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SERVICE RECORDS

ON TREATED

AND UNTREATED FENCEPOSTS

Summary

This progress report on service tests of fenceposts, untreated or treated with preservative, was conducted either by the Forest Products Laboratory and other branches of the Forest Service, or by others in cooperation with the Forest Service. The earliest test installations were started in 1908, and new tests have been added in succeeding years. The service records cover a wide variety of post species, 12 methods of treatment, and 73 different preservatives or preservative combinations. Actual or estimated life figures are shown for test installations where 10 percent or more of the posts had failed at the time of the last inspection. Table 1 is an index to the preservatives and method of treatment reported in table 2.

NOTE

This publication reports research involving pesticides. It does not contain recommendations for their use, nor does it imply that the uses discussed here have been registered. All uses of pesticides must be registered by appropriate State and/or Federal agencies before they can be recommended.

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The Forest Products Laboratory is maintained at
Madison, Wis., in cooperation with the
University of Wisconsin.

SERVICE RECORDS ON TREATED AND UNTREATED FENCEPOSTS¹

BY

**LEE R. GJOVIK, Forest Products Technologist
and
HARLEY L. DAVIDSON, Physical Science Technician**

**Forest Products Laboratory, Forest Service
U.S. Department of Agriculture**

Introduction

The value of service tests on treated wood products in the evaluation of wood preservatives and methods of applying preservatives has long been recognized. Service tests on treated ties were started by the Forest Service (formerly Bureau of Forestry) as early as 1902, and tests on treated fenceposts were started in cooperation with various agricultural experiment stations in 1908. With the establishment of the Forest Products Laboratory in 1910, these studies have been gradually expanded. Service tests on fenceposts are a simple and convenient means for comparing the preservative value of different chemicals and the performance of the numerous methods by which the chemicals can be applied. Post tests are also of value for comparing decay and insect resistance of untreated woods.

This progress report includes records only on test installations by Forest Service agencies or on installations by others in which the Forest Service has cooperated. Space does not permit a presentation of complete details on the treatments or on the properties of the various preservatives used in the treatment of the posts. Much of this information is available, however, either in other publications or in the files of the Forest Products Laboratory.

General Description of the Tests

The records in this report were obtained from test installations in various sections of the United States. Soil and climatic conditions vary

¹ Recent progress reports in this series were prepared by J. Oscar Blew and John W. Kulp as USDA Forest Serv. Res. Note FPL-068 in 1959 and revised in 1964.

widely in the different test areas. In installations such as those in Mississippi and Louisiana, conditions are highly favorable for decay and termite attack. By contrast, in the northern States, temperatures throughout the winter months are not conducive to rapid decay. Furthermore, termites are found only in widely scattered locations in northern test areas such as in Wisconsin, Minnesota, and Montana.

For the most part, the test posts are installed in boundary fences of farms, ranches, and units of the National Forests. Test installations by the Forest Products Laboratory since 1946 at Madison, Wis., and at Saucier, Miss., however, have been in rectangular plots with the posts installed by the randomized-block method. The posts in plots do not support a fence, but for test purposes the plot system has several advantages over the fence-line type of installation. The posts in plots are exposed to more uniform soil and moisture conditions, are less subject to loss, and are easier to inspect than line posts.

In many of the installations the number of posts now shown in test is less than the number originally installed. Losses have occurred through the changing of fence lines, pilferage, fires, mechanical breakage, and other causes not associated with decay or insect attack. In such cases the posts have been eliminated from test.

The posts, except in a few instances where untreated 3-1/2-foot stubs were used, are of usual fencepost size varying in length from 6 to 7-1/2 feet, and in diameter from approximately 3 to 7 inches. Square posts, when they are used, are approximately 4 inches square, and the faces of the split and half-round posts are approximately of the same dimensions as the diameters of the round posts. Posts treated by diffusion processes and the Osmose process were not seasoned, while others, unless specifically indicated, were air seasoned prior to treatment. Posts were generally debarked except where noted or where treated by the tire-tube and end-diffusion processes.

The test posts have been inspected at various times, usually at regular intervals by representatives of the Forest Products Laboratory or by those directly responsible for the installations. During these inspections the posts are examined for the presence of decay and of termite attack. Posts that would break off with a moderate push, or would no longer support a fence because of severe deterioration in the above-ground portions, were considered as failures. They are shown in table 2 as "removed"

Results of Tests

Post service tests must be continued until all or a high percentage of the posts have failed in order to obtain actual figures on average life. Treated or untreated posts that have been in service for 15 years or longer with few or no failures, however, furnish an indication of good

performance. It is also possible through the use of mortality curves developed for crossties to obtain a good estimate on average post life when 10 percent or more of the test posts have failed. On this curve the average life is indicated when 60 percent of the posts have failed. Table 2 shows such estimates, or actual average-life values when all of the test posts have failed.

The various post installations in table 2 are itemized and are grouped alphabetically according to species of wood. In addition to the post removals and average-life figures, information is shown on the preservative used, kind of treatment, and preservative retention, whether the posts are round, square, or split, by whom and where the posts are installed, the dates of installation and of the latest inspection, and the number of posts in test. To obtain information on various post species, the reader can refer directly to table 2. For information on various preservatives or processes, he can first refer to the index (table 1), which will direct him to the item numbers in table 2 relating to those preservatives or processes.

Summary of Results to Date

In arriving at conclusions on the basis of the data presented, the reader should keep in mind two important facts: (1) That the performance of untreated wood used as posts is influenced by the proportion of heart-wood and the soil and climatic conditions to which the posts are exposed, and (2) that the performance of wood treated with a preservative is influenced by the thoroughness of the method of application and by the resulting retention and penetration of preservative.

It is not reasonable to evaluate or to compare preservatives on the basis of results obtained by superficial applications that are known to result in low retentions and incomplete sapwood penetration. Even with the more thorough methods of treatment, poor preservative performance can be the result of poor preservative penetration, due either to careless treatment or to the resistance of a particular species to treatment. These factors, along with the locations of the tests, should be considered when evaluating a method of treatment or comparing different treatments and preservatives.

Following is a review of the results obtained to date in the various post installations according to the method of treatment used:

Brush-treated posts.--Untreated jack pine posts with an average life of 3.8 years in Wisconsin show an average life of 8 to 9 years when brush-treated full length with copper naphthenate (2 pct copper) solution, coal-tar creosote, 5 percent pentachlorophenol in No. 2 fuel oil, a water-repellent preservative containing 3 percent pentachlorophenol and 2 percent chloro-2-phenylphenol, and water-gas tar. Untreated lodgepole pine posts in Colorado show an average life of 8.4 years and 12 years when the butt portion is brushed with water-gas tar. Engelmann

spruce posts at the same location reveal an average life of 7.1 years untreated and 11 years when the butts are brushed with water-gas tar.

Cold-soaking.--This process consists of immersing the posts full length in unheated, low-viscosity preservative oil, usually for a period ranging from several hours to several days. The oldest tests on posts treated by cold soaking were started in Minnesota in 1909. In these tests, elm, basswood, and red oak posts soaked in unheated coal-tar creosote from 1 to 45 hours lasted, on an average, 11 to 23 years. Posts treated with light fuel oil solutions containing coal-tar creosote, pentachlorophenol, and copper naphthenate were exposed in Illinois, Mississippi, Missouri, New York, and Wisconsin since 1942. All show an improvement over untreated posts of the same species. Posts such as pines, black cherry, Douglas-fir, white fir, hickory, and oak, when seasoned and treated with soaking periods of 48 hours or longer, generally can be expected to last 20 years or more in Illinois, Missouri, and Wisconsin. Posts of aspen, balsam fir, birch, maple, and tamarack have shown somewhat less improvement through cold-soaking treatment than those of the species mentioned above. Soaking periods of longer than 48 hours have, in some cases, resulted in improved service. Aspen and birch posts in Mississippi have shown improved service as a result of incising, while incising has resulted in less improvement with balsam fir and tamarack posts in that State.

Double diffusion.--The double-diffusion process consists of successively soaking green-peeled posts in chemical solutions that diffuse into the moisture of the wood and react with each other to deposit a preservative with high leaching resistance. Approximately 122 test installations of posts treated by the double-diffusion process have been made since 1941. Of 100 southern yellow pine posts treated full length, first in copper sulfate solution and then in sodium arsenate solution, and installed during 1941 in Mississippi, only eight posts have failed in 29 years. Later installations of southern pine posts with various chemical combinations have been made in Mississippi, Alabama, Georgia, and Tennessee. After 7 to 26 years of service, an average life of from 8 to 39 years, and possibly longer, is indicated. Many of the earlier failures can be attributed to low preservative retentions and to the inadequate protection to the tops of posts treated only at the butt end. These factors would appear to have greater significance than the effect of differences in chemical combination, although the copper sulfate-sodium arsenate and the nickel sulfate-sodium chromate (with and without arsenic acid) appear to show up favorably. An excessively high retention of chemicals applied to posts from dead (insect-killed) trees provided only limited protection, possibly due to lack of sufficient moisture in the wood to provide good chemical diffusion.

Hardwood posts of red alder, hickories, red and white oaks, sassafras, sweetgum, and tupelo have shown up less favorably than southern pines. Hardwoods such as willow and yellow-poplar appear to show more promising results, particularly with higher retentions and with full-length treatment.

Lodgepole pine and Douglas-fir treated with copper sulfate-sodium chromate have shown poor performance during 9 to 14 years' service in Washington and Oregon but have shown up much better when treated with sodium fluoride-copper sulfate.

Sugi, after 12 years' exposure in Hawaii, has no failures. Brush box, casuarina, bluegum, eucalyptus robusta, silk oak, and ohia have average life values of 4.5 to 11 years.

End diffusion.--In this process the butt ends of green, freshly cut, unpeeled posts were allowed to stand upright for several days in a 15 to 20 percent solution of zinc chloride or other water-soluble wood preservative. Following the application to the butt end, the tops of the posts were given a somewhat shorter application in the same preservative solution. Of the posts treated by end diffusion, six installations were made in Wisconsin during 1945 and 1946, including jack pine treated with copper sulfate, and aspen, red oak, white oak, and jack pine treated with chromated zinc chloride. These posts showed an average life of from 14 to 29 years, or from 10 to 20 years in excess of untreated posts of the same species.

Five installations of posts treated with zinc chloride in Mississippi showed an average life of 5 to 7 years for posts of sweetbay, water tupelo, and sweetgum, 9 years for red oak, and 20 years for slash pine as compared to an average life of 2 to 3 years for untreated posts of these species.

Groundline treatments.--Lodgepole pine posts with Anaconda (arsenic trioxide) around the groundline zone had a life averaging from 18 to 28 years in Wisconsin. The untreated tops of the posts held a fence but were badly rotted in that time. The results were somewhat less satisfactory on lodgepole pine and other species treated in Montana, presumably due to drier soil and conditions otherwise less favorable to diffusion of the preservative in Montana. After mercuric chloride and white arsenic were poured in bored holes at the groundline zones, posts of various species installed in Wisconsin showed an average life of 8 to 10 years for box elder, American elm, and shagbark hickory, and 11 to 18 years for red oak, white oak, slippery elm, and black cherry. Jack pine posts treated with pentachlorophenol solution, applied in holes at the groundline, have a life of 3.7 to 7.5 years in Wisconsin. Southern yellow pine posts treated with Osmoplastic at the groundline and on the post top had an average life of 11.2 years in Mississippi.

Hot bath.--Posts of alpine fir and lodgepole pine treated with a hot bath of water-gas tar lasted 21 and 18 years, respectively, in Colorado, and Virginia pine similarly treated had an average life of 17 years in Maryland. Willow posts treated with a hot bath in asphaltum had an average life of 10.8 years in Maryland.

Hot-and-cold bath.--Approximately 135 installations of posts treated by the hot-and-cold bath method, involving 47 different species and 9

different preservatives, are included in this report. In 58 installations involving posts of various species treated in coal-tar creosote, average post life varies from 9 years to more than 50 years. Where an installation has had an average life of less than 20 years, it was generally butt treated in an area favorable to decay in the untreated tops. In the case of loblolly pine, tupelo, and sweetbay posts in Louisiana, however, the somewhat mediocre performance was attributed to inadequate debarking of the pine and to poor preservative penetration at the ground-line zone of the two hardwoods. Good results were noted with other hardwoods, some of which are difficult to penetrate uniformly.

The results from posts treated with creosote-petroleum solution, pentachlorophenol solution, and water-gas tar are generally favorable. When petroleum oil was applied alone during the hot bath followed by creosote in the cold bath, the length of the post service was not so great as when creosote was used throughout the treatment. In Stoneville, Miss., variable results have been noted when various hardwoods have been subjected to a hot-and-cold bath of diesel oil containing 5 percent pentachlorophenol. The results in treatment with zinc chloride solution in Wisconsin were less satisfactory than with creosote.

Osmose.--An installation in Mississippi of unseasoned southern yellow pine posts treated full length by the Osmose diffusion process displays an estimated average life of 25 years. Four installations of aspen posts in Wisconsin similarly treated show average-life values of 6 to 14 years. Round red oak and jack pine posts installed in Wisconsin in 1946 have an estimated average life of 17 and 21 years, respectively.

Pressure-treated posts.--In reviewing the test installations of pressure-treated posts, 43 installations treated with coal-tar creosote are located in Mississippi, Missouri, Montana, and Wisconsin with 6 to 38 years of service. Of these, 27 installations should have an average life exceeding 30 years, and only 9 installations have had sufficient removals to permit an estimate on average life. Cottonwood, loblolly pine, southern yellow pine, and sweetgum posts treated with approximately 6 pounds of creosote per cubic foot show estimated average-life values of 18, 22, 35, and 23 years in Mississippi, respectively, while with 12 pounds per cubic foot sweetgum posts have an estimated average life of 34 years. The other species should last somewhat longer. Lodgepole pine posts in Montana experienced an average life of only 21 years. In the latter case, the comparatively poor performance is attributed to inadequate bark removal and poor penetration of preservative. The creosote retention is not known, but is presumed to be substandard.

Between 9 and 55 years of service have been reported for 57 installations of posts pressure treated with miscellaneous preservative oils other than straight coal-tar creosote. Outstanding in this group in Wisconsin are southern yellow pine, aspen, basswood, black oak, and northern white cedar posts treated with either creosote-coal tar solution or creosote-petroleum solution. These posts display only one failure during 37 to 56 years of service. Also outstanding are southern pine

posts in Mississippi treated with a 5 percent solution of pentachlorophenol, which have sustained few failures during 33 years of service.

The results noted from posts pressure treated with waterborne preservatives are variable. Southern yellow pine posts treated with zinc meta arsenite have been in service in Mississippi for 33 years with only 14 percent removed; in Nebraska, lodgepole pine posts treated with a similar retention of the same preservative show an estimated average life of only 20 years. Southern pine posts treated with acid copper chromate (Celcure) in Mississippi display an average life of 40 years, while those treated with borax-boric acid average only 10.6 years.

Steeping.--Posts treated by the steeping process using waterborne preservatives, such as zinc chloride, chromated zinc chloride, sodium fluoride, and mercuric chloride, have been installed in Alabama, Mississippi, Montana, Nebraska, and Wisconsin. Posts of southern yellow pine in Mississippi and Douglas-fir and western larch in Wisconsin, treated with mercuric chloride, show estimated average-life figures of 27, 47, and 39 years, respectively. Cottonwood, red oak, sweetbay, sweetgum, tupelo, and willow posts treated by steeping in zinc chloride or chromated zinc chloride have average-life values of 4 to 10 years in Mississippi. In that same State southern pine posts steeped in zinc chloride have had an average life of 20 years. Western redcedar posts treated with sodium fluoride and zinc chloride and installed in Montana exhibit no appreciable increase in life over untreated posts of the same species. In Nebraska, Montana, and Wisconsin, however, a significant increase is reported in the post life of ash, cottonwood, Douglas-fir, elm, western larch, the pines (jack, lodgepole, ponderosa, scotch, and red), and willow, when treated by steeping with sodium fluoride or zinc chloride.

Tire-tube.--Posts of ash, aspen, birch, butternut, cherry, cottonwood, maple, red oaks, jack pine, sweetgum, and willow show an estimated average life of 10 to 26 years when treated by the tire-tube method and installed in Wisconsin. This is significantly greater than the untreated life of posts of these same species. Posts of basswood, hickory, black locust, and white oak in Wisconsin display no significant increase in life as a result of this treatment, however. Aspen, ponderosa pine, and pinyon posts experience considerable added life in Arizona as a result of tire-tube treatment, while posts of naturally durable Arizona cypress, Gambel oak, and local junipers exhibit little or no increase in service life.

Top application.--In treating the tops of red oak posts one-half pint of No. 2 fuel oil containing 5 percent pentachlorophenol was applied by inverting a jar set on a layer of felt. These posts were installed in Wisconsin, but have shown no significant increase over the life of untreated posts.

Table 1.--Index to preservative and methods of treatment (figures refer to item numbers in table 2)--Continued

Preservative	Method of treatment										
	Brush- ing	Cold-soaking diffusion	Double diffusion	End diffusion	Groundline: bath	Hot bath	Hot-and-cold bath	Osmose	Pressure	Steeping	Fire-tube: Top appli- cation
31. Creosote--asphaltum solutions							708				
32. Creosote--coal-tar solutions								570,662, 663			
33. Creosote, coal-tar--creosote, lignite								577			
34. Creosote, coal-tar, plus penta-chlorophenol								569			
35. Creosote, coal-tar--petroleum oil solutions		16,29-34,86, 87,166,167, 270,333,398, 399,718,722, 731,792,793, 817					5,6,58,59, 81,110-112, 152,153,176-178,207-209, 242,243,276, 283,322,324, 325,348-350, 366-368,372, 373,455-458, 709,715,766, 768,830,837, 838		28,67, 254,500, 501,571, 572,660, 661,816		
36. Creosote--petroleum oil solutions, plus pentachlorophenol									573		
37. Creosote, coal-tar--water-gas tar solutions							68,293,294, 716,839				
38. Creosote, lignite									400,576, 639		
39. Creosote, lignite--petroleum oil solutions									578		
40. Creosote, oil tar (Gasco)									574		
41. Creosote (Gasco) plus pentachlorophenol									575		
42. Creosote, wood tar									598,697		
43. Fluor chrome arsenate phenol (Tanalth) (AWPA P5)									664		
44. Mercuric chloride										139,226, 665	
45. Mercuric chloride, white arsenic, sodium chloride					89,968, 154, 162a, 191a, 295,334						

Table 1.--Index to preservative and methods of treatment (figures refer to item numbers in table 2)--Continued

Preservative	Method of treatment									
	Brush- ing	Cold-soaking	Double diffusion	End diffusion	Groundline: Hot bath	Hot- and-cold bath	Osmose	Pressure	Steeping	Tire-tube: Top appli- cation
46. Nickel sulfate and arsenic acid-- sodium chromate			196,310, 351,582- 584,670- 672,840- 842							
47. Nickel sulfate-- disodium phosphate			666-669, 769-771							
48. Nickel sulfate--sodium chromate			401-403, 579-581							
49. Nickel sulfate--sodium dichromate									35,404, 519	
50. Nickel sulfate--sodium fluoride and disodium phosphate			772-774							
51. Osmoplastic					673					
52. Osmosar							36,37, 248, 296, 374, 405, 406, 674			
53. Osmotite							38,39			
54. Pentachlorophenol in various solvents	407	7,21,40-44, 73-79,89a, 93,97,140, 141,155,156, 161,171-173, 181,192,193, 197,222,246, 255,278,298- 303,309,314, 371,375,388, 408-413,460, 461,502,520, 629,678-690, 748-750, 750a,752, 754,756,777, 802,843			414,415		137,158,160, 179,180,210, 277,326,352, 369,370,775, 807	165d, 356,585- 588,675- 677		297
55. Pentachlorophenol and chloro-2-phenylphenol in mineral spirits and water repellent	416									
56. Pentachlorophenol and copper naphthenate in: petroleum oil									589	
57. Petroleum oils	459, 741								590-596	

Table 1.--Index to preservative and methods of treatment (figures refer to item numbers in table 2)--Continued

Preservative	Method of treatment			
	Brush- ing	Cold-soaking diffusion	Double diffusion	End diffusion
58. Phenylchlorarsine				691
59. Sodium chromate				693
60. Sodium dichromate				692
61. Sodium fluoride				8, 9, 113- 115, 142, : 227, 417, : 418, 462, : 503-506, : 521, 522, : 526, 723, : 724, 844
62. Sodium fluoride-- copper sulfate				
63. Tar (see coal-tar and water-gas tar)				
64. Tetrachlorophenol in petroleum oil				45, 46, : 143, 420- 422, 694, : 695, 820- 822
65. Water-gas tar	423, : 470, : 745		169, : 284, : 469, : 710, : 744	124, 466, 818, : 819 : 69, 304, 467, : 468, 742, 743
66. Wolman salts (Tricolith)				523
67. Zinc chloride (see also chromated zinc chloride)				10-13, : 82, 83, : 117-119, : 147, 159, : 312, 336, : 424, 425, : 472, 473, : 507-511, : 524, 527, : 528, 599- : 601, 631, : 725, 726, : 756, 780, : 805, 845- : 847, 849, : 850

Table 1.--Index to preservative and methods of treatment (figures refer to item numbers in table 2).--Continued

Preservative	Method of treatment									
	Brush- ing	Cold-soaking	Double diffusion	End diffusion	Groundline: Hot bath	Hot-and-cold bath	Osmose	Pressure	Steeping	Fire-tube: Top :appli- :cation
68. Zinc meta arsenite										
69. Zinc sulfate--borax and boric acid			604,632						474,699	
70. Zinc sulfate--borax and sodium fluoride			605,606							
71. Zinc sulfate--sodium arsenate and sodium chromate			607							
72. Zinc sulfate--sodium chromate			633							
73. Zinc sulfate--sodium fluoride and sodium chromate			608,609							
74. Zinc sulfate and arsenic acid--sodium chromate			198-202, 315-318, 320,337- 340,475- 478,533- 536,602, 603,620, 781-784, 798,855- 858							

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Table 2.--Service tests of treated and untreated fenceposts

Item No.	Species and preservative	Treatment (full length unless otherwise indicated)	Average retention of preservative	Form	Installed by	Location of test	Date installed	Date of last inspection	Number of posts removed to and at time of last inspection	Posts removed up to and at time of last inspection	Average life		
			Pct						Num-ber	Pct	Cause	Yr	
Alder, red													
1	Copper sulfate--sodium chromate	Double diffusion (butts)	0.98	Round	Oregon State U.	Corvallis, Oreg.	1952	1962	25	25	100.0	Decay	6
2	Sodium fluoride--copper sulfate	do	.14	do	do	do	1952	1970	25	24	96.0	do	9
3	None	Untreated	do	do	do	do	1952	1960	25	25	100.0	do	3
Ash, green													
4	Anacnda Wood Preservative (dust)	Groundline	do	do	U.S. Range Livestock Exp. Sta.	Miles City, Mont.	1926	1941	12	12	100.0	do	7.3
5	Cresote--diesel oil	Hot bath--cresote; cold bath (50-50)	8.9-11.9	Round	Delta Exp. Sta.	Stoneville, Missa.	1941	1959	24	1	4.2	do	
6	do	do	8.9-11.9	do	do	do	1946	1959	11			do	
7	Pentachlorophenol, 10 pct in No. 2 fuel oil	Cold-soaking, 48 h	1.7	Round	U. Illinois	Oregon, Ill.	1942-43	1967	20	1	5.0	Decay	
8	Sodium fluoride	Steeping	.28	do	U.S. Range Livestock Exp. Sta.	Miles City, Mont.	1926	1943	19	19	100.0	do	13.1
9	do	do	.22	do	U.S. Forest Serv.	Halsey, Nebr.	1925	1957	24	24	100.0	Decay and termites	22.9
10	Zinc chloride	do	.46	do	U.S. Range Livestock Exp. Sta.	Miles City, Mont.	1926	1943	10	10	100.0	Decay	13.1
11	do	do	.31	do	do	do	1926	1943	10	10	100.0	do	12.3
12	do	do	.26	do	U.S. Forest Serv.	Halsey, Nebr.	1925	1957	19	19	100.0	Decay and termites	18.7
13	do	do	.28	do	do	do	1925	1957	5	5	100.0	do	30.8
14	None	Untreated	do	do	do	do	1925	1950	10	10	100.0	do	18.7
15	do	do	do	do	U.S. Range Livestock Exp. Sta.	Miles City, Mont.	1926	1941	12	12	100.0	Decay	8.6
Ash, white													
16	Cresote, coal-tar--No. 2 fuel oil (50-50 soln)	Cold-soaking, 48 h	1.5	do	Forest Prod. Lab.	Madison, Wis.	1958	1972	10			do	
17	Zinc chloride	Tire-tube	.26-1.63	do	do	Mazomanie, Wis.	1940	1960	14	14	100.0	Decay	31.1
18	Untreated	do	do	do	do	Madison, Wis.	1958	1968	10	10	100.0	do	4.3
Ash²													
19	Cresote, coal-tar	Hot-and-cold bath (butts)	4.2 lb/post	Half-round	Iowa State U.	Ames, Iowa	1909	1922	11	1	9.1	do	
20	do	do	6.0 lb/post	Round	do	do	1909	1937	22	21	95.5	do	21
Aspen, bigtooth													
21	Pentachlorophenol, 10 pct in No. 2 fuel oil	Cold-soaking, 48 h	1.9	do	U. Illinois	Oregon, Ill.	1942-43	1967	25	25	100.0	do	13.6
Aspen, quaking													
22	Anacnda Wood Preservative (dust)	Groundline	3.0 lb/post	do	U.S. Forest Serv.	Salmon, Idaho	1929	1934	57			do	
23	Chromated zinc chloride	Tire-tube	.64-1.35	do	Forest Prod. Lab.	Madison, Wis.	1937	1966	17	16	94.2	Decay	26
24	Chromated zinc chloride	End diffusion	.75	do	do	do	1946	1972	25	25	100.0	do	13.7
25	Copper sulfate	Tire-tube	.12-.54	do	do	do	1937	1966	17	17	100.0	do	16.9
26	Cresote, coal-tar	Hot-and-cold bath	9.4	do	do	Brocklyn, Wis.	1936	1972	9	2	22.2	do	48
27	do	do	11.4	do	do	Drummond, Wis.	1936	1962	13			do	
27a	do	Pressure	16.3	do	do	Oregon, Wis.	1960-61	1972	16			do	

Table 2.--Service tests of treated and untreated fenceposts--continued

Item No.	Species and preservative	Treatment (full length unless otherwise indicated)	Average retention of preservative	Form	Installed by	Location of test	Date installed	Date of last inspection	Number of posts inspected	Posts removed to and at time of last inspection	Average age of life	
			Pct						Num-ber	Pct	Cause	Yr
28	Aspen, quaking--con. Creosote, coal-tar-- gas oil (25-75 soln):	Pressure	16.1	Round	Forest Prod. Lab.	Brooklyn, Wis.	1916	1972	15	1	7.0	Decay
29	Creosote, coal-tar-- No. 2 fuel oil (50-50 soln)	Seasoned 6-1/2 mo and cold-soaked 48 h	4.4	do	do	Madison, Wis.	1946	1972	25	17	68.0	do
30	do	Seasoned 12 mo and cold-soaked 48 h	4.1	do	do	do	1946	1972	25	18	72.0	do
31	do	Cold-soaking, 48 h	3.6	do	do	do	1958	1972	10	8	80.0	do
32	do	Cold-soaking, 48 h (chemipeeled)	3.8	do	do	do	1958	1972	9	2	22.0	do
33	do	Cold-soaking, 48 h (butts included)	6.2	do	do	Saucier, Miss.	1954	1972	10	4	40.0	Decay
34	do	Cold-soaking, 48 h	4.0	do	do	do	1954	1970	10	10	100.0	Decay and termites
35	Nickel sulfate and sodium dichromate	Butt steeping	1.19	do	do	Madison, Wis.	1945	1972	9	8	55.5	Decay
36	Osmosar	Osmose	.29	do	do	do	1936	1946	16	16	100.0	do
37	do	do	.29	do	do	Drummond, Wis.	1936	1962	46	46	100.0	do
38	Osmotite	do	.23	do	do	Madison, Wis.	1936	1946	7	7	100.0	do
39	do	do	.23	do	do	Drummond, Wis.	1936	1962	41	41	100.0	do
40	Pentachlorophenol, 5 pct in No. 2 fuel oil	Cold-soaking, 8 h	2.8	do	do	Oregon, Wis.	1943	1954	9	9	100.0	do
41	do	Cold-soaking, 24 h	3.4	do	do	do	1943	1963	9	9	100.0	do
42	do	Cold-soaking, 48 h	4.2	do	do	do	1943	1972	9	8	88.9	do
43	do	Cold-soaking, 96 h	5.1	do	do	do	1943	1972	9	6	66.7	do
44	do	Cold-soaking, 168 h	5.5	do	do	do	1943	1972	8	7	87.5	do
45	Tetrachlorophenol, 2.9 pct in used crankcase oil	Pressure	8.2	do	do	Drummond, Wis.	1936	1962	12	5	41.7	do
46	do	do	7.5	do	do	Brooklyn, Wis.	1936	1972	10	2	20.0	do
47	Zinc chloride	Hot-and-cold bath	1.32	do	do	Madison, Wis.	1937	1966	53	31	58.0	Decay
48	do	do	1.20	do	do	Drummond, Wis.	1936	1962	4	1	25.0	do
49	do	Tire-tube	14-1.88	do	do	Madison, Wis.	1937	1966	33	31	94.0	do
50	Zinc chloride, 10 pct	do	do	do	U.S. Forest Serv.	Tucson and Flagstaff, Ariz.	1940	1945	10	3	30.0	do
51	None	Untreated	do	do	do	do	1940	1965	10	10	100.0	do
52	do	Untreated (stubs)	do	do	Forest Prod. Lab.	Drummond, Wis.	1937	1945	33	33	100.0	do
53	do	Untreated	do	do	do	Saucier, Miss.	1954	1956	10	10	100.0	Decay and termites
54	do	do	do	do	do	Madison, Wis.	1958	1972	10	10	100.0	Decay
55	do	Untreated (chemi-peeled)	do	do	do	do	1958	1972	10	10	100.0	do
56	do	Untreated	do	do	do	do	1946	1954	10	10	100.0	do
56a	do	do	do	do	do	Oregon, Wis.	1961	1963	5	5	100.0	do

Table 2.--Service tests of treated and untreated fenceposts--continued

Item No.	Species and preservative	Treatment (full length unless otherwise indicated)	Average retention of preservative	Form	Installed by	Location of test	Date installed	Date last inspection	Number of posts in test	Posts removed to and at time of last inspection	Average life		
			Pct						Num-ber	Cause	Yr		
Baldcypress													
57	Creosote, coal-tar	Hot-and-cold bath (butts), cold bath (tops)	6.6	Round	No. La. Agric. Exp. Sta.	Calhoun, La.	1908-10	1940	49	24	49.0	Decay	29
58	Creosote--diesel oil	Hot bath--creosote, cold bath (50-50)	6.8	do.	Delta Exp. Sta.	Stoneville, Miss.	1941	1959	9				
59	do.	do.	6.8	do.	do.	do.	1946	1959	4				
60	None	Untreated		Round	do.	do.	1937	1947	16	16	100.0	Decay and termites	5.8
61	do.	do.		Split	do.	do.	1937	1947	19	19	100.0	do.	5.4
Basswood													
62	Creosote, coal-tar	Hot-and-cold bath (butts)	5.7 lb/post	Half-round	Iowa State U.	Ames, Iowa	1909	1922	15	3	20.0	Decay	17
63	do.	do.	4.5 lb/post	Split	U. Minnesota	Minneapolis, Minn.	1909	1918	6	6	100.0	do.	9.0
64	do.	Hot bath (butts), cold bath (full length)	5.9 lb/post	do.	do.	do.	1909	1937	117	47	40.2	do.	32
65	do.	do.	5.2 lb/post	do.	do.	do.	1909	1937	35	32	91.4	do.	22
66	do.	Cold-soaking	2.4 lb/post	do.	do.	do.	1909	1937	23	22	95.7	do.	21
67	Creosote, coal-tar--gas-oil, (25-75 soln)	Pressure	28.0	Round	Forest Prod. Lab.	Brooklyn, Wis.	1916	1972	4				
68	Creosote--water-gas tar	Hot-and-cold bath	6.1 lb/post	Split	U. Minnesota	Minneapolis, Minn.	1909	1937	14	13	92.9	Decay	22
69	Water-gas tar	Hot-and-cold bath (butts)	2.4 lb/post	do.	do.	do.	1909	1926	8	8	100.0	do.	9.0
70	Zinc chloride	Tire-tube	.88-1.0	Round	Forest Prod. Lab.	Mazomanie, Wis.	1939	1947	10	10	100.0	do.	5.4
Bay (see Sweet Bay)													
Beech, American													
71	Creosote, coal-tar	Hot-and-cold bath	8.5	do.	Maryland Agric. Sta.	College Park, Md.	1908	1939	9	1	11.1	do.	48
72	do.	Hot-and-cold bath (butts)		do.	do.	do.	1908	1923	5	5	100.0	do.	13.0
Birch, paper													
73	Pentachlorophenol, 5 pct in No. 2 fuel oil	Cold-soaking, 8 h	1.7	do.	Forest Prod. Lab.	Oregon, Wis.	1943	1950	9	9	100.0	do.	4
74	do.	Cold-soaking, 24 h	2.1	do.	do.	do.	1943	1972	9	8	88.9	do.	6
75	do.	Cold-soaking, 48 h	3.0	do.	do.	do.	1943	1956	9	9	100.0	do.	7.5
76	do.	Cold-soaking, 96 h	4.6	do.	do.	do.	1943	1963	9	9	100.0	do.	9.1
77	do.	Cold-soaking, 168 h	5.7	do.	do.	do.	1943	1972	10	8	80.0	do.	16
78	Pentachlorophenol, 5 pct in No. 2 fuel oil--crankcase oil (50-50 soln)	Cold-soaking, 48 h	4.8	do.	do.	Madison, Wis.	1943	1960	11	4	36.4	do.	20
79	do.	Cold-soaking (butts: 48 h, tops 24 h)	4.6	do.	do.	do.	1943	1960	9	5	55.6	do.	18

Table 2.--Service tests of treated and untreated fenceposts--continued

Item No.	Species and preservative	Treatment (full length unless otherwise indicated)	Average retention of preservative	Form	Installed by	Location of test	Date installed	Date last inspection	Number of posts in test	Posts removed up to and at time of last inspection	Average life
			Pct						Num-ber	Per-centage	Yr
	Cherry, black										
96	Creosote, coal-tar	Pressure	8.5	Round	Forest Prod. Lab.	Oregon, Wis.	1960-61	1972	20		
96a	Mercuric chloride, white arsenic, sodium chloride	Groundline				Brooklyn, Wis.	1943	1972	25	21	84.0
97	Pentachlorophenol, oil	Cold-soaking, 46-48 h	3.35		U. Illinois	Oregon, Ill.	1942-43	1967	22	3	13.6
98	Zinc chloride	Tire-tube	.42-1.00		Forest Prod. Lab.	Nazomanie, Wis.	1939	1960	16	16	100.0
98a	None	Untreated				Oregon, Wis.	1961	1966	5	5	100.0
	Chestnut, American										
99	Creosote, coal-tar	Hot-and-cold bath			Maryland Agric. Exp. Sta.	College Park, Md.	1908	1939	10	9	90.0
100	None	Untreated			U.S. Forest Serv.	Waterbury, Conn.	1913	1932	122	74	60.7
101							1913	1932	118	84	71.2
	Cottonwood										
102	Anaconda Wood Preservative (dust)	Groundline			U.S. Range Livestock Exp. Sta.	Miles City, Mont.	1926	1943	33	33	100.0
103	Chromated zinc chloride	Steeping			Delta Exp. Sta.	Stoneville, Miss.	1947	1959	13	13	100.0
104							1948	1953	13	3	23.1
105	Creosote, coal-tar	Tire-tube	.58-.77		Forest Prod. Lab.	Nazomanie, Wis.	1940	1954	6	6	100.0
106	Coal-tar--used crank-case oil (31.3-66.7 soln)	Hot-and-cold bath (butts)	1/3 gal/ post	Split	Ray Ranch	Lavalle, Creek, Mont.	1934	1957	46	46	100.0
107	Creosote, coal-tar	Pressure	6.0	Round	Delta Exp. Sta.	Stoneville, Miss.	1937	1959	12	11	91.7
108			12.0				1937	1959	12		
109		Hot bath (butts), cold bath (full length)	12.2	Split	U. Minnesota	Minneapolis, Minn.	1909	1937	16	8	50.0
110	Creosote--diesel oil	Hot bath--creosote, cold bath (50-50)	6.8-9.1	Round and split	Delta Exp. Sta.	Stoneville, Miss.	1941	1959	25	9	36.0
111			6.8-9.1				1946	1959	12	4	33.3
112	Creosote, coal-tar	Hot-and-cold bath	11.8	Round	U.S. Range Livestock Exp. Sta.	Miles City, Mont.	1926	1943	9		
113	Sodium fluoride	Steeping	.42	Square	U.S. Forest Serv.	Halsey, Nebr.	1925	1939	25	25	100.0
114			.28	Round	U.S. Range Livestock Exp. Sta.	Miles City, Mont.	1926	1943	10	10	100.0
115			.17				1926	1941	13	13	100.0
116	Zinc chloride	Tire-tube	.79-.95		Forest Prod. Lab.	Nazomanie, Wis.	1940	1960	5	5	100.0
117		Steeping	.38	Square	U.S. Forest Serv.	Halsey, Nebr.	1925	1957	24	24	100.0
118			.67	Round	U.S. Range Livestock Exp. Sta.	Miles City, Mont.	1926	1943	6	6	100.0
119			.48				1926	1943	19	19	100.0
120	None	Untreated					1926	1941	7	7	100.0
121				Square	U.S. Forest Serv.	Halsey, Nebr.	1925	1932	10	10	100.0
	Cypress (see Baldcypress)										

Table 2.--Service tests of treated and untreated fenceposts--continued

Item No.	Species and preservative	Treatment (full length unless otherwise indicated)	Average retention of preservative	Form	Installed by	Location of test	Date of installation	Date of last inspection	Number of posts	Posts removed up to and at time of last inspection	Average life
			Pct						Num-ber	Pct	Cause
<u>Cypress, Arizona</u>											
122	Cresote, coal-tar	Hot-and-cold bath	2.3	Round	U.S. Forest Serv.	Arizona and New Mexico	1939	1965	40	1	2.5 Decay
123	do	Hot-and-cold bath (butts)	1.5	do	do	do	1939	1965	36		
124	Tetrachlorophenol, 4.7 pct in spent crankcase oil	do	.65	do	do	do	1939	1965	40	3	7.5 Decay
125	Zinc chloride, 10 pct	Fire-tube		do	do	Tucson and Flagstaff, Ariz.	1940	1965	10	5	50.0 do
126	None	Untreated		do	do	Arizona and New Mexico	1939	1965	95	56	59.0 do
<u>Douglas-fir (Pacific Coast)</u>											
127	Solignum salt S-25 (ZnO + As ₂ O ₅ + CrO ₃ + CuO)	Pressure (oscillating)	.24	do	Forest Prod. Lab.	Saucier, Miss.	1957	1972	5		
128	do	Pressure	.60	do	do	do	1957	1972	5		
129	Cresote, coal-tar	do	4.7	do	do	do	1957	1972	5		
130	Copper sulfate--sodium chromate	Double diffusion (butts)	.49	do	Oregon State U.	Corvallis, Oreg.	1952	1960	25	25	100.0 Decay
131	Sodium fluoride--copper sulfate	do	.13	do	do	do	1952	1970	25	5	20.0 do
132	None	Untreated		do	do	do	1952	1958	25	25	100.0 do
133	do	do		do	Forest Prod. Lab.	Saucier, Miss.	1957	1972	5	5	100.0 Decay and termites
<u>Douglas-fir (Rocky Mountain)</u>											
134	Solignum salt S-25 (ZnO + As ₂ O ₅ + CrO ₃ + CuO)	Pressure (oscillating)	.21	do	do	do	1957	1972	5		
135	do	Pressure	.56	do	do	do	1957	1972	5		
136	Cresote, coal-tar	do	2.6	do	do	do	1957	1972	5	1	20.0 Decay and termites
137	None	Untreated		do	do	do	1957	1970	5	5	100.0 do
<u>Douglas-fir</u>											
138	Amacoda Wood Preservative (dust)	Groundline	3.0 lb/post	do	U.S. Forest Serv.	Basin, Mont.	1928	1935	55		
139	Mercuric chloride	Steeping	.03	do	Chicago, Milw., St. Paul & Pac. R.R.	Madison, Wis.	1926	1962	13	3	23.1 Decay
140	Pentachlorophenol, 5 pct in No. 2 fuel oil	Seasoned 3 mo and cold-soaked 48 h	1.7	do	Forest Prod. Lab.	do	1946	1972	25	6	24.0 do
141	do	Seasoned 12 mo and cold-soaked 48 h	1.7	do	do	do	1946	1972	25	5	20.0 do
142	Sodium fluoride	Steeping	.14	do	Chicago, Milw., St. Paul & Pac. R.R.	do	1926	1962	18	15	83.4 do
143	Tetrachlorophenol, 3 pct in used crankcase oil	Pressure	6.1	Square	Forest Prod. Lab.	do	1935	1956	72	5	6.9 do
144	Water-gas tar	do	5.5	do	do	do	1936	1956	105		
145	Zinc chloride	do	.46	Round	Chicago, Milw., St. Paul & Pac. R.R.	do	1926	1941	17	17	100.0 Decay
146	do	Hot-and-cold bath	.15	do	do	do	1926	1962	11	11	100.0 do
147	do	Steeping	.11	do	do	do	1926	1962	18	18	100.0 do
148	None	Untreated		do	do	do	1926	1958	24	24	100.0 do
149	do	do		do	do	do	1926	1941	9	9	100.0 do
150	do	do		do	U.S. Forest Serv.	Basin, Mont.	1928	1935	7	4	57.1 do
151	do	do		do	Forest Prod. Lab.	Madison, Wis.	1946	1963	10	10	100.0 do

Table 2.--Service tests of treated and untreated fenceposts--continued

Item No.	Species and preservative	Treatment (full length unless otherwise indicated)	Average retention of preservative	Form	Installed by	Location of test	Date installed	Date last inspection	Number of posts in test	Posts removed up to and at time of last inspection	Average age of posts at time of last inspection	Cause of decay	Yr
			Pct						Num-ber	Pct			
	<u>Elm, American</u>												
152	Cresote--diesel oil	Hot bath--cresote, cold bath (50-50)	11.1	Round	Delta Exp. Sta.	Stoneville, Miss.	1941	1959	8				
153	do	do	11.1	do	do	do	1946	1959	4				
154	Mercuric chloride, white arsenic, sodium chloride	Groundline		do	Forest Prod. Lab.	Brooklyn, Wis.	1943	1959	10	10	100.0	Decay	9.4
155	Pentachlorophenol, 10 pct in No. 2 fuel oil	Cold-soaking, 48 h	3.2	do	U. Illinois	Oregon, Ill.	1942-43	1967	24	16	67.0	do	20
156	Pentachlorophenol, 5 pct in diesel oil	Cold-soaking, 5 d	2.5	do	Delta Exp. Sta.	Stoneville, Miss.	1953	1970	15	13	86.6	do	14
157	Pentachlorophenol, 5 pct in No. 2 diesel oil	Hot-and-cold bath	5.9	do	do	do	1947	1959	12				
158	do	do	5.9	do	do	do	1948	1953	10	2	20.0	Decay	7
159	Zinc chloride	Steeping	.19	do	Forest Prod. Lab.	Mazomanie, Wis.	1939	1951	5	5	100.0	do	8.7
	<u>Elm, cedar</u>												
160	Pentachlorophenol, 5 pct in No. 2 diesel oil	Hot-and-cold bath	9.6	do	Delta Exp. Sta.	Stoneville, Miss.	1947	1959	6				
161	Pentachlorophenol, 5 pct in diesel oil	Cold-soaking, 5 d	5.1	do	do	do	1953	1970	15	2	13.0	do	26
	<u>Elm, slippery</u>												
162	Cresote, coal-tar	Pressure	9.8	do	Forest Prod. Lab.	Oregon, Wis.	1960-61	1972	28				
162a	Mercuric chloride, white arsenic, sodium chloride	Groundline		do	do	Brooklyn, Wis.	1943	1956	7	7	100.0	Decay	11.4
162b	None	Untreated		do	do	Oregon, Wis.	1960-61	1964	5	5	100.0	do	3.8
	<u>Elm²</u>												
163	Cresote, coal-tar	Hot-and-cold bath	6.0	do	Iowa State U.	Ames, Iowa	1909	1929	9	9	100.0	do	11.8
164	do	Hot bath (burts), cold bath (full length)	3.0	Split	U. Minnesota	Minneapolis, Minn.	1909	1937	5	2	40.0	do	32
164a	do	Cold-soaking	1.5	do	do	do	1909	1924	5	5	100.0	do	11.0
	<u>Eucalyptus, bluegum</u>												
	<u>(Eucalyptus globulus)</u>												
165	Copper sulfate--sodium arsenate and sodium chromate	Double diffusion	.61	Round	U.S. Forest Serv.	Honolulu, Hawaii	1961	1973	24	19	79.0	Decay and termites	11.0
165a	None	Untreated		do	do	do	1961	1971	25	25	100.0	do	3
	<u>Eucalyptus robusta</u>												
	<u>(Eucalyptus robusta)</u>												
165b	Copper sulfate--sodium arsenate and sodium chromate	Double diffusion	.57	do	do	do	1961	1973	25	25	100.0	do	6.0
165c	Chromated copper arsenate (Erdalith, Greensalt)	Pressure	.85	do	do	do	1962	1973	25	1	4.0	do	
165d	Pentachlorophenol, 8.2 pct in adneral spirits and water repellent	do	4.9	do	do	do	1962	1973	23				
165e	None	Untreated		do	do	do	1961	1973	25	25	100.0	Decay and termites	2.4
165f	do	do		do	do	do	1962	1969	20	20	100.0	Decay	4.5

Table 2.--Service tests of treated and untreated fenceposts--continued

Item No.	Species and preservative	Treatment (full length unless otherwise indicated)	Average retention of preservative	Form	Installed by	Location of test	Date installed	Date last inspection	Num. of posts	Posts removed to and at time of last inspection	Average life		
			Pct						Num. removed	Pct removed	Cause		
	<i>Eucalyptus saligna</i>										yr		
	(<i>Eucalyptus saligna</i>)												
165g	Copper sulfate-sodium arsenate and sodium chromate	Double diffusion	1.03	Round	U.S. Forest Serv.	Honolulu, Hawaii	1961	1973	25	25	100.0	Decay	6
165h	None	Untreated		do.	do.	do.	1961	1964	25	25	100.0	Decay and termites	.8
	<i>Fir, balsam</i>												
166	Cresote, coal-tar No. 2 fuel oil (50-50 soln)	Cold-soaking, 48 h (butts incised)	1.9	do.	Forest Prod. Lab.	Saucier, Miss.	1954	1972	9	8	88.9	do.	15
167	do.	Cold-soaking, 48 h	1.3	do.	do.	do.	1954	1967	9	9	100.0	do.	9.4
168	None	Untreated		Round	do.	do.	1954	1959	10	10	100.0	do.	3.3
	<i>Fir, subalpine</i>												
169	Water-gas tar	Hot-bath (butts)	.64 lb/post	do.	Colorado State U.	Fort Collins, Colo.	1912	1936	8	4	50.0	Decay	21
170	None	Untreated		do.	do.	do.	1913	1936	10	9	90.0	do.	14
	<i>Fir, white</i>												
171	Pentachlorophenol 5 pcr in No. 2 fuel oil	Seasoned 12 mo and cold-soaked 48 h	2.0	Quar-tered	Forest Prod. Lab.	Madison, Wis.	1946	1972	25	10	40.0	do.	29
172	do.	do.	1.6	Round	do.	do.	1946	1972	25	1	4.0	do.	
173	do.	Seasoned 5 mo and cold-soaked 48 h	1.4	do.	do.	do.	1946	1972	25	5	20.0	do.	35
174	None	Untreated		do.	do.	do.	1946	1955	10	10	100.0	do.	5.5
175	do.	do.		Quar-tered	do.	do.	1946	1954	10	10	100.0	do.	5.8
	<i>Gum</i> (see Sweetgum and Tupelo)												
	<i>Hackberry</i> ²												
176	Cresote--diesel oil	Hot bath--cresote; cold bath (50-50)	8.0-12.7	Round and split	Delta Exp. Sta.	Stoneville, Miss.	1941	1959	41	13	31.7	do.	23
177	do.	do.	8.0-12.7	do.	do.	do.	1946	1959	16	5	31.2	do.	17
178	do.	do.	8.0-12.7	Split	do.	do.	1948	1959	6	1	16.7	do.	17
179	Pentachlorophenol 5 pcr in No. 2 diesel oil	Hot-and-cold bath	10.2-12.6	Round and split	do.	do.	1947	1959	29	4	13.8	do.	17
180	do.	do.	10.2-12.6	Round	do.	do.	1948	1953	6			do.	
181	Pentachlorophenol 5 pcr in diesel oil	Cold-soaking, 5 d	3.5	do.	do.	do.	1953	1970	15	15	100.0	Decay	11
	<i>Hamlock, western</i>												
182	Bolliden salt S-25 (ZnO + As ₂ O ₅ + CrO ₃ + CuO)	Pressure (oscillating)	.16	do.	Forest Prod. Lab.	Saucier, Miss.	1957	1972	5			do.	
183	do.	Pressure	.57	do.	do.	do.	1957	1972	5			do.	
184	Cresote, coal-tar	do.	4.4	do.	do.	do.	1957	1972	5			do.	
185	None	Untreated		do.	do.	do.	1957	1960	5	5	100.0	Decay and termites	3.3
	<i>Hickory, bitternut</i>												
186	Zinc chloride	Tire-tube	.28-.86	do.	do.	Mezomanie, Wis.	1939	1949	6	6	100.0	Decay	6.2

Table 2.--Service tests of treated and untreated fenceposts--continued

Item No.	Species and preservative	Treatment (full length unless otherwise indicated)	Average retention of preservative	Form	Installed by	Location of test	Date installed	Date last inspection	Number of posts inspected	Posts removed up to and wt time of last inspection	Average life	
			Pct						Num-ber	Pct	Cause	Yr
187	Hickory, mockernut	Pressure (oscillating)	0.25	Round	Forest Prod. Lab.	Saucier, Miss.	1957	1972	5			
188	do.	Pressure	.38	do.	do.	do.	1957	1972	5			
189	Creosote, coal-tar	do.	8.0	do.	do.	do.	1957	1972	5			
190	None	Untreated		do.	do.	do.	1957	1960	5	5	100.0	Decay and termites
191	Hickory, shagbark	Pressure	9.7	do.	do.	Oregon, Wis.	1960-61	1972	17			
191a	Mercuric chloride, white arsenic, sodium chloride	Groundline	.05	do.	do.	Brooklyn, Wis.	1943	1956	11	11	100.0	Decay
192	Pentachlorophenol, 10 pct in No. 2 fuel oil	Cold-soaking, 168 h	3.5	do.	do.	Oregon, Wis.	1943	1972	5	1	20.0	Decay
193	do.	Cold-soaking, 48 h	2.6	do.	Ill. Illinois	Oregon, Ill.	1942-43	1967	20	3	15.0	Decay
194	Zinc chloride	Tire-tube	27-1.01	do.	Forest Prod. Lab.	Maxam, Wis.	1939	1955	14	14	100.0	Decay
194a	None	Untreated		do.	do.	Oregon, Wis.	1960-61	1966	6	6	100.0	Decay
195	Hickory	Copper sulfate--sodium chromate (butts)	.20	do.	do.	Saucier, Miss.	1953	1972	25	24	96.0	Decay and termites
196	Nickel sulfate and arsenic acid--sodium chromate	do.	.37	do.	Tenn. Valley Authority	Wilson Dam, Ala.	1946	1969	25	25	100.0	Decay
197	Pentachlorophenol, 5 pct in diesel oil	Cold-soaking, 5 d	3.6	do.	Delta Exp. Sta.	Stoneville, Miss.	1953	1970	15	5	33.0	Decay
198	Zinc sulfate and arsenic acid--sodium chromate	Double diffusion	.51	do.	Tenn. Valley Authority	Norris, Tenn.	1951	1963	25	13	52.0	Decay
199	do.	Double diffusion	.39	do.	U.S. Forest Serv.	Athens, Ga.	1955	1973	25	19	76.0	Decay
200	do.	do.	.70	do.	do.	do.	1955	1973	25	13	52.0	Decay
201	do.	do.	1.0	do.	do.	do.	1955	1973	25	12	48.0	Decay
202	do.	Double diffusion, heated to 200° F	.78	do.	do.	do.	1955	1973	25	16	64.0	Decay
203	None	Untreated		do.	do.	do.	1955	1962	50	50	100.0	Decay
204	do.	do.		do.	Tenn. Valley Authority	Norris, Tenn.	1951	1959	25	25	100.0	Decay and termites
205	do.	do.		do.	do.	Wilson Dam, Ala.	1946	1952	23	23	100.0	Decay
206	do.	do.		do.	Forest Prod. Lab.	Saucier, Miss.	1953	1958	25	25	100.0	Decay
207	Honeylocust	Creosote--diesel oil	7.4-9.8	Split	Delta Exp. Sta.	Stoneville, Miss.	1941	1959	43	4	9.3	Decay
208	do.	Hot bath--creosote, cold bath (50-50)	7.4-9.8	do.	do.	do.	1946	1959	20	2	10.0	Decay
209	do.	do.	7.4-9.8	do.	do.	do.	1948	1959	8			
210	Pentachlorophenol, 5 pct in No. 2 diesel oil	Hot-and-cold bath	7.8	Round	do.	do.	1947	1959	27	1	3.7	Decay
211	None	Untreated		Round	do.	do.	1937	1947	24	24	100.0	Decay and termites
212	do.	do.		Split	do.	do.	1937	1947	56	56	100.0	Decay
213	do.	do.		do.	do.	do.	1941	1952	9	9	100.0	Decay
214	Juniper, alligator	Zinc chloride, 10 pct		Round	U.S. Forest Serv.	Flagstaff, Ariz.	1939	1958	5	3	60.0	Decay
215	None	Untreated		Round	do.	Arizona and New Mexico	1939	1965	74	15	20.3	Decay

Table 2.--Service tests of treated and untreated fenceposts--continued

Item No.	Species and preservative	Treatment (full length unless otherwise indicated)	Average retention of preservative	Form	Installed by	Location of test	Date installed	Date of last inspection	Number of posts in test	Posts removed up to and at time of last inspection	Average life	
			Pct						Num-ber	Pct	Cause	Yr
216	Juniper, one-seed Zinc chloride, 10 pct	Tire-tube		Round	U.S. Forest Serv.	Flagstaff, Ariz.	1939	1958	5			
217	None	Untreated		do	do	Arizona and New Mexico	1939	1965	72	12	16.7	Decay
218	Juniper, Rocky Mt. Zinc chloride, 10 pct	Tire-tube		do	do	Flagstaff, Ariz.	1939	1958	5			
219	None	Untreated		do	do	Arizona and New Mexico	1939	1965	39	6	15.4	Decay
220	Juniper, Utah Zinc chloride, 10 pct	Tire-tube		do	do	Flagstaff, Ariz.	1939	1958	5			
221	None	Untreated		do	do	Arizona and New Mexico	1939	1965	87	24	27.6	Decay
222	Larch, European Pentachlorophenol, 5 pct in No. 2 fuel oil	Gold-soaking, 168 hr	1.6	do	New York State College of Forestry	Syracuse, N.Y.	1942	1948	10			
223	Larch, western Borliden salt N-25 (ZnO + As ₂ O ₅ + CrO ₃ + CuO)	Pressure (oscillating)	.30	do	Forest Prod. Lab.	Saucier, Miss.	1957	1972	5			
224	do	Pressure	.52	do	do	do	1957	1972	5			
225	Cresote, coal-tar	do	4.7	do	do	do	1957	1972	5	1	20.0	Decay and termites
226	Mercuric chloride	Steeping	.04	do	Chicago, Milw., St. Paul, & Pac. R.R.	Madison, Wis.	1926	1962	15	7	46.7	Decay
227	Sodium fluoride	do	.13	do	do	do	1926	1962	16	13	81.2	do
228	Zinc chloride	Pressure	.50	do	do	do	1926	1941	21	21	100.0	do
229	None	Untreated		do	do	do	1926	1954	22	22	100.0	do
230	do	do		do	do	do	1926	1941	9	9	100.0	do
231	do	do		do	Forest Prod. Lab.	Saucier, Miss.	1957	1970	5	5	100.0	Decay and termites
232	Locust, black Cresote, coal-tar	Hot-and-acid bath	1.6	do	Maryland Agric. Exp. Sta.	College Park, Md.	1908	1939	7	3	42.9	Decay
233	Zinc chloride	Tire-tube	.63-.95	do	Forest Prod. Lab.	Mazomanie, Wis.	1939-40	1960	6	6	100.0	do
234	None	Untreated		Round	Maryland Agric. Exp. Sta.	College Park, Md.	1908	1939	15	5	33.3	do
235	do	do		Round	Delra Exp. Sta.	Stoneville, Miss.	1937	1959	67	64	95.6	Decay and termites
236	do	do		do	do	do	1937	1959	63	59	93.6	do
237	do	do		Split	do	do	1937	1959	36	28	77.8	do
238	do	do		Round	U.S. Forest Serv.	Ord, Neb.	1935	1955	77	18	23.4	do
239	do	do		Split	do	do	1935	1955	14	4	28.6	do
240	Locust, New-Mexican None	do		Round	do	Tucson, Ariz.	1940	1965	35	27	77.2	do

Table 2.--Service tests of treated and untreated fenceposts--continued

Item No.	Species and preservative	Treatment (full length unless otherwise indicated)	Average retention of preservative	Form	Installed by	Location of test	Date installed	Date of last inspection	Number of posts	Posts removed up to and at time of last inspection	Average life		
			Pct						Num-ber	Per-centage	Yr		
241	Maple, red Creosote, coal-tar	Hot-and-cold bath		Round	Maryland Agric. Exp. Sta.	College Park, Md.	1908	1939	13	7	53.9	Decay	32
242	Creosote, coal-tar--crude petroleum	Hot bath--petroleum, cold bath--creosote		do	do	do	1908	1921	5	5	100.0	do	11.0
243	Creosote--diesel oil	Hot bath--creosote, cold bath, 50-50	8.2	Round and	Delta Exp. Sta.	Stonewille, Miss.	1941	1959	8	3	37.5	do	22
244	None	Untreated		Round	Maryland Agric. Exp. Sta.	College Park, Md.	1908	1914	5	5	100.0	do	3.6
245	Maple, silver Creosote, coal-tar	Pressure	11.7	do	Forest Prod. Lab.	Oregon, Wis.	1960-61	1972	4				
245a	Copper sulfate--sodium chromate	Tire-tube (double treatment)	CuSO_4 , .34 $\text{Na}_2\text{Cr}_2\text{O}_7$, .60	do	do	Mazomanie, Wis.	1940	1954	2	2	100.0	Decay	10.4
246	Pentachlorophenol, 10 pct in No. 2 fuel oil	Cold-soaking, 18 h	2.1	do	U. Illinois	Oregon, Ill.	1943	1967	23	20	87.0	do	19
247	Zinc chloride	Tire-tube	.92-.98	do	Forest Prod. Lab.	Mazomanie, Wis.	1940	1957	5	5	100.0	do	14.6
248	Maple, sugar Gomosear	Osmose	.33	Square	Wis. State Highway Commission	Madison, Wis.	1956	1965	9	6	66.7	do	8
249	Maple Creosote, coal-tar	Hot bath (bolts), cold bath (full length)	4.3	Split	U. Minnesota	Minneapolis, Minn.	1909	1937	10	6	60.0	do	28
250	Mesquite None	Untreated		Round	U.S. Forest Serv.	Tucson, Ariz.	1940	1965	35	32	97.0	Decay and termites	18
251	Mulberry None	do		do	Delta Exp. Sta.	Stonewille, Miss.	1937	1959	39	35	89.8	do	19
251a	do	do		Split	do	do	1937	1959	40	30	75.0	do	21
252	Norfolk-island pine (Araucaria excelsa) Copper sulfate--sodium arsenate and sodium chromate	Double diffusion	.97	Round	U.S. Forest Serv.	Honolulu, Hawaii	1961	1973	24	12	50.0	Decay	12
252a	None	Untreated		do	do	do	1961	1964	10	10	100.0	Decay and termites	1.4
253	Oak, Arizona white None	Untreated		do	do	Tucson, Ariz.	1940	1965	27	25	93.0	do	20
254	Oak, black Creosote, coal-tar--gas oil (25-75 soln)	Pressure	6.6	do	Forest Prod. Lab.	Brooklyn, Wis.	1916	1972	4				
255	Pentachlorophenol, 10 pct in No. 2 fuel oil	Cold-soaking, 48 h	2.7	do	U. Illinois	Oregon, Ill.	1942-43	1967	18	1	5.0	Decay	
256	None	Untreated		do	Tenn. Valley Authority	Norris, Tenn.	1951	1957	25	25	100.0	do	2.8

Table 2.--Service tests of treated and untreated fenceposts--continued

Item No.	Species and preservative	Treatment (full length unless otherwise indicated)	Average retention of preservative	Form	Installed by	Location of test	Date installed	Date last inspection	Number in test	Posts removed to and at time of last inspection	Average life	
			Pct						Number	Pct	Cause	Yr
286	:Oak, northern red :Chromated zinc :chloride	:End diffusion	: 0.75	:Round	:Forest Prod. Lab.	:Madison, :Wis.	: 1946	: 1972	: 25 : 22	: 88.0	:Decay	: 21
287	:Creosote, coal-tar	:Hot-and-cold bath :(butts)	: 1.6	:Split	:U. Minnesota	:Minneapolis, :Minn.	: 1909	: 1937	: 19 : 9	: 47.4	:do.	: 33
288	:do.	:Hot-and-cold bath		:Round	:Maryland Agric. Exp. :Sta.	:College :Park, Md.	: 1908	: 1939	: 10 : 4	: 40.0	:do.	: 36
289	:do.	:Hot bath (butts), :cold bath (full :length)	: 2.7	:Split	:U. Minnesota	:Minneapolis, :Minn.	: 1908	: 1937	: 83 : 24	: 28.9	:do.	: 34
290	:do.	:do.	: 1.4	:do.	:do.	:do.	: 1909	: 1937	: 9 : 6	: 66.7	:do.	: 27
291	:do.	:Cold-soaking	: 1.7	:do.	:do.	:do.	: 1909	: 1937	: 15 : 13	: 86.6	:do.	: 23
292	:do.	:Pressure	: 5.8	:Round	:Forest Prod. Lab.	:Oregon, Wis.	: 1960-61	: 1972	: 27			
293	:Creosote, coal-tar :water-gas tar	:Hot bath--water-gas :tar, cold bath-- :creosote		:do.	:Maryland Agric. Exp. :Sta.	:College :Park, Md.	: 1908	: 1939	: 10 : 8	: 80.0	:Decay	: 27
294	:do.	:Hot-and-cold bath	: 2.4	:Split	:U. Minnesota	:Minneapolis, :Minn.	: 1909	: 1937	: 22 : 15	: 68.2	:do.	: 27
295	:Mercuric chloride, :white arsenic, :sodium chloride	:Groundline	: 0.05-0.10 lb/post	:Round	:Forest Prod. Lab.	:Brooklyn, :Wis.	: 1943	: 1972	: 24 : 23	: 95.8	:do.	: 13
296	:Damonar	:Dipose	: .25	:do.	:do.	:Madison, :Wis.	: 1946	: 1972	: 25 : 22	: 88.0	:do.	: 17
297	:Pentachlorophenol, : 5 pct in No. 2 : fuel oil	:Top treatment	: 1/2 pt/post	:do.	:do.	:do.	: 1946	: 1968	: 25 : 25	: 100.0	:do.	: 9.8
298	:do.	:Cold-soaking, 8 h	: 3.2	:do.	:do.	:Oregon, Wis.	: 1943	: 1962	: 9 : 9	: 100.0	:do.	: 14.2
299	:do.	:Cold-soaking, 24 h	: 3.5	:do.	:do.	:do.	: 1943	: 1972	: 9 : 7	: 77.8	:do.	: 20
300	:do.	:Cold-soaking, 48 h	: 4.5	:do.	:do.	:do.	: 1943	: 1972	: 8 : 5	: 62.5	:do.	: 28
301	:do.	:Cold-soaking, 96 h	: 5.8	:do.	:do.	:do.	: 1943	: 1972	: 7 : 2	: 22.2	:do.	: 36
302	:do.	:Cold-soaking, 168 h	: 5.7	:do.	:do.	:do.	: 1943	: 1972	: 9 : 2	: 22.2	:do.	: 36
303	:Pentachlorophenol, : 10 pct in No. 2 : fuel oil	:Cold-soaking, 66 h	: 2.6	:do.	:U. Illinois	:Oregon, Ill.	: 1942-43	: 1967	: 10			
304	:Water-gas tar :(butts)	:Hot-and-cold bath	: 1.5	:Split	:U. Minnesota	:Minneapolis, :Minn.	: 1909	: 1937	: 14 : 10	: 71.5	:Decay	: 26
305	:Zinc chloride	:Tire-tube	: .39-1.47	:Round	:Forest Prod. Lab.	:Hazomanie, :Wis.	: 1939	: 1960	: 27 : 27	: 100.0	:do.	: 11.9
306	:None	:Untreated		:do.	:Maryland Agric. Exp. :Sta.	:College :Park, Md.	: 1908	: 1923	: 5 : 5	: 100.0	:do.	: 9.8
307	:do.	:do.		:do.	:Forest Prod. Lab.	:Madison, :Wis.	: 1946	: 1958	: 10 : 10	: 100.0	:do.	: 7.2
308	:do.	:do.		:do.	:do.	:Oregon, Wis.	: 1960-61	: 1966	: 3 : 3	: 100.0	:do.	: 4.7
309	:Oak, southern red :Pentachlorophenol, : 5 pct in No. 2 : fuel oil	:Cold-soaking, 48 h	: 3.9	:do.	:do.	:Saucier, :Miss.	: 1947	: 1972	: 25 : 18	: 72.0	:do.	: 23
310	:Nickel sulfate and :arsenic acid--sodium :chromate	:Double diffusion :(butts)	: .75	:do.	:Tenn. Valley :Authority	:Wilson Dam, :Ala.	: 1946	: 1969	: 25 : 25	: 100.0	:Decay and :termites	: 9
311	:Zinc chloride	:End diffusion	: .95	:do.	:Forest Prod. Lab.	:Saucier, :Miss.	: 1947	: 1962	: 25 : 25	: 100.0	:do.	: 8.8
312	:do.	:Steeping	: 2.4	:do.	:do.	:do.	: 1947	: 1960	: 25 : 25	: 100.0	:do.	: 5.8
313	:None	:Untreated		:do.	:do.	:do.	: 1947	: 1957	: 25 : 25	: 100.0	:do.	: 2.8
314	:Oak, red :Pentachlorophenol, : 5 pct in diesel oil	:Cold-soaking, 5 d	: 5.6	:do.	:Delta Exp. Sta.	:Stoneville, :Miss.	: 1953	: 1970	: 15			
315	:Zinc sulfate and :arsenic acid--sodium :chromate	:Double diffusion	: 1.0	:do.	:U.S. Forest Serv.	:Athens, Ga.	: 1955	: 1973	: 25 : 9	: 36.0	:Decay	: 21
316	:do.	:do.	: 1.6	:do.	:do.	:do.	: 1955	: 1973	: 25 : 8	: 32.0	:do.	: 22
317	:do.	:do.	: 2.1	:do.	:do.	:do.	: 1955	: 1973	: 25 : 19	: 76.0	:do.	: 16

Table 7.--Service tests of treated and untreated fenceposts--continued

Item No.	Species and preservative	Treatment (full length unless otherwise indicated)	Average retention of preservative	Form	Installed by	Location of test	Date installed	Date of last inspection	Number of other posts in last inspection	Posts removed up to and at time of last inspection	Average life		
			Pct						Number	Pct	Cause	Yr	
318	Oak, red Zinc sulfate and arsenic acid--sodium chromate	Double diffusion, first solution heated to 200° F	1.6	Round	U.S. Forest Serv.	Athens, Ga.	1955	1973	25	21	84.0	Decay	16
319	None	Untreated		do	do	do	1955	1966	50	50	100.0	do	4.3
320	Oak, scarlet Zinc sulfate and arsenic acid--sodium chromate	Double diffusion (butts)	.44	do	Tenn. Valley Authority	Norris, Tenn.	1953	1963	25	14	56.0	Decay and termites	10
321	Oak, silverleaf None	Untreated		do	U.S. Forest Serv.	Tucson, Ariz.	1940	1958	43	43	100.0	do	9.3
322	Oak, swamp chestnut Creosote, coal-tar--grade petroleum creosote	Hot bath--petroleum, cold bath--creosote		do	Maryland Agric. Exp. Sta.	College Park, Md.	1908	1939	13	10	76.9	Decay	28
323	None	Untreated		do	do	do	1908	1921	5	5	100.0	do	7.4
324	Oak, water Creosote--diesel oil	Hot bath--creosote, cold bath (50-5C)	8.4-9.6	Round and split	Delta Exp. Sta.	Stoneville, Miss.	1941	1959	35	6	17.1	do	27
325	do	do	8.4-9.6	do	do	do	1946	1959	46	3	6.5	do	
326	Pentachlorophenol, 5 pct in No. 2 diesel oil	Hot-and-cold bath	2.7-5.6	do	do	do	1947	1959	29	2	6.9	do	
327	Oak, white Borden salt, S-25 (ZnO + As ₂ O ₅ + CrO ₃ + CuO)	Pressure (oscillating)	.76	Round	Forest Prod. Lab.	Saucier, Miss.	1957	1972	5				
328	do	Pressure	.54	do	do	do	1957	1972	5				
329	Chromated zinc chloride	End diffusion	.75	do	do	Madison, Wis.	1946	1972	25	10	40.0	Decay	29
330	Creosote, coal-tar	Hot-and-cold bath		do	Maryland Agric. Exp. Sta.	College Park, Md.	1908	1939	15	5	33.4	do	37
331	do	Pressure	8.1	do	Forest Prod. Lab.	Saucier, Miss.	1957	1972	5				
332	do	do	6.9	do	do	Oregon, Wis.	1960-61	1972	17				
333	Creosote, coal-tar--No. 2 fuel oil, (50-50 gain)	Cold-soaking, 48 h	3.3	do	do	Madison, Wis.	1958	1972	10				
334	Mercuric chloride, white arsenic sodium chloride	Groundline	.05-1.0	do	do	Brooklyn, Wis.	1943	1972	17	16	94.2	Decay	13
335	Zinc chloride	Fire-tube	.32-1.01	do	do	Maromarie, Wis.	1939	1960	17	17	100.0	do	16.6
336	do	Steeping	1.74-1.80	do	do	do	1940	1960	10	10	100.0	do	16.4
337	Zinc sulfate and arsenic acid--sodium chromate	Double diffusion, first solution heated to 200° F	1.7	do	U.S. Forest Serv.	Athens, Ga.	1955	1973	25	20	80.0	do	16
338	do	do	1.5	do	do	do	1955	1973	25	9	36.0	do	21
339	do	do	2.3	do	do	do	1955	1973	25	9	36.0	do	21
340	do	Double diffusion, first solution heated to 200° F	1.7	do	do	do	1955	1973	25	17	68.0	do	17
341	None	Untreated		do	do	do	1955	1966	50	50	100.0	do	6.6
342	do	do		do	Forest Prod. Lab.	Saucier, Miss.	1957	1963	5	5	100.0	Decay and termites	4.8
343	do	do		do	do	Madison, Wis.	1958	1968	10	10	100.0	Decay	5.7
344	do	do		Square	do	do	1937	1972	48	44	91.8	do	26

Table 2.--Service costs of treated and untreated fenceposts--continued

Item No.	Species and preservative	Treatment (full length unless otherwise indicated)	Average retention of preservative	Form	Installed by	Location of test	Date installed	Date last inspection	Number of posts in test	Posts removed up to and at time of last inspection	Average life
			Pct						Number	Pct	Cause
370	Pecan, bitter-con. Pentachlorophenol, 5 pct in No. 2 diesel oil	Hot-and-cold bath	4.3-6.7	Round	Delta Exp. Sta.	Stoneville, Miss.	1947	1959	30	1	3.3 Decay
371	Pentachlorophenol, 5 pct in diesel oil	Cold-soaking, 5 d	5.2	Round	do	do	1953	1970	15	5	33.3 do
372	Perlimmon ² Creosote--diesel oil	Hot bath--creosote, cold bath (50-50)	7.9	do	do	do	1941	1959	11	2	18.2 do
373	do	do	7.9	do	do	do	1946	1959	7		
374	Pine, eastern white Osmosar	Osmosar	.19	Square	Wis. State Highway Commission	Madison, Wis.	1956	1965	4	1	25.0 Decay
375	Pentachlorophenol, 10 pct in No. 2 fuel oil	Cold-soaking, 18 h	2.2	Round	U. Illinois	Oregon, Ill.	1943-44	1967	22	1	4.0 do
376	do	Cold-soaking, 24 h	2.6	do	do	do	1942-46	1967	68	9	13.2 do
377	do	Cold-soaking, 48 h	3.1	do	do	do	1943-44	1967	33	1	1.9 do
378	do	Cold-soaking, 72 h	3.4	do	do	do	1942-46	1967	41	1	2.2 do
379	Pentachlorophenol, 7.5 pct in No. 2 fuel oil	Cold-soaking, 65-68 h	3.5	do	do	do	1942-48	1967	76	2	2.6 do
380	Pentachlorophenol, 5 pct in No. 2 fuel oil	Cold-soaking, 6 h	1.9	do	do	do	1943-46	1967	43	35	81.4 do
381	do	Cold-soaking, 24 h	3.0	do	do	do	1943-47	1967	41	7	17.1 do
382	do	Cold-soaking, 41-42 h	2.5	do	do	do	1942-47	1967	88	34	38.7 do
383	do	Cold-soaking, 8 h	1.6	do	Forest Prod. Lab.	Oregon, Wis.	1943	1972	9	9	100.0 do
384	do	Cold-soaking, 24 h	2.0	do	do	do	1943	1972	9	8	88.9 do
385	do	Cold-soaking, 48 h	2.8	do	do	do	1943	1972	8	7	87.5 do
386	do	Cold-soaking, 96 h	3.2	do	do	do	1943	1972	9	7	77.8 do
387	do	Cold-soaking, 168 h	3.3	do	do	do	1943	1972	9	6	66.7 do
388	do	do	4.4	do	New York State College of Forestry	Syracuse, N.Y.	1942	1948	10		
389	None	Untreated		do	U. Illinois	Oregon, Ill.	1942-43	1967	25	25	100.0 Decay
390	Pine, jack Chromated zinc chloride	End diffusion	.76	do	Forest Prod. Lab.	Madison, Wis.	1945	1962	10	10	100.0 do
391	do	do	.75	do	do	do	1946	1972	25	17	68.0 do
392	Copper naphthenate, 2 pct copper, in mineral spirits and water repellent	Brush	.48	do	do	do	1946	1964	25	25	100.0 do
393	do	Seasoned 4 mo, and cold soaked, 48 h	2.8	do	do	do	1946	1972	25	2	8.0 do
394	do	Seasoned 12 mo, and cold soaked, 48 h	2.5	do	do	do	1946	1972	25		
395	Copper sulfate	End diffusion	.75	do	do	do	1946	1972	25	18	72.0 Decay
396	Copper sulfate--sodium arsenate and sodium chromate	Double diffusion		do	do	do	1960	1972	25		
397	Creosote, coal-tar	Brush	.58	do	do	do	1946	1972	25	25	100.0 Decay
398	Creosote, coal-tar-- No. 2 fuel oil (50- 50 soln)	Seasoned 7 mo, and cold soaked, 48 h	3.8	do	do	do	1946	1972	25		
399	do	Seasoned 12 mo, and cold soaked, 48 h	4.0	do	do	do	1946	1972	25		
400	Creosote, lignite	Pressure	6.7	do	do	do	1937	1966	83	6	7.2 Decay
401	Nickel sulfate--sodium chromate	Double diffusion (butts)	2.21	do	do	do	1946	1972	10	4	40.0 do
402	do	do	1.2	do	do	do	1945	1972	9		
403	do	do	1.3	do	do	do	1945	1972	9		

Table 2.--Service costs of treated and untreated fenceposts--continued

Item No.	Species and preservative	Treatment (full length unless otherwise indicated)	Average retention of preservative	Form	Installed by	Location of test	Date installed	Date last inspection	Number of posts inspected	Posts removed to and at time of last inspection	Average life							
												Ref	Num-ber	Pct	Cause	Yr		
	Pine, Jack-con.																	
404	Nickel sulfate and sodium dichromate	Butt steeping	0.95	Round	Forest Prod. Lab.	Madison, Wis.	1945	1972	10	3	30.0	Decay	26					
405	Osmosar	Osmose	.25	do	do	do	1946	1972	25	22	88.0	do	21					
406	do	do	.25	Square	Wis. State Highway Commission	do	1956	1965	13	1	7.7	do						
407	Pentachlorophenol, 5 pct in No. 2 fuel oil	Brush	.43	Round	Forest Prod. Lab.	do	1946	1959	25	25	100.0	do	7.6					
408	do	Cold-soaking, 2 h	4.7	do	do	Brooklyn, Wis.	1942	1972	18									
409	do	Cold-soaking, 6 h	1.7	do	do	Madison, Wis. (Syene)	1942	1963	22	22	100.0	Decay	11.8					
410	do	Cold-soaking, 24 h	2.4	do	do	Madison, Wis.	1942	1966	44	41	93.2	do	18					
411	do	do	4.4	do	do	do	1942	1966	7									
412	do	Cold-soaking, 48 h	2.8	do	do	Madison, Wis. (Syene)	1942	1966	44	39	88.6	Decay	21					
413	do	Cold-soaking, 168 h	8.2	do	do	Madison, Wis.	1942	1966	13									
414	do	Groundline	.5 lb/post	do	do	do	1945	1962	10	10	100.0	Decay	3.7					
415	do	do	240 cm ² /post	do	do	do	1946	1963	25	25	100.0	do	7.5					
416	Pentachlorophenol, 1.0 pct and chloro-2-phenylphenol, 2 pct in mineral spirits and water repellent	Brush	.52	do	do	do	1946	1959	25	25	100.0	do	7.6					
417	Sodium fluoride	Steeping	.37	Square	do	do	1926	1941	7	4	57.1	do	15					
418	do	do	.46	Round	U.S. Forest Serv.	Halsey, Nebr.	1925	1952	25	25	100.0	Decay and termites	16.5					
419	Sodium fluoride--copper sulfate	Double diffusion (butts)		do	Forest Prod. Lab.	Madison, Wis.	1960	1972	19	2	10.0	Decay						
420	Tetrachlorophenol, 5.0 pct in used crankcase oil	Pressure	5.7	do	do	do	1936	1963	14									
421	Tetrachlorophenol, 2.8 pct in used crankcase oil	do	5.3	do	do	do	1936	1963	41									
422	do	do	5.8	do	do	Brooklyn, Wis.	1936	1972	22	5	22.7	Decay	46					
423	Water-gas tar	Brush	.45	do	do	Madison, Wis.	1946	1962	25	25	100.0	do	8.4					
424	Zinc chloride	Steeping	.51	do	U.S. Forest Serv.	Halsey, Nebr.	1925	1954	20	20	100.0	Decay and termites	16.9					
425	do	do	.51	do	do	do	1925	1950	5	5	100.0	Decay	13.8					
426	do	Tire-tube	.82-1.01	do	Forest Prod. Lab.	Madison, Wis.	1938	1948	7									
427	None	Untreated (stubs)		do	do	do	1934	1935	21	21	100.0	Decay	7.4					
428	do	Untreated		do	do	do	1946	1952	10	10	100.0	do	3.8					
429	do	Untreated		do	do	do	1960	1972	18	16	100.0	do	6.4					
430	do	do		do	U.S. Forest Serv.	Halsey, Nebr.	1925	1939	10	10	100.0	Decay and termites	5.7					
	Pine, lodgepole																	
431	Anaconda Wood Preservative (dust)	Groundline	1.5 lb/post	do	U.S. Range Livestock Exp. Sta.	Miles City, Mont.	1926	1943	13	12	92.3	Decay	15					
432	do	do	1.8 lb/post	do	Forest Prod. Lab.	Madison, Wis.	1929	1955	18	18	100.0	do	320.4					
433	do	do	1.8 lb/post	do	do	do	1929	1955	16	16	100.0	do	325.4					
434	do	do	3.0 lb/post	do	U.S. Forest Serv.	Basin, Mont.	1928	1935	228	25	8.8	do						
435	Anaconda Wood Preservative (granules)	do	1.8 lb/post	do	Forest Prod. Lab.	Madison, Wis.	1929	1955	19	19	100.0	do	318.5					
436	do	do	1.8 lb/post	do	do	do	1929	1955	19	19	100.0	do	324					
437	Anaconda Wood Preservative (paste)	do		do	do	do	1929	1955	17	17	100.0	do	325.5					
438	Anaconda Wood Preservative (granules and paste)	do		do	do	do	1929	1955	18	18	100.0	do	325.9					

Table 2.--Service tests of treated and untreated fenceposts--continued

Item No.	Species and preservative	Treatment (full length unless otherwise indicated)	Average retention of preservative	Form	Installed by	Location of test	Date installed	Date last inspection	Number of posts in test	Posts removed up to and at time of last inspection	Average life		
			Pct						Num-ber	Pct	Cause		
439	Pine, lodgepole--con- Anascond Wood Preservative (gran- ules and paste)	Groundline		Half- round	Forest Prod. Lab.	Madison, Wis.	1929	1955	18	18	100.0	Decay	21.8
440	do	do		Square	do	do	1929	1955	18	18	100.0	do	28.3
441	Boliden salt S-25 (ZnO + As ₂ O ₃ + CrO ₃ + CuO)	Pressure (oscillating)	0.26	Round	do	Saucier, Miss.	1957	1972	5				
442	do	Pressure	.57	do	do	do	1957	1972	5				
443	Copper sulfate--sodium chromate	Double diffusion (butts)	1.36	do	U.S. Forest Serv.	Bend, Oreg.	1952	1966	25	18	72.0	Decay	10
444	do	do	.97	do	do	do	1952	1966	25	17	68.0	do	10
445	do	do	.70	do	Wash. State College	Prosser, Wash.	1953	1966	23	10	43.5	do	14
446	do	do	1.1	do	Oregon State U.	Corvallis, Oreg.	1952	1964	25	25	100.0	do	5
447	Creosote, coal-tar	Hot-and-cold bath (butts)	3.1 lb/post	do	U.S. Forest Serv.	Dillon, Colo.	1908	1963	109	48	44.0	do	Over
448	do	do	3.1 lb/post	do	do	do	1908	1958	413	199	48.2	do	Over
449	do	Hot-and-cold bath (butts), hot bath (top)	6.0 lb/post	do	Forest Prod. Lab.	Madison (Syene), Wis.	1929	1964	12	9	75.0	do	35
450	do	do	8.2 lb/post	Half- round	do	Madison, Wis.	1929	1964	3				
451	do	Hot-and-cold bath (butts)	4.6	Round	U.S. Forest Serv.	Missoula, Mont.	1916	1957	14	14	100.0	Decay	45
452	do	do	3.6	Split	do	do	1916	1957	17	17	100.0	do	41
453	do	Pressure		Round	Anascond Copper Mining Co.	Rockler, Mont.	1915	1931	610	146	24.0	do	21
454	do	do	4.4	do	Forest Prod. Lab.	Saucier, Miss.	1957	1972	5				
455	Creosote, coal-tar-- used crankcase oil (50-50 soln)	Hot-and-cold bath (butts), hot bath (tops)	3.1 lb/post	do	do	Madison (Syene), Wis.	1929	1964	11	3	27.2	Decay	44
456	do	do	3.4 lb/post	Half- round	do	Madison, Wis.	1929	1964	4	1	25.0	do	45
457	Creosote, coal-tar-- used crankcase oil (25-75 soln)	do	6.9 lb/post	Round	do	do	1929	1964	7				
458	do	do	3.1 lb/post	Half- round	do	do	1929	1964	3	2	66.8	Decay	33
459	Crude petroleum	Brush	.39 lb/post	Round	Colorado State U.	Fort Collins, Colo.	1913	1936	18	17	94.5	do	6.8
460	Pentachlorophenol, 5 pct in No. 2 fuel oil	Seasoned 3 mo, cold-soaked, 48 h	3.5	do	Forest Prod. Lab.	Madison, Wis.	1946	1972	22				
461	do	Seasoned 12 mo, cold-soaked, 48 h	5.8	do	do	do	1946	1972	25				
462	Sodium fluoride	Steeping	.095	do	U.S. Range Livestock Exp. Sta.	Miles City, Mont.	1926	1943	36	36	100.0	Decay	13.5
463	Sodium fluoride-- copper sulfate	Double diffusion (butts)	.38	do	U.S. Forest Serv.	Band, Oreg.	1952	1966	25	1	4.0	do	
464	do	do	.32	do	do	do	1952	1966	25	8	24.0	do	18
465	do	do	.37	do	Washington State College	Prosser, Wash.	1953	1966	25				
466	Tetrachlorophenol, 3 pct in petroleum	Hot-and-cold bath (butts)		do	U.S. Forest Serv.	Gallatin Nat'l. Forest	1935	1957	83	8	9.6	Decay	34
467	Water-gas tar	do	4.6 lb/post	do	Colorado State U.	Fort Collins, Colo.	1912-13	1936	18				
468	do	do	1.6 lb/post	do	do	do	1913	1936	10	5	50.0	Decay	20

Table 2.--Service tests of treated and untreated fenceposts--continued

Item No.	Species and preservative	Treatment (full length unless otherwise indicated)	Average retention of preservative	Form	Installed by	Location of test	Date installed	Date of last inspection	Number of posts inspected	Posts removed up to and at time of last inspection	Average life			

:Pct														
:Num														
:ber														
:Pct														
:Cause														
:Yr														
469	Pinus lodgepole--con. Water-gas tar	Hot bath (butts)	1.3	lb/post	Round	Colorado State U.	Fort Collins, Colo.	1912-13	1936	18	12	66.6	Decay	18
470	do	Brush (butts)	.4	lb/post	do	do	do	1912-13	1936	19	17	89.5	do	13
471	Zinc chloride	Pressure	.83	Round	U.S. Forest Serv.	Halsey, Nebr.	1929	1957	33	33	100.0	do	20.3	
472	do	Steeping	.28	Round	U.S. Range Livestock Exp. Sta.	Miles City, Mont.	1926	1943	17	17	100.0	do	15.0	
473	do	do	.35	do	do	do	1926	1943	51	32	62.7	do	16	
474	Zinc meta arsenite	Pressure	.43	Half-round	U.S. Forest Serv.	Halsey, Nebr.	1929	1957	32	32	100.0	do	20.0	
475	Zinc sulfate and arsenic acid--sodium chromate	Double diffusion (butts)	.96	Round	Washington State College	Prosser, Wash.	1953	1966	24	2	8.3	do		
476	do	do	.73	do	Oregon State U.	Corvallis, Oreg.	1952	1970	25	13	52.0	do	19	
477	do	do	.91	do	U.S. Forest Serv.	Bend, Oreg.	1952	1966	25	1	4.0	do		
478	do	do	.27	do	do	do	1952	1966	25	7	28.0	do	17	
479	None	Untreated		do	do	do	1952	1966	25	24	96.0	do	6	
480	do	do		do	do	Saucier, Miss.	1957	1962	5	5	100.0	Decay and termites	4.3	
481	do	do		do	Washington State College	Prosser, Wash.	1953	1966	25	15	60.0	Decay	10	
482	do	do		do	Oregon State U.	Corvallis, Oreg.	1952	1958	25	25	100.0	do	3.0	
483	do	Untreated (stubs)		Half-round	U.S. Forest Serv.	Halsey, Nebr.	1929	1947	20	20	100.0	Decay and termites	9.4	
484	do	Untreated		Round	do	Basin, Mont.	1928	1935	22	14	63.6	Decay	6	
485	do	do		do	do	Dillon, Colo.	1908	1917	213	213	100.0	do	8.2	
486	do	do		do	Colorado State U.	Fort Collins, Colo.	1912	1934	19	19	100.0	do	8.4	
487	do	do		do	U.S. Range Livestock Exp. Sta.	Miles City, Mont.	1926	1943	20	20	100.0	do	9.4	
488	do	do		do	U.S. Forest Serv.	Missoula, Mont.	1916	1928	5	5	100.0	do	11.0	
489	do	do		Split	do	do	1916	1926	5	5	100.0	do	9.4	
490	do	Untreated (stubs)		Round	Forest Prod. Lab.	Madison, Wis.	1929	1952	20	20	100.0	do	9.5	
491	do	do		Half-round	do	do	1929	1944	20	20	100.0	do	7.4	
492	do	do		Square	do	do	1929	1955	20	20	100.0	do	11.6	
493	do	do		Round	do	Madison, Wis.	1929	1939	9	9	100.0	do	7.0	
494	do	do		Half-round	do	do	1929	1938	9	9	100.0	do	5.6	
495	do	do		Square	do	do	1929	1938	9	9	100.0	do	7.1	
496	do	Untreated		Round	do	do	1946	1965	10	10	100.0	do	8.8	
497	Pinus ponderosa Anaconda Wood Preservative (dust)	Groundline		do	U.S. Range Livestock Exp. Sta.	Miles City, Mont.	1926	1943	26	25	96.2	do	13	
498	do	do		Split	do	do	1926	1943	6	6	100.0	do	15.0	
499	Creosote, coal-tar	Hot-and-cold bath	10.1	Round	Forest Prod. Lab.	Drummond, Wis.	1936	1962	15	1	6.7	do		
500	Creosote, coal-tar--petroleum oil (40-60:1 soln)	Pressure	11.3	do	U.S. Forest Serv.	Armour, S. Dak.	1935	1962	197					
501	do	do	11.2	do	do	Litchville, N. Dak.	1935	1966	186					
502	Pentachlorophenol, 5 pct in No. 2 fuel oil	Cold-soaking, 168 hr	4.5	do	New York State College of Forestry	Syracuse, N.Y.	1942	1948	10					

Table 2.--Service tests of treated and untreated fenceposts--continued

Item No.	Species and preservative	Treatment (full length unless otherwise indicated)	Average retention of preservative	Form	Installed by	Location of test	Date installed	Date last inspection	Number of posts inspected	Number of posts removed to and at time of last inspection	Percentage of posts remaining	Cause of failure	Average life in years
<u>Pine, ponderosa--con.</u>													
503	Sodium fluoride	Steeping	0.25	Round	U.S. Range Livestock Exp. Sta.	Miles City, Mont.	1926	1943	33	32	97.0	Decay	12
504	do.	do.	.24	do.	do.	do.	1926	1943	17	17	100.0	do.	9.9
505	do.	do.	.27	Split	do.	do.	1926	1943	20	20	100.0	do.	15.3
506	do.	do.	.33	Round	U.S. Forest Serv.	Halsey, Neb.	1925	1937	25	25	100.0	Decay and termites	15.6
507	Zinc chloride	do.	.46	do.	do.	do.	1925	1937	19	19	100.0	do.	19
508	do.	do.	.18	do.	do.	do.	1925	1954	5	5	100.0	do.	20.0
509	do.	do.	.75	do.	U.S. Range Livestock Exp. Sta.	Miles City, Mont.	1926	1943	6	5	83.3	Decay	15
510	do.	do.	.48	do.	do.	do.	1926	1943	40	27	67.5	do.	16
511	do.	do.	.49	Split	do.	do.	1926	1943	18	18	100.0	do.	15.1
512	Zinc chloride, 10 pct	Fire-tube		Round	U.S. Forest Serv.	Tucson and Flagstaff, Ariz.	1940	1965	10	1	10.0	do.	39
513	None	Untreated		do.	do.	do.	1939-40	1950	45	45	100.0	do.	5.7
514	do.	do.		do.	do.	Argonne, S. Dak.	1935	1955	21	21	100.0	do.	9.0
515	do.	do.		do.	do.	Halsey, Neb.	1925	1935	10	10	100.0	Decay and termites	6.3
516	do.	do.		Split	U.S. Range Livestock Exp. Sta.	Miles City, Mont.	1926	1943	6	6	100.0	Decay	8.3
517	do.	do.		Round	do.	do.	1926	1941	23	23	100.0	do.	8.6
518	do.	do.		do.	National Bison Range	Moivse, Mont.	1909	1912	380	380	100.0	do.	3.5
<u>Pine, red</u>													
519	Nickel sulfate and sodium dichromate	Butt steeping	1.19	do.	Forest Prod. Lab.	Madison, Wis.	1945	1972	8	3	38.0	do.	24
520	Pentachlorophenol, 5 pct in No. 2 fuel oil	Cold-soaking, 168 h	6.0	do.	New York State College of Forestry	Syracuse, N.Y.	1942	1948	10				
521	Sodium fluoride	Steeping	.06	Square	Forest Prod. Lab.	Verona, Wis.	1925	1945	33	33	100.0	Decay	13.7
522	do.	do.	.44	do.	do.	Madison, Wis.	1926	1941	6	5	83.3	do.	12.0
523	Wolman salts (Triolith)	do.	.10	do.	do.	Verona, Wis.	1925	1945	34	34	100.0	do.	15.9
524	Zinc chloride	do.	.31	do.	do.	do.	1925	1944	31	31	100.0	do.	14.7
525	None	Untreated (stubs)		do.	do.	do.	1925	1944	50	50	100.0	do.	10.0
<u>Pine, scotch</u>													
526	Sodium fluoride	Steeping	.42	Round	U.S. Forest Serv.	Halsey, Neb.	1925	1949	25	25	100.0	Decay and termites	11.2
527	Zinc chloride	do.	.49	do.	do.	do.	1925	1943	18	18	100.0	do.	11.9
528	do.	do.	.34	do.	do.	do.	1925	1944	5	5	100.0	Decay	13.6
529	None	Untreated		do.	do.	do.	1925	1936	12	12	100.0	Decay and termites	6.3
<u>Pine, southern yellow (Imbolly)</u>													
530	Creosote, coal-tar	Pressure	6.0	do.	Delta Exp. Sta.	Stoneville, Miss.	1937	1959	12	8	66.7	Decay	22
531	do.	do.	12.0	do.	do.	do.	1937	1959	12				
532	do.	Hot-and-cold bath (butts), cold bath (tops)	3.7	Round	North Louisiana Exp. Sta.	Calhoun, La.	1908-10	1940	305	293	96.1	Decay	16.8
533	Zinc sulfate and arsenic acid--sodium chromate	Double diffusion	1.2	Round	U.S. Forest Serv.	Athens, Ga.	1955	1971	25	5	20.0	do.	24
534	do.	do.	1.2	do.	do.	do.	1955	1973	25				
535	do.	do.	2.3	do.	do.	do.	1955	1973	25	1	4.0	Decay	
536	do.	Double diffusion (first solution heated to 200° F)	2.1	do.	do.	do.	1955	1973	25				
537	None	Untreated		do.	do.	do.	1955	1959	50	50	100.0	Decay	2.1

Table 2.--Service tests of treated and untreated fenceposts--continued

Item No.	Species and preservative	Treatment (full length unless otherwise indicated)	Average retention of preservative	Form	Installed by	Location of test	Date installed	Date of last inspection	Number of posts in test	Posts removed up to and at time of last inspection	Average life		
			Pct						Num-ber	Pct	Yr		
	Pine, southern yellow (longleaf)												
538	Ammoniacal copper arsenite (Chemonite) (AWPA P5)	Pressure	0.34	Round	Forst Prod. Lab.	Saucier, Miss.	1949	1972	25	3	12.0	Decay	35
539	Bolden salt B (ZnO + H ₂ AsO ₄ + CrO ₃)	do.	.50	do.	do.	do.	1949	1972	25				
540	Carbostan (coal-tar creosote)	do.	6.0	do.	do.	do.	1949	1972	25				
541	Chromated zinc arsenate (Bolden salts) (AWPA P5)	do.	.70	do.	do.	do.	1949	1972	25	1	4.0	Decay	
542	Chromated zinc chloride, copperized (AWPA P5)	do.	.98	do.	do.	do.	1949	1972	25	12	48.0	do.	25
543	Chromated zinc chloride, (FR) (AWPA P10)	do.	3.25	do.	do.	do.	1949	1972	25	3	12.0	do.	35
544	Copper naphthenate, 1/2 pct copper-metal, in petroleum oil (Item No. 595)	do.	6.0	do.	do.	do.	1949	1972	25	3	12.0	Decay and termites	35
545	Copper sulfate	Butt steeping	.47	do.	do.	do.	1951	1972	25	24	96.0	do.	7
546	Copper sulfate--borax and boric acid	Double diffusion (butts)	.81	do.	do.	do.	1956	1972	25	24	96.0	Decay	12
547	do.	Double diffusion (butts), steeping (cons) in borax and boric acid	.61	do.	do.	do.	1956	1972	25	24	96.0	do.	12
548	Copper sulfate--borax and sodium fluoride	Double diffusion (butts)	.46	do.	do.	do.	1956	1972	25	21	84.0	do.	14
549	Copper sulfate--sodium arsenate and sodium chromate	do.	.94	do.	do.	do.	1956	1972	25	1	4.0	do.	
550	Copper sulfate--sodium fluoride and sodium chromate	do.	.62	do.	do.	do.	1956	1972	25	11	44.0	Decay and termites	18
551	Copper sulfate--sodium fluoride	do.	.38	do.	do.	do.	1951	1972	25	21	84.0	Decay	13
552	do.	do.	.80	do.	do.	do.	1951	1972	24	14	58.4	do.	21
553	Copper sulfate and arsenic acid--sodium chromate	do.	.40	do.	do.	do.	1951	1972	25	16	64.0	do.	21
554	do.	do.	1.18	do.	do.	do.	1951	1972	24	3	12.5	do.	31
555	Creosote coal-tar	Pressure	5.9	do.	do.	do.	1949	1972	25	1	4.0	Decay and termites	
556	Straight run, low residue	do.	5.6	do.	do.	do.	1949	1972	25	3	12.0	do.	35
557	Straight run, high residue	do.	6.0	do.	do.	do.	1949	1972	25	1	4.0	do.	
558	Medium residue, low in tar acids	do.	5.7	do.	do.	do.	1949	1972	25				
559	Medium residue, low in naphthalene	do.	6.1	do.	do.	do.	1949	1972	25	1	4.0	Decay	
560	Medium residue, low in tar acids and naphthalene	do.	6.0	do.	do.	do.	1949	1972	25				
561	Low residue, low in tar acids and naphthalene	do.	6.0	do.	do.	do.	1949	1972	25	2	8.0	Decay and termites	
562	High residue, low in tar acids and naphthalene	do.	6.1	do.	do.	do.	1949	1972	25				

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Table 2.--Service tests of treated and untreated fenceposts--continued

Item No.	Species and preservative	Treatment (full length unless otherwise indicated)	Average retention of preservative	Form	Installed by	Location of test	Date installed	Date of last inspection	Number of posts to and at time of last inspection	Posts removed up to and at time of last inspection	Average age of life				

										Num-ber	Pct	Cause	Yr		
Pine, southern yellow (longleaf)--con.															
563	Medium residue, low in	Pressure	6.1	Round	Forest Prod. Lab.	Saucier, Miss.	1949	1972	25	4	16.0	Decay and termites	33		
fraction from 235° to 270° C, crystals removed															
564	High residue, crystals	do.	6.0	do.	do.	do.	1949	1972	25						
removed															
565	Low temperature	do.	6.3	do.	do.	do.	1949	1972	25						
566	English, vertical	do.	6.3	do.	do.	do.	1949	1972	25	1	4.0	Decay			
retort															
567	English, coke oven	do.	6.0	do.	do.	do.	1949	1972	25						
568	English, vertical	do.	6.0	do.	do.	do.	1949	1972	25						
retort--coke oven, (50-50 soIn)															
569	Medium residue (low in	do.	6.0	do.	do.	do.	1949	1972	25						
tar acids and naphthalene with 2-1/2 per cent chlorophenol															
570	Creosote, coal-tar--	do.	6.1	do.	do.	do.	1949	1972	25						
coal-tar (70-30 soIn)															
571	Creosote, coal-tar	do.	5.9	do.	do.	do.	1949	1972	25	1	4.0	Decay			
(item No. 560)--petroleum oil (item No. 594) (50-50 soIn)															
572	Creosote, coal-tar	do.	6.0	do.	do.	do.	1949	1972	25	1	4.0	do.			
(item No. 560)--petroleum oil (item No. 596) (50-50 soIn)															
573	Creosote, coal-tar	do.	6.0	do.	do.	do.	1949	1972	25						
(item No. 560)--petroleum oil (item No. 596) (50 pct plus 2-1/2 pct pentachlorophenol)															
574	Creosote, oil tar	do.	5.9	do.	do.	do.	1949	1972	25	3	12.0	Decay and termites	35		
(Gasco)															
575	Creosote (Gasco) with	do.	5.8	do.	do.	do.	1949	1972	25						
2 pct pentachlorophenol															
576	Creosote, lignite	do.	6.3	do.	do.	do.	1949	1972	25	8	32.0	Decay and termites	28		
removed															
577	Creosote, lignite--	do.	6.3	do.	do.	do.	1949	1972	25						
creosote, coal-tar (item No. 560) (50-50 soIn)															
578	Creosote, lignite--	do.	6.4	do.	do.	do.	1949	1972	25	6	24.0	Decay	30		
petroleum oil (item No. 596) (50-50 soIn)															
579	Nickel sulfate--sodium	Double diffusion	1.32	do.	do.	do.	1946	1972	25	3	12.0	do.	39		
chromate (hutta)															
580	do.	do.	.25	do.	do.	do.	1946	1959	25	25	100.0	Decay and termites	7.8		
removed															
581	do.	do.	.36	do.	do.	do.	1946	1972	25	21	84.0	do.	10		
582	Nickel sulfate and	do.	1.61	do.	do.	do.	1946	1972	25	7	28.0	Decay	32		
arsenic acid--sodium chromate															
583	do.	do.	.60	do.	do.	do.	1946	1972	25	2	8.0	do.			
584	do.	do.	.33	do.	do.	do.	1946	1972	25	14	56.0	Decay and termites	27		

Table 2.--Service tests of treated and untreated fenceposts--continued

Item No.	Species and preservative	Treatment (full length unless otherwise indicated)	Average retention of preservative	Form	Installed by	Location of test	Date installed	Date of last inspection	Number of posts removed to and at time of last inspection	Percentage decay	Cause	Year
			Pct						Num-ber	Pct	Cause	Yr
	Five southern yellow (longleaf)--con.											
	Pentachlorophenol:											
585	5 pct in petroleum oil (item No. 594)	Pressure	6.3	Round	Forest Prod. Lab.	Saucier, Miss.	1949	1972	25	1	4.0	Decay
586	5 pct in petroleum oil (item No. 595)	do	5.9	do	do	do	1949	1972	25			
587	3 pct in petroleum oil (item No. 595)	do	6.0	do	do	do	1949	1972	25			
588	5 pct in petroleum oil (item No. 596)	do	6.0	do	do	do	1949	1972	25	5	20.0	Decay and termites
589	Pentachlorophenol, 5 pct in petroleum oil (item No. 595)--copper naphthenate, 1/2 pct copper-retal; in petroleum oil (item No. 595) (50-50 soln)	do	6.2	do	do	do	1949	1972	25			
590	Aromatic, high residue (S.W.)	do	6.1	do	do	do	1949	1972	25			
591	Aromatic, low residue (S.W.)	do	6.1	do	do	do	1949	1972	25	2	8.0	Decay and termites
592	Highly aromatic (S.O.)	do	6.0	do	do	do	1949	1972	24	15	62.5	Decay
593	Highly aromatic, high residue (S.O.)	do	6.1	do	do	do	1949	1972	24	11	46.0	Decay and termites
594	No. 2 fuel oil (mid-U.S.)	do	5.9	do	do	do	1949	1967	25	25	100.0	do
595	No. 4 aromatic residual (Calif.)	do	5.9	do	do	do	1949	1972	25	6	24.0	do
596	Wyoming residual	do	5.8	do	do	do	1949	1968	25	25	100.0	do
597	Sodium fluoride--copper sulfate (bucets)	Double diffusion	.57	do	do	do	1951	1972	24	5	20.8	do
598	Termitool (softwood tar creosote)	Pressure	6.1	do	do	do	1949	1972	25	13	52.0	do
599	Zinc chloride	Butt steeping	1.41	do	do	do	1946	1972	25	13	52.0	do
600	do	do	.32	do	do	do	1946	1962	23	23	100.0	do
601	do	do	.23	do	do	do	1946	1957	25	25	100.0	do
602	Zinc sulfate and arsenic acid--sodium chromate (bucets)	Double diffusion	.53	do	do	do	1951	1972	25	17	68.0	do
603	do	do	1.20	do	do	do	1951	1972	25	15	60.0	Decay
604	Zinc sulfate--borax and boric acid	do	.83	do	do	do	1956	1972	25	22	88.0	do
605	Zinc sulfate--borax and sodium fluoride	do	.67	do	do	do	1956	1972	25	22	88.0	Decay and termites
606	do	do	.50	do	do	do	1956	1972	24	19	79.2	do
607	Zinc sulfate--sodium chromate and sodium arsenate	do	.80	do	do	do	1956	1972	25	4	16.0	do
608	Zinc sulfate--sodium chromate and sodium fluoride	do	1.11	do	do	do	1956	1972	24	5	20.8	Decay
609	do	do	.75	do	do	do	1956	1972	25	10	40.0	do
610	None	Untreated		do	do	do	1956	1960	25	25	100.0	Decay and termites
611	do	do		do	do	do	1949	1952	25	25	100.0	do
612	do	do		do	do	do	1951	1953	25	25	100.0	do

Table 2.--Service tests of treated and untreated fenceposts--continued

Item No.	Species and preservative	Treatment (full length unless otherwise indicated)	Average retention of preservative	Form	Installed by	Location of test	Date installed	Date of last inspection	Number of tests	Points removed to and at time of last inspection	Average life	
			Pct						Num-ber	Pct	Cause	Yr
	Pine, southern yellow (shortleaf)											
613	Copper sulfate and arsenic acid-sodium chromate	Double diffusion (butts) steeping (tops) in Na ₂ CrO ₄	0.94	Round	Tenn. Valley Authority	Korris, Tenn.	1953	1963	25			
614	do	do	.88	do	do	do	1953	1963	25	2	8.0	Decay and termites
615	Copper sulfate-sodium chromate	do	.70	do	do	do	1953	1963	25	2	8.0	do
616	do	Double diffusion (butts) steeping (tops) in Na ₂ CrO ₄ (bug peeled)	2.05	do	do	do	1953	1963	25	8	32.0	Decay
617	Cresote, coal-tar	Pressure	6.0	do	Delta Exp. Sta.	Stoneville, Miss.	1937	1959	12	2	16.7	do
618	do	do	12.0	do	do	do	1937	1959	12	1	8.3	do
619	Sodium fluoride--copper sulfate	Double diffusion (butts)	.64	do	Tenn. Valley Authority	Korris, Tenn.	1953	1963	23	4	17.3	do
620	Zinc sulfate and arsenic acid-sodium chromate	Double diffusion (butts) steeping (tops) in Na ₂ CrO ₄	.72	do	do	do	1953	1963	24			
621	None	Untreated		do	do	do	1953	1956	25	25	100.0	Decay and termites
622	do	Untreated (bug peeled)		do	do	do	1951	1954	25	25	100.0	do
623	do	Untreated		do	do	do	1953	1956	25	25	100.0	do
	Pine, southern yellow (slawh)											
624	Copper sulfate-borax and boric acid	Double diffusion (butts)	.34	do	Forest Prod. Lab.	Saurier, Miss.	1953	1972	24	15	62.5	do
625	Copper sulfate-sodium chromate	do	.27	do	do	do	1953	1972	25	22	88.0	do
626	do	Steeping (tops) in Na ₂ CrO ₄	.21	do	do	do	1953	1970	25	25	100.0	do
627	do	Double diffusion (butts)	.74	do	do	do	1953	1972	25	10	40.0	Decay
628	do	Double diffusion (butts) steeping (tops) in Na ₂ CrO ₄	.62	do	do	do	1953	1972	25	22	88.0	Decay and termites
629	Pentachlorophenol, 5 pct in No. 2 fuel oil	Cold-soaking, 48 h	6.8	do	do	do	1947	1972	25	4	16.0	Decay
630	Zinc chloride	End diffusion	.94	do	do	do	1947	1972	25	22	88.0	Decay and termites
631	do	Steeping	2.5	do	do	do	1947	1972	25	23	92.0	Decay
632	Zinc sulfate-borax and boric acid	Double diffusion (butts)	.59	do	do	do	1953	1972	24	22	91.6	Decay and termites
633	Zinc sulfate-sodium chromate	do	.65	do	do	do	1953	1972	25	14	56.0	Decay
634	None	Untreated		do	do	do	1947	1952	25	25	100.0	Decay and termites
635	do	do		do	do	do	1953	1955	25	25	100.0	do
	Pine, southern yellow											
636	Acid copper chromate (Calcure) (AWPA P5)	Pressure	.92	do	do	do	1936-37	1970	77	27	35.2	do
637	Beta naphthol, 5 pct in petroleum mixture	Pressure	6.2	do	do	do	1936-37	1967	98	98	100.0	do
638	Bolliden salt, S-25 (ZnO + As ₂ O ₃ + CrO ₃ + CuO)	Pressure (oscillating)	.42	do	do	do	1957	1972	5			
639	do	Pressure	.57	do	do	do	1957	1972	5			

Table 2.--Service tests of treated and untreated fenceposts--continued

Item No.	Species and preservative	Treatment (full length unless otherwise indicated)	Average retention of preservative	Form	Installed by	Location of test	Date installed	Date last inspection	Number of posts in test	Posts removed up to and at time of last inspection	Average life		
			Pct						Num-ber	Pct	Yr		
	Pine, southern												
	yellow--con.												
640	Borax	Pressure	1.1	Round	Chicago, Milw., St. Paul, & Pac. R.R.	Madison, Wis.	1926	1953	4	4	100.0	Decay	15.2
641	do	do	1.0	Half-round	do	do	1926	1953	20	20	100.0	do	14.4
642	Borax--boric acid (equal parts by weight)	do	.92	Round	Forest Prod. Lab.	Saucier, Miss.	1936-37	1957	97	97	100.0	Decay and termites	10.6
643	Chromated copper arsenate (Erdalith Greensalt)	do	.5	Square	Wis. State Highway Commission	Madison, Wis.	1954	1965	1				
644	Chromated zinc chloride	do	1.22	do	do	do	1956	1965	8				
645	do	do	.87	Round	Forest Prod. Lab.	Saucier, Miss.	1936-37	1970	93	69	74.2	Decay and termites	30
646	Copper sulfate--sodium arsenate	Double diffusion	.51	do	do	do	1941	1970	90	8	8.9	Decay	
647	Copper sulfate--disodium phosphate (butes)	Double diffusion	.93	do	do	do	1948	1961	25	25	100.0	Decay and termites	6.4
648	do	do	.29	do	do	do	1948	1961	25	25	100.0	do	7.6
649	do	do	.19	do	do	do	1948	1961	26	26	100.0	do	6.8
650	do	Double diffusion (butes), tops brushed with pentachlorophenol, 5 pct, in No. 2 fuel oil	.40	do	do	do	1948	1961	24	24	100.0	do	8.3
651	Copper sulfate--sodium chromate	Double diffusion (butes)	1.09	do	do	do	1948	1961	25	25	100.0	do	8.1
652	do	do	.78	do	do	do	1948	1961	25	25	100.0	do	7.5
653	do	do	.10	do	do	do	1948	1960	25	25	100.0	do	6.9
654	Coal tar	Pressure	6.5	do	do	do	1936-37	1970	90	59	64.0	do	43
655	Crankcase oil, used	do	7.6	do	do	do	1936-37	1970	96	94	98.0	do	8
656	Creosote, coal-tar	do	6.0	do	do	do	1936-37	1970	89	35	39.0	Decay	89
657	do	do	6.0	Square	Wis. State Highway Commission	Madison, Wis.	1954	1965	5	3	60.0	do	12
658	do	do	6.5	Round	Forest Prod. Lab.	Saucier, Miss.	1957	1972	5				
659	Creosote, lignite	do	8.3	do	do	do	1936-37	1970	96	55	57.0	Decay and termites	34
660	Creosote, coal-tar--used crankcase oil (10-90 soln)	do	7.1	do	do	do	1936-37	1970	98	86	88.0	do	11
661	Creosote, coal-tar--used crankcase oil (50-50 soln)	do	5.4	do	do	do	1936-37	1970	85	19	22.0	Decay	44
662	Creosote, coal-tar--coal tar (80-20 soln)	do	7.5	do	do	Brooklyn, Wis.	1926	1972	12				
663	do	do	7.5	Half-round	do	do	1926	1972	12	2	17.0	Decay	50
664	Fluor chrome arsenate phenol (Tamalith) (AWPA P5)	do	.35	Round	do	Saucier, Miss.	1936-37	1970	94	68	72.0	Decay and termites	31
665	Mercuric chloride	Steeping	.09	do	do	do	1936-37	1970	99	86	87.0	do	27
666	Nickel sulfate--disodium phosphate (butes)	Double diffusion	1.15	do	do	do	1948	1961	24	24	100.0	do	10.3
667	do	do	.76	do	do	do	1948	1961	25	25	100.0	do	9.6
668	do	do	.28	do	do	do	1948	1961	25	25	100.0	do	9.7
669	do	do	.24	do	do	do	1948	1961	25	25	100.0	do	7.6

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Table 2.--Service tests of treated and untreated fenceposts--continued

Item No.	Species and preservative	Treatment (full length unless otherwise indicated)	Average retention of preservative	Form	Installed by	Location of test	Date installed	Date of last inspection	Number of posts inspected	Posts removed up to and at time of last inspection	Average age in years		
			Pct						Num-ber	Pct	Cause	Yr	
	<u>Pine, southern yellow</u> --con.												
670	Nickel sulfate and araeic acid--sodium chromate	Double diffusion (butts)	1.74	Round	Tenn. Valley Authority	Wilson Dam, Ala.	1946	1969	25				
671	do	do	.64	do	do	do	1946	1969	25	4	16.0	33.0	
672	do	do	.42	do	do	do	1946	1963	25	16	64.0	Decay and termites	22
673	Osmosplastic	Groundline	.34	do	Forest Prod. Lab.	Saucier, Miss.	1941	1960	99	99	100.0	do	11.2
674	Osmosar	Osmose	.30	do	do	do	1936-37	1970	94	89	95.0	do	25
675	Pentachlorophenol, 5 pcr in petroleum oil	Pressure	6.0	Square	Wis. State Highway Commission	Madison, Wis.	1954	1965	6	2	33.3	Decay	13
676	Pentachlorophenol, 4.82 pct in used crankcase oil	do	6.7	Round	Forest Prod. Lab.	Saucier, Miss.	1936-37	1970	91	7	7.8	Decay and termites	
677	Pentachlorophenol, 3.02 pct in used crankcase oil	do	6.4	do	do	do	1936-37	1970	80	17	21.2	Decay	45
678	Pentachlorophenol, 10 pct in No. 2 fuel oil	Cold-soaking, 24 h	2.4	do	U.S. Forest Serv.	Willow Springs, Mo.	1944	1974	57			Over	50
679	do	Cold-soaking, 72 h	4.2	do	do	do	1944	1974	36			Over	50
680	do	Cold-soaking, 120 h	4.5	do	do	do	1944	1974	27			Over	50
681	Pentachlorophenol, 6.2 pct in No. 2 fuel oil	Cold-soaking, 24 h	2.7	do	do	do	1944	1974	69	3	4.4	Decay	Over 50
682	Pentachlorophenol, 5 pct in No. 2 fuel oil	Cold-soaking, butts, 20 h, tops, 3-4 h	2.1	do	do	do	1944	1974	24			Over	50
683	do	Cold-soaking, butts, 72 h, tops, 4 h	4.0	do	do	do	1944	1974	11			Over	50
684	do	Cold-soaking, butts, 120 h, tops, 3 h	3.3	do	do	do	1944	1974	10			Over	50
685	do	Cold-soaking, 4 h	1.4	do	Forest Prod. Lab.	Oregon, Wis.	1943	1966	13	13	100.0	Decay	14.3
686	do	Cold-soaking, 8 h	1.8	do	do	do	1943	1972	12	12	100.0	do	16.9
687	do	Cold-soaking, 24 h	1.9	do	do	do	1943	1972	13	13	100.0	do	17.5
688	do	Cold-soaking, 48 h	2.7	do	do	do	1943	1972	13	10	77.0	do	19
689	do	Cold-soaking, butts, 18 h, tops, 6 h	2.2	do	do	do	1943	1972	17	13	76.5	do	26
690	do	Cold-soaking, 168 h	4.0	do	do	Madison (Synne), Wis.	1942	1966	10				
691	Phenyldichlorarsine, 0.84 pct in gas oil	Pressure	5.9	do	do	Saucier, Miss.	1936-37	1970	94	86	91.6	Decay and termites	21
692	Sodium dichromate	do	.88	do	do	do	1936-37	1970	96	95	99.0	do	18
693	Sodium chromate	do	.93	do	do	do	1936-37	1970	88	84	95.4	do	16
694	Tetrachlorophenol, 2.9 pct in used crankcase oil	do	7.1	do	do	do	1936-37	1970	87	35	40.2	do	39
695	Tetrachlorophenol, 4.8 pct in used crankcase oil	do	5.8	do	do	do	1936-37	1970	90	33	36.7	do	40
696	Water-gas tar	do	6.3	do	do	do	1936-37	1970	86	27	31.4	do	41
697	Wood-tar creosote (No-D-K)	do	6.6	do	do	do	1936-37	1970	99	91	92.0	do	21
698	Zinc chloride	do	.94	do	do	do	1936-37	1970	95	81	85.0	do	27
699	Zinc meta arsenite	do	.42	do	do	do	1936-37	1970	88	12	13.6	do	50
700	None	Untreated		do	do	do	1937	1943	65	65	100.0	do	3.1
701	do	do		do	do	do	1938	1943	33	33	100.0	do	3.7
702	do	do		do	do	do	1948	1952	25	25	100.0	do	2.3
703	do	do		do	do	do	1957	1961	5	5	100.0	do	3.4

Table 2.--Service tests of treated and untreated fenceposts--continued

Item No.	Species and preservative	Treatment (full length unless otherwise indicated)	Average retention of preservative	Form	Installed by	Location of test	Date installed	Date last inspection	Number of posts in test	Posts removed up to and at time of last inspection	Average age at time of last inspection	Cause of decay	Life expectancy	
										Pct	Num-ber	Pct	Cause	Ye
<u>Pine, southern</u>														
704	None	Untreated		Round	Tenn. Valley Authority	Wilson Dam, Ala.	1946	1963	24	24	100.0	Decay and	4	
705	do	do		do	Chicago, Milw., St. Paul, & Pac. R.R.	Madison, Wis.	1926	1935	15	15	100.0	Decay	6.6	
706	do	do		Half-round	do	do	1926	1936	19	19	100.0	do	6.5	
<u>Pine, Virginia</u>														
707	Creosote, coal-tar	Hot-and-cold bath		Round	Maryland Agric. Exp. Sta.	College Park, Md.	1908	1939	14	3	21.4	do	41	
708	Creosote-asphaltum	Hot bath--asphaltum, cold bath--creosote		do	do	do	1908	1939	6	5	83.3	do	27	
709	Creosote-crude petroleum	Hot bath--petroleum, cold bath--creosote		do	do	do	1908	1939	7	4	57.1	do	32	
710	Water-gas tar	Hot bath (butts)		do	do	do	1908	1935	7	7	100.0	do	17.0	
<u>Pinon</u>														
711	Zinc chloride, 10 pct	Tire-tube		do	U.S. Forest Serv.	Tucson and Flagstaff, Ariz.	1940	1965	10					
712	None	Untreated		do	do	do	1939-40	1950	10	10	100.0	Decay	6.2	
<u>Poplar, white</u>														
713	Creosote, coal-tar	Hot-and-cold bath		do	Maryland Agric. Exp. Sta.	College Park, Md.	1908	1939	11	8	72.7	do	29	
714	do	Hot-and-cold bath (butts)		do	do	do	1908	1939	5	4	80.0	do	27	
715	Creosote-crude petroleum	Hot bath--petroleum, cold bath--creosote		do	do	do	1908	1939	5	5	100.0	do	11.8	
716	Creosote-water-gas tar	Hot bath--water-gas tar, cold bath--creosote		do	do	do	1908	1939	7	1	14.3	do	45	
<u>Popple (see Aspen)</u>														
<u>Redcedar, eastern</u>														
717	Creosote, coal-tar	Hot-and-cold bath		do	do	do	1908	1939	5					
718	Creosote, coal-tar--No. 2 fuel oil (50-50 soln)	Cold-soaking, 48 h	1.0	do	Forest Prod. Lab.	Madison, Wis.	1958	1972	10					
719	None	Untreated		do	do	do	1958	1972	9					
<u>Redcedar, western</u>														
720	Anacnda Wood	Groundline		Split	U.S. Range Livestock Exp. Sta.	Miles City, Mont.	1926	1943	50	10	20.0	Decay	23	
721	Creosote, coal-tar	Hot bath (butts)		Round and split	National Bison Range	Montese, Mont.	1909	1951	8227	3064	37.2	do	48	
722	Creosote, coal-tar--No. 2 fuel oil (50-50 soln)	Cold-soaking, 48 h	1.8	Round	Forest Prod. Lab.	Madison, Wis.	1958	1972	9					
723	Sodium fluoride	Steeping	.14	Split	U.S. Range Livestock Exp. Sta.	Miles City, Mont.	1926	1943	19	10	52.6	Decay	18	
724	do	do	.11	do	do	do	1926	1943	18	1	5.5	do		
725	Zinc chloride	do	.34	do	do	do	1926	1943	24	9	37.5	do	20	
726	do	do	.25	do	do	do	1926	1943	24	1	4.2	do		
727	None	Untreated		do	do	do	1926	1943	42	16	38.1	do	20	
728	do	do		do	U.S. Forest Serv.	Missoula, Mont.	1916	1939	51	51	100.0	do	16.4	

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Table 2.--Service tests of treated and untreated fenceposts--continued

Item No.	Species and preservative	Treatment (full length unless otherwise indicated)	Average retention of preservative	Form	Installed by	Location of test	Date installed	Date last inspection	Number of posts in test	Posts removed up to and at time of last inspection	Average life		

										Num-ber	Pct	Cause	Yr
:Swamp-privet													
752	Pentachlorophenol	Cold-soaking, 5 d	5.2	Round	Delta Exp. Sta.	Stoneville, Miss.	1953	1970	15	11	73.0	Decay	16
: 1 pct in diesel oil													
:Sweetbay													
753	Creosote, coal-tar	Hot bath (butts), cold bath (full length)	9.3	Round	N. Louisiana Agric. Exp. Sta.	Calhoun, La.	1908-10	1940	112	94	83.9	do	18
754	Pentachlorophenol, diesel oil	Cold-soaking, 48 h	9.2	Round	Forest Prod. Lab.	Saucier, Miss.	1947	1972	25	17	68.0	do	24
755	Zinc chloride	End diffusion	.94	do	do	do	1947	1958	25	25	100.0	Decay and termites	5.0
756	do	Steeping	1.6	do	do	do	1947	1958	25	25	100.0	do	5.6
757	None	Untreated		do	do	do	1947	1950	25	25	100.0	do	1.6
:Sweetgum													
758	Holliden salt, S-25 (ZnO + As ₂ O ₃ + CrO ₃ + CuO)	Pressure (oscillating)	.78	do	do	do	1957	1972	5				
759	do	Pressure	.73	do	do	do	1957	1972	5				
760	Creosote, coal-tar	do	9.7	do	do	do	1957	1972	5				
761	do	Hot-and-cold bath (butts), cold bath (tops)	7.7	do	N. Louisiana Agric. Exp. Sta.	Calhoun, La.	1908-10	1940	134	91	67.9	Decay	23
762	do	Hot-and-cold bath		do	Maryland Agric. Exp. Sta.	College Park, Md.	1908	1939	13				
763	do	Hot-and-cold bath (butts)		do	do	do	1908	1939	5	5	100.0	Decay	13.8
764	do	Pressure	6.0	do	Delta Exp. Sta.	Stoneville, Miss.	1937	1939	12	7	58.3	do	23
765	do	do	12.0	do	do	do	1937	1959	9	1	11.1	do	34
766	Creosote--crude petroleum	Hot bath--petroleum, cold bath--creosote		do	Maryland Agric. Exp. Sta.	College Park, Md.	1908	1939	6	6	100.0	do	15.7
767	Creosote--diesel oil	Hot bath--creosote, cold bath (50-50)	11.0	do	Delta Exp. Sta.	Stoneville, Miss.	1941	1959	9	1	11.1	do	27
768	do	do	11.0	do	do	do	1946	1959	3				
769	Nickel sulfate--disodium phosphate	Double diffusion (butts)	.53	Round	Forest Prod. Lab.	Saucier, Miss.	1948	1958	26	26	100.0	Decay and termites	4.0
770	do	do	.21	do	do	do	1948	1954	24	24	100.0	do	2.1
771	do	do	.38	Round	do	do	1948	1957	25	25	100.0	do	4.8
772	Nickel sulfate--sodium fluoride and disodium phosphate	do	1.08	do	Tenn. Valley Authority	Wilson Dam, Ala.	1946	1960	25	25	100.0	Decay	9
773	do	do	.47	do	do	do	1946	1969	25	25	100.0	Decay and termites	12
774	do	do	.44	do	do	do	1946	1969	25	25	100.0	do	7
775	Pentachlorophenol, 5 pct in No. 2 diesel oil	Hot-and-cold bath	2.3-10.0	do	Delta Exp. Sta.	Stoneville, Miss.	1947	1959	27	11	40.8	do	15
776	do	Cold-soaking, 5 d	6.0	do	do	do	1953	1970	15	6	40.0	Decay	19
777	Pentachlorophenol, 5 pct in No. 2 fuel oil	Cold-soaking, 48 h	4.9	do	Forest Prod. Lab.	Saucier, Miss.	1947	1972	24	20	83.4	Decay and termites	21
778	Zinc chloride	Tire-tube	1.02-1.12	do	do	Madison, Miss.	1939	1948	10	5	50.0	Decay	10
779	do	End diffusion	.95	do	do	Saucier, Miss.	1947	1963	25	25	100.0	Decay and termites	6.6
780	do	Steeping	2.0	do	do	do	1947	1957	25	25	100.0	do	5.9
781	Zinc sulfate and arsenic acid--sodium chromate	Double diffusion	1.9	do	U.S. Forest Serv.	Athens, Ga.	1955	1973	25	12	48.0	Decay	19

Table 2.--Service tests of treated and untreated *Ipocopsis*--continued

Item No.	Species and preservative	Treatment (full length unless otherwise indicated)	Average retention of preservative	Form	Installed by	Location of test	Date (installed)	Date of last inspection	Number of tests	Posts removed up to and at last inspection	Average life		
			Pct						Number	Pct	Cause	Yr	
Sweetgum--con.													
782	Zinc sulfate and arsenic acid--sodium chromate	Double diffusion	2.4	Round	U.S. Forest Serv.	Athens, Ga.	1955	1973	25	13	52.0	Decay	19
783	do	do	2.9	do	do	do	1955	1973	25	12	48.0	do	19
784	do	Double diffusion, first solution heated to 200° F	3.1	do	do	do	1955	1973	25	18	72.0	do	17
785	None	Untreated		do	do	do	1955	1958	49	49	100.0	do	2.2
786	do	do		do	Maryland Agric. Exp. Sta.	College Park, Md.	1938	1914	5	5	100.0	do	4.2
787	do	do		do	Tenn. Valley Authority	Wilson Dam, Ala.	1946	1949	25	25	100.0	Decay and termites	7.3
788	do	do		do	Forest Prod. Lab.	Saucier, Miss.	1947	1949	25	25	100.0	do	1.8
789	do	do		Round (unpeeled)	do	do	1948	1950	22	22	100.0	do	1.5
790	do	do		Round	do	do	1957	1959	5	5	100.0	do	2.4
Sycamore, American													
791	Cresosote, coal-tar	Hot-and-cold bath		do	Maryland Agric. Exp. Sta.	College Park, Md.	1908	1919	7			do	
Tamarack													
792	Cresosote, coal-tar--No. 2 fuel oil (40-50 soln)	Cold-soaking, 48 h (butts incised)	1.3	do	Forest Prod. Lab.	Saucier, Miss.	1954	1972	10	10	100.0	Decay and termites	10.5
793	do	Cold-soaking, 48 h	.9	do	do	do	1954	1964	10	10	100.0	do	8.0
794	Zinc chloride	Fire-tube		do	do	Leoti, Miss.	1948	1963	28	3	10.7	Decay	38
795	None	Untreated		do	do	Saucier, Miss.	1954	1963	10	10	100.0	Decay and termites	5.1
Tupelo, black													
796	Cresosote, coal-tar	Hot-and-cold bath (butts), cold bath (tops)	7.2	do	N. Louisiana Agric. Exp. Sta.	Calhoun, La.	1908-10	1940	38	25	65.8	Decay	20.6
797	do	Hot-and-cold bath		do	Maryland Agric. Exp. Sta.	College Park, Md.	1908	1939	15			do	
798	Zinc sulfate and arsenic acid--sodium chromate	Double diffusion (butts)	.52	do	Tenn. Valley Authority	Norris, Tenn.	1953	1963	25	6	24.0	Decay and termites	13
799	None	Untreated		do	do	do	1951	1957	25	25	100.0	do	3.4
800	do	do		do	Maryland Agric. Exp. Sta.	College Park, Md.	1908	1914	5	5	100.0	Decay	4.2
Tupelo, water													
801	Cresosote, coal-tar	Hot-and-cold bath (butts), cold bath (tops)	8.6	do	N. Louisiana Agric. Exp. Sta.	Calhoun, La.	1908-10	1940	73	49	67.0	do	23
802	Pentachlorophenol, 5 pct in diesel oil	Cold-soaking, 5 d	6.5	do	Delta Exp. Sta.	Stoneville, Miss.	1953	1970	15	4	27.0	do	22
803	Pentachlorophenol, 5 pct in No. 2 fuel oil	Cold-soaking, 48 h	5.0	do	U.S. Forest Serv.	Saucier, Miss.	1947	1972	25	21	84.0	do	21
804	Zinc chloride	End diffusion	.94	do	do	do	1947	1958	25	25	100.0	Decay and termites	5.4
805	do	Steeping	1.5	do	do	do	1947	1961	25	25	100.0	do	4.4
805a	None	Untreated		do	do	do	1947	1950	25	25	100.0	do	2.1
Turpentine tree (Syncarpia glomulifera)													
806	Copper sulfate--sodium arsenate and sodium chromate	Double diffusion	1.15	do	do	Honolulu, Hawaii	1961	1973	26	16	62.0	Decay	8
806a	None	Untreated		do	do	do	1961	1971	25	25	100.0	Decay and termites	1.9

Table 2.--Service tests of treated and untreated fenceposts--continued

Item No.	Species and preservative	Treatment (full length unless otherwise indicated)	Average retention of preservative	Form	Installed by	Location of test	Date installed	Date of last inspection	Number of posts in test	Posts removed up to and at time of last inspection	Average life
Fencepost											
Cause											
Yr											
807	Waterlocust Pentachlorophenol, 5 pct in No. 2 diesel oil	Hot-and-cold bath	8.1	Round	Delta Exp. Sta.	Stoneville, Miss.	1947	1959	15	1	6.7 Decay
808	White-cedar, northern Creosote, coal-tar	Hot-and-cold bath (butts)	4.1 lb/post	Round	Iowa State U.	Ames, Iowa	1909	1937	139	10	7.2 do
809	do	do	1.7 lb/post	do	do	do	1909	1934	64	do	do
810	do	do	do	do	do	do	1910	1934	69	do	do
811	do	do	2.0 lb/post	do	do	do	1910	1934	116	4	3.4 Decay
812	do	do	2.0 lb/post	do	do	do	1910	1934	12	4	33.3 do
813	do	do	2.0 lb/post	do	do	do	1912	1937	9	1	11.1 do
814	do	Pressure	8.6	do	Forest Prod. Lab.	Verona, Wis.	1925	1966	16	do	do
815	do	do	5.9	do	do	Brooklyn, Wis.	1925	1972	26	do	do
816	Creosote--gas oil (25- 75 soln)	do	7.7	do	do	do	1916	1972	5	do	do
817	Creosote, coal-tar-- No. 2 fuel oil (50- 50 soln)	Cold-soaking, 48 h	1.3	do	do	Madison, Wis.	1958	1972	10	2	20.0 Decay
818	Tetrachlorophenol, pct in used crank- case oil	Hot-and-cold bath (butts), hot bath (tops)	1.9 lb/post	do	do	Madison, (Syene), Wis.	1932	1966	48	33	68.8 do
819	Tetrachlorophenol, pct in used crank- case oil	do	2.2 lb/post	do	do	Madison, Wis.	1932	1966	48	39	81.2 do
820	Tetrachlorophenol, pct in used crank- case oil	Pressure	8.6	do	do	Drummond, Wis.	1936	1962	14	1	7.1 do
821	Tetrachlorophenol, 2.86 pct in used crankcase oil	do	6.5	do	do	Madison, Wis.	1934	1951	11	do	do
822	do	do	4.5	do	do	do	1934	1948	8	do	do
823	None	Untreated	do	do	do	do	1958	1972	10	5	50.0 Decay
824	do	Untreated (stubs)	do	do	do	Madison, (Syene), Wis.	1932	1954	19	19	100.0 do
825	do	do	do	do	do	Drummond, Wis.	1936	1962	43	43	100.0 do
826	do	do	do	do	do	Verona, Wis.	1924	1946	29	29	100.0 do
827	do	do	do	do	Iowa State U.	Ames, Iowa	1910	1934	5	2	40.0 do
828	Willow, black Chromated zinc chloride	Steeping	do	do	Delta Exp. Sta.	Stoneville, Miss.	1948	1953	13	7	53.8 Decay and termites
829	do	do	do	do	do	do	1947	1959	13	12	92.3 do
830	Creosote--diesel fuel oil	Hot bath--creosote, cold bath (50-50)	8.4	Round	do	do	1941	1959	13	11	84.6 Decay
831	Willow, diamond ² None	Untreated	do	Round	Forest Prod. Lab.	Madison (Syene), Wis.	1930	1943	13	13	100.0 Decay
832	Willow, white Creosote, coal-tar	Hot-and-cold bath (butts)	6.0 lb/post	do	Iowa State U.	Ames, Iowa	1909	1937	15	14	93.3 do
833	do	do	1.6 lb/post	do	do	do	1909	1937	18	14	77.8 do

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