AUSTIN ENERGY BUILDS BETTER DISTRIBUTION SYSTEM WITH STEEL POLES

By Dan Snyder

Just over a decade ago, Austin Energy — a municipally owned utility serving 364,000 customers in central Texas — turned to steel distribution poles when searching for an innovative and cost-effective solution to a tricky technical distribution problem. Their positive experience with steel convinced the Texas municipal utility to try the "new material" in other applications. Today, 90 per cent of all new major power distribution projects at Austin Energy include steel poles. A cost analysis confirmed that Austin Energy has saved time and money with steel while increasing its system's reliability.

In the late 1980s, the city of Austin, Texas was in a period of explosive growth, booming with the birth of new technology companies and the dot-com rush. To support this growth, new construction was everywhere. New highways were being built and existing ones widened. These roads were leading to new businesses and residential developments that would need electric power — and the pressure was on Austin Energy to deliver.

According to Jeff Padavick, Austin Energy's Superintendent of Transmission and North Distribution, Austin's booming economy and its burgeoning infrastructure led to the initial use of steel poles in the Austin Energy distribution system.

"At that time, we were using a three-pole wood structure to turn angles," Padavick explains. "We couldn't use side guys because the state required us to be within the designated assignment of right-of-way, and our commercial customers didn't want to give up any more right-of-way than was absolutely necessary."

He adds that the company's typical three-pole wood installation was a headache in other ways. It congested business access, its construction and maintenance was labor-intensive, and the multiple-hole excavations and guy anchor installation increased the chances of underground utility conflicts.

"We had to come up with a solution to turn these angles without all the poles and hardware," he says.

Padavick recalls it was then that a steel representative came to the utility with an idea. "He showed us a steel product designed to replace our three-pole structures, or our side guyed wood poles, that could turn angles on distribution-type loading. We decided to research the product and give it a try."

The utility first used light-duty weathering steel structures in the early 1990s in various 'test' applications. A cost-benefit analysis of the structures was performed to help determine if steel was a suitable distribution-pole material for Austin Energy.

TIME AND LABOR SAVINGS

"We conducted a business justification, reviewing the total installed cost of the three-pole wood structure including

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materials, anchoring, hardware and labor, and compared it to that of the one-pole steel structure," says Padavick. "Our analysis found that we significantly reduced the time it took to install the structure, and showed anywhere from 50 per cent to 73 per cent savings on labor on the initial installations."

Specifically, the labor cost to install the steel pole structure was 64 per cent less than the wood. The material cost for steel was 15 per cent less. Even with the higher cost of the steel pole we were able to show a cost savings.

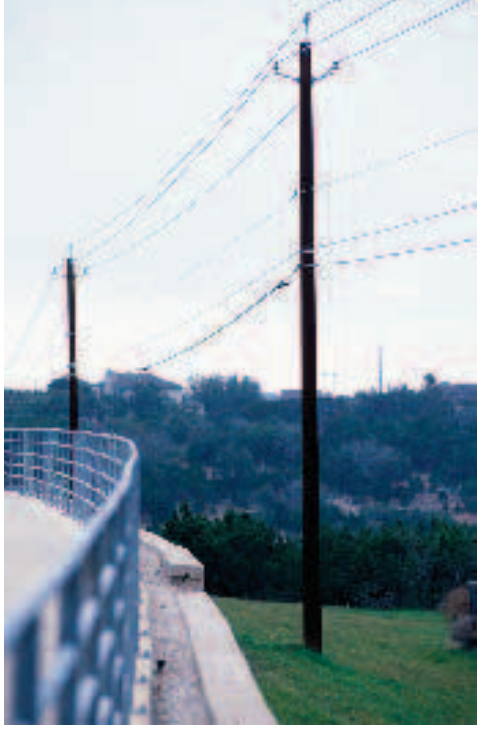
Economic analyses of other Austin Energy applications provided further evidence that integrating steel poles into its system was a very cost-effective practice. For instance, labor costs were 73 per cent less for a double-circuit 795 steel pole application. This analysis is based on using one steel pole instead of three poles and anchors to turn angles. The material costs were 43 per cent lower.

RELIABILITY AND LONGEVITY

With this positive report on the financial advantages of the steel distribution poles, the company decided to move ahead in other areas with steel poles.

Standardized drawings were developed early on to expedite engineering and pole delivery, as was a standardized unguyed angle load chart for distribution design function.

"We started looking at using steel distribution poles in our highway crossings," says Padavick. "We had one crossing that failed when a wood pole was struck by lightning, and some conductor lines were dropped across a major highway. This was not an experience that Austin Energy wanted to repeat."



After this incident, the utility made the decision to change many of its primary highway crossings to steel. "We were looking for longevity and reliability with these structures, and for a pole that wouldn't deteriorate in the event of lightning," he says.

"We retrofitted our highway crossings with 70-foot steel poles to support the longer spans that crossed them. At this height, the poles maintained clearance over multi-level highways. They were also comparable in cost to wood poles of the same height."

The Texas municipal utility has also found steel poles effective in a variety of other applications. For instance, light-duty poles have proven to work well in multiple-pole installations that are curved, alongside freeways with limited easements, or in situations requiring multiple unguyed turns. Padavick adds that the weathering steel poles are ideal as replacement poles in established neighborhoods, as the pole "blends right in to the existing line."

AESTHETICS IS A SELLING POINT

According to Padavick, the aesthetics of steel poles has proven to be a major selling point. "We've enhanced our distribution system by including galvanized and weathering tubular steel poles as wood-pole equivalent replacements." He explains that customers in locations such as residential areas and commercial business parks are now concerned with curb appeal as well as reliability. With steel poles, Austin Energy can offer options to its customers.

"Weathering poles tend to blend better in a wood pole environment because of rustic brown color scheme," explains Padavick. "We also get requests for colored poles from our customers. In these cases, we paint over galvanized steel — brown, green or even other colors — and the customer covers the painting costs."

The veteran transmission-and-distribution superintendent says that having the option to use galvanized steel poles has made it easier to obtain permission to install a distribution project alongside a road right-of-way in a commercial area. "Historically, we would have to put the wood poles in the rear property of a business, which creates a maintenance nightmare," he says. "Because galvanized steel poles are more aesthetically pleasing to these customers we're able to place the project next to the street."

Padavick cites two examples in Austin Energy's service area where the aesthetics of steel poles made a significant difference in customer satisfaction and cost savings for Austin Energy.

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One such installation was at Steiner Ranch, a recently constructed residential development located in the hill country just west of Austin. Before installing a project in the area, Austin Energy made an agreement with the developer to use weathering steel distribution poles along the road.

"We were able to install the distribution line — matter of fact, double circuits — and avoid going into the canyons," Padavick recalls. "Yes, it was initially more expensive, but the ability to access those poles easily will be far better for our line crews in the long run. If we had used wood in that location, we would have had to install the distribution poles in an area much harder to access, and at a greater maintenance cost in the future. It's very difficult — and time-consuming — to change out any pole in the rear easement, especially in a hilly area."

In another example, Austin Energy saved money by not having to go underground with the utility lines. "The commercial residents of one of Austin's business parks did not want poles installed along their road, which was already outfitted with galvanized streetlight standards. So we went back with galvanized steel distribution poles that were 65 feet tall — which were 20 feet taller then the street light standards — and the commercial customers were completely satisfied. Today, the residents probably don't even notice they're there," he says.

LINEMEN ADJUSTED WELL TO WORKING WITH STEEL

Steel poles are now a standard part of Austin Energy's distribution system, and the utility's highly trained lineman are well adjusted to working with the different types of poles.

Padavick explains that understanding the conductive nature of a steel pole as compared to a wood pole was a primary concern at first for his linemen. "Working with a live line was one of the big hurdles we encountered with learning to use steel poles," Padavick says. "Basically, we just made some procedural changes in the way we handle them. We cover more conductors and cover the pole, and our linemen always wear the proper safety gear when working with wood or steel. We do this because we're setting the steel pole in an energized conductor. Granted we could try to de-energize the line, but it takes more time and more money."

He adds that responding to trouble calls without climbing a pole was another issue raised by Austin Energy linemen at first. "The guys were unsure how they could work if they couldn't climb the poles." Padavick says they arrived at a fairly simple solution. "Typically we put the steel poles in locations where we can always use bucket trucks. This means we don't need to step them, which saves us money. However, we do have a few steel poles that are stepped for special situations."

CONFIGURING THE RIGHT SYSTEM TAKES TIME

Padavick says that integrating the steel poles into the utility's distribution network has been a positive learning experience. "It took us about five years to figure out the best configuration for our system,' he says. "We continued to use our standard hardware, but made sure that we had the correct insulation properties. We added fiberglass deadend arms, fiberglass three-eared-arms, the correct insulators, and fiberglass ridge pins."

Whether or not the poles are delivered pre-drilled depends entirely on the project at hand, he adds. "Each framing configuration is unique. We may drill in the field or in the air, or order pre-drilled poles," Padavick adds. "When we drill, we use a bigger, beefier heavy-duty drill to get through the thicker-plated structures (over 9/32). On the lighter tubular poles, we just use a regular 1/2-inch power drill."

PLANNING AHEAD

Austin Energy typically orders steel poles by the project, which means careful and detailed advance planning. "We work with the transmission-and- distribution design team up front, which allows us to know exactly what is required in an installation, and by when."

"Today, we typically order poles in five-foot increments, and usually as a two-piece pole if the pole is over 70 feet. This allows for easier transport to the job site, and no permit is required," he explains. "And in some cases steel poles are lighter than the wood pole of the same size, which makes them easier to handle."

The Texas municipal utility stipulates in its contracts that steel pole suppliers deliver the steel poles between six and ten weeks after the order is placed, depending on the type of poles ordered. There is little worry about the need for a large storage facilities, as a majority of the steel poles are taken directly to the installation site. "We utilize a small lay-down yard just for steel poles. This helps us keep excess stock on hand for emergencies and rush jobs," Padavick says.

He adds that the variety of readily available steel poles has improved Austin Energy's engineering and construction response time on unscheduled and maintenance projects.

A GOOD MOVE TO STEEL

Padavick concludes that the move to add steel to Austin Energy's rapidly growing distribution system has been a good one. In fact, he says there are those who would like to see nothing but steel in their system. "We get a call from environmental groups at least once a year asking us to use 100 per cent steel. They are well aware that steel eliminates the use of preservatives and is recyclable."

"I know that our utility will always have wood and steel in its distribution system," he adds. "And the more options we have, the better. Today, steel is installed where it makes the most sense — for strength and for aesthetics — and I'm sure this will continue. Steel has helped Austin Energy build a better distribution system, solve problems and save money, all at the same time."

Dan Snyder is the technology transfer program manager for the American Iron and Steel Institute (AISI), a nonprofit association of North American companies engaged in the iron and steel industry. AISI comprises 35 member companies, including integrated and electric furnace steelmakers, and 145 associate and affiliate members who are suppliers to or customers of the steel industry.

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