Oregon Wood Innovation Center

Connecting people, ideas, resources

VOLUME 2, ISSUE 1 2007

COMING OWIC EVENTS:

- **February 25-28, 2007:** Forest Products Management Development
- **April 26-27, 2007:** Selling Forest Products
- **May 24-25, 2007: Architectural Design with Wood**

INSIDE THIS ISSUE:

"It's a Moisture Problem..."

Scott Leavengood
OWIC Director
Scott.Leavengood@oregonstate.edu

"It's a moisture problem" may be a wood technologist's most commonly-used phrase. Many of the challenges we experience with wood are related to wood's natural affinity for water. For example:

- dresser drawers that stick during certain times of the year but slide smoothly other times of the year.
- a well-made joint in a cabinet becomes open and loose after the piece is installed
- face veneers on plywood made in a dry climate swell and buckle in a hotter and more humid climate.

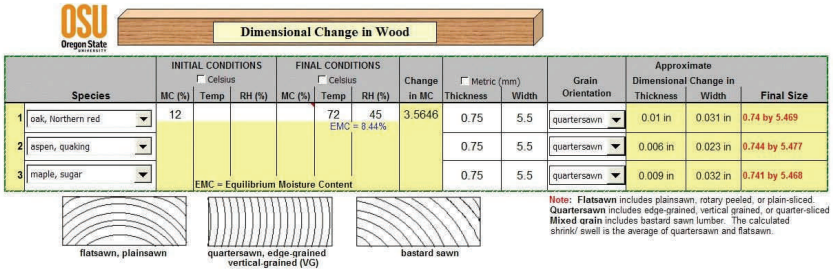
Lumber is often kiln-dried to a moisture content (MC) suited to the end-use. For example, the target MC is 6-8% for interior use. However, the MC changes whenever the surrounding temperature and relative humidity change.

Wood swells when it gains moisture and shrinks when it loses moisture. The problem for the woodworker is determining how much a certain piece will shrink or swell. The amount of movement depends on wood species, surrounding conditions, grain orientation, and piece size. Published coefficients and formulas for making such estimates can be challenging and time-consuming to use.

We developed an Excel-based program called *Wood.xls* to simplify these calculations. The user selects:

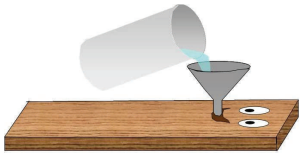
- Species - select from 42 North American softwoods, and 61 North American hardwoods;
- Moisture conditions - initial and final moisture content, if known, or ambient temperature and relative humidity;
- Size - board or veneer width and thickness;
- Grain orientation –flatsawn (rotary peeled or plain-sliced), quartersawn (quarter-sliced), or mixed grain

The **Dimensional Change** worksheet reports the estimated amount of shrinkage or swelling and the final board size.



Wood.xls has 2 additional functions: **EMC** (equilibrium moisture content) and **SG & Density** (specific gravity and density).

EMC calculates the equilibrium moisture content for wood given the ambient temperature and relative humidity. This worksheet is used by the **Dimensional Change** worksheet to estimate initial and/or final moisture content conditions.



SG & Density calculates specific gravity (SG) at user-defined moisture contents given SG green and volumetric shrinkage. The user may select a species from the drop-down lists or enter values in the spaces provided. The program calculates density, ovendry density of the wood, weight per board foot at 15 percent moisture content and the weight of the water in the wood at the specified moisture content. Note: The terms density and SG are often used interchangeably, however these terms have different meanings. Density is the weight per unit volume (e.g., lbs/ft^3 or kg/m^3) whereas SG is the ratio of the density of a material to the density of water and thus is unitless. Wood is unique in that its weight and volume change as it gains and loses moisture; therefore, its SG also changes. This issue is often confusing for people wanting to estimate weight given SG. This worksheet helps to simplify the process of estimating weight of wood at varying moisture contents.

See http://owic.oregonstate.edu/woodxlsform.php to download the program.

Oregon State University OSU College of Forestry

Want to Learn About Southeastern Hardwoods?

Chris Knowles
Program Assistant, OWIC
Chris.knowles@oregonstate.edu

The Oregon Wood Innovation Center, in conjunction with the Tennessee Forest Products Center at the University of Tennessee, is planning a designed education event that focuses on the hardwood manufacturing industry in the southeastern United States.

The main objective of this event is to improve the competitiveness of Oregon's hardwoods industry - both producers and users of hardwood lumber - by exposing Oregon manufacturers to the hardwood industry in the southeastern United States.

We have prepared an on-line survey to help us determine the level of interest of potential industry participants as well as to obtain your feedback on the details of the event; your feedback will be very valuable in in designing and organizing this course. Please take a few minutes of your time to complete the questionnaire by clicking here.

Featured Researcher: Mike Milota

This month's featured researcher is Dr. Mike Milota. Dr. Milota is a Professor with the Department of Wood Science and Engineering, with interests in the areas of wood drying and physical properties; air emissions from processing wood; quantification of compounds emitted during wood drying; and sorting lumber to improve lumber quality.

Dr. Milota currently has two graduate students and one faculty research assistant working with him on several projects including determining how costs are distributed in a log sort yard, using ionic liquid to reduce emissions, and developing a model for dry kilns. The model can be used to determine how a kiln will react as the kiln parameters are changed. This model will eventually be used as a teaching tool.

In December 2006, Dr. Milota hosted 38 forest industry professionals from Oregon, Washington, California and Canada at the annual *How to Dry Lumber For Quality & Profit Workshop.*

More information about Dr. Milota's work can be found at: http://woodscience.oregonstate.edu/facstaff/milota.php.

Innovative Oregon Companies

Chris Knowles
Program Assistant, OWIC
Chris.knowles@oregonstate.edu

The OWIC website has a new feature—profiles of innovative Oregon wood products companies: http://owic.oregonstate.edu/innovators/. This web page will feature the stories behind these innovative companies.

Does your company produce innovative wood products? Have you developed and/or implemented innovative approaches in your manufacturing processes or managerial systems. If so, the Oregon Wood Innovation Center wants to hear from you.

If you would like your company to be featured contact Chris Knowles at chris.knowles@oregonstate.edu or 541-737-1438.

Undergraduates Put Their Experience to Work

Jeff Morrell
Professor, Wood Science and Engineering
Jeff.Morrell@oregonstate.edu

How can undergraduates put their learning to work and obtain valuable job experience before they graduate? Wood Science and Engineering helps their students do both through their Senior Project Series.

Taken as a full year course, the students begin by identifying a problem and writing up a proposal that includes a review of previous work and an outline of how they will address the problem. They present this proposal to the faculty for a helpful critique. The students then perform the work and finish up with a spirited presentation to the faculty at the end of the year.

So what kind of projects do the students do? Projects have included:

- Identifying new additives for adhesives
- Assessing machine centers
- Market research
- Bucking recovery studies
- Mill simulation studies

There are currently four students participating in the course, working on the following projects:

- Evaluating green advertising of forest products in the U.S.
- Effect of borates on fire resistance and mechanical properties of particleboard
- Mechanical properties of woods used for constructing bows
- Quality audits of engineered door components

While most involve industrial cooperators and take place within the mill setting, others are lab oriented.

The goal of all the projects is to help the students hone their problem solving skills. Coupled with the 6 months of industrial experience required to obtain a WS&E degree, the Senior Project helps our graduates smoothly transition to an industrial setting to help make immediate impacts.

Ask the Expert

Have questions related to wood? The faculty of the Wood Science and Engineering Department at OSU have the expertise to handle almost any question about wood. Simply submit your question using the Ask the Expert form. Please be as specific as possible.

The following are examples of recent 'Ask the Expert' questions:

Q: Who develops and enforces lumber grading rules?
A: In short, the American Softwood Lumber Standard is a voluntary product standard managed by the American Lumber Standards Committee (ALSC) of the National Institute of Standards & Technology (NIST). A number of grading agencies are accredited by ALSC to develop and publish lumber grading rules.

Space limits us from giving all the nitty-gritty details here, however, we have a presentation, and several publications, on this topic on the Links section of our website as well as a discussion forum dedicated to the topic of lumber grading for small sawmills.

Architectural Design with Wood

Chris Knowles
Program Assistant, OWIC
Chris.knowles@oregonstate.edu

The 2nd annual Architectural Design with Wood course will be held on May 24-25 on the OSU campus in Richardson Hall. This course is designed to improve architects' knowledge of wood as a building material.

A diverse group of speakers has been organized for this years course including:

- field representative from The Engineered Wood Association (APA)
- practicing engineer
- practicing architect
- Oregon State University and Washington State University faculty

Topics to be discussed in the course include:

- Overview of wood as a building material
- Seismic design
- Designing with FSC certified wood—challenges and opportunities
- Improving safety of wood decks
- Creativity in wood design
- Innovative wood products made in Oregon
- The effect of wood on human mood

Watch future issues of this newsletter and our website for more information.

To subscribe to this newsletter send an email to Chris Knowles with "subscribe to newsletter" in the subject line.

Contact us:

Oregon Wood Innovation Center

http://owic.oregonstate.edu

119 Richardson Hall

Corvallis, OR 97331-5751

Fax: 541-737-3385

Scott Leavengood, OWIC Director

Scott.Leavengood@oregonstate.edu

Phone: 541– 737-4212

Chris Knowles, Program Assistant

Chris.Knowles@oregonstate.edu

Phone: 541-737-1438

Previous issues of the OWIC newsletter are available at:
http://owic.oregonstate.edu/newsletter/

Oregon State University OSU College of Forestry

OWIC Oregon Wood Innovation Center
Connecting people, ideas, resources