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PACIFIC SOUTHWEST
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Experiment Station

FENCEPOSTS BUTT-SOAKED IN PENTACHLOROPHENOL

still sound after 22 years

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ABSTRACT: Seventeen types of fenceposts from 15 tree species installed in 1945 on the San Joaquin Experimental Range, Calif., were evaluated for durability in 1968. Post butts of one-half of each type had been soaked overnight in 5 percent pentachlorophenol in diesel oil; the other half of each type was untreated. After 22 years, every untreated post except split incense-cedar heartwood and manzanita had rotted, but most of the treated posts were still sound and serviceable.

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RETRIEVAL TERMS: fenceposts; treated wood durability; wood preservatives; pentachlorophenol.

Want a simple way to treat fenceposts economically for longer life? Just use easily-obtained species, remove the bark, and soak the butt ends in 5 percent pentachlorophenol and diesel oil for a day.

After 22 years, fenceposts treated in this way were still sound and serviceable on the San Joaquin Experimental Range, near Coarsegold, Calif. And this treatment is less costly than making posts from durable but hard-to-get split cedar.

In 1945, the following groups joined in a study on durability of 17 types of fenceposts: Madera County Fencepost Treating Committee, University of California Extension Service, California Division of Forestry, Sierra National Forest, and the Station's San Joaquin Experimental Range.

SPECIES AND TREATMENT

The test materials consisted of posts (4 to 7 inches top diameter) from these 15 species:

Common name	Scientific name
Incense-cedar	*Libocedrus decurrens*
Giant sequoia	*Sequoia gigantea*
Sugar pine	*Pinus lambertiana*
White fir	*Abies concolor*
Ponderosa pine	*Pinus ponderosa*
Digger pine	*Pinus sabiniana*
Manzanita	*Arctostaphylos mariposa*
Mountain-mahogany	*Cercocarpus betuloides*
California buckeye	*Aesculus californica*
Interior live oak	*Quercus wislizenii*
Blue oak	*Quercus douglasii*
Fremont cottonwood	*Populus fremontii*
Willow	*Salix*
River redgum	*Eucalyptus camaldulensis*
Lodgepole pine	*Pinus murrayana*

Some posts were split and peeled, some left round but peeled, some left round but not barked, and in one species, were left round but only the butt barked. All in all, there were 17 different types of posts *(table 1)*.

Table 1 –*Service life of posts butt-soaked 24 hours in cold pentachlorophenol and of untreated control posts, San Joaquin Experimental Range*

Species	Posts[1]		No. failed			Average service life (years)[2]
	Type	No.	1953	1957	1968	
TREATED FENCEPOSTS						
Incense-cedar heartwood	Split	5	0	0	0	–
Incense-cedar sapwood	Split	5	0	1	0	–
Incense-cedar	Round	5	0	0	0	–
Giant sequoia	Round	5	0	0	1	–
Sugar pine	Round	5	0	0	0	–
White fir	Round	5	0	0	0	–
Ponderosa pine	Round	5	0	0	0	–
Digger pine	Round	5	0	0	3	<22
Manzanita	Round	5	0	0	0	–
Mountain-mahogany	Round	5	0	0	1	–
California buckeye	Round	5	0	0	1	–
Interior live oak	Round, not barked	5	0	0	1	–
Blue oak	Round, not barked	5	0	0	1	–
Fremont cottonwood	Round, not barked	5	5	–	–	< 6
Willow	Round, not barked	5	1	3	1	<10
River redgum	Round, butt barked	5	0	0	1	–
Lodgepole pine	Round	15	0	0	3	–
UNTREATED FENCEPOSTS						
Incense-cedar heartwood	Split	5	0	1	0	–
Incense-cedar sapwood	Split	5	1	0	4	<22
Incense-cedar	Round	5	2	2	1	<10
Giant sequoia	Round	5	3	2	–	< 6
Sugar pine	Round	5	5	–	–	< 6
White fir	Round	5	3	1	1	< 6
Ponderosa pine	Round	5	5	–	–	< 6
Digger pine	Round	5	5	–	–	< 6
Manzanita	Round	5	0	0	1	–
Mountain-mahogany	Round	5	4	1	–	< 6
California buckeye	Round	5	2	3	–	<10
Interior live oak	Round with bark	5	5	–	–	< 6
Blue oak	Round with bark	5	5	–	–	< 6
Fremont cottonwood	Round with bark	5	5	–	–	< 6
Willow	Round with bark	5	3	2	–	< 6
River redgum	Round, butt bark	5	3	2	–	< 6
Lodgepole pine	Round	15	10	2	2	< 6

[1]All posts except lodgepole pine installed in 1945, lodgepole installed in 1947.
[2]Average life is the approximate elapsed time at which 60 percent or more of the posts had failed.

Ten posts of each type were selected except that 30 round lodgepole pine posts were used. One-half of each type was treated and one-half untreated. The treatment consisted of a 24-hour cold soaking in a tank with butts covered to a depth of 30 inches by a solution of 5 percent (by weight) pentachlorophenol in diesel oil. This simple treatment for ranch use requires only some sort of vat, oil drums, etc.

Posts were installed in a fenceline during October and November of 1945, except lodgepole pine posts were installed in May 1947.

The test site, in a grassy flat swale, is in a relatively moist area. The soils were surveyed in 1965 as a Visalia coarse sandy loam and a transition between the Visalia and a moderately deep Ahwahnee coarse sandy loam. Annual precipitation at the Experimental Range averages 19 inches, with extremes of 10 and 32 inches since 1934. A moist site would provide a more severe test than dry upland sites for studying the durability of posts. After repairing about 14 miles of fence the past few years, we found that sites similar to that of the study area required several times as many replacement posts as did upland sites (untreated split incense-cedar heartwood in place over 30 years).

RESULTS AND DISCUSSION

The posts were tested for soundness by giving each one a sharp push—if the post broke it was considered an unsound post, if it did not break it was considered sound. By 1953 it was evident that pentachlorophenol treatment had extended the service of round posts, except cottonwood *(table 1)*. If the bark had been removed before treatment, this species might have lasted longer. Untreated posts of all species except split incense-cedar and manzanita were generally unsatisfactory after only 7-1/2 years of service.

In 1957, treated willow posts joined cottonwood as unsatisfactory. Debarking before treatment might have extended the life of the species also. Treated posts of all types except cottonwood and willow were sound in 1957. Split incense-cedar and manzanita were the only untreated posts still solid.

The 1968 evaluation reflected 22-1/2 years of service. We found that every untreated post except those of split incense-cedar heartwood and manzanita had succumbed to the effects of such factors as time, weather, and decay organisms. Three of the five treated digger pine posts had rotted between 1957 and 1968. But nearly all treated posts were still sound *(table 1)*. Most of the posts that failed had rotted at the ground line or slightly below. Treated posts of ponderosa pine and interior live oak were solid in the ground, but most had rotted to some degree at the top. Treatment of the entire post probably would have prevented this top rot. Maguire reported a similar test in a 43-inch rainfall area in El Dorado County, Calif., where pentachlorophenol also proved to be a practical preservative and greatly extended post life.[1]

Cost of the preservative solution in 1945 was about 4 or 5 cents per post. By 1954, cost was about 10 cents per post.[2] In 1968, it cost about 14 cents per post for material and labor to treat 400 posts at the San Joaquin Experimental Range.

Treatment cost of about a nickel per post in 1945 seems to have paid off in increased post life for most species. Even though preservative application costs have about tripled since then, initial post costs and labor costs for replacing posts have also increased considerably. And so, unless posts are from high quality, durable wood, treating them with pentachlorophenol appears to be a wise investment.

NOTES

[1]Maguire, W. P. *A study of posts in El Dorado County.* Calif. Div. Forestry, State Forest Note 15, 7 p. 1963.

[2]Metcalf, Woodbridge. *Progress report on Penta treated fenceposts.* Calif. Agr. Ext. Serv. 4 p. 1954.

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