

Taking the High Road



Carroll White Rural Electric Membership Corporation (REMC) in Indiana needed to rebuild a substation outside of Monticello, about 90 miles north of Indianapolis. While doing so, Carroll White decided to also upgrade the power line to the Lake Shafer community, which included a 1,600-foot span across the recreational lake. The homes that surrounded the lake were traditionally seasonal-use dwellings, with limited expansion for residents due to the use of septic systems. However, sewer lines had been installed, and the improvement allowed the seasonal cabins and trailers to be converted to more permanent year-round homes, which resulted in the need for improved load supply. While reviewing the existing long span over the lake, the poles had significant structural issues. Replacing these poles, which consisted of a three-pole structure with a 20-foot distance between the phases to prevent incidental contact from the existing bare wire conductor in extreme weather, was a crucial component to upgrading the circuit.



Taking the High Road



The Shortest Distance

We are taught in early algebra that the shortest distance between two points is a straight line. The route of the existing distribution line was a relatively straight shot from the substation to the Lake Shafer community, with only nominal “left-to-right” diversions to address variations in local topography along the route. The biggest challenge to the upgrade of the line was the Lake Shafer crossing.

Lake Shafer, one of two reservoirs created on the Tippecanoe River back in the early 1920s, is a 1,200-acre lake for outdoor summer fun. Boating, swimming and fishing are just a few of the activities the locals and tourists enjoy. Lake Shafer is also home to the Indiana Beach Resort on the southwest bank of the lake, a destination for those in northwest Indiana since the lake was created. Given the size of the lake and the importance of the lake to the local community, Lake Shafer was indeed a significant obstacle.

Options Are Limited

As Carroll White executives and engineers explored numerous options to address the 1,600-foot span, including rerouting the path altogether, they explored going under the 1,200-acre lake as the first option, utilizing submarine cable.

Submarine cable is often used for this type of application, but at a distance of more than a quarter mile from one side of the lake to the other, Carroll White knew that the installation of the cable under the lake was not going to be an inexpensive endeavor. Once quoted, the approximate cost for the submarine cable solution was in the neighborhood of \$1 million.

The next option that the team at Carroll White considered was to go around the perimeter of the lake with bare wire. This option was certainly the most conventional, but it wouldn’t be without a fair amount of engineering and execution challenges, which included crossing the water at several locations. As with the submarine cable option, the cost to go around the 1,200-acre and 10-mile long lake was not an inexpensive solution to consider. The cost estimate provided for this solution was still an \$800,000 investment that Carroll White would have to make.



Over the River

The third option was to maintain the existing path and go over Lake Shafer and the Tippecanoe River with a replacement span. But this time, Carroll White considered using the Hendrix Aerial Cable System to replace the existing span with the cracked poles.

At a fraction of the cost of the other options being considered – approximately \$250,000 – the team at Carroll White sat down with Hendrix to learn more about the pros and cons of the aerial system solution. What Carroll White learned was that the solution would fit its needs perfectly. Considering the three options, the Hendrix Aerial Cable System was the most valuable and the least expensive option available to Carroll White. Terry LaOrange, operations manager of Carroll White REMC stated, “It was more equitable to use Hendrix.”

Aerial Cable at Its Best

The Hendrix Aerial Cable System that was used for the Lake Shafer and Tippecanoe River installation was in and of itself an engineering marvel. The total distance of the aerial span was 1,523 feet – more than a quarter of a mile in length – and remains 50 feet above the water at all times. On both banks of the water, the span was anchored by 90-foot high, 12-sided steel guyed poles, with the base of the poles bolted to concrete footers that were 8 feet across and 22 feet deep. The aerial cable system is supported by a #8 Alumoweld Aluminum (AW) messenger cable, tensioned at 7,500 pounds at 60 degrees F. The three-phase conductor cables are all held in place and hung from the messenger cable by the Hendrix Aerial Cable System spacers, and are 336 kcm, 19-strand compact AAC, 15kV black conductor with strand shield.

The Carroll White REMC installation at Lake Shafer is one of the longest spans to date of the Hendrix Aerial Cable System. It was installed in 2005 and has been a reliable source of distributed power to Monticello and the surrounding communities. In the ten years since the installation, there hasn’t been a single outage on this circuit, and the community is quite pleased!

Carroll White REMC – Lake Shafer Installation Options

\$1 million – Submarine Cable – under the lake

\$800,000 – Bare Wire – around the lake perimeter

\$250,000 – Hendrix Aerial Solution – 1,523-foot span over the lake

