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Service Records of Crossties from Various Oregon Woods

Report of 1958 Inspection of Ties in Main Lines
of Southern Pacific Company

By **R.D. Graham**
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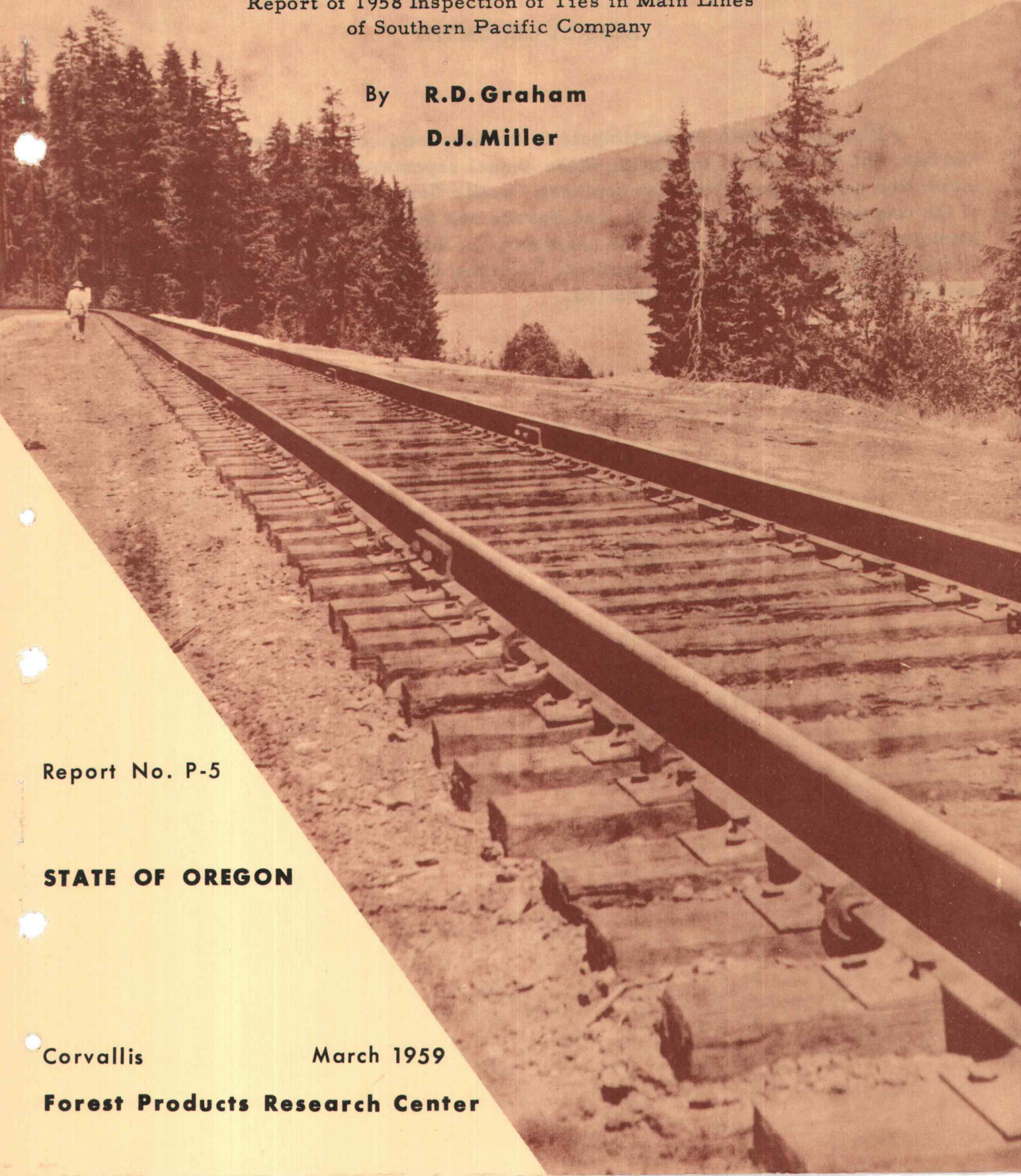
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Although the authors participate in the inspection of crossties in Oregon and have the privilege of preparing these annual reports, most of the tedious inspection work is performed by Southern Pacific Company personnel. The bulk of the ties in Arizona, California, and Nevada are inspected by R. M. Alpen, Manager, Treating Plants, and his assistant, L. Svoboda. They are assisted in Oregon by V. M. Kysh, Superintendent, Treating Plant, Eugene, and L. McKenny, Assistant Engineer, Portland Division.

SERVICE RECORDS OF CROSSTIES FROM VARIOUS OREGON WOODS
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INTRODUCTION

This cooperative project was undertaken in 1947 to determine the suitability of various Oregon woods for use as crossties. Species included initially were incense cedar, Douglas fir, Shasta red fir, white fir, West Coast hemlock, lodgepole pine, ponderosa pine, and Sitka spruce. Later, mountain hemlock and tanoak were included, and Oregon white oak will be added shortly.

Ties were graded, air-seasoned, then pressure-treated with a petroleum solution of coal tar creosote containing 25 per cent creosote. Information on seasoning and treatment of these species was published in the reports listed on page 3. Crossties were installed in main-line tracks of the Southern Pacific Company in Arizona, California, Nevada, and Oregon. These test tracks are described in Table 5.

Test tracks have been inspected annually since 1954, and ties were rated for severity of checking, splitting, plate-cutting, twisting, breaking, or combinations of these defects. Ties rated as good had none of these defects. Removed ties were inspected, when possible, and cause of failure determined.

INSPECTION

Test tracks in Oregon were inspected by members of the staffs of the Southern Pacific Company and the Forest Products Research Center. Those in the other states were inspected by Southern Pacific Company personnel.

RESULTS

Condition of all ties inspected during 1958 is summarized in Table 1. Percentage of good ties, years in service, and major defects of different species by location of test track are shown in Table 2. Condition of ties in Nevada and Oregon test tracks after 4-5 years in service is summarized in Table 3. Percentage of good ties in Oregon test tracks at each of the 5 annual inspections is shown in Table 4.

DISCUSSION OF RESULTS

The few renewals to date (less than 1 per cent) prevented drawing final conclusions. The average service life for Douglas fir ties in tracks of the Southern Pacific Company is 35 years. Incense cedar, Shasta red fir, white fir, and West Coast hemlock compared favorably with Douglas fir when allowance was made for the differences in service life (Table 1). Other species, such as mountain hemlock and lodgepole pine, had a low percentage of good ties (33 per cent) and a high percentage of split or severely checked ties (52-59 per cent). About 95 per cent of the lodgepole pine ties were boxed-heart, which would help explain the high incidence of checking and splitting in this species.

Within each species there was a wide range in percentage of good ties at the different test tracks (Table 2). Comparisons between species in Arizona and California test tracks were difficult to make because of the great variation in service life of the different species of ties at each location. In addition, ties in a number of these test tracks were adzed since installation (Table 5), which interfered with evaluation of the severity of plate cutting.

Comparisons could be made between species in the Nevada and Oregon test tracks, where virtually all ties had been installed for 4 or 5 years (Table 3). Based on the percentage of good ties, the species were grouped as follows:

Better than Douglas fir---incense cedar.

Comparable to Douglas fir---Shasta red fir, white fir, West Coast hemlock.

Poorer than Douglas fir---lodgepole pine, Sitka spruce, mountain hemlock.

During the past 5 years, the number of good incense cedar ties in test track in Oregon decreased only 10 percentage points, while good ties of all other species decreased from 18 to 30 percentage points (Table 4).

PUBLISHED REPORTS*

1. "The Air Seasoning and Preservative Treatment of Crossties from Eight Oregon Conifers," Proceedings, American Wood Preservers' Association, 50:175-184, 1954.
2. "Preservative Treatment of Eight Oregon Conifers by Pressure Processes," Proceedings, American Wood Preservers' Association, 52:117-138, 1956.
3. "Seasoning and Preservative Treatment of Tanoak," Forest Products Journal, IV, 2:92-95, 1954.
4. "Seasoning and Pressure Treatment of Oregon White Oak Crossties," Progress Report, Forest Products Research Center, 1958.

* Reports are available from Forest Products Research Center, P. O. Box 571, Corvallis, Oregon.

Table 1. Summary of Condition of All Crossties Inspected During 1958.

Species	Service		Ties in-spect-ed	Ties re-newed to date	Ties in good con-dition	Defective ties*			Boxed heart ties
	Avg	Range				Badly checked, split	Plate-cut	Cross-grained, twisted	
	Yr	Yr			%**	%**	%**	%**	%**
IC***	5.4	4-7	1,416	6	68	21	15	0	47
DF	7.0	4-10	2,022	39	58	21	18	6	32
SF	4.3	4-5	1,235	5	68	22	10	2	34
WF	6.4	4-9	1,553	5	55	25	26	1	32
MH	3.8	2-4	1,152	2	33	52	1	15	--
WH	7.1	4-10	1,568	14	51	43	16	5	22
LP	6.4	4-8	1,319	9	34	59	16	5	95
PP	2	--	596	0	72	25	1	1	--
SS	5.6	4-8	1,170	4	49	39	11	6	61
TO	5	--	187	0	59	36	0	6	--
			12,218	84					

* Shattered or broken ties did not exceed 1 per cent.

** Based on ties inspected, including renewals.

*** IC--incense cedar; DF--Douglas fir; SF--Shasta red fir; WF--white fir; MH--mountain hemlock; WH--West Coast hemlock; LP--lodgepole pine; PP--ponderosa pine; SS--Sitka spruce; TO--tanoak.

Table 2. Percentage of Good Ties, Years in Service, and Major Defects at 1958 Inspection.

Location	Incense cedar	Douglas fir	Shasta red fir	White fir	Mountain hemlock	West Coast hemlock	Lodgepole pine	Ponderosa pine	Sitka spruce	Tanoak
<u>Arizona</u>										
Dome	17-6-P*	40-9-P	80-4-CP	77-6-CP	46-4-CX	51-9-CP	30-8-C	75-2-C	66-6-CP	47-4-C
Dome				48-8-P						
<u>California</u>										
Bowman	89-6-C	76-8-C	78-4-C	79-9-C	31-4-C	70-9-C	45-6-C	--	88-6-C	--
Garnet	52-6-P	12-7-P	44-5-P	0-9-P	62-4-CX	7-9-P	16-8-CP	96-2-C	20-8-CP	--
Garnet	--	28-9-P	--	--	--	--	--	--	--	--
King City-	71-4-C	53-5-C	49-5-P	72-5-CP	20-4-C	--	--	67-2-C	62-4-CP	56-6-C
MP 160	55-6-CP	--	--	--	--	--	--	--	--	--
King City-	--	74-8-C	--	12-8-P	--	44-10-C	6-8-C	--	32-8-CP	--
MP 164	--	0-10-P	--	--	--	--	--	--	--	--
Loma Linda	6-6-P	14-9-P	26-5-CP	4-9-P	52-4-CPX	12-9-CP	14-7-CP	58-2-C	--	--
Modesto	50-7-P	69-9-CP	70-4-CP	20-8-P	49-4-C	58-9-CP	14-8-CP	74-2-C	58-7-P	--
Palmdale	62-5-C	52-9-P	82-5-C	40-8-P	59-3-C	44-9-P	24-8-CP	74-2-C	--	--
Soda Springs	57-6-C	57-8-C	84-5-C	79-8-C	50-4-C	30-10-C	33-8-C	--	61-6-C	--
Webster	--	62-5-C	--	--	--	--	--	--	--	--
<u>Nevada</u>										
Halleck	80-4-C	75-4-C	77-4-C	67-4-C	19-4-C	56-4-C	25-4-C	--	38-4-C	--
Upsal	95-4-C	87-4-C	89-4-C	94-4-C	26-4-C	76-4-C	44-4-C	--	61-4-C	--
<u>Oregon</u>										
Fields	--	--	--	--	--	--	--	--	--	65-5-C
Marion	90-5-C	69-5-C	53-5-C	59-5-C	--	40-5-C	41-5-C	--	37-5-C	37-5-C
Modoc Point	82-5-C	68-5-C	67-5-C	65-5-C	17-4-C	67-5-C	61-5-C	--	45-4-C	--
Odell Lake	91-5-C	67-5-C	67-5-C	57-5-C	17-5-C	58-5-C	45-5-C	--	21-5-C	--

*1st number indicates number of defective ties in per cent; 2nd number denotes years in service. Letter signifies major defect, as: C-split or severely checked; P-plate-cut; X-cross-grained or twisted. 2 or more letters denote nearly equal distribution of defects.

Table 3. Summary of Condition of Ties in Nevada and Oregon Test Tracks After Four and Five Years of Service.

Species*	Ties in test	Ties renewed	Good ties	Defective ties		
				Split, badly checked, shattered	Plate-cut	Cross-grained, twisted, broken
			<u>%</u>	<u>%</u>	<u>%</u>	<u>%</u>
IC	628	0	87	15	0	1
DF	629	4	74	16	0	10
SF	623	2	72	23	1	4
WF	546	0	68	28	3	2
MH	512	2	20	64	0	18
WH	651	0	65	32	1	7
LP	629	1	42	53	0	6
SS	653	0	41	51	2	8

* IC--incense cedar; DF--Douglas fir; SF--Shasta red fir; WF--white fir; MH--mountain hemlock; WH--West Coast hemlock; LP--lodgepole pine; SS--Sitka spruce.

Table 4. Ties in Good Condition* in Oregon Test Tracks at Each Annual Inspection.

	Years in test track				
	1	2	3	4	5
	<u>%</u>	<u>%</u>	<u>%</u>	<u>%</u>	<u>%</u>
Incense cedar	97	97	97	90	87
Douglas fir	89	84	79	74	68
Shasta red fir	81	78	75	70	63
White fir	90	87	81	65	60
Mountain hemlock	45	46	25	--	17
West Coast hemlock	83	78	70	61	54
Lodgepole pine	74	67	65	55	49
Sitka spruce	62	56	50	43	35
Tanoak	95	80	78	71	65

* Major defects in other ties are splitting and severe checking.

Table 5. Location and Description of Test Tracks.

Location		Curves	Grade	Ballast	Weight of rail	Plate length	Annual tonnage to 1956	Year adzed
Town	Mile posts							
<u>Arizona</u>		<u>Degrees</u>	<u>Per cent</u>		<u>Lb/yd</u>	<u>Inches</u>		
Dome	749-753	2-6	0 to +.3	Slag	113,132,136	11,14	31	1956
<u>California</u>								
Bowman	128-129EB	0	+1.5	Rock	132	14*	17	1952
Garnet	589.7-590	0	-.4	Rock	132	14*	33	1956
King City	160-162	0	+.2 to +.5	Rock	112,132,136	11,14*	17	1956
King City	164-168**	1-4	-.5 to +.7	Rock	131,132,136	11,14*	17	1956
Lick	49.6-49.7	0	0	Cinder	132	14	22	
Loma Linda	542	0	+1.0	Rock	113	11	33	
Modesto	110-111	0	0 to +.1	Rock	113	11	19	
Palmdale	412-413	0	0 to +.8	Rock	112	11	22	1956***
Soda Springs	189-190	2-7	+1.3 to +1.7	Rock	132	11,14	17	
Webster	80WB	0	0	Rock	113	11	15	
<u>Nevada</u>								
Halleck	576.3-578.3	0	-1 to +1	Rock	132	14	22	
Upsal	304.8-306.3	1/2	-.4 to +.4	Rock, Slag	132	14	42	
<u>Oregon</u>								
Fields	554.3-554.9	8	-1.4 to -1.8	Rock	132	14	30	
Marion	706-709	0	0 to -.3	Rock	132	14	24	
Modoc Point	447-449.8	0	-.4 to +.4	Cinder	132	14	35	
Odell Lake	533-534	4	-.2 to +.2	Cinder	132	14	30	

*Plates 11 inch before 1953 (or 1952, Bowman only).

**Derailment damage, 1950.

***Adzed 1956, except ponderosa pine.

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