

Developing the Next Generation of Structural Engineers

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The world of Structural Engineering is in one of the most significant transitions we have seen in recent history. As we exit the more recent Great Recession and establish new normal economic conditions, we are also dealing with rapidly changing technology, the effects of a more global economy, and ever-evolving contract structures and delivery methods. The growth of the economy in the last few years has provided new opportunities and filled the backlog of most firms, but we still see pricing pressures. BIM, finite element modeling, and the growing sophistication of computer programs are changing workflows. Where we used to compete against a small group of local firms that we knew, we are now finding ourselves competing with firms across the country and even internationally.

When you combine this with the retirement of Baby Boomers, happening at a record rate, it is easy to see why structural engineering firms are so desperate for new talent. Finding young, ambitious engineers is just the start. You have to recruit them and then enhance their education with experience to make them productive as quickly as possible. Recruiting, refining, and retaining new engineers is one of the biggest challenges facing firm leaders today.

Young engineers are experiencing new and bigger pressures than their predecessors. Because of the shrinking Baby Boomer workforce and the fact that Generation X is one of the smallest generations in recent history, Millennials are expected to fill the ranks of firm leadership earlier in their career. They also must become proficient in building codes, design procedures, contract structures, risk management, and technology in a more complicated environment than we saw even ten years ago. Staffing a firm with new leaders is difficult for both the firm principals and the young engineers.

We, as a profession, can help develop the next generation of structural engineers by getting involved in their collegiate education as advisors, mentors, and teachers. Many colleges and universities throughout the U.S. welcome input and assistance from professionals. By getting involved at the collegiate level, professionals give student engineers a real-world perspective that builds upon the material covered in their classes. Also, it gives

firm leaders a chance to vet potential new hires in an environment where you get a better picture of their work ethic over a prolonged period, rather than in a short interview.

Guest lecturing a class is an easy way to get involved. Whether you lecture on a technical topic or soft skill, the use of examples from current projects will serve as a valuable lesson. Giving students an opportunity to see how the skills they are learning in college are applied to real projects provides a perspective that can make learning more exciting, thought-provoking, and easier to connect practical application to abstract concepts.

Professionals can also get involved in the student chapters of professional organizations. ASCE's concrete canoe and AISC's steel bridge competition are examples of activities where professionals can spend time with students in a fun and educational environment. These programs give professionals a means to share design techniques while assisting students in competitions against other universities, which indirectly ties to today's competitive market for engineering services.

Co-ops and internships are also good ways for firms to get involved in the education of students. These opportunities can be invaluable to a young engineer, and to the firm. These soon-to-be engineers gain valuable experience, and the firm can "test drive" a potential new hire. This is a great way to recruit young engineers before the competition even knows they are entering the job market.

Once you hire a new engineer, the task of giving them the experience and mentoring they need can be overwhelming for both the senior engineer and the junior engineer. One approach that works is to give the young engineer a cycle of assignments with steep learning curves that plateau periodically. This can be done with a combination of projects that expand the young engineer's skills with projects that are familiar. Giving a new engineer a project that challenges them followed by a project very similar helps the engineer gain confidence as they perform tasks on their own. It also gives the senior engineer a chance to get out of the constant training mode and progress with their daily work and responsibilities.

The senior engineer does have to provide the young engineer opportunities for as broad a skill base as possible. The experience and skill set of the young engineer should be continuously reviewed, and projects and tasks assigned that will continue their growth. As they become proficient at technical skills, it will be time to make them responsible for more project management tasks like budgeting, scheduling, and communicating with clients and team members.

It is also essential to give the young engineer feedback and insights as to why certain things are done. Routine trips to job sites should be common, an excellent opportunity for senior engineers to teach the "hows" and "whys" behind the things we do. Senior engineers should also take the time to debrief young engineers after meetings. Continually teaching young engineers the thought process that produces desired outcomes is important to growing new firm leaders.

Ultimately, one goal should be to have the young engineer become licensed. Licensure allows up-and-coming engineers to expand their job role and their responsibility in the firm. This starts by teaching them the importance of licensure while they are still in college. It should be continued when they enter the workforce. Senior engineers can help by providing experiences that will aid in passing exams. Young engineers should also be trained in the responsibilities associated with licensure and ethics involved with being a professional engineer.

CASE has prepared a toolkit that assists in training new engineers. Tool 5-2: *Milestone Checklist for Young Engineers* can be downloaded from CASE's website by members and is for sale for non-members. This tool provides a guide for the skills young engineers should develop before becoming licensed. ■



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