

Redwood Boards

durability studied in 12-year test of decay-resistance and weathering

L. W. Neubauer

Strength and appearance of redwood boards are not synonymous as far as durability is concerned.

This was shown by a study of weathering and decay-resistance of redwood boards undertaken as a part of a broader investigation of durability of boards, stakes and posts at Davis.

A set of 1" x 12" x 48" redwood boards of various grades was placed on test and observed over a period of 12 years. Each board was set on end 24 inches into loamy soil in a natural condition, with no preservative treatment. During the first three summers the specimens were watered at intervals, to accelerate decay and termite action. Subterranean termites are very common in this section, as well as in most other western and southern areas and have been found in nearly all states.

Included in the test set were eight grades of redwood, and one each of Douglas fir and white fir. Similar sets of specimens also were placed at four other locations in California, although they were not tested in the same way.

The first failure at Davis occurred in three years, when the Douglas fir board broke. The white fir broke in four years. Both were badly decayed.

All redwood boards endured for the full 12 years, but showed various effects from termites and weathering. When they were removed, observations were made to rate the boards according to appearance, as well as strength.

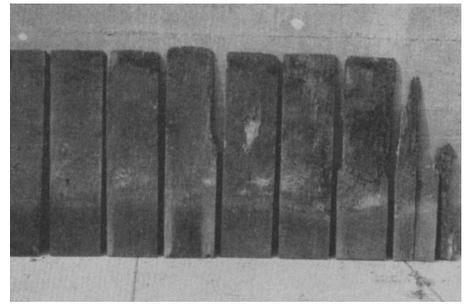
Each board was sawed longitudinally into 1" x 1" strips, and cut laterally into three pieces—each 1" x 1" x 12" in order

to compare top, middle and bottom sections. Each piece was tested for ultimate flexural strength in a lever-type beam-testing machine. Thus a numerical comparison was made of various grades of boards, as well as for the three longitudinal positions. The tabulation shows this relation.

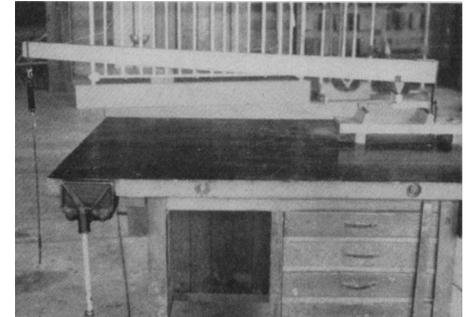
Light grades of redwood boards generally showed the best appearance at the conclusion of the test, while greatest strength was exhibited by the heavy and clear grades. Sap wood was relatively weak in all cases. Number 3 grade heavy was strongest and Number 3 light was weakest, the ratio being nearly two to one. Samples were not sufficiently numerous to make the results conclusive, but they are indicative of what may be expected.

The strength of each grade has been plotted vertically to form a bar graph, showing visually the relative value of each specimen after the 12-year exposure. The superiority of the heavy samples, designated A and B in the table clearly is evident. Differentials between the other values are not sufficient to be very significant. It is obvious that none of these redwood boards was weakened seriously by the exposure.

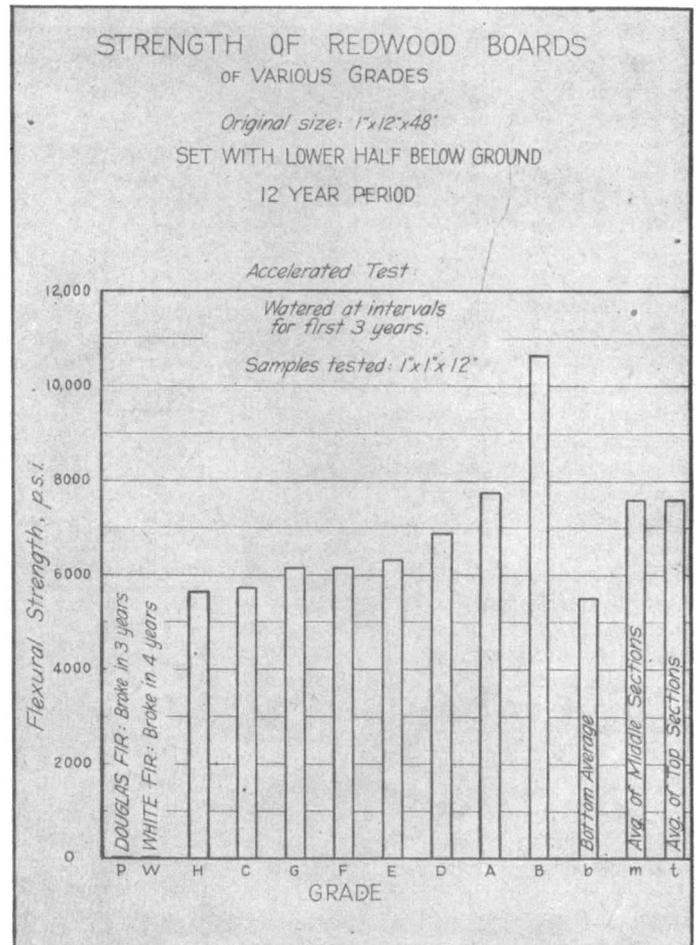
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A group of redwood boards after being exposed for 2 1/2 years at Delhi. The last two on the right are white fir and Douglas fir. The redwoods are placed in the same order as in the tabulation. All are shown upside-down as compared to their positions in the ground.



A small beam-testing machine in operation. It is attached to a heavy work bench. The load is applied downward at the left end of the lever, causing rupture of the 1" x 1" x 12" test-piece at the right, which rests on two supports and is broken by the load at its midsection.



REDWOOD DURABILITY									
Spec.	Wood	Grade	Condition		Weak Section	Average Strength	Rating		
			Top	Bottom			Appear.	Str.	
						Pounds per square inch			
A	Rw	clear, heavy	WSC	tC	B	7,770	4	2	
B	"	No. 3 heavy	WSC	TT	B	10,640	5	1	
C	"	clear, sap, heavy	WSC	ST	B	5,760	6	7	
D	"	clear, extra light	W	Fr	B	6,870	1	3	
E	"	sap, light	W	TT	B	6,330	2	4	
F	"	construction	S	T	M	6,150	8	5	
G	"	Heart common, light	W	T	B	6,150	3	6	
H	"	No. 3 light	WC	T	B	5,650	7	8	
P	D.F.	Douglas fir	Broke in 3 years			0		10	
W	W.F.	White fir	Broke in 4 years			0		9	

KEY:
 Rw—redwood
 D.F.—Douglas fir
 W.F.—white fir
 W—weathered
 S—split
 C—cracks
 WSC—small amount
 t—trace of termites
 T—some termites
 TT—many termites
 F—fair condition
 B—bottom
 M—middle