

## Assessment of First Professional Degree Criteria

By Enno “Ed” Koehn  
Lamar University

### Abstract

Recently, the American Society of Civil Engineers (ASCE) approved the concept of the Master’s degree as the First Professional Degree for the practice of engineering. The American Society for Engineering Education (ASEE) and the National Society of Professional Engineers (NSPE) are also discussing this idea.

The present investigation suggests that undergraduate and graduate students approve this concept. In fact, undergraduates during a six-month period have sharply increased their interest to the point that over 50% either agree or strongly agree that the Master’s degree should be the First Professional Degree. Sixty percent of the graduate students also support this concept. However, graduate student acceptance is lower than might be expected for individuals working towards an advanced degree.

In contrast, practitioners do not perceive that the Master’s degree should be required for professional practice. The findings indicate that over 90% of the practicing engineers are against the idea, including 51.7% who voted for the strongly disagree category. This suggests that ASCE should consider an educational and/or marketing campaign to explain the rationale behind the First Professional Degree concept.

### I. Introduction

In October 1998, the Board of Direction of the American Society of Civil Engineers (ASCE) approved a policy statement “endorsing the master’s degree for the practice of engineering at the professional level.” The board also directed the Educational Activities Committee to develop a society policy for the first professional degree in civil engineering<sup>2</sup>. These actions may partially be in response to legislation in various states limiting the number of hours that a state university may require to obtain a bachelor’s degree. In addition, numerous practitioners and educators perceive that students need additional courses in the communications and financial areas in order to practice engineering at a professional level when they graduate.

The reaction of ASCE members to the policy statement has been unprecedented and has generated a great deal of negative comment, some of which has been published in ASCE magazines and newsletters. In response to these concerns, the Board at their April, 1999 meeting established a task committee to study and re-evaluate the policy statement and report back to the Board in April, 2000<sup>8</sup>.

This paper presents the results of an investigation involving the perceptions of a group of undergraduate and graduate students as well as practicing engineers concerning the ASCE first

professional degree policy statement. The data for the study was obtained from a survey instrument which was distributed to students enrolled in various civil engineering degree programs as well as practitioners attending ASCE section and branch meetings. Respondents were requested indicate whether they strongly agree, agree, disagree, or strongly disagree with the policy statement endorsing the Master's degree for the practice of engineering at the professional level.

## II. First Professional Degree

The ASCE Board of Direction believes that, today, engineers must have skills in information and computer technologies, foreign languages, and an understanding of the economic and social implications of civil engineering projects. Along with the aforementioned breadth, increased specialty area knowledge is also required<sup>1</sup>. This level of knowledge is difficult to develop in the current four-year B.S. program format. In fact, the U.S. Department of Education indicates that the first professional degree signifies a level of academic and professional skills beyond that normally required in a bachelor's degree program<sup>7</sup>. The ASCE Board believes that the proposed increased educational requirements may improve the professional stature of civil engineers in addition to enhancing the compensation levels of the profession<sup>1</sup>.

Most professions (business, law, medicine, etc.) do not consider a bachelor's degree to be a professional degree. Considerable additional course work is required for professional practice<sup>9</sup>. Engineering, however, as mentioned in the previous paragraph does not follow U.S. Department of Education guidelines and still treats the B.S. as a professional degree. Nevertheless, a number of universities have begun offering Master of Engineering Management, and Master of Engineering Degrees for graduate students. These programs are generally designed to prepare students for professional practice rather than careers in research. As an example, at some schools, real-life design projects are brought to the campus by prominent practicing engineers who return to campus several times during the year to interact with the students and participate in the design project. The degree is usually obtained in nine to twelve months for students with an acceptable background<sup>6</sup>.

Requiring a five year engineering program for professional practice would be comparable to the increase in educational criteria established by law and medicine approximately sixty years ago<sup>3</sup>. The increase in degree requirements would permit engineering programs to add course-work in communications, leadership, and business skills while maintaining the technical base of the curriculum.

## III. Assessment of ASCE Criteria

As a segment of a continuing review of professional practice issues and the general engineering curriculum, a survey instrument involving the aforementioned concept of the First Professional Degree was distributed to junior, senior, and graduate students enrolled in various courses offered by the Civil Engineering Department of Lamar University. Practicing civil engineers were also given the opportunity to respond to the questionnaire. One hundred sixty-nine usable forms were returned, the tabulated results of which form the data base for the investigation. In particular, 36 undergraduates, 41 graduate students and 92 practitioner forms were returned. The

survey instrument provided six different responses or answers to the question involving whether the Master's should be considered The First Professional Degree for the professional practice of engineering. Specifically, the possible answers are similar to those used in a 1994 ASCE survey and are illustrated in the Tables 1 - 3.

The perceptions of undergraduate students appear in Table 1. As shown, only 5.3% of the students agreed with the Master's concept when it was first mentioned in Fall '98. This increased to 52.9% in the strongly agree and agree categories six months later in Spring '99. The difference was most likely due to the discussion of the topic in the senior seminar course and the realization that a master's, at this time, is often required for professional practice of environmental, geotechnical and structural engineering<sup>5</sup>.

Graduate students did not change their overall perceptions during the 6 months under consideration. As shown in Table 2, sixty percent strongly agreed or agreed with the proposed Master's criteria in Spring '99 versus 61.8% in Fall '98. However, the strongly agree category increased from 19.0% to 30.0% over the six month period. Nevertheless, it was expected that students working towards an advanced degree would support the concept of a Master's degree serving as the first professional degree at a level higher than that illustrated in Table 2.

It was vital that practitioners also provide data for the study. Here, input was obtained from engineers attending ASCE branch and section meetings in Texas. The responses as a function of the year of graduation are most likely related to the age of the practicing engineers attending the meetings. As shown in Table 3, practitioners do not support the ASCE policy statement involving the use of the Master's degree for the practice of engineering at the professional level. Seventy-five percent of the respondents either disagreed or strongly disagreed with the proposal in Fall '98. Six months later, in Spring '99, this increased to 91.7% with over 50% of the respondents in the strongly disagree category.

A typical comment is as follows, "I have spoken with numerous CE professionals on this topic. They strongly disagree with the idea. Four years of experience is invaluable and much more preferable than a Master's degree." This comment is similar to many of those published in *Civil Engineering* and *ASCE News*.

It appears that ASCE has not developed an adequate educational program or marketing strategy concerning the First Professional Degree. An educational approach has been found to be successful with undergraduate students as illustrated in Table 1. Nevertheless, the policy statement approved by the Board of Direction states that "ASCE supports the concept of the Master's degree as the First Professional Degree for the practice of engineering at a professional level<sup>4</sup>." However, the Board of Direction believes that this is to be "ASCE's vision for the future" and, therefore, not to be necessarily implemented now, tomorrow, or even next year<sup>5</sup>.

#### IV. Summary and Conclusions

This paper presents the results of an investigation of the perceptions of practitioners and a group of undergraduate/graduate engineering students concerning the ASCE policy statement that "supports the concept of the Master's degree as the First Professional Degree for the practice of

Table 1. Undergraduate Student Responses Involving the Master's Degree as the First Professional Degree for Engineering Practice

Survey Results, as a Percentage of Respondents

<u>Survey Item</u>	<u>Fall '98</u>	<u>Spring '99</u>	<u>Average</u>
Strongly Agree	0.0	17.6	8.3
Agree	5.3	35.3	19.5
Neither agree or disagree	15.8	5.9	11.1
Disagree	10.5	11.8	11.1
Strongly disagree	68.4	29.4	50.0
Don't know	0.0	0.0	0.0

Table 2. Graduate Student Responses Involving the Master's Degree as the First Professional Degree for Engineering Practice

Survey Results, as a Percentage of Respondents

<u>Survey Item</u>	<u>Fall '98</u>	<u>Spring '99</u>	<u>Average</u>
Strongly agree	19.0	30.0	24.4
Agree	42.8	30.0	36.6
Neither agree or disagree	4.8	15.0	9.7
Disagree	28.6	20.0	24.4
Strongly disagree	4.8	5.0	4.9
Don't know	0.0	0.0	0.0

Table 3. Practitioner Responses Involving the Master's Degree as the First Professional Degree for Engineering Practice

Survey Results, as a Percentage of Respondents

<u>Survey Item</u>	<u>Fall '98</u>	<u>Spring '99</u>	<u>Average</u>
Strongly agree	12.5	3.3	6.5
Agree	6.3	1.7	3.3
Neither agree or disagree	3.1	3.3	3.3
Disagree	28.1	40.0	35.8
Strongly disagree	46.9	51.7	50.0
Don't know	3.1	0.0	1.1

civil engineering at a professional level.” Data for the study was obtained from a survey instrument which was completed by practicing engineers as well as students enrolled in various civil engineering degree programs.

In particular, the results suggest that undergraduate students have increased their support of the proposal from 5.3% to 52.9% during a six-month period. The difference may have been due to class discussion and/or the realization that, today, a master’s degree is often required to practice environmental, geotechnical, and structural engineering at the professional level. Approximately 60% of the graduate students support the ASCE policy statement. In Spring ’99 this was equally divided between the agree and strongly agree categories. It is interesting that not a greater percentage of graduate students support the Master’s degree concept.

Practicing engineers do not perceive that the Master’s degree should be required for the practice of engineering at the professional level. In fact, over 50% of the respondents strongly disagree with the concept of the Master's being considered as the First Professional Degree. The findings suggest that ASCE must consider an aggressive educational and/or marketing campaign to persuade practitioners to accept the master’s degree as the First Professional Degree for the practice of civil engineering at a professional level. In this regard, the Board has established a task committee to study and re-evaluate the original policy statement.

It is hoped that the results of this investigation can be utilized by ASCE as input to the review, discussion, and comment process involved with the Master’s degree policy statement. In addition, the findings could be utilized, for comparative purposes, by other organizations that may wish to consider taking similar action.

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### Biography

Enno “Ed” Koehn is Professor and Chair of the Department of Civil Engineering at Lamar University, Beaumont, TX. Professor Koehn has served as the principal investigator for several research and development projects dealing with various aspect of construction and has experience in the design, scheduling, and estimating of facilities. In addition, he has authored/co-authored over 100 papers in engineering education and the general areas of civil and construction engineering. Dr. Koehn is a member of ASEE, AACE International, ASCE, NSPE, Chi Epsilon, Tau Beta Pi, and Sigma Xi and is a registered Professional Engineer and Surveyor.