



STATE FOREST NOTES

Office of the State Forester
Sacramento

No. 15

July, 1963

A STUDY OF POSTS IN EL DORADO COUNTY

W. P. Maguire ^{1/}

SUMMARY

Round posts of native species were installed in 1942 and 1944 on the Eldorado National Forest by a farm forester to test preservatives (fig. 1).

The posts were treated with commercial 50-50 creosote-petroleum solution, 50-50 mercuric and sodium chloride dry salts, 10 percent zinc chloride solution, osmoplastic paste and five percent pentachlorophenol solution.

This study indicates that pentachlorophenol is a practical preservative which can greatly extend the life of all the tested species of round wood posts. The untreated control posts had an average life of 4.6 years. Only three posts of the original 25 treated with pentachlorophenol failed during the first 18 years of the study; these three posts were only butt-peeled and butt-treated and the failure was due to rot above the ground level. The remaining penta treated posts have an estimated average life of 40 years judging by their present condition (fig. 2).

Since incense cedar (*Libocedrus decurrens*) is a commonly used post wood in California a separate test of this species provides a comparison. The split-post test consisted of five posts each of sap cedar, sap cedar with the butt charred and heart cedar; these were split in April 1942 and installed in December 1942. The seasoned, split, sap incense cedar posts had an average life of five years. When the butts were charred the average life was three years. Split heartwood incense cedar posts are serviceable after 20 years but are loose in the ground.

^{1/} Service Forester, California Division of Forestry, Camino, California.



Fig. 1. General view of 16-20 year-old post plot.



Fig. 2. Posts in foreground are ponderosa pine that were treated 18 years ago.

PROJECT

During the summer and late fall of 1942 the Soil Conservation Service, under the Norris-Doxey Farm Forestry Program, initiated a post project using 125 round posts of five native species and five simple preservative treatments. The study is located on the Gilmore tract of the Eldorado National Forest at an elevation of 3,600 feet; the average annual rainfall is approximately 43 inches. Five posts each of ponderosa pine (*Pinus ponderosa*), incense cedar (*Libocedrus decurrens*), Douglas-fir (*Pseudotsuga menziesii*), white fir (*Abies concolor*), and black oak (*Quercus Kelloggii*), were installed in each of the treatment methods, to depths of 20 to 28 inches. Since 1945 the California Division of Forestry has made inspections almost every year to determine the condition of the posts.

Posts

All of the posts in this study were round sapwood posts, 4½ to 7 inches in top diameter and seven feet long. The posts for the creosote-petroleum oil mixture were cut in May 1942 and installed in December 1942. The untreated posts, those in the 10 percent zinc chloride, and those in the mercuric and sodium chloride treatments were cut and installed in December 1942. Posts used in the osmoplastic treatment were cut and installed in October 1944. In the final treatment, pentachlorophenol, the posts were cut in June 1944 and installed in November 1944.

Preservatives and Treatment

Commercial 50-50 creosote-petroleum oil mixture was liberally painted on all peeled surfaces of seasoned posts.

A level tablespoonful of 50-50 mercuric chloride-sodium chloride dry salt was placed in a ¾-inch hole which was drilled six inches above ground level on a downward slant two-thirds through the 4 to 5 inch middle diameter posts. Posts 5 to 6 inches at middle diameter received 1½ tablespoonfuls. The holes were tightly closed with corks to prevent animals from being poisoned. One-fifth of the green posts were peeled (figs. 3 and 4).

Ten percent zinc chloride solution was absorbed into green posts by the tire tube method (figs. 5 and 6). ^{2/}

^{2/} Tire-Tube Method of Fence Post Treatment. Report No. 1158, revised 1962. Forest Products Laboratory. USDA, Forest Service.



Fig. 3. Two white fir posts that received the mercuric chloride treatment. Note the decay in the unpeeled post at left as compared with the peeled post.



Fig. 4. This row of mercuric chloride treated ponderosa pine posts are all serviceable after 20 years in the ground.



Fig. 5. This zinc chloride treated white fir post is still firm in the ground despite top decay.

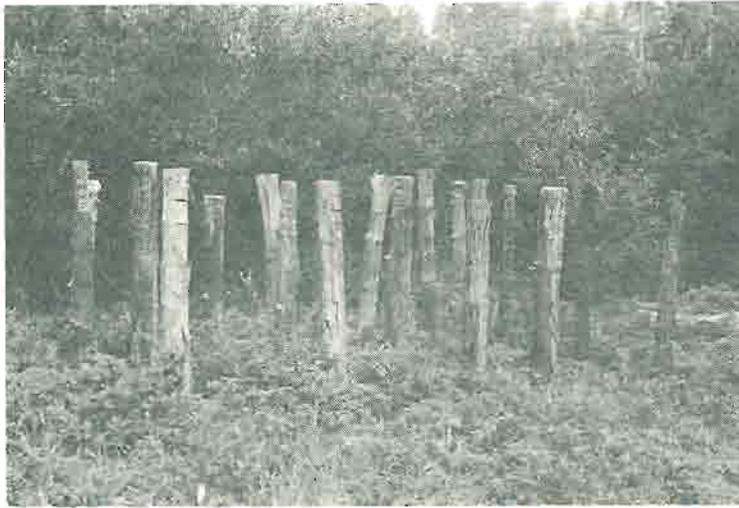


Fig. 6. After 20 years, 20 of the original 25 posts receiving the zinc chloride treatment are still useable; four of the posts that failed were ponderosa pine.

The osmoplastic ground line method consisted of smearing the paste over the peeled post butts and covering the butts with water-resistant paper. The osmoplastic used was reported to contain sodium fluoride, dinitrophenol, potassium dichromate, refined coal tar, and coal tar creosote.

Permatox A, 1 to 5 concentrate of pentachlorophenol, was diluted with five parts of #2 fuel oil to make a 5 percent solution. The goal for absorption of penta, five pounds per cubic foot, was not attained. Approximately $3\frac{1}{2}$ pounds per cubic foot was absorbed and this penetrated to a depth of about $\frac{1}{8}$ inch. It required 3, 7, and 11 days of cold soaking, respectively, to obtain this absorption in seasoned posts of incense cedar, ponderosa pine, and Douglas-fir and white fir. The posts with peeled tops were painted with penta.

Results to Date

During the May 1962 inspection, as in previous inspections, each post was given a firm thrust, under the force of which it would break off several inches below the ground level if decay or termite attack had progressed to a critical point. Loosening of a post indicates the first sign of decay and was recorded at each inspection.

The untreated control posts had an average life of 4.6 years with no significant difference among species (table 1).

Table 1. Condition of each set of five round posts of ponderosa pine, incense cedar, Douglas-fir, white fir, and black oak in May, 1962.

Preservative	Species ^{a/}	Form of pre-servative	Method of treatment	Number of serviceable posts	Average life (years) ^{b/}
<u>Posts installed in 1942</u>					
Control plot	all	none	none	none	4.6
Creosote-petroleum	PP	oil	painted	0	4
	IC	"	"	2	19
	DF	"	"	0	4.4
	WF	"	"	0	5.5
	BO	"	"	1	5
Mercuric and sodium chloride	PP	salt	in drilled	5	28
	IC	"	hole	5	35
	DF	"	"	4	22
	WF	"	"	5	30
	BO	"	"	2	8
Zinc chloride	PP	solution	tire tube	1	5
	IC	"	"	5	40
	DF	"	"	5	35
	WF	"	"	5	35
	BO	"	"	4	40
<u>Posts installed in 1944</u>					
Osmoplastic	PP	paste	smear	2	17
	IC	"	"	4	32
	DF	"	"	0	4
	WF	"	"	0	4
	BO	"	"	1	12
Pentachlorophenol ^{c/}	PP	oil	cold soak	2	45 ^{d/}
	IC	"	"	4	35
	DF	"	"	3	45 ^{d/}
	WF	"	"	4	40
	BO	"	"	4	35

^{a/} PP - ponderosa pine, IC - incense cedar, DF - Douglas-fir, WF - white fir, and BO - black oak.

^{b/} Figures in excess of 20 years indicate that the majority of the posts are still serviceable and the post life can only be estimated. Estimates were based on observed intervals between the loosening of a post, cracking of post below ground level, and failure in which post is completely broken off.

^{c/} After 1951 only four posts of each species comprised the test since the others had been removed for a county fair display.

^{d/} Average estimated life is based upon the peeled posts, on which penta was painted on the tops. The three failures to date occurred in the posts with unpeeled tops.

In the penta test two ponderosa pine, two incense cedar, three Douglas-fir, three white fir and two black oak posts were examined and noted to be firm; also, one black oak post in the zinc chloride test was firm. The remaining serviceable posts are characterized by looseness or are broken below the ground level.

In the penta treatment one post of each species was removed in 1951 for exhibition at a county fair, and were not replaced. The three posts which have failed were only butt-peeled and failure was due to top rot in the untreated portion above ground level.

From
CALIFORNIA DIVISION OF FORESTRY
301 State Office Building No. 1
Sacramento 14, California