REDUCED WOODPECKER DAMAGE IN ACZA TREATED UTILITY POLES

A presentation to American Wood-Preservers' Association
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Abstract

This study, which began unofficially in 1989, documents 1,173 poles on four different transmission lines which were exposed to damage by woodpeckers over a ten-year period. After preliminary findings were reported in 1990, the study was formalized in 1991.

A number of alternative methods to prevent utility damage in utility poles have been explored by Virginia Power and other utilities for years. These methods included the use of concrete and steel poles, metal and vinyl mesh wire, solid vinyl wraps, chemical repellents, plastic owls and hawks, and bird boxes attached to the poles. None has been successful.

Data were collected on the 1,173 poles located in four different geographic locations. The data were sorted by wood species and treatment type. An average level of damage was established for each pole type. These averages were compared to determine if there was a correlation between bird activity and pole type.

The study concludes that the level of damage to poles treated with Ammoniacal Copper Zinc Arsenate (ACZA) was 71% less than damage to wood poles treated with other chemicals.

There are 22 species of woodpeckers that inhabit the United States. While most people assume they reside in or near trees, many species utilize man-made structures to nest. In fact, woodpeckers have extended their habitat to include wooden fence posts, utility poles and buildings. So these days, you'll find woodpeckers even where you don't find trees.

History

In this part of the country, the challenge is principally the Pileated woodpecker, which does a considerable amount of damage to Virginia Power's wood poles. I'm told that the bird is not uncommon in this region.

(left to right) Red-headed Woodpecker, Downy Woodpecker, Yellow-bellied Sapsucker.

Rumsey and Biesterfeldt of the USDA Forest Service reported in 1970 that among the causes for pole replacement in the southeastern United States, woodpecker damage ranks second only to decay.

Because they are often found in remote locations, transmission poles are "most often attacked, but distribution poles are also damaged. Virginia Power purchases over $10,000 worth of epoxy fillers and splints to repair bird-damaged poles each year. In 1989 the Division of Transmission Departments projected that they would replace 185 transmission poles due to woodpecker damage the following year.

Often when a pole is replaced, the birds will return and excavate a cavity on the new pole at the same level and orientation as the old nest. Therefore, some poles have to be replaced on a regular basis.

Unsuccessful Prevention

Over the past 30 years, Virginia Power has experimented with many products and methods to protect poles from woodpeckers.

Metal mesh wire was used, but only heavy gauge steel could stand up to the birds' persistent efforts to get through to the wood pole.

Heavy-gauge steel mesh proved to be expensive and difficult to install. It made the poles dangerous to climb and affected the dielectric properties of the structure.

Vinyl mesh eliminated some of the disadvantages of metal, but was no match for the birds. In addition, it breaks down in ultraviolet light. Solid vinyl wraps worked well because they made it impossible for the woodpeckers to perch on the poles. However, the wrap also breaks down in time, has a tendency to become brittle, and, with nails breaking through, falls off the pole. Additionally, the vinyl must be removed before climbing the pole.

Other unsuccessful methods of preventing damage from woodpeckers have included plastic hawks and owls, which seem to actually attract rather than repel the birds.

Chemical repellents have proven ineffective, although if they were impregnated into the pole they might be more effective. Naturally, poles are already impregnated with treating chemicals, and adding chemicals would be difficult and more expensive.

One technique that has had minor success has been the use of bird boxes. These large, deep birdhouses are built with treated lumber and attached to the poles. The woodpeckers sometimes nest in the box rather than excavate a new cavity. We've also tried sawing off the portion of the pole which contains the nest cavity and attaching it to the new pole at the same level and orientation, thus retaining the bird's existing nest. Sometimes the birds will return to their old nest instead of excavating a new one.

In spite of the limited success of these methods, we continue to look for a better, more reliable system. Of course, steel and concrete poles are essentially woodpecker-proof, but wood poles are still the most desirable and economical alternative in most cases.

The Search Goes On

This search has continued for years as we're always looking for new and better ideas.

It was in 1988 when I first spotted a trend that interested me. The #293 West Staunton to Valley 230kv transmission line is heavily infested with woodpeckers. Over the years many poles have been replaced, so this line now contains a combination of species and pole treatments dating from 1974 onward. Many showed woodpecker damage. In 1988, I walked sections of this line and noted which poles were being attacked. I observed 52 poles and noted that 12 (23%) had significant damage. I noticed that another 12 poles were treated with Chemonite and only one of those 12 had been attacked by woodpeckers.

While this certainly wasn't heavy research, it did pique my curiosity. In fact, these observations, along with some from other utilities were reported in a paper written by Janet Cunningham of J.R. Baxter & Co. in 1989. The findings were covered in a brief story that appeared in the March 1990 issue of *Electrical World* magazine. This encouraged me to begin a more formal study.

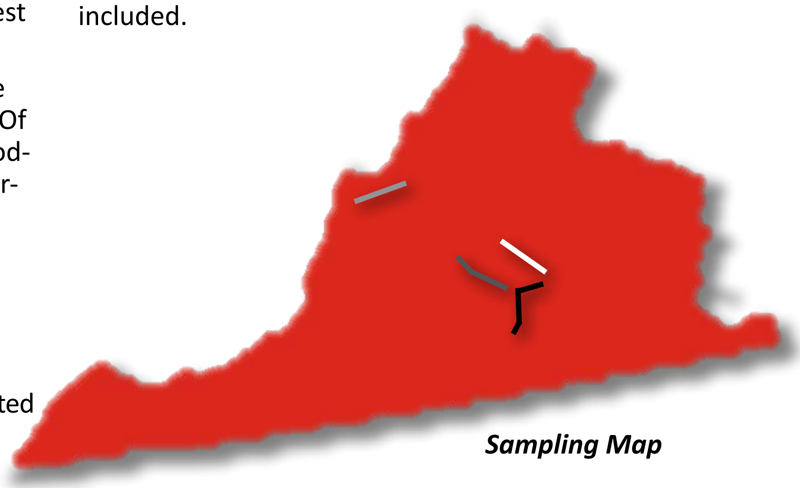
In 1991, I walked short, woodpecker-infested sections of several lines trying to create a larger data base that might yield more conclusive results. The data I collected indicated resistance in Chemonite poles, but again the sampling was too small to be conclusive. In addition, I felt I might be unintentionally biasing the study through my selection of study sites. The only way to eliminate the possibility of this bias was to study entire units ... whole transmission lines or taps.

Formal Study

I decided to set up a formal study of four different transmission lines containing 1,173 poles.

Transmission lines were chosen for the study if they had more than 15% Chemonite-treated poles interspersed with poles of other treatments through an area or areas of known woodpecker activity. Each line was over ten years old, so a history of activity over time could be observed.

In order to eliminate potential bias from the selection of the study locations, every pole on the study lines from substation to substation was included in the sampling. If only a tap of the line qualified for the study, every pole on the entire tap of the line was included.



Sampling Map

Line #298 runs from Bremo Bluff Power Station on the James River at the center of the state of Virginia south to the town of Farmville. It includes concrete poles from Bremo to Buckingham — approximately the midpoint of the line. The southern half of the line includes a variety of wood poles and runs through rural Cumberland County. The treatment dates on the poles range from 1955 through 1988, with most of the poles dated in the mid-1970s.

Line #293 runs through the Shenandoah Valley in the northwestern part of Virginia. Most of these poles were treated in 1974.

Line #235 starts at Farmville where the 298 line stops and runs south-southwest of Chase City in Mecklenburg County, about fifteen miles north of the North Carolina line. Poles on this line were treated in 1974 and include only two types of poles — Chemonite-treated Douglas fir and CCA-treated Southern yellow pine.

Table I

Line #	DFSB	DFC	DFCAC	SPC	SP (SK or SJ)	WCCAC	Total Poles
298	34	1	27	52	90		204
293	80	5	86		56		227
235	461				124		585
84	33	30	8		67	19	157
Total	608	36	121	52	337	19	1,173
Avg. Age	18	10	18	21	18	18	

NOTE: **DFSB** **= Chemonite treated Douglas fir**
DFC **= Creosote treated Douglas fir**
DFCAC **= CCA treated Douglas fir**
SPC **= Creosote treated Southern pine**
SP (SK or SJ) **= CCA (type B or type C) treated Southern pine**
WCCAC **= CCA treated Western red cedar**

from American Wood Preservers' Association standard brand symbols

Line #84 is a long line that runs a circuitous route from Chase City to Farmville. Only the South Creek Tap, which contained some Chemonite poles, was included in the study.

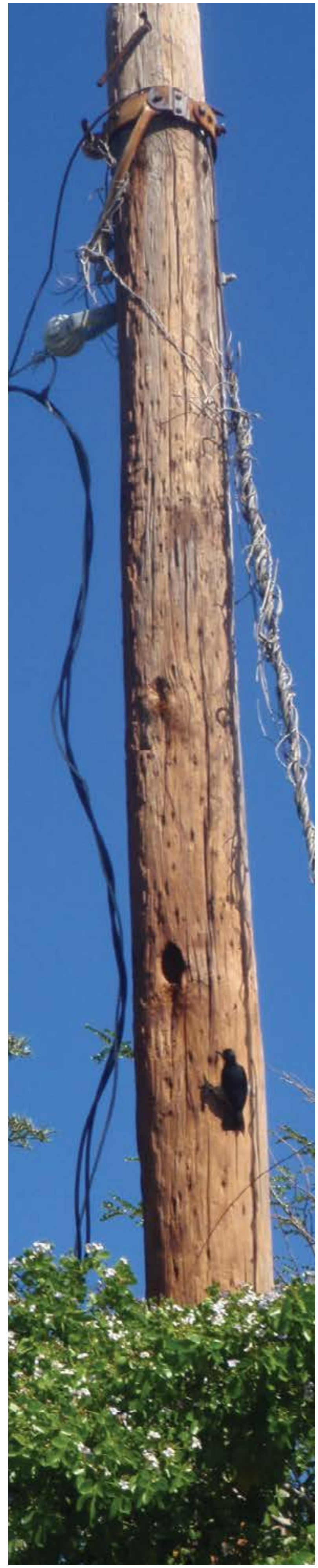
Each pole was first inspected and given a history. We included and recorded the structure number, the position (left, right or center), wood species and pole birth dates. Table I indicates the breakdown of all poles on each of the four lines.

Next, each pole was inspected and rated for woodpecker damage and evidence of woodpecker activity. Fresh new cavities were given the same value as older or even previously repaired damage, since our object was to assess the amount of activity during the service life of each pole. Based upon the ratings shown here on Table II, each pole was given a WPH index rating.

Table II

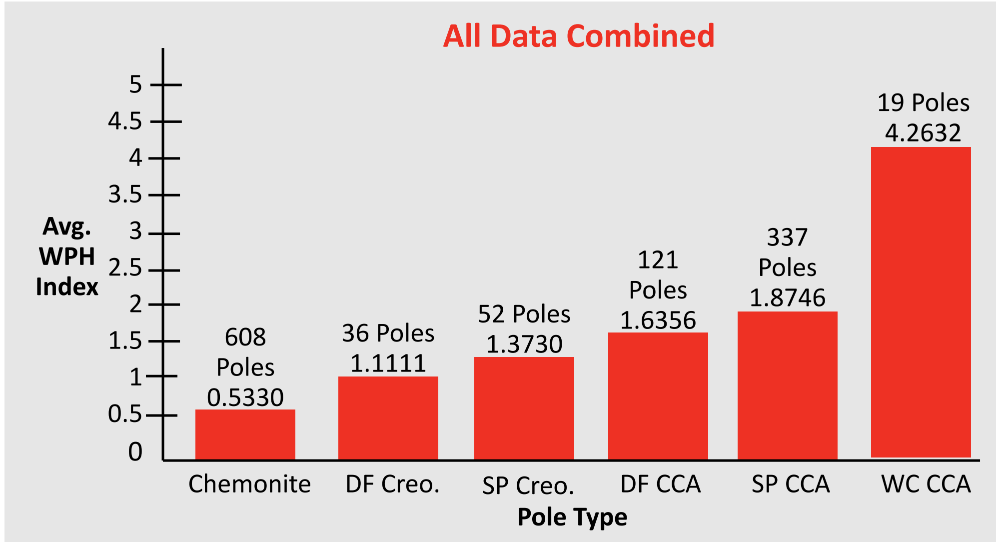
WPH Index	Description
0	No evidence of woodpecker activity.
1	One or two small points of Exploratory Pecking. May be of questionable origin.
2	Two or more Exploratory Pecking sites limited to one face or level of the pole.
3	Widespread Exploratory Pecking on more than one face or level of the pole.
4	One Small Cavity. Exploratory Pecking may or may not be present.
5	Two to five Small Cavities.
6	More than five Small Cavities or one Nest Cavity.
7	Widespread Small or Nest Cavities on more than one face of the pole.
8	Severe damage to the point that the pole should be scheduled to be changed. (Note: most poles are changed out by this point so this study contained few poles rated 8 or higher).
9	Pole is in imminent danger of falling.
10	Pole has failed.

After each pole in a study line was assigned a WPH rating, the poles were sorted by species and treatment and the average index for each pole type was calculated and compared to others to determine if there was a statistically significant trend.



Here are the results:
As the data indicates, the level of woodpecker activity was significantly less on the Chemonite treated poles than any others. There are questions regarding the Douglas fir creosote-treated poles on line 84, but there was not enough data to extract any meaningful information.

The only single treatment in the study to show meaningful resistance compared to the other poles was Chemonite.



Conclusion

This study clearly shows that there is a definite tendency for woodpeckers to leave Chemonite-treated poles alone. The level of damage to the 608 Chemonite-treated poles was 71% less than the level of damage to the 565 other poles in the study. Chemonite cannot be considered “woodpecker proof” since some Chemonite poles were damaged, but the average damage on large numbers of poles shows more damage to poles of other treatment.

Conclusion

Chemonite — 608

Other — 595

71% Less Damage

No conclusion could be drawn about the relative resistance between the other five combinations of species and treatments represented in the study. There may be a hierarchy of resistance among all species and treatments, but it did not show up in this data.

While no conclusion could be drawn about why the birds tend to avoid Chemonite-treated poles,there may be a particular component that is responsible. If that component could be isolated, it might be possible to incorporate it into other treatments to make them more resistant to bird damage. Chemical analysis is beyond the scope of this study.

Virginia Power has been using Chemonite poles on transmission lines for twenty years. These poles have performed well and have resisted decay and insect damage as well as any other poles. The cost of Chemonite-treated Douglas fir transmission poles is comparable to Douglas fir poles treated with creosote.

Chemonite is not currently available in Southern pine because, although Southern pine can be treated with Chemonite no plants in the South currently use Chemonite.

The price of poles is negligible compared to the price of labor to install them. If a pole lasts longer and delays replacement costs, or if it requires less maintenance, it becomes the appropriate choice because of its cost-effectiveness.

With 71% less woodpecker damage, we believe Chemonite-treated poles would be the cost effective choice in woodpecker-infested areas.

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