NCSEA
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STRUCTURAL CONNECTION

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What Are You Communicating?

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Communication is what the listener does.

Mark Horstman, engineer, author and co-creator of the Manager Tools podcast, first said this several years ago to make an important point. What a reader or listener takes away from our writing or speech is truly the communicated message. Often, this can be different than what we had intended to convey, sometimes vastly different. As structural engineers, effective communication is vital to achieving our profession's objectives.

We use a wide variety of media for our messages: email, telephone, proposals, reports, calculations, specifications, drawings, personal conversation, etc. Yet, how often are we sure what the recipient understands is what we intend? Usually, we can have a reasonable degree of confidence with direct personal communication, such as one-on-one conversation or telephone calls where there is opportunity for clarification and questions. The asynchronous nature of other forms, such as email or drawings, makes working to create clarity paramount; it cannot be assumed. As a result, both existing and developing media leave room for miscommunication.

For example, consider how drawings packages have changed over time. Surely, any structural engineer who has examined drawing sets used for the construction of older facilities has marveled at what was built with a dozen or so drawings. Today, comparable structures would have hundreds of drawings.

Early in the industrial revolution, when engineers also were master builders (think of John Roebling or James Eads), there was little separation between the engineer and the craftsmen building the structure. The engineer, or the engineer's primary understudy, was almost always on site to address any questions or concerns. This is one of the reasons that magnificent structures such as the Brooklyn Bridge or the Eads Bridge could be built with so few drawings.

Due in part to changes in the practice of engineering, the gulf between builders and structural engineers has grown. This was and continues to be driven in part by greater specialization of engineering disciplines, developments of technology, and greater specialization in procurement and building methods.

Like most professions, structural engineering is shaped by associated technologies and business climates. Calculations are not made with slide rules anymore and drawings aren't inked onto linen sheets. Even using a hand held calculator and AutoCAD is less common. We use various FEA systems, new and updated code provisions, BIM, laser scanning, greater degrees specialization (e.g. truss designers, curtain wall designers, etc,), accelerated project delivery, and other resources from around the globe.

These forces driving change tend to have technical bent. Understandably, many structural engineers focus their development in these areas. Further, many engineering managers place a strong emphasis on developing greater technical proficiency. While the engineering professions have faced these challenges, the building professions have faced others: greater diversity of product installation requirements, increased environmental and safety provisions and scarcity of qualified craftsmen to name a few.

Unfortunately, the robust bridge of communication that existed between a Roebling and his craftsmen has been stretched well into the plastic range. In some instances, drawings or specifications are the only information to make a journey across that bridge. This can leave builders, under commercial and time constraints, to make their best interpretation of the engineer's intent. At best, this is problematic, and at worst, hazardous to the public.

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What Are You Communicating? Continued

Special inspections represent a partial solution. But finding problems after they are built is an expensive and time consuming approach. We need to work toward strengthening the communication bridge with builders so that what is built matches the design intent. Having held both roles—consultant and customer—I've seen structural engineers take steps to understand a builder's perspective and I've seen builders perplexed by confusing details and notes and they are unable to reach the engineer for clarification.

When we take the opportunity to learn what our notes and details mean to a builder, it is more likely that the built structure will match the design. As structural engineers, we know what is intended by the drawings and specifications. But that is not communication. Communication is what the builder understands the drawings and specifications to represent. Engineers can be more assured that builders understand the design intent by asking for feedback. Listen to what builders have to say. Does it align with the design? If so, great. If not, you have a chance to present the information in a different manner (sending the same note or detail again won't help, but that's a different editorial).

Even though business practices and technology have widened the gap between structural engineer and builder, we can work to present designs that are understood by the hard working craftsmen (and women) who build them.