

FIVE-YEAR FIELD TRIALS USING PRESERVATIVE-TREATED, SECOND-GROWTH DOUGLAS-FIR EXPOSED IN GROUND CONTACT IN AUSTRALIA

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ABSTRACT

The durability of preservative-treated stakes of second-growth Coastal Douglas-fir was evaluated in a field plot in northern Queensland, Australia. Results from this field trial indicate that second-growth Douglas-fir can be treated with preservatives to meet Australian standards and will provide long-term durability in adverse environments. Data presented indicate that within a 5-year time frame, the importance of minimum penetration parameters decreases as retention increases.

ule that began with a dry-bulb temperature of 43.3°C (110°F) and concluded with 71.1°C (160°F), with a 4.4°C (8°F) depression between wet- and dry-bulb throughout. This drying schedule was more conservative than that developed for Coastal Douglas-fir of this thickness (4).

Lack of experience in Australia with treated Coastal Douglas-fir (*Pseudotsuga menziesii*) impedes consideration of this commodity for utilization in engineered structures, such as stress-laminated bridge decks and in other construction. The objective of this study was to address questions about treatability of second-growth Douglas-fir and document its durability in a high decay hazard site in Northern Queensland. Specific objectives were to document the treatability of wood from second-growth Coastal Douglas-fir trees with alternative preservatives and provide a database on the performance of alternative treatments for Douglas-fir exposed in ground contact in a tropical environment.

MATERIALS AND METHODS

WOOD

The lumber used in this trial came from the Pacific Coastal region of Oregon, a region where Douglas-fir is generally regarded as permeable (Fig. 1). The lumber was obtained from a mill

that was cutting second-growth timber. Thus, the lumber resource used in this study is considered representative of second-growth material that is currently being harvested.

The Douglas-fir lumber was 50-mm (2-in.-) thick material and was not kiln-dried prior to shipment to the Forest Products Laboratory (FPL) in Madison, Wis. Upon arrival at FPL, the lumber was kiln-dried following a mild sched-

The dried lumber was then longitudinally cut into members approximately 50-mm (2-in.) square or 19-mm (3/4-in.) square and 2.43 m (8 ft.) long, with the longest dimension parallel to the grain. All material was vacuum impregnated with deionized water. Material was subjected to a vacuum of 68.6 mm (27 in.) Hg for 15 minutes, then flooded with water and allowed to stand overnight at atmospheric pressure.

The 50-mm by 2.54-m (2-in. by 8-ft.) material was incised to a depth of 8 mm

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