

STRUCTURAL LICENSURE

issues related to the regulation
of structural engineering practice

The Lake Wobegon Effect and Structural Licensure

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Lake Wobegon is a fictional Minnesota Town from *A Prairie Home Companion*, a popular public radio show by Garrison Keillor. One of the show's famous lines about the town is:

"...the little town that time forgot and the decades cannot improve ... where all the women are strong, all the men are good-looking, and all the children are above average."

Part of the humor is the plainly impossible circumstance that every member of each group excels. The very definition of an average requires that some members of a population are above the mean, and some are below. Unfortunately, people are not good at making an accurate self-assessment to determine where their performance ranks in relation to the group as a whole.

In 1999, David Dunning and Justin Kruger of Cornell University examined our abilities to judge our proficiency at certain skills. Their finding that the least capable were generally the most likely to significantly overestimate their proficiency became known as the Dunning-Kruger effect. More recently, Professor D. G. Myers termed this type of illusory superiority the Lake Wobegon effect.

Last year, Prof. Myers showed that more than three-quarters of those polled thought themselves to be safer than the average driver, and nearly two-thirds said they are better than average at parallel parking.

The research indicates that we fail at making accurate self-assessments. And while we can find humor in an overestimation of our parking skills, when it comes to driver safety, there's a little more at stake. Is there any amount of added caution that the truly above-average drivers can take to mitigate the risks posed by those who falsely think they also fit into that category? I doubt the risk can be completely mitigated when it comes to driving cars; however, those who drive others or operate large vehicles can be required to pass tests indicating a higher level of mastery of critical driving skills.

Based on the research, is it irrational to contend that engineers may be affected by the Lake Wobegon effect? Does our engineering education and training make us immune to tendencies of the human brain toward cognitive bias?

It is rational to conclude that some engineers overestimate their ability and take on projects beyond their capability. A system of checks and balances can stop the abuse of the professional seal – sometimes. However, that system is not foolproof.

The potential risk to the public as a result of an engineer's inability to adequately recognize their limits is a strong reason for advocating structural licensure. Just as we require those who chauffeur passengers or transport heavy loads to undergo more rigorous certification than most drivers, we should also expect engineers who design significant

structures to demonstrate a higher degree of proficiency. This is a natural conclusion from the growing body of evidence that shows we can and do misjudge our capabilities.

If you are not swayed yet, consider the same logical stance applied to driving. Would it be rational to let someone who just passed a driving test to decide what limits should be placed on their driving? Let's also mix in financial incentives in this hypothetical situation and assume their financial well being and the well being of their family depend on being able to drive. Under those conditions, how well will that person assess their own skills when offered a chance to earn a good income for driving a truck that looks to be just a little more vehicle than they are accustomed to driving? This scenario parallels circumstances faced by engineers regularly.

A recently registered PE may be confronted with some very weighty choices. Take Pat, a hypothetical structural engineer who recently became registered by passing the civil-structural PE exam. Pat works for a small consulting firm and is their only registered engineer with structural experience. Pat's manager, the owner, has a great opportunity for the firm. The project involves the design of a five-story healthcare facility that will also serve as an emergency shelter. Working on this project could mean significant growth opportunities as well as better financial stability for Pat. While this design is greater in magnitude than any of Pat's prior efforts, Pat is familiar with its elements: foundations, concrete design, and steel design.

During construction, everything appeared to be in order and progressed according to schedule. Unfortunately, there is an undiscovered design flaw – the anchorage details for the shear walls to the foundation are not adequate. The inadequacy is not so egregious as to cause failure during construction, but the anchorage might fail in a design level storm or seismic event. Sadly, nobody involved in the project is aware of this flaw, and all involved view the project as a success. The error stemmed partly from Pat's overconfidence, and partly from pressure, possibly self-induced, to help the firm obtain a significant project.

Confirmation bias is a further complication that arises from this situation. The apparent success of the healthcare facility project is likely to give Pat even more confidence to tackle a similar project, and very possibly repeat the same error. Like Bill Gates said, "Success is a lousy teacher. It seduces smart people into thinking they can't lose."

Circumstances like Pat's are one reason structural engineers should support structural licensure. Having a process in place to assure that structural engineers, for significant structures, are vetted by testing and experience helps to guard against human fallibility. Admittedly, the dilemmas in these situations are hypothetical and written to demonstrate the advantages of structural licensure. But they are entirely within the realm of reasonable possibility. ■