



MINNESOTA FORESTRY NOTES

No. 44
July 15, 1955

DURABILITY OF PENTACHLOROPHENOL TREATED FENCE POSTS

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Minnesota farmers set an estimated 12,000,000 fence posts annually. Of these, about 3,000,000 are steel, somewhat more than 1,000,000 are commercially treated wood posts, and the remaining 8,000,000 are untreated wood posts of various species. Although a considerable number of the untreated wood posts are of species with durable heartwood such as bur and white oak and northern white cedar, probably one-third of the fence posts used by farmers annually are locally produced from non-durable species.

Wood posts that have received thorough treatment with good preservatives by commercial treating plants can be expected to last 25-30 years or even longer. The increasing availability of commercially treated posts will result in more farm fences with longer service lives and lower maintenance costs. Their use is to be encouraged.

However, there remains a tremendous problem associated with posts of non-durable species as well as with the oaks and northern white cedar^{2/}. In order to increase the useful life of non-durable species, preservatives and treating procedures must be available that are simple, low in cost and adapted to home use.

Such a treatment is available in oil solutions of pentachlorophenol (Penta), which are now widely marketed through retail channels. Although oil solutions of pentachlorophenol are most effective when applied by pressure, hot-cold bath, or vacuum treating processes, they can be used in open tanks or barrels and the posts or other products treated by soaking for various periods. Cold soaking in oil solutions of Penta is a practical treating procedure adapted to farm and similar uses.

During the spring of 1942, fence posts of seven species, jack pine, black ash, paper birch, cottonwood, aspen, red oak, and white oak were cut, peeled, and seasoned for about two months. In early August they were treated in a 5.0 per cent oil solution of pentachlorophenol by soaking them in an upright position in open oil drums. The treating solution was prepared by diluting one part of a Penta concentrate with four parts of kerosene. One-half of the posts of each species treated was given a 24-hour treatment; 18 hours with the butts down and then reversed and the tops soaked for six hours. The remainder were given a 48-hour treatment; 36 hours with the butts down and then reversed and the tops soaked for 12 hours.

The posts were then set in service plots at the Cloquet Forest Research Center, St. Paul Campus, and Waseca. Beginning in 1945 and continuing to the present, the

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^{2/} Rees, L. W. 1953. The strength of northern white-cedar posts. Minn. For. Note No. 15.

posts have been tested annually or biennially by subjecting them to a 100-pound pull applied at four feet from the ground.

The results at the end of 13 years in test plots are shown in the table. All of the treated jack pine posts were in excellent condition. Most of these posts appear to be as sound as when set. A few untreated jack pine, because of a large amount of highly resinous heartwood, continue serviceable. The results with black ash appear to be almost as favorable and indicate that this species likewise treats well by cold-soaking. Although not quite as good, the results on paper birch are sufficiently promising to recommend cold-soaking treatment with pentachlorophenol.

Aspen and cottonwood are extremely difficult to treat by all treating processes and the same situation appears to hold for cold-soaking. Poor penetration and distribution of the preservative were obtained and this is showing up in the number of posts that have failed. However, even with these species treatment will no doubt result in at least a fourfold increase in service life over the untreated controls. Although the increase in service life with white and red oak as a result of treatment is not as striking as for the less naturally durable species, the increase may be sufficient to warrant their treatment.

The results of this test to date indicate that treatment of seasoned posts by cold-soaking in a 5.0 per cent oil solution of pentachlorophenol is a simple, low-cost method of increasing the durability of species tested, particularly jack pine, black ash, and paper birch. Treatment by this method is not equivalent to that which can be given by commercial treating plants, but it has a place in the farm treatment of posts that would otherwise be used untreated.

Record of post test plots, 1942-1955

Species	Length	Posts Set	Absorption of	Posts Serviceable
	Treatment		Preservative Solution	after 13 Years
	Hours	Number	Lbs./cu. ft.	Per Cent
Jack pine	24	67	2.27	100
" "	48	65	2.62	100
" "	Untreated	70	0	6
Black ash	24	70	2.99	97
" "	48	70	3.60	100
" "	Untreated	70	0	0 ^{1/2}
Paper birch	24	70	3.02	72
" "	48	70	3.54	94
" "	Untreated	70	0	0 ^{1/2}
Cottonwood	24	59	3.24	75
" "	48	60	4.17	78
" "	Untreated	60	0	0 ^{1/2}
Aspen	24	69	3.69	44
" "	48	70	3.24	61
" "	Untreated	70	0	0 ^{1/2}
Red oak	24	60	1.47	92
" "	48	60	1.39	100
" "	Untreated	51	0	40
White oak	24	30	1.48	97
" "	48	30	1.39	100
" "	Untreated	30	0	50

^{1/} The average life of untreated posts showing complete failure were: black ash, 4.5 yrs.; paper birch, 4.1 yrs.; aspen and cottonwood, 3.8 yrs.