

Editorial | *Much Will Be Expected*

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As I enter the latter phases of my career, I reflect on changes in how structural design documents are developed, recorded, and used for facilities and bridges around the globe. I am a Baby Boomer, so the only constant in my career has been change.

When I first started, we produced drawings on mylar and specifications using a typewriter; there were no electronics involved. We moved from the slide rule to calculators early in my career and ran structural software utilizing punch cards and mainframe computers. I remember when we did preliminary and final analysis using the portal frame and moment distribution techniques. Companies had a computer room where one went to run an analysis. I still remember doing building additions and renovations where the original drawings were on linen; those documents were works of art. Everyone had a drafting board with a T-square, triangles, electric erasers, and erasing shields.

As my career progressed, personal computers came into vogue, and word processors and spreadsheets became the new normal. You could now do all your work at your desk. Can you remember C:>, WordPerfect, MultiMate, and Lotus 123? How about Intel i186, i286, i386, and i486 microprocessors, and finally the Pentium? We had 13-inch screens with green characters, followed by an amber monitor which was so much easier on the eyes. Then one day we woke up and the Windows operating system was born, with colors everywhere! You could have two programs open at the same time. Monitors gradually became larger and flatter, and today most of us use two or three that are 24-inch or larger.



With all this new technology came changes in how we documented our work. AutoCAD became the new normal. How awesome was it that we could put our drawings together electronically and plot them without those terrible smelling ammonia printers? Remember drum plotters with multiple pens of different line weights? Those drum plotters gave way to sheet plotters, which gave way to today's plotters that work like a copier.

As this was happening, how we communicated changed from letters and telephone calls to e-mails. Next came text messaging, followed by social media: Facebook, LinkedIn, Twitter, Instagram, and now Snapchat. It seemed we suddenly started talking to each other less and less. It was much easier to communicate with many people using one of these media options than to pick up the phone to say hello.

The next transformation was mobility. Up to this point, all work was done at the office; we could not very well carry our bulky PCs

around, and our phones were hardwired. It feels like just yesterday the mobile phone and laptop computer became the new normal, and suddenly we could work from anywhere. Fortunately – or unfortunately, depending on your viewpoint – we were connected 24/7. I remember telling my wife that I never wanted to be that connected to work and now, 20 years later it seems as if we all work around the clock. I am not so sure that this is a good thing.

For better or for worse, those who embrace change will reap the rewards. One question we must ask ourselves, has all this made our profession better? I think that the answer is a resounding yes – our analysis tools are much better and how we document our work is more accurate. The different disciplines share the same layers, which reduces drawing errors, and many of our analysis software results can be imported directly into our documents. We even have clash detection to ensure that the different building systems will fit within the same space.

We are producing work at lightning speeds – but are we spending adequate time reviewing it? Here is where I think we need to focus significantly more effort. With ever shorter deadlines, we sometimes forget the adage that an ounce of prevention is worth a pound of cure. How often – be honest – have you seen a set of drawings go out without a thorough review? I am not talking about a senior engineer spending an hour or two, but someone spending a day or two reviewing the plans, details, calculations, and specifications. Those reviewers are checking the design and coordination, not only within the structural drawings but also with the rest of the project documents.

At the beginning of my career, this was the norm; now it happens far less frequently. In many cases, that decision is controlled by the financial condition of the project. As professionals, we are mandated to protect the health, safety, and welfare of the public. While we do this well, I believe that document review is our most significant opportunity for improvement.

Years ago, it was easy to spot the places on design drawings to look more closely – wherever the mylar was most smudged or had lost its film because of various revisions. Now, when we plot electronic drawings, they all look so good that it is much tougher to spot problem areas – it requires the expertise of a seasoned structural engineer. How about specifications – does anyone do more than a cursory review of those these days? Without thorough coordination with the drawings, we could be adding unnecessary cost and schedule impacts or, worse yet, miss something that could negatively impact the design integrity of the structure.

Let me encourage all of us to take a few minutes to evaluate how we review our work to ensure that what we produce truly represents the quality level we intend. This is an awesome profession that has grown much over the years. As the saying goes, from those to whom much has been given, much will be expected. We need to make sure that we do not lose focus on design quality by relying too much on the technology that has significantly improved how we perform our work. ■



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