Extending Woo with Remedial

By Randy Marquardt

For many years, pole owners have recognized the benefits of inspecting in-service wood utility poles and service life extension through remedial treatment applications. Today's economic conditions, however, combined with environmental issues and ever-growing regulatory mandates, place an even greater burden on utility management to maximize the safe use of existing wood poles.

It's impossible to discuss effective remedial treatment programs without an analysis of inspection methods and inspector qualifications. Accurate inspection, decay assessment, and treatment selection and application are as important to the process as the performance characteristics of remedial treatment systems themselves.

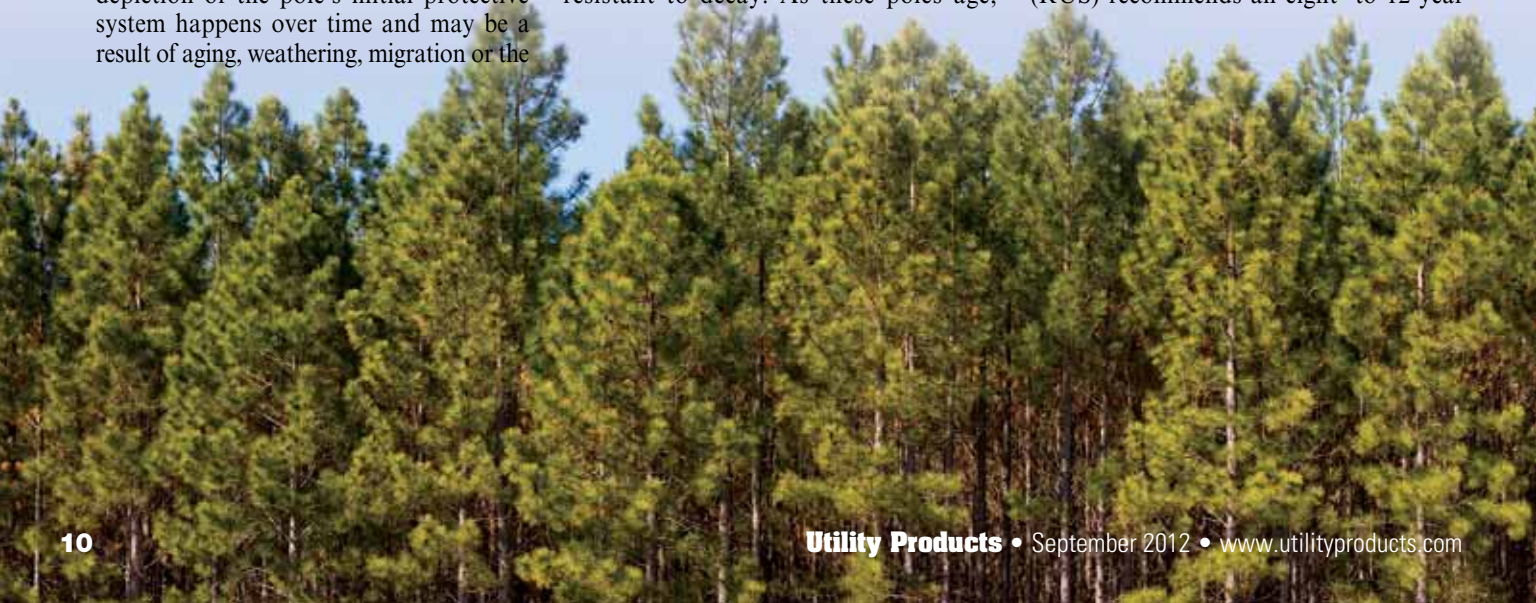
Remedial treatments are designed to extend service life by supplementing the manufacturer's original treatment. The depletion of the pole's initial protective system happens over time and may be a result of aging, weathering, migration or the volatility of chemical elements. Combined with the remaining original preservative—typically pentachlorophenol, creosote or chromated copper arsenate (CCA)—remedial treatments can provide an effective defense against a wide variety of wood-destroying organisms, extending the service life years beyond what is typically expected. See Survivor Curve - Deterioration Zone 3 as referenced by the American Wood Protection Association (AWPA) U1-12.

The All-important Groundline

Wood poles commonly used in North America are subject to surface decay or "shell rot" below the ground level. In southern pine poles, which comprise some 85 percent of the poles in North America, this type of decay is most common. Western species such as Douglas fir and red cedar are less susceptible to surface decay; the sapwood of neither Douglas fir nor western red cedar, however, is naturally resistant to decay. As these poles age, therefore, they may be subject to surface decay, though later in life when compared to southern pine.

Decay fungi are the most common wood-destroying organisms, and they can be found in virtually any environment. Decay fungi require four elements to cause damage: air, water, a favorable temperature and food—in this case, the wood pole. These four elements are most prevalent from the groundline to 18 inches below groundline; in most cases, air becomes a limited factor at deeper depths. As a result, this area is highly susceptible to decay. Because the outer 2 to 3 inches of the pole is where some 90 percent of the strength is located, it is vital to protect this part of the pole to preserve its strength.

Preserving the pole plant's durability can be accomplished by in-place treatment with remedial preservatives as part of a cyclical maintenance program. In Bulletin 1730B-121, the Rural Utilities Service (RUS) recommends an eight- to 12-year



od Pole Life Preservatives

cycle based on the environment's decay conditions where the poles are installed. Excluding remedial treatments from a pole maintenance program leaves owners with only an inspection program. This "run to failure" strategy can have significant, long-term negative impacts on our natural resources, skilled manpower and financial resources. In addition, it increases the pole owner's safety and reliability risk.

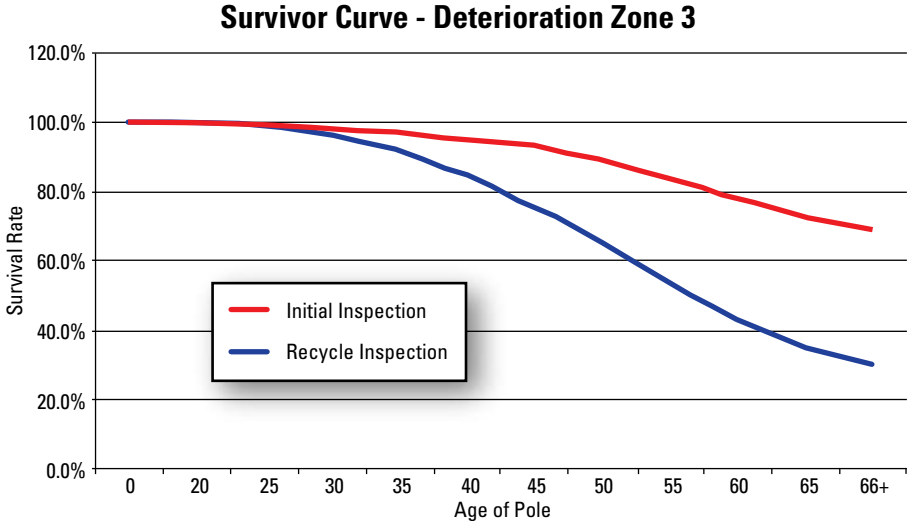
Groundline Preservatives

Externally applied preservatives vary greatly in their chemical make-up, environmental profile, efficacy, penetration into a pole, and their ability to remain in the treatment zone to control decay for an extended time period. Selecting an appropriate remedial treatment strategy can save pole owners' millions of dollars by reducing the number of pole change-outs and reducing the risks associated with pole failures.

An effective external groundline treatment must have the following characteristics:

1. The ability of one of the active ingredients to penetrate the outer two to three inches of the pole, at or above threshold levels. Additional active ingredients can provide increased protection at or near the pole's surface. Note: The threshold level is the amount of preservative that must be present to control decay.
2. The active ingredients must display an ability to remain in the designated treatment zone at levels capable of controlling decay and for time periods consistent with remedial treatment cycles.
3. The active ingredients must be able to control both soft rot and brown rot decay fungi.
4. Remedial preservatives with multiple active biocides are preferred because they can provide a broader spectrum of protection against wood-destroying organisms.

Active ingredients most commonly used in remedial groundline treatments are various types of copper compounds, such as copper naphthenate and copper hydroxide; sodium fluoride; various types of borates; and, most recently, a combination of copper, boron, tebuconazole and bifenthrin. Groundline treatments vary in how they are applied to the pole. Some are available as a brush-on paste application, which is then covered with a polyethylene-backed moisture barrier to encourage inward migration of the active ingredients. Others are available as ready-to-use wrap applications—paste wraps, liquid wraps and dry wraps. These wraps combine the preservative and the moisture barrier. Preservatives that contain two or



AGE	0	20	25	30	35	40	45	50	55	60	65	66+
Initial Inspection	100.0%	99.7%	98.5%	96.4%	91.8%	84.9%	75.7%	65.4%	53.8%	43.6%	35.2%	30.1%
Recycle Inspection	100%	99.8%	99.0%	98.2%	97.0%	95.3%	93.7%	89.4%	83.8%	78.1%	72.6%	69.1%

more active ingredients are referred to as co-biocides. In these formulations, one active ingredient, such as boron or sodium fluoride, typically penetrates deeply and other actives, such as copper, usually stay closer to the surface by penetrating 1/4 inch

Go Green: An effective pole maintenance program is environmentally responsible

It is estimated that there are more than 150 million wood poles in service in the US. Each year, some four million of those poles are replaced as they reach the end of their service life. Wood poles are considered to have an effective service life of 40 years; there is an increasing body of evidence, however, that shows poles can last more than 80 years if they are properly inspected and remedially treated on a cyclical basis. Given that evidence, it's not unrealistic to assume that two million of those four million poles would still be in-service had they been inspected and remedially treated on a regular basis.

Save Trees

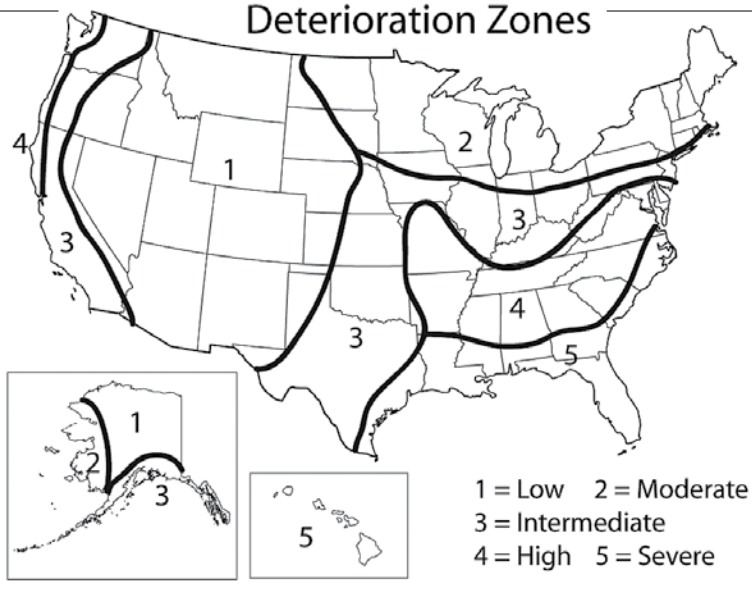
Extending pole life promotes the efficient use of trees and reduces the potential waste of this important resource. Forestalling the replacement of two million poles saves two million large trees each year.

Improve Air Quality

Avoiding the unnecessary harvest of two million trees means those trees are still in our forests absorbing carbon dioxide—an estimated 48,000 tons of carbon dioxide each year.

Reduce Chemical Use

Reducing the need for new poles also decreases the need for chemicals and petroleum carriers used in their manufacture. The typical distribution pole contains some 6.4 pounds of chemical/active (pentachlorophenol, creosote, etc.) and 128 pounds of diesel oil. Forestalling the replacement of two million poles each year might save as much as 34 million gallons of fuel oil per year.



to 1/2 inch. Cobiocides are found to be more effective than copper naphthenate alone because of copper naphthenate's limited ability to penetrate wood at threshold levels in a topical treatment.

Preservative Pastes

The majority of commercially available pastes are waterborne and do not use petroleum solvents or carriers. The paste's consistency makes it easy to apply and helps ensure 100 percent coverage of the pole surface in the treatment zone with no wasted product and no slumping (the process of the product succumbing to gravity rather than remaining fixed in the treatment zone).

Preservative Bandages

Bandages, though more expensive than pastes, are viewed by some as easier or less-time consuming to apply—particularly dry bandages. With bandages, however, there is the potential for incomplete coverage of the targeted pole surface because of obstructions or an irregular surface resulting from decay removal. A liquid bandage can be subjected to unequal material distribution because of the effect of gravity (slumping). The seaming on segmented bandages often can limit coverage to less than 80 percent of the treatment zone, and excess overlap can cause the preservative to be directed away from the pole.

Investing time to understand what remedial treatment options are available can have long-term financial benefits. It can also limit environmental exposure and other risks associated with pole ownership. Pole owner's engineering, standards, risk management and environmental departments are strongly encouraged to investigate remedial treatment options as they plan their maintenance strategies. Choosing a preservative that will cover 100 percent of the treatment zone and penetrate and persist into the desired pole depths is paramount to effectively preserving the useful service life of wood poles. A preservative that can accomplish those objectives with a low toxicity profile and low exposure risk is the ideal choice. ❑

About the Author:
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