



Being Civil in an Electrical World

By Otto J. Lynch, P.E., F.SEI, F.ASCE

My favorite toy as a child was an erector set. Not the fancy new ones that have the precut plastic panels and big rubber tires, but the old ones that were all metal, including the wheels. My favorite structures to build were buildings and bridges. Of course, this led to my desire to be a Civil/Structural Engineer, so I could design and build real buildings and bridges.

As a college senior interviewing for what would ultimately be my first job at Black & Veatch, I was asked if I would be interested in designing and building power lines instead of buildings and bridges. “Isn’t that a job for Electrical Engineers?” I asked. It was explained that transmission lines were merely gigantic multiple-span suspension bridges made up of steel, concrete, wood, aluminum, and other materials that required surveying, site work, foundations, and of course project and construction management. Sounds like structural engineering to me!



It is surprising to hear people even within our profession that think of transmission and distribution power lines as something that electrical engineers do. While there is obviously a lot of electrical engineering involved in our power grids, once the wires are sized for a transmission line, the rest of it is mostly structural. In fact, ASCE is quite active in the transmission line industry. Under SEI, there are two Standards, ASCE-10 *Design of Latticed Steel Transmission Structures* and ASCE-48 *Design of Steel Transmission Pole Structures*. Both standards are used and referenced worldwide. Also, under SEI is the Electrical Transmission Structures (ETS) technical administrative committee. This committee is over many other committees that develop Manuals of Practices for wood pole structures, fiberglass pole structures, concrete pole structures, substation structures, and even loadings which interprets ASCE 7 specifically for overhead power lines and addresses other important loading and design considerations unique to our industry. While I happen to think that all transmission lines are beautiful, there is even a committee on aesthetics that is currently authoring a white paper to assist engineers in making more aesthetically pleasing structures and lines.

Every three years, the ETS committee holds a conference specifically for Electrical Transmission and Substation Structures. At the last conference, there were more than 1200 attendees from 20 countries in attendance. Our next conference is November 4 – 8, 2018, in Atlanta. The theme is ***Dedicated to Strengthening our Critical Infrastructure***. 35 papers from nearly 200 abstracts submitted were selected to be presented in a single track at the conference. In addition to the technical sessions, there will be an exhibit hall with over 100 exhibitors and a workshop on the latest developments in ASCE Standards and Manuals of Practices. For program information, see etsconference.org. If you are even remotely interested in learning more about this industry, we invite you to attend.

The ASCE Committee on America’s Infrastructure (CAI) issues a Report Card for America’s Infrastructure (infrastructurereportcard.org) every four years; the last one was issued in 2017. I am one of the Energy representatives on CAI. The Energy sector received a grade of D+, which was no change over the 2013 grade. Like most of our infrastructure in America, our electric grids are old and weak. We are also experiencing a change in generation, with renewable energies not being placed where the coal plants are being retired. At the same time, the public is expecting a more consistent and reliable supply of electricity than we have had in the past. Thus, we are experiencing a heightened awareness of outages due to extreme weather events. Our industry is in what I term “The Perfect Storm” and is growing rapidly as we essentially are having to rewire America.

It has been thirty years since first realizing that Civil/Structural Engineers play a vital role in our electrical grids, and I have not looked back once on this career choice. I would encourage any younger engineers that might be looking for a fun, challenging, and fast-paced career in a growing business sector to consider looking into becoming a Transmission Line Engineer. If you already are involved in other structural engineering industries but are looking to expand into another market, come to the ETS Conference in Atlanta in November and learn about our industry.

Maybe I need to find an old erector set so I can build a transmission tower now. ■



View ASCE’s video, *Interchange on Protecting Our Nation’s Power Grid*, at <https://bit.ly/2r378PT>

Otto Lynch is President and CEO of Power Line Systems Inc. and has been involved in the design and construction of numerous transmission line projects around the world. He was the pioneer of the then newly emerging LiDAR technology with transmission line design. Otto is an active member on nearly every ASCE, IEEE, and ANSI committee that deals with the physical design and analysis of overhead power lines and is a voting member of both Subcommittee 5 and the Main Committee of the National Electrical Safety Code. He was honored in 2012 with the ASCE Gene Wilhoite Innovations in Transmission Line Engineering Award.