Editorial

Code Complexity and Information Overload

Where will it end?

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While recently studying a set of original construction drawings for an old elementary school built in the early 1960s, I could not help but notice the number of drawings. Including the civil, architectural, structural, plumbing, mechanical and electrical, there were a total of 13. It dawned on me that on one of our recent projects of comparable size there were in excess of 150 drawings, plus a 3000 page specification book! Even with that level of documentation, on this particular project there was still multiple page addendums, countless RFIs and numerous change orders. Building Codes have experienced a similar growth. In 1929, North Carolina's building code had a total of 30 pages. By 1940, it had increased to 50 pages and to 120 by 1956. Today, that state's building code fills six volumes and about 2,000 pages.

Practicing in Virginia in the early 1970s, we utilized the BOCA Code. There were a total of (84) 5 ½- by 8 ½-inch pages in the structural sections of that code. Wind loads could be determined by choosing a basic pressure from a chart, based solely on a wind speed selected from a map of 50 year mean recurrence interval contours and multiplying it by some basic coefficients. Component and cladding pressures were determined simply by multiplying the basic pressure by a factor of 1.5. Seismic loads were something that only those guys on the west coast had to worry about.

Today, the 2003 International Building Code has almost (250) 8 ½- by 11-inch pages in the structural sections. Wind and Seismic calculations cannot be done anymore without a spreadsheet, and the "Simplified Method" for wind is anything but simple. Seismic considerations have become an every day consideration, even for us on the east coast.

Model codes and many design standards are now typically published on a three year cycle, with supplements each year. Therefore, it is very difficult to keep current. There is little time to study and properly understand the provisions of the new codes before they become outdated. In addition, the adoption of the various editions of the model codes by local, state and other regulatory bodies varies greatly. Thus, we are forced to deal with multiple versions of the same code concurrently. Many jurisdictions even adopt their own amendments.

Most disturbing of all are the mountains of information that is available at our fingertips on the internet. The entire library of the American Concrete Institute, including the Manuals of Standard Practice, is but a couple of clicks of the mouse away. Design aids, catalogues and various kinds of information from every trade organization and manufacturer in the market are also there. AISC advertises that there are "more than ten thousand pages of technical information" available twenty four hours a day, seven days a week. It is almost becoming a full time effort just attending the seminars offered by the various professional organizations.

Some might say that the world is a different place today – more complex and faster paced – and I would certainly agree. There are many factors that have influenced the design and construction process over the past 30 to 50 years, including new and more sophisticated materials, specialized areas of practice, the evolution and parabolic growth of computer technology, and the litigious environment in which we now live and work.

However, I am concerned that the increased complexity and continued development of building codes and standards, and the volume of information routinely available to us, has created serious threats to the practice of structural engineering… not only technically, but from both risk management and business practice perspectives. How much does it cost to maintain a level of technical competence consistent with the standard of care? In a highly competitive market, can the current fee structure absorb these costs? To what new risks are we exposing ourselves? How can we manage them effectively? A consulting structural engineering firm is a business, and it must be run as such. Therefore, the costs of doing business in an ever changing market must be controlled.

I am not advocating a return to "the good old days". However, we must find ways to work together to control the business side of our practice and manage the new risks, while learning to take advantage of new technology.

The writers of the Codes and Standards should give consideration to a longer change cycle, say five years instead of three. Issue yearly supplements for only the most significant changes. This would allow the users more time to study and learn the provisions of the codes, and fully implement them into their practice. In addition, consider development of truly simplified procedures for wind and seismic design. A large percentage of buildings and structures do not warrant use of complex or sophisticated wind and/or seismic load procedures, and could be safely and economically designed based on simplified provisions.

As practioners, it is necessary that we devote the time and resources necessary to keep up with the latest research and code developments. Continuing education, whether or not it is mandated by state registration laws, is essential. Statistics show that firms that promote and provide opportunities for training are more profitable and experience a lower claims frequency than those who do not.

The fundamental concepts of risk management are more important today than ever. Evaluate each project before you take it on. Make sure it is something that you have the resourses and experience to handle. Have a well written contract with a defined scope of work, free from onerous language. Devote time for review and checking of your work, and have formal quality control procedures. Maintain a presence throughout the construction phase of the project. Finally, learn to recognize potential problems early, and take steps to mitigate them.

So, will Codes continue to change, incorporating results of new technology and research? Absolutely! Is the information age going to end? Absolutely not! Therefore, the development and application of sound principles of business and risk management are crucial to the future well being of our profession.▪