

TVA Linemen Install Poles in Hard-to-Reach Areas

The utility uses new construction rig to install poles on government-protected forest land.

By **Travis Terry**, *Tennessee Valley Authority*

Back in the 1920s, linemen trekked into the North Carolina mountains by mule to construct a transmission line. Eighty years later, rust was corroding the steel-lattice structures and the line was starting to show signs of age. To improve system reliability, Tennessee Valley Authority (TVA; Knoxville, Tennessee) retired the 69-kV line between Cleveland and Murphy, Tennessee, and constructed a new 5-mile, 161-kV line.

While it had fulfilled its purpose, the old transmission system had reached the end of its life expectancy. At that point, the utility risked the possibility of the towers rusting in two and falling down. To rebuild the line, TVA linemen had to navigate through steep terrain, cross over mountains and find a way to get across government-protected national forestry land without impacting the environment.

The utility faced two options: either do a lot of hand digging and rely on helicopters, or invest in a new construction rig to help cross over the land. The project had a lot of environmental restrictions, and the linemen couldn't rely on traditional rubber-tired equipment to build roads into the U.S. National Forest in Copperhill, Tennessee.

In-Field Demonstration

To complete the job, TVA needed a creative solution. The utility provides power to 159 power distributors serving 8.8 million customers in seven southeastern states. Oftentimes, TVA linemen work in a wide variety of terrain. Line crews have to travel across the swamps in Mississippi, the mountains in North Carolina and the Smoky Mountains in Tennessee. As a result, TVA needed a type of machine that could handle wet, steep or rough areas without tearing up the land.

The utility began searching for products and technology online and came across a website for a construction rig called the Linecat from Linecat Inc. (Red Bluff, California). To see the equipment in action, the utility invited the company to perform a demo of the machine on an in-field pole change.

TVA expected the job to take several days because of the need for the construction of an earthen platform at the site. However, instead of multiple days, the workers completed the job in four hours from start to finish. During the demonstra-



tion, the company changed a wood transmission pole to a steel transmission pole. The workers removed the line, pulled the existing pole, dug the hole and installed the new pole.

The demo also caught TVA's attention because it was done in a rough area without the construction of a platform, road or pad. If the linemen would have tried to complete the same task with a crane, they would have had to build roads to reach the remote area and construct a pad to work in the wet terrain.

About 20 employees from utilities nationwide attended the demonstration and gave positive feedback about the machine's versatility, capability, low ground pressure and environmental friendliness.

When TVA employees first saw the demonstration, they were amazed with the machine but had doubts about the boom. When Linecat unrolled the 80-ft boom, which folds to fit behind the cab, TVA saw it as a great piece of equipment for line work. It became the first utility to purchase the Linecat and put the 830G rig into service, on Nov. 12, 2007.

Training Line Crews

After TVA purchased the construction rig, the utility trained line crews on the Linecat and appointed a limited number of special equipment operators to move and locate



the rig. Linemen use the rig to dig holes, set poles and, when used as a bucket truck, do work in the air.

On the transmission line project, the linemen loved the fact that they didn't have to dig holes by hand or hang from helicopters to do the work. While TVA crews still had to use the helicopter, the construction rig reduced the usage by about 50% to 60%.

On the Job

TVA started using the Linecat on the construction of the new transmission line in November and ended in March 2008. The Linecat saved several thousand man-hours on the construction of the new line.

The machine, which is a cross between a crane truck and a bucket truck, is designed to work like a dozer with a boom on the back. To use the Linecat, operators run the machine like a normal crane. By using the construction rig, linemen can dig holes, set poles, anchor crossarms, construct roads, clear brush or lift lines.

Environmental Restrictions

Work on U.S. National Forest land requires adherence to strict environmental regulations, and in most instances, rubber-tired vehicles are not permitted because of the damage they can inflict on the terrain. Tracked vehicles usually are allowed, because they cause less damage to the environment.

The Linecat's specially designed center line drive disperses weight evenly, producing low ground pressure. Thus, it is more environmentally friendly than other tracked vehicles. Because the Linecat is essentially four rigs in one — a bucket truck, a digger derrick, a crane and a dozer with water on board, and a wench on the back — it lessens the need for other vehicles, reducing environmental impact. These are some of the reasons TVA chose Linecat and why it gained government approval for this project.

Reducing Downtime

Because the Linecat can travel over any kind of terrain, utilities don't need to construct roads to get their equipment into a remote area. For this reason, they can save time and money by spending the time it would take to build a road on



constructing a line.

This has come in handy not only on the U.S. National Forest project, but also when TVA crews are working a storm. Rather than building roads and taking a line out of service following a storm, linemen can load a pole onto the machine and head into the area. They can then reconstruct the line in the time that it takes to build a road to get into the location.

Installing Lines in Any Weather Condition

TVA finished the construction of the transmission line in March 2008, but the utility is still using the construction rig on other pole changeouts or new construction projects in rough or swampy areas. The linemen also use the construction rig in rough terrain or in areas where they want to eliminate the need for roads or pads.

The device also comes in handy when TVA does work for residential customers. Linemen can go in and out of customers' backyards without tearing up the land.

By using the Linecat, TVA linemen can get the job done in less time, which allows our utility to be more productive and better serve its customers. **TDW**

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