

Raise the Bar

Strengthening the
Civil Engineering
Profession

Edited by
Jeffrey S. Russell, Ph.D., P.E.
Thomas A. Lenox, Ph.D.

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Preface

Background

Key educational and professional leaders of the civil engineering community in the United States met at the American Society of Civil Engineers (ASCE) Civil Engineering Education Conference (CEEC '95) in June 1995 in Denver, Colorado. They were concerned that rapid technological advancement, globalization, and ever-increasing political, social, environmental, and economic constraints were fundamentally changing the practice of civil engineering. These leaders believed that many academic institutions were ill-equipped to respond to these challenges, because of the significant downward trend in credit hours required for an accredited four-year engineering baccalaureate degree. As a result, they were convinced that the baccalaureate degree was becoming increasingly inadequate as the formal academic preparation for the professional practice of civil engineering.

In response to the call for action from CEEC '95, the American Society of Civil Engineers (ASCE) Board of Direction adopted Policy Statement 465 in October 1998. The initial version of the policy stated that the Society “supports the concept of the master’s degree as the First Professional Degree for the practice of civil engineering at the professional level.” As the strategy for achieving this vision developed, it became apparent that the policy should more broadly address the academic prerequisites for professional practice and licensure, rather than focusing only on the attainment of a specific academic degree. Hence, in October 2001, the ASCE Board adopted a modified version of Policy 465, indicating that ASCE “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.” Soon thereafter, the ASCE Board charged a new Committee on Academic Prerequisites for Professional Practice (CAP³) with implementing Policy 465. While ASCE Policy 465 would be refined and revised three more times over the next decade, the charge to CAP³ would be unchanging:

Develop, organize, and execute a detailed plan for the full realization of ASCE Policy Statement 465 (Academic Prerequisites for Licensure and Professional Practice). The Committee’s activities shall be organized to occur in a concurrent, integrated, and coordinated manner across the broad areas of civil engineering body of knowledge, curriculum development, accreditation, and licensing.

From the work of CAP³ arose one of the most significant civil engineering educational and professional reform initiatives of the last several decades – the Raise the Bar Initiative.

Purpose and Scope

The editors believe that the successful processes of the past and the associated “lessons learned” must be clearly communicated to future leaders and proponents of the “Raise the Bar” initiative. Much has been learned from the experiences of the past – and these hard-learned experiences

should guide the future direction of this ongoing initiative. A relevant quotation (from Adlai E. Stevenson, a former Governor of Illinois and two-time presidential candidate) comes to mind: “We can chart our future clearly and wisely only when we know the path which has led to the present.”

While hundreds of papers and articles have been published related to the Raise the Bar Initiative over the last fifteen years, the editors have carefully selected ten papers that (1) include current and accurate information about one of the broad areas of civil engineering body of knowledge, curriculum development, experiential development, accreditation, or licensing; (2) are foundational to changing the future of civil engineering and/or (3) are of enduring value. Collectively the papers provide the reader with an integrated and holistic perspective of the Raise the Bar Initiative.

As a group, the ten papers of this volume provide engineering educators and practitioners with a description of the history, lessons learned, and the next steps related to the Raise the Bar Initiative. The first of the ten papers provides a summary of the overall initiative from 1995 through 2012 as witnessed and experienced by the two editors of this volume -- the long-term leaders of CAP³. The second paper assesses the Raise the Bar Initiative from the perspective of the sociological theory of professions. The third paper describes a vision of civil engineering for 2025 resulting from the Summit on the Future of Civil Engineering of June 2006 – a meeting that laid the foundation for a refined civil engineering body of knowledge. The next five papers were written about five different, yet closely related, aspects of the Raise the Bar Initiative including the (1) civil engineering bodies of knowledge, (2) revised accreditation criteria, (3) changed university curricula, (4) experiential guidelines, and (5) modified licensure laws and rules. The ninth paper assesses the key points made by the opponents to the Raise the Bar initiative as presented in the position paper of the American Society of Mechanical Engineers titled “Mandatory Educational Requirements for Engineering Licensure.” The final paper summarizes “leadership lessons learned” from a decade-long major change process including ideas about how to lead any change effort. Each of these ten papers includes an extensive bibliography related to its focus area. In addition, Appendix B of the first paper is a special annotated list of over 100 papers related to the Raise the Bar initiative that have been published by the American Society for Engineering Education (ASEE) since 1998. All of these ASEE papers can be downloaded from <http://www.asee.org/search/proceedings>.

Acknowledgments

The editors’ experiences with the Raise the Bar initiative supports the view of Phil Jackson, Hall of Fame basketball player and coach, that “The strength of the team is each individual member -- the strength of each member is the team.” Each of authors of the ten papers included in this volume is a nationally renowned leader of the engineering profession. A short biographical summary of each author’s career is included in the About the Contributors section in this volume. Equally important as their individual credentials, the authors of these ten papers have been long-time members of ASCE’s Raise the Bar Team – working together to make sure that future civil engineers are properly prepared for their futures as part of a learned profession.

Many other individuals were also key leaders and members of the Raise the Bar Team. In large part, these include the dedicated engineering professionals who worked on various ASCE CAP³ committees. These individuals are listed in Appendix C of the first paper of this volume. An examination of this list shows that the work to Raise the Bar for the engineering profession was not accomplished by a small group of reform-minded individuals, but a robust group of dedicated, committed, and concerned change agents.

The editors also wish to express their gratitude to the presidential officers of the American Society of Civil Engineers for their unfailing support of the Raise the Bar Initiative since 1998. The continuity of their support, vision, and leadership was critical to the furthering of the Raise the Bar initiative. Their names are listed in Appendix D of the first paper of this volume.

The long-time leaders of CAP³ have “passed the torch” of the Raise the Bar Initiative to the leaders of a new national committee -- appropriately named the Raise the Bar Committee. The chair of the Raise the Bar Committee is ASCE President-Emeritus Blaine Leonard, and the committee’s primary staff supporters are Stefan Jaeger and Mark Killgore. The current focus of the committee is to influence state licensing boards to Raise the Bar for future professional engineers. The editors of this volume are fully confident that the critical reform efforts as reported in this volume will continue under their leadership.

The editors express their sincere appreciation to the staff members of ASEE who have granted the appropriate permissions to print several of ASEE’s *Proceedings* papers. This includes Norman Fortenberry, Mark Matthews, and Wayne Davis. They also wish to express their heartfelt gratitude to the three members of ASCE’s publication staff who have worked so conscientiously and expertly to make this publication possible. This includes Bruce Gossett, Betsy Kulamer, and Donna Dickert.

Dedication

The editors dedicate this work to Richard O. Anderson, P.E., Dist.M.ASCE; Gerald E. Galloway, Ph.D., P.E., NAE, Hon.D.WRE, Dist.M.ASCE; and Stuart G. Walesh, Ph.D., P.E., D.WRE, Dist.M.ASCE. These three individuals have been the ultimate selfless servants of the engineering profession by leading and/or serving on CAP³-related committees continuously from 1998 through 2012. Collectively, they have been the heart and spirit of the Raise the Bar Initiative.

Chapter 1

A Historical Overview

Jeffrey S. Russell, Ph.D., P.E., Dist.M.ASCE, NAC, F.NSPE, *University of Wisconsin-Madison*

Thomas A. Lenox, Ph.D., Dist.M.ASCE, *American Society of Civil Engineers*

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