WOOD

NPARR, 6(3 & 4), 2015-230 **Effects of heat treatment on wet shear strength of plywood bonded with soybean meal-based adhesive**

The aim of this study was to improve the water resistance of soybean meal-based adhesive with heat treatment after hot pressing. The effects of four different heat-treatment processes on plywood bonded with soybean meal-based adhesive were examined. Five-ply plywood specimens were fabricated to measure the adhesive's water resistance. Extending the hot press time allowed the adhesive to cure more completely and improve its water resistance. The surface and core layer wet shear strength of plywood at a 70 s/mm hot press time increased by 18.8% and 109%, respectively, compared with that of a 60 s/mm hot press time. The surface and core layer wet shear strength improved by 56.3% and 102.3%, respectively, with 4 min low pressure heat treatment, which makes it practical for use in industrial applications. Heat treatment could also improve the water resistance of the adhesive by improving the cross-linking density of the adhesive layer in plywood and releasing its interior force, according to a vertical density profile analysis. Therefore, 8 h oven drying heat treatment at 120 °C, the surface and core layer wet shear strength improved by 60.0% and 175.0%, respectively [Jing Luo , Jianlin Luo, Qiang Gao* and Jianzhang Li (MOE Key Laboratory of Wooden Material Science and Application, Beijing Forestry University, Beijing 100083, China), *Industrial Crops and Products*, 2015, **63**, 281–286].

NPARR, 6(3 & 4), 2015-231 **Isolation and characterization of mold fungi and insects infecting sawmill wood, and their inhibition by gamma radiation**

This article describes the isolation, identification, and characterization of wood-rotting fungi and insects, and their inhibition was studied using gamma radiation. Products manufactured from plantation timber species are deteriorated by wood-rotting fungi such as Hypocrea lixii, Fusarium proliferatum, and Aspergillus flavus, and insects such as powderpost beetles. Proper preservation methods are necessary for ensuring a long service life of wood products. In this study, wood samples were treated with 2.5% copper ethanolamine boron (CEB) (10% w/. v) and subsequently irradiated with gamma rays (10. kGy). It was observed that CEB-treated and gamma-irradiated samples controlled fungi and powderpost beetles significantly. As wood is a dead organic material, penetration of chemicals into it is very difficult. Gamma rays easily pass through wooden objects with hidden eggs and dormant spores of insects and fungi, respectively. Gamma irradiation was proved very effective in reducing damage caused by both fungi and insects [Kalawate, A. and Mehetre, S. (Mehetre, S.; Nuclear Agriculture and Biotechnology Division, Bhabha Atomic Research Centre, India), *Radiation Physics and Chemistry*, 2015, **117**, 191-197].

NPARR, 6(3 & 4), 2015-232 **Effect of microwave treatment on air permeability and preservative impregnation of *Eucalyptus tereticornis* wood**

Low permeability of many wood species causes problems during timber drying as well as impregnating with preservatives and resins. In the present study, microwave treatment of *Eucalyptus tereticornis* Sm. wood which is difficult to treat, was done at 2.45 GHz frequency at different levels of intensity and radiation time. The gas permeability of E. tereticornis wood was measured in an in-house built apparatus. Preservative uptake/retention was tested using Acid Copper Chrome preservative by dipping method. The effect of radiation intensity and time was studied with respect to air permeability and preservative uptake. The results revealed remarkable increase in

longitudinal wood air permeability and preservative uptake with the increase of intensity and time of treatment. The results indicate that this technology could be tested and applied on pilot scale for application in wood preservation industry [Poonia, P. K*, Tripathi, S. , Sihag, K. and Kumar, S. ((Wood Preservation Discipline, Forest Products Division, Forest Research Institute, India), *Journal of the Indian Academy of Wood Science,* 2015, **12**(2), 89-93].

NPARR, 6(3 & 4), 2015-233 **Open-air drying of cut and windrowed short-rotation poplar stems**

Two-pass harvesting of short-rotation forestry plantations offers the opportunity to accumulate large biomass stores without occupying costly industrial areas, while letting the biomass dry before comminution. This study aimed at developing a simple model for predicting moisture content reduction of short-rotation forestry poplar stems felled and windrowed in the field. In a controlled experiment, cut stem windrows were built and left in the field for up to 6 months (from early December to early June). Thus stored, poplar stems incurred a reduction of moisture content between 10 and 20 percent points. Drying rate varied with the period of storage, and it was faster for later felling dates. Precipitation accounted for 20 to 40 % of the drying rate. No dry matter losses due to microbial activity were recorded during the whole storage period, lasting up to 6 months. The models developed with this study are simple and robust, and allow precision management of collection operations in order to guarantee a constant flow of biomass to user plants [Civitarese, V., Spinelli, R*. , Barontini, M., Gallucci, F., Santangelo, E., Acampora, A., Scarfone, A., del Giudice, A., and Pari, L. (CNR IVALSA, Via Madonna del Piano 10, Italy), *Bioenergy Research,* 2015, **8**(4), 1614-1620].