



## Structural Engineers

Leadership to Address the World's Challenges

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Who better than structural engineers (and civil engineers in general) have the skills, temperament, and understanding of the built environment to lead the next disruptive changes to advance society?

As automation, artificial intelligence, machine learning, and biotech dominate the “4<sup>th</sup> industrial revolution,” structural engineers are in a perfect position to be leaders and innovators. To become innovative leaders, the collective profession needs to shift its focus to the broader challenges of society to determine how infrastructure will play a dominant role in advancing society. This means growing the profession’s societal involvement and becoming trusted leaders.

To accomplish this, structural engineers have to grow their skills beyond their technical abilities and take on greater leadership in both infrastructure projects and societal issues. The ASCE Report card is an excellent example of how engineers have led newsworthy infrastructure-related societal issues that have also impacted policy changes. Structural engineers need to increase their visible advocacy by serving on boards and city councils. They are often regarded as technically very smart, but improving emotional intelligence is critical to the success of the profession. Most importantly, the profession needs to embrace its responsibility to educate future engineers to be creative, innovative, and a stronger motivational force for positive change.

### Educating the Future Engineer

Education, and the constant desire to make every new engineer in one’s own image, disrupt reinvention. Engineers often lack soft skills and the profession often focuses on the technical side of education. This occurs despite research that shows that technical skill only covers 15 percent of the skills needed to be successful in this profession. While there are significant differences in degree programs – including general civil, structurally-focused, and architectural engineering degrees – none prepares an engineer for a lifetime career. A bachelor’s degree is considered the bare minimum knowledge required to start as a practicing engineer.

While there are current efforts to “raise the bar” and complaints that a bachelor’s degree has fewer credits and less technical content than in the past, the fact is that a bachelor’s degree – or for that matter, a master’s degree – and a license are only the beginning of the education required to be a structural engineer. This is because the demands of the industry are changing rapidly, as witnessed by the complexity of codes, the breadth of knowledge required, and the pace of technology. Most structural engineering firm leaders say that engineering graduates do not know a fraction of what is needed, so they are hired based on the limited requirement of problem-solving abilities. None of this addresses the required focus and education on the non-technical skills needed for leadership. The most significant innovation in this field is coming from Elon Musk, Physics Ph.D., and entrepreneur who has reinvigorated tunneling.

The bachelor’s and master’s degrees should peak an engineer’s curiosity and instill the desire to learn. This would leverage a more significant role for continuous professional education. All of these issues, however,



clearly depend on what industry the structural engineers support and the focus of their professional practice. An engineering career typically spans three stages: Early, Mid, and Late. Part of the career path often includes decisions to remain focused on the technical aspects of engineering or, more often, opportunities move experienced engineers onto a management path. The profession needs to consider developing both technical and management career paths as a way to improve the profession. Currently, most of the financial incentive is focused on the management track.

The SEI Continuing Education committee has developed a strategy. Continuing education needs based on career stage, as well as much of this editorial, came from that effort. The needs at each stage are:

**Early-Career:** Knowledge of all Basic Building Materials, Design and Detailing Requirements, Communication, Listening, Report Writing, and Computational Literacy

**Mid-Career:** Management skills, Communication, Judgement and Decision Making, Currency with Codes, and Technology

**Late-Career:** Marketing and Selling (Firm Legacy), Stewardship of the Profession, Motivate and Inspire (both inside and outside profession), Mentoring and Leadership, and Subject Matter Expert

While technical expertise will always be in demand as an engineer moves through the three career stages, there is an increasing demand for non-technical skills such as communications, business acumen, and leadership. Continuing professional education is an efficient way to help engineers gain the needed additional non-technical skills and expand or deepen technical knowledge and skills.

It is clear that future structural engineers will need a variety of both technical and non-technical skills. This fits the need and the new direction of the SEI Vision. These skills will vary based on personal goals, individual career path, and company focus. Whatever the direction, the opportunity to improve society through the built environment has given engineers the chance to provide a more rational approach to the future.

**Get involved and grow your skills to lead:**  
[www.asce.org/SEI](http://www.asce.org/SEI) – Join a Committee or Chapter effort, participate at a conference [www.asce.org/advocacy](http://www.asce.org/advocacy).



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