Editorial

Are We Relying Too Much on Computers?

A Reprise

By Edwin T. Huston, P.E., S.E., Vice President of NCSEA

The two articles on this topic in the February 2007 edition of STRUCTURE® elicited an unusually large response. We received about 30 letters to the editor, and I have received another 40 or so comments from individuals as I have visited Member Organizations. There is a rule of thumb that for every letter received on a topic, there are 99 other individuals who thought about writing but didn't get around to it. It appears that this topic struck a chord. Due to this large response, I decided to use this month's editorial to report back to you.

In case you didn't see the February editorial, I started it with the following opinion. "I believe that our profession may be nearing a crisis and that most of us don't realize it or, if we do, we don't know what to do about it. I believe the crisis will be brought about by an over-reliance on computers, coupled with an inability to sense when an answer isn't correct. In fact, I will go so far as to say that I believe this crisis will manifest itself in the collapse of structures."

About 5 percent of the letters we received on this topic expressed mild opposition to this point of view. One, written by a retired colleague, expressed the opinion that things weren't as bad as I made them out to be. He said that "Computers are here to stay, and the benefits of using them certainly outweigh a rare bad result." Another took exception with my statement that "I don't think that the engineers of my generation are any smarter than today's graduates." The writer listed four reasons for his difference of opinion. I don't have enough space to go into them now, but those reasons may be the topic of a future article.

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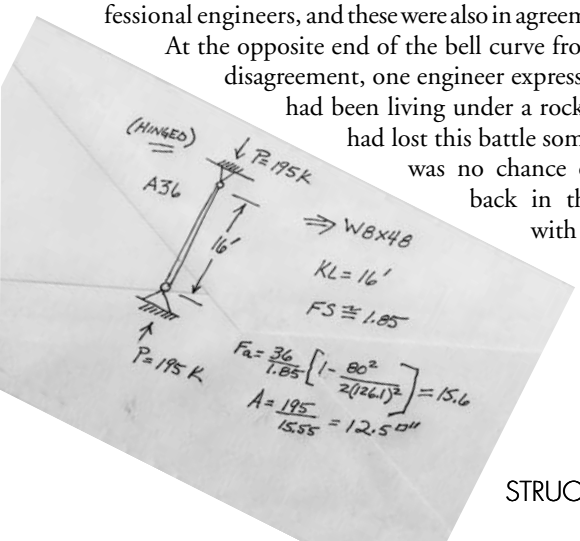
Ten percent of the letters were in agreement and were from University Professors who described how they tried to teach their students to deal with this problem. Two of them try to instill a sense of judgment in their students. One noted that while students lost points for unrealistic answers from a calculator or a computer, they could get some of those points back if they recognized that the results were bogus. A third professor said that he still taught the classic methods of analysis, so that students had the tools to check their output.

The remaining eighty-five percent of the responses were from professional engineers, and these were also in agreement with my premise. At the opposite end of the bell curve from those who were in disagreement, one engineer expressed the opinion that I had been living under a rock somewhere, that we had lost this battle some years ago and there was no chance of putting the genie back in the bottle. I disagree with this opinion.



Many letters gave actual examples of some of the flawed designs that had been generated from errors in computer modeling. Thankfully, these were all caught prior to construction. One letter stated that, due to this problem, the writer's firm had instituted a policy of 100 percent in-house peer review of all designs of younger engineers. One particularly plaintive letter was from a young engineer who wisely observed that part of the problem was in the complexity of the Building Code and Standards. He noted that his Bachelor's degree left him unprepared to deal with this complexity and that he had started working on a Master's degree. This topic of code complexity was also echoed in a few other letters.

Two other responses suggested additional education as the answer. One thought that this education should be at the university level, the other thought that it should start there but should continue with additional training in our offices. I agree that additional education is the answer. I think we need to collect "rules of thumb", "back of the envelope methods", pre-solved methods from textbooks such as Kleinlogel or Roark, approximate analysis techniques and, yes, even dust off those classic methods of analysis. We could then assemble these and find an effective method of distribution. While I may not be the person who ultimately puts this together, I will volunteer to be the point of contact.

So send me more letters. Tell me what rules of thumb you use. They can be simple rules such as "the depth of a floor beam in inches should be three-quarters of the length of the beam in feet." They can be generalizations such as "the seismic base shear for Seismic Design Category 'D' of a short building should be 20 percent of the weight of the structure when using strength design." They can be the procedures you use to check output, whether that is checking equilibrium or a procedure to check deflections. Whatever they are, send them to me. I'll collect them; and let's see if we can prevent that collapse that has me so concerned.▪

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