constructor', by definition, is an individual who possesses the skills and knowledge acquired by education and experience to manage the execution of all or a substantial portion of construction works. According to AIC, a constructor is an individual who is committed to serve the construction industry in a professional and ethical manner and engages in a continued development of skills and education to meet increasing industry challenges and changes. Certification raises the standards of practice of the Constructor and thus benefits all parties involved in the construction industry, including society at large.

The AIC Constructor Certification Commission encourages professional credentialing of students as Associate Constructors (AC), and practitioners as Certified Professional Constructors (CPC). Constructor certification, like engineering licensing, is a two-step process.

1. The testing of basic and advanced construction knowledge through written examinations
2. The verification of professional experience and/or education

Proceedings of the 2002 American Society for Engineering Education Annual Conference & Exposition
Copyright © 2002, American Society for Engineering Education
Construction certification is a voluntary, non-governmental and private process to acknowledge the educational and experience-based proficiencies of a practicing Constructor. The following are the requirements for AC and CPC certification and are directly reproduced from the promotional literature of AIC.\(^4\)

**Associate Constructor - AC**

The successful candidate
- Must have a baccalaureate degree in construction from an accredited construction program or equivalent experience or a combination of experience and education.
- Must pass the Constructor Qualification Examination (CQE) Level I - Construction Fundamentals.
- Will be awarded the designation of Associate Constructor (AC) in recognition of his/her progress toward full certification and receive a certificate and wallet card indicating the level of achievement.

The content of construction fundamentals examination (CQE - Level I) includes subject areas of:
- Communication Skills
- Design/Engineering Concepts & Associated Mathematics and Sciences
- Management Concepts and Philosophies
- Construction Materials & Methods
- Estimating, Plan Reading, Bid Process, Codes, Insurance, and Ability to Establish Work Methods
- Budgeting/Cost Accounting, Cost Control, & Cost Closeout
- Scheduling and Schedule Control
- Safety
- Construction Surveying & Project Layout, and
- Project Administration

**Certified Professional Constructor - CPC**

A professional engineering (PE) license requires taking two eight-hour engineering examinations, the first being the Fundamentals of Engineering examination (referred to as the EIT/FE exam), and the second being the Principles and Practice of Engineering (referred to as the PE exam). Similarly, construction students have to first qualify as an Associate Constructor (AC), and then are eligible to take the CPC examination after acquiring acceptable professional experience.

The successful candidate
- Must meet the qualifications for Associate Constructor and have passed or been exempted from the Constructor Qualification Examination Level I.
- Must acquire seven years of additional acceptable professional experience beyond that required to sit for CQE Level I with two of those years managing the execution of construction work.
- Must successfully pass the Constructor Qualification Examination (CQE) Level II - Advanced Construction Applications.
- Will be awarded the designation of Certified Professional Constructor (CPC) and receive a certificate and wallet card indicating the level of achievement.

Requirements for Maintaining AC and CPC Status

Both the Certified Professional Constructor and Associate Constructor must
- Agree to abide by the Constructor Code of Conduct adopted by the AIC Certification Commission
- Comply with Continuing Professional Development requirements
- Pay all applicable fees

The above-noted requirements for AC and CPC certifications have been reproduced from the AIC's Candidate Handbook and CPC brochures. In essence, the requirements of CPC and PE are similar. CPC is a certification to practice as a Constructor, while PE is a license to practice engineering. The two are not exactly the same in terms of educational and professional experience requirements but both do have similar goals. They both aim at high standards of practice.

The Changing Face of Construction Education

Constructor certification is aimed at improving education for construction executives and managers. The schools of construction are the initial suppliers of these executives and managers. To set these future construction managers and executives on the right course at the outset, it is appropriate for the construction industry to encourage schools of construction to give their students the opportunity to acquire professional credentials such as Associate Constructor (AC) in their junior or senior year. This certification can also be made as a program requirement by individual schools of construction, and used as an assessment tool of their learning outcomes.

Many schools have not investigated AIC's Constructor Certification Program. This paper is a formal attempt on the part of the author to educate the educators about the advantages of AIC’s certification program. T. J. Ferrantella, CPC, who is the Chairman of the AIC Constructor Certification Commission says, "Constructor Certification is a part of an evolution in construction industry education that began more than 30 years ago and the AC/CPC credentials are becoming the industry standard for recent college graduates. Constructor Certification, however, isn't only for recent college graduates. Seasoned professionals also have the opportunity to become CPCs."  

The goals of AGC, AIC, and The American Council for Construction Education (ACCE) are focused on the quality of education for the construction industry. The AIC's Certified Professional Constructor program is one method of providing quality education to our students enrolled in construction engineering and technology programs all across the United States, and to all those practitioners who are engaged in managing construction.
Conclusion

Professional credentials give credibility to an individual's ability to carry out professional work. The State Boards of Law, Medicine, Engineering, Surveying, Architecture, Nursing, Accounting, etc., have had a long tradition of requiring practicing individuals to qualify for the special honor to practice their individual professions. These Boards have given their approval only after individuals have proven that they have the requisite education and experience, and have passed the required written examinations. The construction profession is now following the lead of the other professions and headed in the right direction by evolving to a stage where AC/CPC credentials are becoming the industry standard for the recent college graduates.

As a note of caution, schools of construction should only encourage, not demand, that all students sit for the AIC's Construction Qualification Examination (CQE) Level I, which is similar to engineering EIT/FE examination, and should be taken in their junior or senior year. The pros for taking the CQE are many, and cons are none. It is also important that schools use this examination as an assessment tool to gauge the effectiveness of their program's learning outcomes. It may lead to redefining their educational objectives. Also, it is important to understand that the AIC's certification program's goal is to provide voluntary, non-governmental certification. The plan is in no way aimed at increased licensing by governmental bodies.  

Bibliography

1. ASCE Official Register 2002, Reston, Virginia 20191
2. Professional Publications, Inc., Belmont, CA 94002
3. AIC Constructor Certification Commission, St. Petersburg, FL 33702
4. Ibid
6. Reference 3

VIRENDRA K. VARMA

Virendra K. Varma, Ph.D., P.E., is Professor of Construction Technology, and an Ex-Chair of the Department of Engineering Technology at Missouri Western State College. He is an ABET Commissioner of Technology Accreditation Commission (TAC). He is President of ACI-Missouri, and a Past President of Missouri Society of Professional Engineers-NW Chapter. He has authored/co-authored numerous papers in engineering education and areas of civil and construction engineering. He is an ACI Examiner and a Consultant to construction industry.