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Large Variations In Absorption Result When Cold Soaking Poorly Seasoned Posts

by

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A recent inspection of one series of fence posts produced such erratic results that no valid evaluation of the method of treatment or preservative could be made. Because the data indicated such a wide range of values, the standard deviation of retentions was calculated in order to better understand the service life of these posts. This experiment was initiated in 1948 to investigate the length of time necessary to obtain adequate protection of several species of fence posts treated with copper naphthenate in 0.78 and 0.40 percent solutions by the cold soaking method.

Graph I shows the average retention, the range of one standard deviation of the posts and the retention for extreme use recommended by the AWPA. Since the range of one standard deviation includes approximately two-thirds of the posts treated, the data indicates that a small proportion of the total number of posts received the proper amount of preservatives. Some of those posts which retained enough preservative have failed, indicating other factors than those examined in this experiment.

Table I lists the species, soaking time and solution strength. The standard deviations of the reported retentions are shown with the average retentions. Some of the groups are small and the deviations are probably misleading, however even the larger groups show variations that are just as extreme. In the cases where 100 percent failure has not been obtained, the service life has been estimated, using the Renewal Curves 1/.

There are several factors which might explain the results obtained from this study. If the posts had been improperly seasoned, the amount of moisture in the posts would restrict the penetration and absorption of the treating solution by restricting the amount of void area available to the preservative. Also high surface moisture caused by exposure to rain would present an effective barrier to the penetration of the preservative. Some of the posts had not been peeled adequately, thus the inner bark restricted the movement of the treating solutions. Even in the cases of good retentions, some of the posts failed, due to checking after treatment because of insufficient drying time prior to treatment. In the case of hop hornbeam the retentions are about what might be expected since this species is relatively hard to treat.

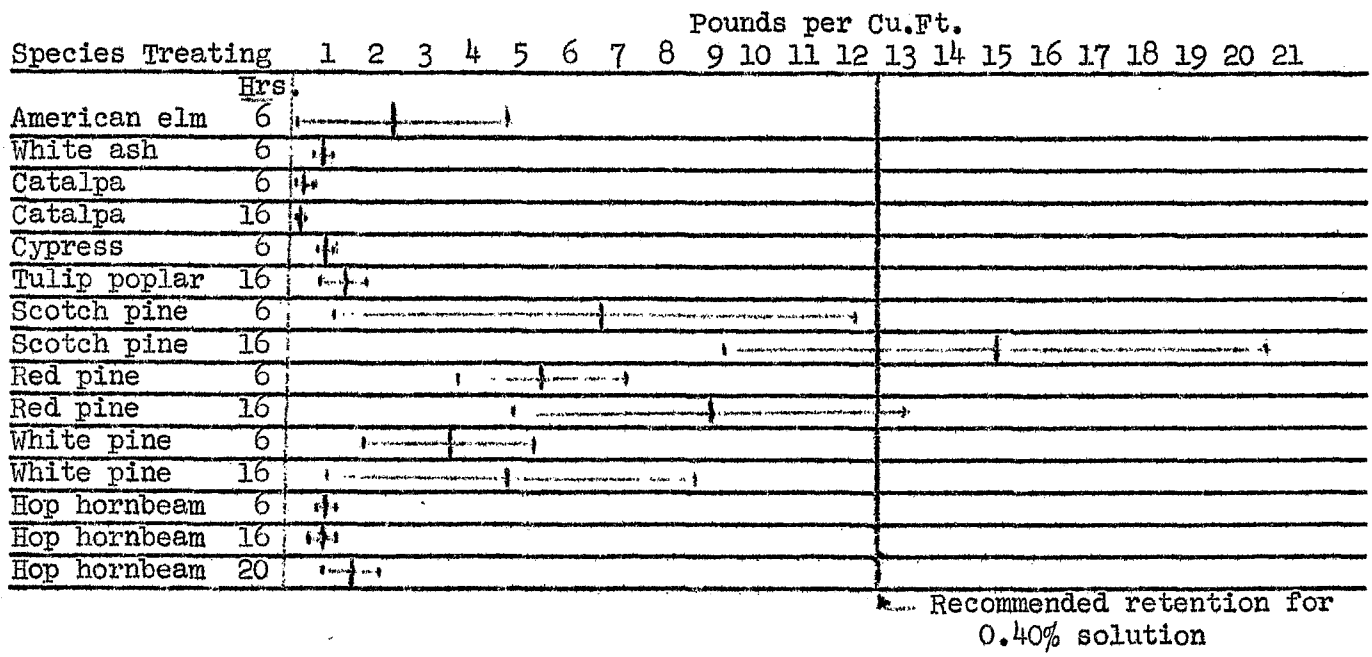
Several experiment stations recommend cold soaking to persons interested in treating fence posts for their own use or for sale. Often these recommendations include only the length of soaking time for a certain species. It is advisable to stipulate that the posts be well seasoned and well peeled prior to treatment, thus insuring the preserver and consumer of a quality product.

Further work on means of obtaining satisfactory absorption of preservative in posts of different species will be done.

1/ Percentage Renewals and Average Life of Railway Ties (1951) Forest Products Laboratory Report No. R886.

Figure 1

One Standard Deviation of Average Retentions of Species Treated by the Cold Soaking Method for Varying Periods of Time in Two Solutions of Copper Naphthenate



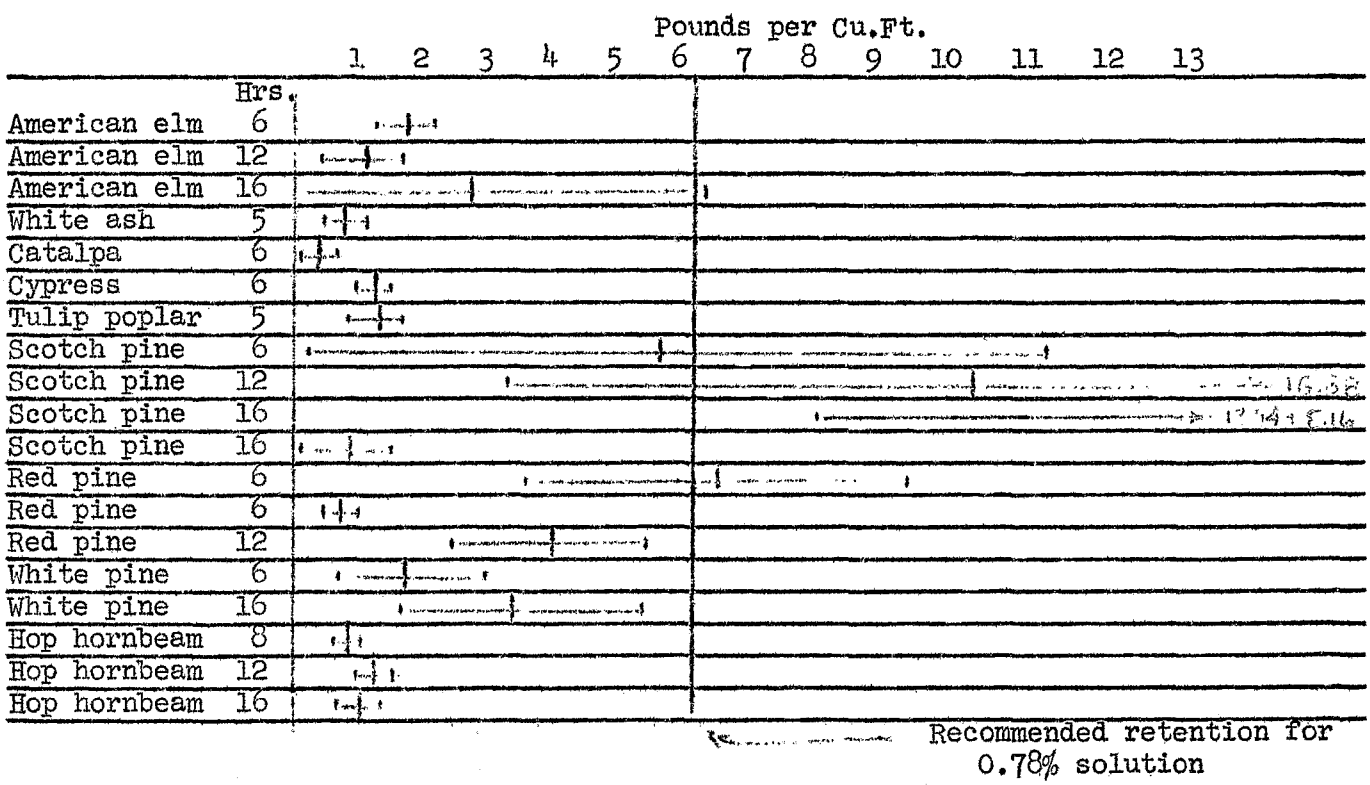


Table I

Service Life of Species Treated with Copper Naphthenate by the Cold Soaking Method for Varying Amounts of Time in 0.78 and 0.40 Percent Copper Solutions

Species	Treatment Hrs.	Treatment % Sol.	Average Retention #/cu.ft. of Sol.	Number of Posts Tested	Failed	%Failed	Service Life Mos.
American elm	6	0.78	1.90 ± 0.52	7	6	86	65*
" "	12	0.78	1.15 ± 0.64	4	1	25	-
" "	16	0.78	2.76 ± 3.76	4	4	100	45
" "	48	0.78	1.39 ± 0.40	8	4	50	83*
" "	48	0.40	2.39 ± 2.30	17	9	53	82*
" "	-	-	- -	11	9	82	68*
Green ash	5	0.78	0.84 ± 0.25	8	6	75	72*
" "	6	0.40	1.03 ± 0.16	6	4	67	76*
" "	-	-	- -	6	5	83	67*
Catalpa	6	0.78	0.40 ± 0.35	6	-	-	-
"	16	0.40	0.13 ± 0.06	7	-	-	-
"	-	-	- -	9	-	-	-
Cypress	6	0.78	1.21 ± 0.20	7	-	-	-
"	6	0.40	1.21 ± 0.35	7	2	29	-
"	16	0.40	2.36 ± 1.78	5	1	20	-
"	-	-	- -	5	1	20	-
Tulip poplar	5	0.78	1.27 ± 0.34	7	5	71	74*
" "	16	0.40	1.44 ± 0.39	6	4	66	76*
" "	-	-	- -	10	9	90	63*
Scotch pine	6	0.78	5.70 ± 5.50	34	1	3	-
" "	12	0.78	10.28 ± 6.60	4	-	-	-
" "	16	0.78	13.94 ± 8.06	8	-	-	-
" "	**16	0.78	0.99 ± 0.88	5	3	60	79*
" "	6	0.40	6.65 ± 5.42	18	3	16	-
" "	16	0.40	14.92 ± 5.54	13	-	-	-
" "	-	-	- -	9	8	89	63*
Red pine	6	0.78	6.62 ± 2.83	6	-	-	-
" "	**6	0.78	0.86 ± 0.52	5	2	40	-
" "	12	0.78	4.05 ± 1.44	11	-	-	-
" "	6	0.40	5.53 ± 1.69	9	-	-	-
" "	16	0.40	9.01 ± 3.98	4	-	-	-
" "	-	-	- -	7	7	100	36
White pine	6	0.78	1.93 ± 1.10	28	2	7	-
" "	16	0.78	1.60 ± 1.75	12	1	8	-
" "	6	0.40	3.58 ± 1.83	22	2	9	-
" "	16	0.40	4.76 ± 3.80	18	1	6	-
" "	-	-	- -	7	5	70	74*
Hop hornbeam	8	0.78	1.05 ± 0.25	14	8	57	79*
" "	12	0.78	1.31 ± 0.29	16	8	50	83*
" "	**16	0.78	1.16 ± 0.36	5	4	80	70*
" "	6	0.40	1.15 ± 0.27	10	6	60	79*
" "	16	0.40	1.14 ± 0.32	13	10	80	70*
" "	20	0.40	1.63 ± 0.47	11	6	55	81*
" "	-	-	- -	8	8	100	45

*Average service life estimated from Forest Products Laboratory curves.

**Green