

## **ADDING A NEW TOOL TO THE TOOL BOX**

By Brad Weidenfeller, Xcel Energy

Xcel Energy's northern states region transmission system consists of 7,500 line-miles throughout Minnesota, Wisconsin, North Dakota, South Dakota and Michigan—an area that encompasses approximately 85,000 acres. Our Vegetation Management department oversees and directs contracted vegetation management crews for routine clearing in this region to ensure the electrical integrity and safe operation of the transmission system. And crews often work in remote areas that are inaccessible using normal equipment and that require manual, labor-intensive side-clearing. Trees are among the leading cause of outages, so this is a challenge we are continually trying to overcome.

In concert with Haverfield Aviation, Xcel Energy started a pilot program in August 2010 to test an aerial side saw solution. Previously, Xcel Energy had been using alternative side-clearing methods that required a team of professionals skilled in navigating through remote and rough terrain. In addition to requiring a number of employees, it also limited us as far as weather and safety were concerned.

Tested for performance and cost, Haverfield's aerial saw solution cut through the challenges and set new standards for managing the vegetation in its inaccessible corridors. Although the aerial saw has been successfully used by numerous utilities for over the past twenty years, this was our first attempt at using it so we started slow with a small project that lead to several more.

The aerial saw consists of 10 circular, two-foot in diameter, carbide-tipped blades, which are suspended 120 feet below the helicopter. The saw is driven by a low emission, 28-horsepower Kohler engine and is operated by the pilot with pin-point accuracy. The length of the aerial saw can be added or subtracted by sections of aluminum poles. This depends on the height of the trees and the terrain. Haverfield's twenty seven years of airborne utility experience proved to be invaluable as it specializes in precision ROW cutting—from easy access to 30 inch distribution ROWs.

The aerial saw side trims the right of way from sky to ground and 20 feet of right of way vegetation at a time. Mountainous terrain, swamps and environmentally sensitive areas do not diminish the effectiveness of the saw. In fact, the aerial saw tackles these problem areas with ease.

We chose Haverfield for this project because of its long history and its successful use of the aerial saw for utilities in Georgia, North and South Carolina, Tennessee, Missouri, Virginia, West Virginia, Illinois, Indiana, Maryland, Ohio, Pennsylvania, New York, Minnesota, Wisconsin and Oklahoma.

Haverfield is certified through the International Standard for Business Aircraft Operations (IS-BAO) and has completed a Safety Management System Audit (SMS). The IS-BAO is a set of international standards ensuring that best practices in safety, aviation management, and overall professionalism are met. Haverfield is the only U.S. operator in its class to obtain this certification. Haverfield has 18 Hughes MD helicopters and one Twin Star and is home to the largest MD 500 fleet in the world. It is our understanding that the MD 500 is the helicopter of choice for both the aerial saw and utility flying. We trust the expertise Haverfield brings to a solution like this, and rely on them and other partners to help us maintain a high level of uptime while maintaining a positive safety record.

Xcel Energy's use of aerial saw side trimming is part of consistent effort to improve efficiency and overall performance of their electric transmission system. Xcel Energy's goals are to protect its system and minimize outages, minimize impact to the environment, perform work safely and efficiently and maintain a positive relationship with the landowners and public.

The project started with a 10-mile trial on 69-kV, H-frame structures but eventually encompassed numerous different transmission lines, ranging from 69-kV to 345-kV, in and around southeast Minnesota and East Central Wisconsin. We also utilized the saw on a one-mile distribution line crossing hilly terrain with overhang, all while keeping the line energized. Haverfield is one of the only service providers that offers this service while the line is energized—doing so cuts downtime and dramatically reduces our costs commonly associated with this kind of maintenance.

Haverfield's precision pilots trimmed the first line in an hour and twenty minutes without causing an outage. Hand-cutting this line would have taken one of our larger crews over a month—and the line might have required a planned outage depending on how the vegetation needed to be cleared. Haverfield's expertise in planning projects helped us understand when we would need to deploy our resources for maximum value. In concert with us, Haverfield's planning help cut the overall project time down by nearly 75 percent, resulting in cost savings.

The program's initial successes lead to other accomplishments throughout the entire pilot project, including additional side-trimming conducted on a one and three-quarter mile-line crossing the Mississippi River. In this case, using the aerial side saw eliminated the need for boats and took only one and one-half hours. In the past, this would have taken a ground crew weeks to accomplish at ten times the cost.

Another benefit of the saw is its ability to completely handle the entire cut—eliminating the need for buckets or jarraffs. This is a huge benefit whenever dealing with landowners that might not want to the machines on their property. Aerial saw side trimming keeps work crews and heavy equipment off private property.

Xcel Energy is always cognizant of the environment and landowners whenever engaging in tree trimming operations. Throughout the pilot project, landowners were alerted ahead of time that we intended to use the helicopter and aerial saw. Haverfield and Xcel Energy's project planning included securing landing zones for the helicopter to refuel along the right of way. The feedback from landowners was favorable and they were amazed at the speed and efficiency of the solution. What otherwise would've required a few days, an entire crew and a few machines on their property now only took one afternoon.

We were pleased to also discover that the aerial saw is also effective in remote areas with hundreds of miles of right-of-way to clear. In examining the right of way after the aerial saw completed the side trimming we found that the cuts were precision, clean cuts with little or no tearing. No different than what a chain saw produces.

In conclusion, throughout this pilot program almost 100 miles were trimmed by the end of the nine-week pilot.

The speed and efficiency of the aerial saw minimized long stays near landowners and reduced the amount of workmen needed to clean-up. In some cases, and only when necessary, a ground tree crew follows behind the helicopter to remove debris from roadway, waterways, fences and landscaped and maintained areas. However, the trimming debris can be left on the right of way. In either case, the result is aesthetically-pleasing and one of which the landowners and utility can be proud.

Using the aerial saw also allows crews to continue working in inclement weather. The lateral trimming affords protection against snow and ice loading on the branches. Moreover, what would have otherwise taken 10 tree workers (three if they were using jarraffs) required only one, demonstrating that this solution affords a better use of manpower.

Further, and a point that is not lost on us as a company that values the safety of its employees—the use of the aerial saw reduces the chances of injuries to ground and climbing crews. Xcel Energy counts safety among its core values and requires its partner organizations to do the same.

Haverfield's safety and training department has a "Safety Management System" (SMS) in place which identifies hazards and assesses and measures safety risks in an effort to mitigate or eliminate hazards or reduce them to an acceptable level. The system helps us, as a team, track and evaluate safety management activities to ensure they are appropriate and effective. Haverfield is constantly promoting safety through education and communication to its employees. Daily pre job safety meetings are critical to safety and planning the days work with all employees involved.

Haverfield's side aerial saw complies with industry standards for ANSI A300 for mechanical pruning. It has a number of additional benefits, including:

- Virtually no physical footprint made by the equipment. The helicopter does not disturb environmentally sensitive areas. This reduces or eliminates the need for permits.
- Mountainous terrain or large bodies of water do not impede its progress. Time and savings are realized even more whenever ground access is limited to ground crews.
- The saw is nimble. It provides up to eight years' control of laterally growing limbs and an extra degree of protection from snow and ice loading. This is also a huge factor in distribution line trimming which helps keep outages to a minimum during heavy, wet snow and ice storms.
- Reduction in cost compared with traditional ground methods, and, as stated, what a ground crew would take weeks to achieve the aerial side saw can do in a few hours.

Haverfield and Xcel Energy are now focused on using the aerial side saw to complete other projects in and around its territory in the Midwest. Xcel Energy will use the cost savings for additional jobs and redirect manpower to additional tasks that promise to save more time and money—as well as keep our outages to a minimum.

Haverfield recently added a horizontal saw known as the tree topper to its aerial saw services. This saw is used to top trees along the right of way to prepare them for take downs. The tree topper is also used to mitigate danger trees identified through vegetation patrols. It can also be used in conjunction with the side trimming saw for maximum right of way clearing. Xcel Energy will be exploring possibilities of using the tree topper where applicable.

We were thoroughly pleased with the results of our pilot and with our working relationship with Haverfield.

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