

Recent Advances in Wood Drying

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Wood drying is recognized as a key operation in sawmill production and affects product quality, value yield and the suitability of wood material for different end user products. The 11th International IUFRO Wood Drying Conference organized by Luleå University of Technology in Skellefteå, Sweden, January 18-22 presented important findings in six key areas of wood drying:

Drying Quality and Wood Properties

A better understanding of the thermal wood properties is essential. At the conference a method of determining wood properties on the basis of morphological characterisation by combining ESEM microscopy and image analysis was presented. Another paper looked at the physical properties and drying behaviour of white wood and red heart of European beech and stated that a good drying quality of red heart samples of beech was achieved when keeping the drying temperature below 80°C.

Methods for Monitoring the Drying Process

Neutron imaging is a non-destructive method for high resolution imaging of wood during drying. It can be used to determine diffusion coefficients and water content. Another method that was described was the combination of impedance and acoustic emission from boards.

Modelling

Emphasis was, among other things, placed on free water movement in the capillary network as well as on the inclusion of sorption hysteresis and mechano-sorptive behaviour.

Applied Wood Drying

Under this theme, the relation between green sawing and final dimensions with regard to shrinkage and cupping was studied. Results indicated a possible increase in value yield by decreasing the green sawing dimension. Optimizing lumber sorting strategies based on empirical relationship between the moisture content of lumber and drying degrade showed a possibility of increasing sales depending on kiln capacity and market conditions.

Alternative Drying Methods

Super-heated steam vacuum drying of Australian hardwood and microwave heating for redistribution of pre-dried softwood show potential. Veneer drying using a cold plate arrangement for condensation of moisture indicated nearly 50%



Industrial plant for heat treatment with autoclave in nitrogen atmosphere presented by Professor Peter Niemz at ETH – Swiss Federal Institute of Technology in Zürich

reduction of drying time compared to conventional drying.

Wood Modification Related to Drying

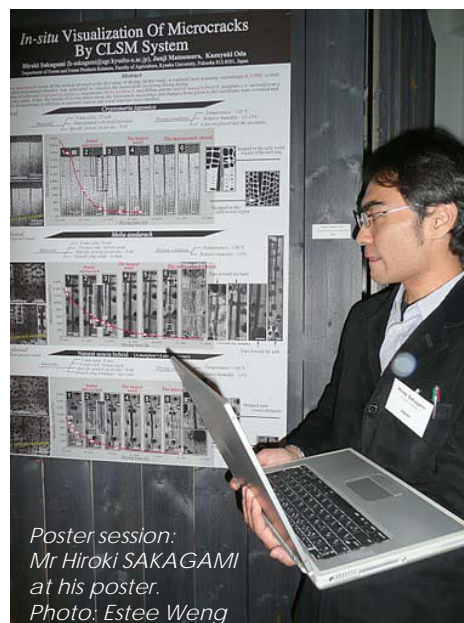
Chemical changes of thermally modified wood and colour stability of heat-treated wood exposed to outdoor conditions were among the topics discussed under this theme.

Miscellaneous Drying Technologies

Among the many issues addressed was the treatment of lodge pole pine with cold water spray or low pressure steam to reduce treatment time and warp. Radio frequency heating with various moisture contents and power densities was investigated in order to pasteurize green lumber. Microwave drying of sawdust for biofuel production gave better strength properties of pellets without reducing the fatty acids content. Heat treatment for sterilisation against emerald ash borer was studied monitoring temperature changes during the process.

At the conference three excellent keynotes were presented addressing the historical perspective on timber drying methods, modelling issues and the future directions in drying research. The next conference within this series will take place in July/August 2012 in Brazil.

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Poster session:
Mr Hiroki SAKAGAMI
at his poster.
Photo: Estee Weng