

POSTER

CONTROL OF BROWN STAIN IN SLASH PINE SAWN WOOD

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Brown stain has been a serious limitation to kiln drying of Pinus elliottii lumber under high temperature in Brazil. Brown stain is produced due to a chemical reaction of cell contents which are transported to the surface of the boards by capilarity and degraded by the temperature while water is evaporated. Up to the present stage of development the only practical alternative found to prevent brown stain is to dry down to 30% moisture content using a low temperature schedule. Further drying can be conducted at higher temperatures without causing brown stain. As a result of the utilization of this schedule drying times are much longer and also energy consumption is higher. This research was developed in order to investigate new alternatives. The studies carried out considered the chemical treatment of freshly cut boards. The effect of board thickness and drying temperature were studied in a second step. Finally, using X-ray the moisture gradients formed during drying of treated and untreated samples were also evaluated. The results indicated that freshly cut boards treated with a solution of sodium fluoride at 1% promoted a significant reduction of brown stain. It was also observed that thicker boards tended to present more brown stain than thinner ones and that stain became darker as drying temperature increased. Although boards treated with sodium fluoride were less affected by brown stain, changes in colour of the treated material appeared in deeper portions of the boards, while in untreated ones stain was present mostly in portions close to the surface. The utilization of X-ray showed that drying gradients formed are quite different from those reported in the literature and even in an advanced stage free water is present at layers very close to the surface. For this reason drying temperature can only be increased when almost all free water has been evaporated. Samples treated with sodium fluoride showed a different pattern. Free water line receded to inner portions in an earlier stage and this seems to be the reason associated to the fact that stain was less intense in layers close to the surface. This suggests that the action of the sodium fluoride is based on a physical mechanism rather than on the enzymatic reaction.