

Hardwood Research Initiative Project 10 – RF continuous drying

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Introduction

- Drying of hardwoods presents important challenges:
 - colour
 - thickness
 - species
 - final MC requirements
- Long required drying times delay delivery of final products
- RF vacuum drying studied in the past is:
 - very fast (+)
 - provides great results in terms of quality (+)
 - does not reach a MC variation low enough to meet the requirements for these products (-)



Needs

- Reduce production time of dried hardwood products
- Maintain colour of fair coloured species
- Perform quality drying at a competitive price

Approach

- Drying tests with an experimental RF continuous drying unit on red oak 12/4 cants
- Drying tests of 4/4 maple for discolouration study
- Theoretical model to quantify potential investment and energy costs related to given applications
- Survey with companies to determine their interest and potential applications when provided with information about equipment and energy costs



Results and Impact

- Drying time established at approx. 4 days for 3X3 red oak with low final MC variation (**about 40X faster**)
- Drying time of 4/4 sugar maple is 2.4 hours with colour preservation (**about 100X faster**)
- Continuous system that allows MC management one board at a time
- Low MC gradient in thickness
- Insignificant residual stress



Results and Impact

- Equipment cost estimated for 10MMfbm annual production
 - Complete drying from green to dry 60 to 8%: \$5M
 - Predrying 60 to 30% MC: \$3.5M
 - Redrying 15 to 8% MC: \$1.5 M
- Estimated energy cost
 - Complete drying from green to dry : \$50/Mfbm
 - Predrying 60 to 30% MC: \$33/Mfbm
 - Redrying 15 to 8% MC: \$12/Mfbm

Conclusion

- Despite high estimated equipment and energy costs, 5 companies agreed that research for the development of this technology should continue. The most interesting applications are:
 - Complete drying
 - Predrying
 - Redrying
 - Heat treatment
- Design and fabrication of an industrial unit foreseen for 2012 to 2014 for redrying of softwoods.
- Flexible unit that will allow exploring other potential uses for hardwoods.

Industry Partners

- Planchers Lauzon
- JM Champeau
- Laboratoire des Technologies de l'Énergie (LTE) d'Hydro-Québec