



Developing the Next Generation of Structural Engineers

Glenn R. Bell

Simpson Gumpertz & Heger, Boston, Massachusetts, USA

Contact: grbell@sgh.com

Abstract

Rapid changes in technology coupled with global societal developments and challenges require a new breed of structural engineer, more broadly capable than ever before. We must define a new set of structural engineering competencies and dramatically overhaul our approach to the engineer's education and development. This will require a massive collaboration among stakeholder organizations world-wide. The future of our profession depends on it.

Keywords: Education, Competencies, Skills, Professional Practice, Future Challenges, Globalization, Societal Needs.

1 Introduction

The future promises unprecedented opportunity and challenge for the structural engineering community. Globalization, energy and sustainability imperatives, economic pressures, technological advancements, and the impact of climate change will fundamentally disrupt our profession.

Such far-reaching developments require a new breed of structural engineer, more broadly capable than ever before, to be global leaders in meeting many of society's greatest needs.

Advancements in computers and other forms of automation are increasing at an accelerating pace. This is a dual-edge sword for the structural engineering profession. If we allow machines to increasingly do the jobs we do "manually" today, they will commoditize and supplant our roles. However, if we harness the power of automation to our advantage, we can free ourselves of drudgework and engage our creativity to provide solutions of greater value to our clients and society as never before. This will require different skills and fundamentally new approaches to our work.

2 Next Generation Competencies

Tomorrow's structural engineer must be globally adept; creative, collaborative and communicative; solidly grounded in engineering fundamentals and able to obtain reliable results with complex computational tools; skilled in designing to performance goals rather than solely by prescriptive methods; and effective in delivering solutions that are efficient and of high value.

I believe that the successful new breed of structural engineer will have the following qualities:

- To be a successful *global practitioner* we must have solid fundamental technical skills to practice with varying codes, materials and systems, and construction techniques. We also must have exceptional soft skills to operate in venues with varying languages, cultures, values, and business environments.
- We must be able to *collaboratively lead* tomorrow's project teams, which will have multidisciplinary members, who are scattered around the globe.