



STEEL DISTRIBUTION POLE CASE STUDY

Carbon Power and Light, Saratoga, Wyoming

CPL Utility Crew Illustrates Ease of Handling and “Clean” Attributes of Steel Poles with Wood Pole Replacement on Recent “Dirty Jobs” TV Episode

David Cutbirth has worked at Saratoga, Wyoming-based Carbon Power and Light for more than 31 years. Carbon Power and Light provides power to approximately 6100 customers in several small towns on the Wyoming/Colorado border as well as the outlying areas around Laramie. At the cooperative, Cutbirth's number one priority is system safety. He also oversees day-to-day operations of crews, inventory management, fleet management, outages, construction and maintenance of the utility's 4500 miles of territory and its 130 miles of transmission and 1730 miles of distribution lines.

As a seasoned utility line professional, Cutbirth is well qualified to talk about changes he has experienced on the job in his years as a lineman and in his current role as Carbon Power and Light's Director of Operations. He says that the integration of steel distribution poles into the utility's distribution system in the 1990s has been a very positive change for the cooperative. According to



Cutbirth, the cooperative now has over 4600 steel distribution poles in its system, which equates to 14.5 percent of the CPL distribution system. This percentage continues to rise as steel is now used for all new poles and replacement poles at CPL.

Cutbirth's confidence in the utility's move to steel as the pole of choice in its distribution system was recently showcased on an episode of the popular Discovery Channel's ***Dirty Jobs*** TV program. When Cutbirth got the call from the show's producers who were putting together a series on maintaining America's infrastructure, he offered up the idea of changing out a wood distribution pole with a steel one, a task that was on his crew's to-do list. The idea took hold and the episode titled "Working the Pole" aired

in January 2011. (A short clip from the program is available at <http://dsc.discovery.com/videos/dirty-jobs-hair-fairy> — Choose the “Working the Pole” option on the list underneath the video screen.)

The Decision to Go With Steel

According to Cutbirth, the overwhelming majority of new and replacement distribution poles set — from small routine pole changes to larger multi-pole line work — are steel. The utility, which installs an average of 300 to 400 steel poles annually, typically uses Class 3 or Class 4 poles ranging in height from 30 to 70 feet in height. Carbon Power and Light installs less than 10 wood poles annually.



Why did the company switch to steel poles? Cutbirth explains, “In the early 1990s, the price of wood poles started to skyrocket. At that time, my predecessor decided to look at steel for several reasons—primarily, because steel poles are expected to last up to 80 years. Additionally, the poles require minimal maintenance. And finally, the cost of wood to steel was comparable at that time. The economics are different now and steel poles may cost more, but the benefits outweigh the initial cost difference. Steel helps us create a more reliable system. So overall, the life cycle cost is better with steel.” He adds that Carbon Power and Light also began using fiberglass crossarms around that same time.

Lineman Acceptance Came Quickly

Cutbirth says that the acceptance of steel poles by the company’s linemen was a non-issue: “At first we were a little skeptical of the changes, but now I wouldn’t want to change back to using anything else. We definitely like the steel poles.” He adds that very little training was required during the transition,



especially since he follows the exact same safety procedures and uses the same type of insulated cover-up materials for both wood and steel poles when working with an energized line.

The Nuts and Bolts of Using Steel

Carbon Power and Light orders its poles from the manufacturer as 95 percent drilled. The utility line crew drills the remaining five percent of holes in the field using a Unibit or a step drill bit. The utility keeps about 300 – 400 steel poles on hand for new installations and pole replacements. Cutbirth explains that he uses steel for a single pole tap or to build a complete three-phase-line with hundreds of poles. In the

Carbon Power and Light system, the average number of poles per mile of line is 18 for both wood and steel.

Avian Protection is Integral to the Plan

When introducing steel poles into its system, Carbon Power and Light placed emphasis on incorporating best practices for avian protection planning, construction techniques and associated materials. The cooperative worked with EDM of Fort Collins, Colorado to revise its avian protection plans for the transition from wood to steel poles. Construction practices were changed with respect to circuit phase-to-phase and phase-to-ground separations to "isolate" potential avian contact incidents. As with wood pole construction, the plan utilized the coverage of circuits with appropriate materials to "insulate" and mitigate potential avian contact incidents. The switch to fiberglass materials assisted in insulation as well. Carbon Power and Light also implemented the suspension of conductors below the crossarm, which provides a perch area. These and other best practices are identified by the Avian Power Line Interactive Committee (APLIC) in its Avian Protection Plans Guidelines.



Important Benefits to the Community and the Cooperative's Bottom Line

In the years that he has worked with steel poles, Cutbirth and his crews have realized several advantages beyond their life cycle and cost benefits, including:

Resistance to Nature's Wrath: Standing tall during ice storms was one of the first benefits realized with the steel pole installations. "Some of the territory we cover is very prone to ice, and every year we would lose a few wood poles," says Cutbirth. "Even though we have had power lines go down with the weight of the ice, we haven't had to replace broken steel poles in the middle of a storm. This is a major benefit. In addition, with wood poles, we had problems with winds knocking them down, with lightning shattering the pole tops, and with either lightning or a broken-down insulator starting fires on the pole tops. Steel is a solution to preventing these pole-top fires."

He adds that steel poles have proven to be a deterrent to the woodpeckers that create problems for wood poles in the area, an important benefit that ensures the system's longevity and service.

Less Maintenance Required: Cutbirth cites a steel pole's resistance to shrinkage as a major benefit in the field. "With a wood pole, shrinkage often occurs after the pole is set, which requires ongoing

maintenance to adjust and tighten the hardware,” he says. “With steel, we don’t have shrinkage, bending, bowing or twisting, and the hardware remains tight. When we patrol our lines, we find no loose hardware on the steel poles. In my experience, steel poles provide more reliability than wood poles and require less maintenance.”



Aesthetics: “Our steel poles are uniform in size, and straight with no splinters. Another advantage is that after the steel poles have been installed for awhile, the galvanizing dulls a bit and the poles blend easily into the environment. Our customers notice this and tell us about it,” Cutbirth explains.

One difference that Cutbirth noted is the need to insert climbing steps in the pre-drilled holes on the steel poles, if climbing is necessary. He notes that his crews typically use bucket trucks when working with steel poles.

Versatility: “Our territory has everything from prairie to mountains, sand to rock and we have put steel poles in just about every type of soil. They are very versatile,” says Cutbirth.

The Right Move to Steel

Carbon Power and Light’s veteran lineman and director of operations says that steel poles have been the right choice for the utility for both operational and life cycle reasons. “The use of steel has helped our crew harden Carbon Power and Light’s line against storm damage, increased line reliability, and given the community a more environmentally responsible alternative to wood. Making the switch was the right decision, and we haven’t looked back,” says Cutbirth.

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To learn more about steel distribution poles, visit <http://www.smdisteel.org> or lineman.steel.org.

The Steel Market Development Institute (SMDI), a business unit of the American Iron and Steel Institute (AISI), grows and maintains the use of steel through strategies that promote cost-effective solutions in the automotive, construction and container markets, as well as for new growth opportunities in emerging steel markets.