Developing the Next Generation of Structural Engineers

Part 4: Industry Reform/Conclusions

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This is the final article of a four-part series on the opportunities and challenges we face in developing the next generation of structural engineers. It is based on the author's keynote address at the SEI Structures Congress in March 2012. This article reviews some of the ongoing reform efforts by ASCE and others, and closes with a call for action by all in the structural engineering community.

Thought Leadership to Date

Many organizations and individuals have provided excellent thought leadership about the future of engineering, in general, and our ability to compete in a global marketplace.

The National Academy of Engineering and various academic leaders have focused heavily on educational reform. Some of their ideas are quite far-reaching.

SEI's parent organization, ASCE, has shown outstanding leadership on behalf of the broad civil engineering community. ASCE Policy Statement 465 sets forth a certain body of knowledge for licensure that would be met by a combination of a baccalaureate degree in civil engineering, a master's degree or 30 graduate or professional practice credits, and appropriate practical experience.

In June 2006, ASCE held a summit of leaders in civil engineering and related disciplines on the future of civil engineering. The result was ASCE Vision 2025, published in 2007. Vision 2025 sets forth an inspiring view of our future.

Finally, ASCE's Committee on Academic Prerequisites for Professional Practice (CAP3) has been studying proposed changes in the way civil engineering is taught and learned. The Body of Knowledge (BOK) committee published its second-edition report (known as BOK2) in 2008. It is a monumental work, laying out 24 desired "outcomes," or areas of competence, that a well-trained civil engineer should possess. The report offers a roadmap for achieving those proficiencies through undergraduate training, graduate training, and professional experience. But the thinking stops at attainment of licensure.

Industry Leadership

We are not alone in the structural engineering community. We have the strength and resources of all of ASCE behind us. ASCE is working on many of these issues through its CAP3 and associated subcommittees. SEI has partners in the other ASCE Institutes. Beyond ASCE, there are many other organizations worldwide with which we need to build coalitions.

Most importantly, our engineering community needs to do a better job of talking to the rest of the world; by that I mean more public outlets within the structural engineering community in the US and outside our country's borders. My colleagues around the globe tell me that they observe that most US structural engineers are relatively sheltered in their view of the world.

I am pleased to see that the SEI Board of Governors has taken on a number of strategic initiatives that are exactly in line with the need to develop a new breed of structural engineer.

Our Profession at a Crossroads

Our profession today is at a critical crossroads. If we fail to act boldly *now*, our work will become trivialized and we will get run over by the steamrollers of automation and global competition. Our current position of strength in engineering in the United States, and our fundamental culture of promoting leadership, innovation, and entrepreneurship, position us well to take on the grand challenges of the world in the 21st century. We have a wonderful opportunity to contribute to global society in a profound way. The future for structural engineers offers us the chance to attract and retain our best and brightest into a profession where they can be challenged, continuously learn and develop, and shape the future of the world. To succeed, we must overcome our fears and inertia and lead change *now*.

This is not a challenge that will be met only by the leaders and committees of our engineering societies. This is not a challenge only for the young professionals among us. This is not a challenge only for academic leaders. Each one of us must get involved.

Professors and Academic Leaders

I encourage professors and academic leaders to work and advocate for academic reform along the lines of the developing ASCE Body of Knowledge. Develop rubrics specific to structural engineering. Fight to change the evaluation and reward systems in academia to assure a proper focus on teaching and professional development. Work with industry to improve the integration and overlap of teaching, research, and practice. Spend some sabbaticals in industry practice. Invite more practitioners into your classrooms. Leverage the value of effective industry-academic advisory boards.

Engineering Managers and Leaders

If you are a project team leader or company CEO, the most important thing you can do is invest in your staff. Not only do we have to make financial investments in training and professional development programs, we have to enhance the power of experiential learning. We must commit to restore the waning art of mentoring. More creative, confident, value-producing engineers will return your investment in them with productivity and loyalty to your organization.

Young Professionals and Students

To young professionals and students I say, "This is your future." Take charge of it. No one is going to do it for you. Ensure you always have a long-range professional development plan and work toward it. Expect to invest your own time in self-study. Read prodigiously and broadly, not only in subjects related to your practice, but in other areas that will help you become a better global leader. And invest yourself at an early age in professional society work.

Closing

As we stand at our profession's crossroads, let us resolve to choose the path of greatness. If we work together with passion, energy, focus, and unyielding determination, we can take this great profession to even greater heights, and in the process change the world.▪

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