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Pole Testing and Treatments: An Overview

The Ramifications of Remedial Treatments on In-Service Poles

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Effect of Inspection Holes on the Load Strength of Poles in Service

A well treated pole will provide exceptional performance under most conditions, but even a properly treated structure can experience decay while in service. While a variety of non-destructive test methods have been developed for detecting internal insect attack and decay in poles, intrusive inspection is generally necessary to determine the cause and degree of damage, however, many utilities are concerned about the potential for the inspection holes themselves to become damaging, both from the removal of cross sectional area as well as from the potential to act as pathways for future fungal attack. Application of a remedial internal treatment can mitigate the risk of the holes acting as conduits for future fungal attack, but the potential effects on strength needed to be tested.

Poles were randomly allocated to four groups of 22-23 poles. The poles received the following treatments around the theoretical groundline (6 feet from the butt).

1. No holes

2. Three 5/8 inch diameter holes drilled at 6 inches below the groundline, 6 inches above the groundline and 18 inches above the groundline. The holes were approximately 15 inches long and drilled inward at a 45 degree angle. Each hole was 120 degrees around from the others.

3. Three 7/8 inch diameter holes drilled at 6 inches below the groundline, 6 inches above the groundline and 18 inches above the groundline. The holes were approximately 15 inches long and drilled inward at a 45 degree angle. Each hole was 120 degrees around from the others.

4. Six 7/8 inch diameter holes drilled in pairs beginning 6 inches below the groundline, 6 inches above the groundline and 18 inches above the groundline. The holes were approximately 15 inches long and drilled inward at a 45 degree angle. Holes at a given location from the groundline were drilled 120 degrees apart.

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The first two drilling patterns were selected to simulate a first inspection of a pole, while the third was designed to simulate a re-inspection of the same pole at a later date. QRS does not recommend drilling additional holes in a re-inspection unless probing in the original inspection holes suggests that shell thickness has declined. The poles were then loaded to failure, defined as the point at which the pole could not continue to take increasing load. After failure, each pole was evaluated and the location of failure was recorded.

The results indicate that drilling three or six steep angled holes into the groundline zone of a pole had no significant effect on modulus of rupture. The test apparatus placed the maximum stress in the area where the holes were drilled, indicating that inspection holes do not pose a significant threat to pole flexural properties. Despite the ability to drill additional holes, we would still recommend re-using inspection holes wherever possible.

Re-treatment

The timing of re-treatment schedules varies with the wood species and climate. Poles under severe conditions may be inspected as often as every 5 years. Those in drier climates may be inspected at 15 year intervals; most utilities, however, use a 10 year retreatment cycle.

Metam sodium, chloropicrin, MITC and dazomet all appear to be effective for 10 years in Douglas-fir and limited studies suggest that the results should be similar in western red cedar. Re-treatment cycles with fumigants will tend to be shorter in southern pine because the chemicals dissipate and wood degrading organisms invade the wood more rapidly