Rock-Solid Replacements: Harlan Electric Co. replaces transmission structures in New Hampshire

By Susan Bloom | Mar 15, 2024

New Hampshire's 'Southern Tier,' a populous section of the Granite State, features the bustling, urban centers of Manchester, Nashua and Concord as well as parks, lakes and beaches. Thanks to transmission structure replacements completed by Harlan Electric Co., Windham, N.H., a subsidiary of MYR Group, Thornton, Colo., Eversource New Hampshire and its hundreds of thousands of customers can be assured of the most updated and reliable electric service.

"Harlan Electric operates throughout Michigan, Ohio, the Mid-Atlantic Region and the six New England states," said Chris Lenahan, Harlan Electric's district manager for the New England region, which was created in 2005 and is based in Windham.

Two years ago, Harlan Electric's expertise and experience was called upon by Eversource New Hampshire, the state's largest utility.

"We've had a Master Service Agreement with Eversource since 2017 that allows us to work in their three-state service territory of New Hampshire, Massachusetts and Connecticut, and we started providing them with energized work in 2020," Lenahan said.

"In early 2022, Eversource issued an RFP to the several live line contractors in New Hampshire, of which we're one. And in May 2022, we were successfully awarded the contract to provide electrical line construction services for a complex series of transmission structure replacements, including extensive energized work in the state.

"The job involved replacing 252 largely H-Frame, two-pole structures ranging from 50–80 feet in height across four different 115-kV circuits in the same corridor," Lenahan said.

Originally built in 2011, the laminated wood structures had deteriorated from the inside.

"In the late 2010s, a lot of utilities in this area started installing laminated wood poles because round wood poles were difficult to source," he said. "Laminated wood consists of layers of wood pressed and glued together, but because of the way they're constructed and our climate here in New Hampshire, especially in the winter, moisture was able to get in between the layers, causing them to rot at the seams. So, while the laminated wood poles remained structurally and functionally operable, they didn't offer the same durability and the utility prioritized that they [would] be repaired."

Unexpected Challenges

Harlan Electric began replacing the old poles in July 2022 and, according to Lenahan, had to address several challenges along the 20-mile corridor stretching from the Scobie Pond Substation in Londonderry to the Power Street Substation in Hudson, N.H.

“One of the biggest concerns on this project involved the location of the poles and the fact that there were three other 345-kV circuits in that corridor,” he said. “As one of the main corridors in a population-dense area that’s five circuits wide, we had to be cognizant of what circuits we were working on and how close they were to other circuits. Our team needed to be especially mindful of what was behind and alongside them when positioning our bucket trucks and other equipment.”

The team was prepared to encounter some issues with the landscape during the project—“We’re known as the Granite State because there are lots of rocks all over the place,” Lenahan said—but an unexpected environmental challenge added an extra layer of difficulty.

“After we were awarded the project, the New Hampshire Fish and Game Department enforced some new environmental regulations designed to protect two species of nesting turtles in the state,” both of which are species at risk, Lenahan explained. “Ours was the first Eversource project on which those regulations were applied and it impacted some of the risk and the measures we had to take.”

One of those measures involved Harlan Electric installing a series of “turtle gates” along access roads on the job site so the protected turtles were prevented from entering their work areas. As a result, “there were anywhere from 10–20 gates we’d have to open and close behind us to get in and out of our work areas, which was time-consuming,” Lenahan said.

The team was also required to lay down extra timber mats—8-inch-thick, 4-foot-long, 16-foot-wide hardwood mats designed to prevent vehicles from damaging wetland areas.

“We had to put a bridge between our timber mats so that the turtles could go under them,” he said. “We’ve all been through ‘turtle training’ and these aren’t new concepts to contractors in our area, but the requirements for additional mats, turtle bridges and silt fence gates were all new to both our team and Eversource and involved a lot more labor, installation and mat- erial than we’d planned.”

With several other 345-kV circuits in the same corridor, Harlan Electric team members had to be mindful of what they worked on and the proximity to other circuits when positioning bucket trucks and other equipment.

A streamlined process

“We had anywhere from 12 to nearly 40 Harlan Electric employees plus subcontractors on this job,” Lenahan said. To prepare the project site, “we subcontracted all of our work pad and access road work—e.g., building roads and installing silt fences and timber mats—to Harwinton, Conn.-based specialty contractor Supreme Industries, and they brought in a couple of dozen workers in four crews.”

“Once the access roads and pads were built, we drilled new holes directly into the ground (instead of concrete foundations), installed corrugated metal pipes into the ground and placed the new steel round wood (Core 10) poles right into the pipes,” Lenahan said.

“We framed them in the air, placing the cross-arms on and transferring the conductors from the old to the new structures while energized. Once the transfer was successfully made and tested, we’d wreck the old structure.

“Based on the sheer quantity of holes to be drilled—two holes per each of the 252 structures, and in some cases more for certain three-pole configurations, or over 500 holes in total—we partnered with

Libertyville, Ill.-based Aldridge Electric for that part of the job," Lenahan said. "Together, we brought four drill rigs to the process, and the team from Aldridge was instrumental in helping us to complete that phase of the project."

The job started slowly as the site was prepared. Once crews acclimated to the environmental regulations and extra time was devoted to equipment setups and bucket positioning so that crews weren't in proximity to other energized circuits in that corridor, the rest of the project progressed fairly smoothly.

"We started every morning on the job by going over the plan for the day and having a general safety discussion," Lenahan said. "Our team members worked 10-hour days, six days a week and all of the crews we had were local to the project, so everyone was able to go home each day."

Harlan Electric installed 'turtle gates' along access roads to the job site so the protected turtles were prevented from entering work areas.

Time and temperature

While snow wasn't a major issue in the area in late 2022, there were some rainstorms.

"During the project, we had to perform some emergency storm restoration work to address outages in New Hampshire and eastern Massachusetts," he said.

But that didn't delay the timetable, which Eversource slated to run from June 2022 to February 2023. "In fact, due to the extra environmental regulations placed on this project, we ended up starting the structure replacements in July, later than planned, but we actually finished right before Christmas 2022, two months early," Lenahan said. "We had good groups working on our teams, our crews all had longevity with us and we did our best to use our time productively. For example, we worked on dead-

end structures on circuits under outage (not energized), so we used that time to do some other tandem structures as well."

Harlan Electric's project involved the replacement of 252 old poles situated along the Granite State's signature rocky terrain. Photo by Harlan Electric Co.

"This project put us in a great position with [Eversource] in terms of getting more complex projects that are energized in the future. Our successful completion of this job gave them more confidence in our abilities," he said.

As for the benefits of the upgrade, Lenahan said that the new steel poles will drive greater reliability and durability overall.

"The majority of the structures gained between 5–15 feet in height and now range from 60–95 feet, which allows additional clearance for natural vegetation to grow from an environmental perspective and which will also help hide the poles aesthetically," he said.

"From a performance standpoint, Eversource can upgrade the poles to an even higher-capacity conductor if they want, as the structures were built to accommodate that option in the future," Lenahan said.

He attributes success to the attention the Harlan Electric crew members paid to every detail.

"As Harlan Electric's first major live line rebuild project, we had strict procedures that everyone adhered to, and as a result we had no safety incidents," he said of the project, which achieved a NECA Zero Injury Award and a NECA Safety Excellence Award in 2022 and a 2023 NECA Project Excellence Award in the overhead transmission category.

"While I oversee all operations in our district, I personally estimated this project and submitted it for the RFP, so it was rewarding to see it get awarded to us and wrap up successfully in terms of productivity, financial measures and scheduling," Lenahan said. "It's exciting to see our district get awarded a project of that size, scope and complexity, and we look forward to getting more of those on a regular basis."

In addition to praising his team, Lenahan couldn't say enough about the strong support Harlan Electric received from its utility partner.

"We want to extend our sincere thanks to the project team at Eversource New Hampshire, who gave us a lot of flexibility in terms of the schedule we developed for the four circuits," Lenahan said. "We appreciate the great communication and coordination they provided and thank them for having confidence in us and giving us a chance to hit it out of the park for them."

Header image: An aerial view of some of the transmission structure replacements Harlan Electric made along a 20-mile corridor in New Hampshire in 2022. Photo by Harlan Electric Co.

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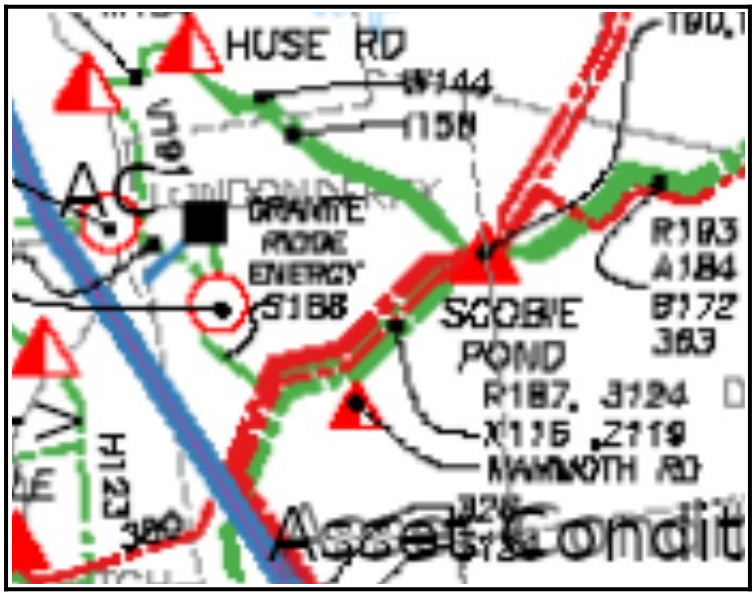
https://www.ecmag.com/magazine/articles/article-detail/rock-solid-replacements-harlan-electric-co.-replaces-transmission-structures-in-new-hampshire

R-187: 2.88 miles, 1272, replace 31/31 structures, Laminated phase II, $7.5 m.

X-116: 11.2 miles, 1590, replace 139/144 structures, Laminated Phase I, $26 m.

Z-119: 11.1 miles, 1590, replace 136/140 Laminated Phase I, $25.4 m.

S-188: 2.2 miles, 1272, replace 32/32 structures, Laminated phase II, $7.4 m.



NETOs response to stakeholder comments on Asset Condition project proposals:

Comment 5

The maximum conductor (ASCR, ACSS and ACCC or equivalent (I. e. C7)) size the existing poles, and the proposed poles at their proposed heights, can carry.

NETO Response to Comment 5

“Determining ability of an existing or proposed structure to support a particular conductor requires complex calculations that depend on a myriad of factors, including conductor size, structure heights, span lengths, expected weather, applicable safety standards, and other factors. The NETOs undertake asset condition projects to address known and identified deficiencies with existing transmission facilities, not to expand the capacity of the transmission system. Because of this, the hypothetical maximum size of a conductor that could be supported by a new or proposed tower is not usually calculated, and the information would not serve to provide a good comparison between projects for stakeholders to consider. However, the NETOs may provide this information where appropriate and beneficial for solutions discussions.”