



Black, White, and Gray

Ethics in Engineering

By Greg Cuetara, P.E., S.E.

As engineers, we have a great deal of black and white in our world. We have been trained to define a problem and come up with a solution. Does a structure have the capacity we need, or not? How do the capacities compare to the imposed loads? We use “engineering judgment” grounded in our knowledge and experience to determine whether a structure is safe; but, even with this information, we are using defined skills. It can be difficult to see that there is also a lot of gray area in engineering.

One such area is ethics. Essentially, ethics is doing what is right. To be ethical as engineers, we need to practice within our discipline, field of competence, and area of examination, which is why we are licensed in the first place. As our licensing rules state, we also have an ethical duty not only to ourselves, the engineering community, and the work that we produce, but also to protect the safety, health, and welfare of the public.

In most jurisdictions, there is no differentiation between disciplines; each engineer has the obligation to practice only in the areas in which he or she is genuinely competent (structural, electrical, etc.). However, this arrangement is now being questioned by many in our industry. For example, NCSEA, CASE, and SEI all advocate specifically licensing structural engineers (SE) as distinct from other disciplines, either separately or as an additional credential beyond the professional engineer (PE) license. Building codes are changing so frequently that it is difficult for anyone not practicing solely in that discipline to keep up with them.

In addition, the National Council of Examiners for Engineering and Surveying (NCEES) has determined that engineers should be tested specifically in their area of competence, which they have organized into 25 different exams. Some of these are generic in the morning and specific in the afternoon. NCEES has also determined

that a single 8-hour exam is not sufficient to test structural engineers and instead now offers a 16-hour structural exam. These exams do not cover every situation, but they are a means to evaluate engineers to verify that they have achieved a minimal level of competence.

Some states and municipalities require peer reviews of an engineer’s work. As a result, I have had the opportunity to review other engineers’ drawings and projects, and at times this has tested my ethics. Recently, a set of documents from another engineer raised a number of red flags as I was looking through the drawings, calculations, and field notes. The existing conditions as noted did not make sense and did not match what was shown on the drawings, and my own initial calculations suggested problems with the design. I discussed my concerns with the engineer, and he simply blew them off. I was now in a position in which I had to defend what was right and the safety of the building’s occupants. I was fortunate enough to be able to take my concerns to the next level; fortunately, that person paid attention to my concerns, and everything was resolved.

This situation, to me, was black and white – we did not have the option to disregard inconsistencies. When it comes to ethics, however, many people often assume that it is a gray area with no right or wrong answers. The other engineer was trying to please his client by taking shortcuts, putting his duty and responsibility aside.

There are times when we as engineers push our limits and that is okay, as long as we are practicing within our area of legitimate competence as demonstrated by having been tested. Still, we have a duty as professionals to act in an ethical manner. Unfortunately, we sometimes lose sight of the big picture and get caught up in the weeds when we are working for our clients. They ask for the impossible and we believe that, in order to keep them happy,

we have to provide any design that they request. However, *we* are the trained professionals and need to make well-reasoned recommendations to our clients on what is required and appropriate.

Ultimately, we need to remember that our “clients” are not only the people paying our immediate fees, but also the end users of our buildings, bridges, and other structures. We must always keep them in mind, especially in the (hopefully rare) circumstances in which we are forced to question what is right and what is wrong. We have a duty to the public, due to our education and experience, to protect our friends, family, and neighbors as best we can. While it is impossible to find and catch everything, when we see something that is not right, it is our responsibility to question and challenge why and determine what should be done to address it. In short, when it comes to engineering, we need to defend what is right.

If you are ever put in a position that tests your ethics, you do have options. Many large companies have an ethics hotline that you can call to report the situation. If that is not an option, take it to your industry peers by notifying professional engineering licensing boards or building code officials. It is up to us as engineers to police ourselves and uphold the ethical responsibility that we have to the public, and it is a part of the job that we should take just as seriously as the designs that we produce. ■

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