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## Liquid Impregnation of Green Wood using a Roller-pressing Method

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**Abstract:** Phenol-formaldehyde resin (PF resin) solution was impregnated by a roller-press into Sugi (*Cryptomeria japonica* D. Don) sapwood, spruce (*Picea* spp.) heartwood, and Douglas-fir (*Pseudotsuga menziesii* Franco) heartwood, in the green or the air-dry condition and of various dimensions.

In case of sugi sawn timber, green specimens showed higher volume retention than air-dried specimens. At 45% compression, volume retention and the distribution of the solution in the longitudinal direction of 10 and 20 mm-thick specimens were almost the same. The distribution of volume retention in a cross section in the middle of those specimens was uniform in the 10 mm-thick specimens, but was concentrated in a marginal layer of the surface in the 20 mm-thick specimens. Volume retention and uniformity of distribution of the retention was enhanced with increasing of cyclic compression.

In the case of spruce and Douglas-fir sawn timber, volume retention of green specimens after cyclic compression showed a much greater increase than that of air-dried wood. This suggests that the green wood has a lower amount of pit aspiration (*i.e.*, higher permeability of the aqueous solution and higher recovery of cell deformation) than that of air-dried wood.

In the case of sugi rotary veneer in the green condition, the time required for reaching the same volume retention as sawn timber was relatively short. The bending properties of LVL made of roller-pressed rotary veneer were not changed.

**Keywords:** refractory wood, green wood, roller press, impregnation, cyclic compression



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