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SUBMITTED BY: SCOTT LEAVENGOOD

Focus of this presentation will be on:

- What/who is the Oregon Wood Innovation Center (OWIC) at Oregon State University
- Examples of some of our activities to foster innovation in Oregon's forest industry
- Areas of future focus

Oregon Wood Innovation Center

- Established Jan. 2006
- Joint initiative –
  - OSU Forest Research Laboratory
  - OSU Extension Service
- ***Mission*** – To improve the competitiveness of Oregon's wood products industry by fostering innovation in products, processes and business systems

What does OWIC do?

• Education – workshops, conferences, webinars, publications

• Facilitating 'connections' – connecting buyers and sellers such as through the web-based Oregon Forest Industry Directory

• Technical Assistance/Service – Market research and evaluation, New product development/evaluation, Applied research

I will focus my comments on the technical assistance/service activities.

Examples

- Faculty Inventions
  - Green adhesives
  - VTC (densified) wood
- Industry Outreach
  - Assistance with identifying new markets
  - Improving product performance
  - Technical assistance in new product development

Two broad categories of examples:

'Internal' to OSU: faculty inventions for which industry partners are sought for commercialization. Two recent examples include 1) the formaldehyde-free adhesive Dr. Kaichang Li invented that is now in use by Columbia Forest Products in all of its facilities in North America and 2) viscoelastic thermal compressed (VTC, i.e. densified/hardened) wood invented by Dr. Fred Kamke. Dr. Kamke and graduate students are exploring the market opportunities for this invention. Potential markets include engineered components for structural building materials, flooring, truck beds, and even 'bulletproof' components for door frames, bank counters, etc.

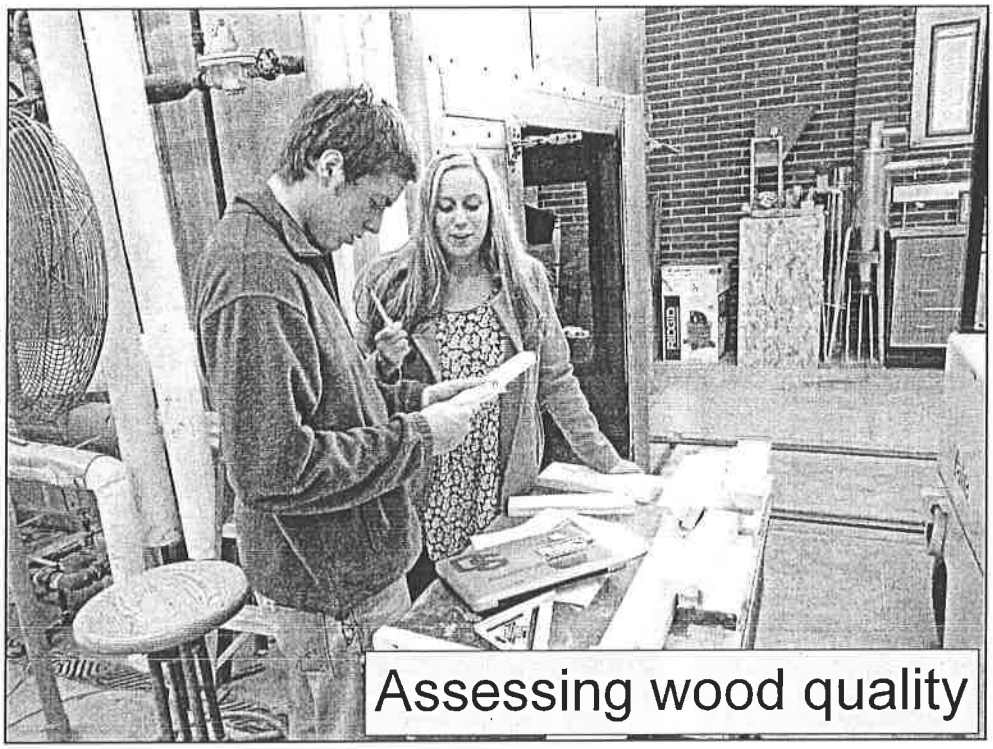
'External' or Outreach-oriented: projects conducted at the request of entrepreneurs and existing firms. Focus may be on identifying new markets, improving product performance, or assisting with new product development.

We produced a report for the Oregon Woodland Cooperative discussing potential new market opportunities for their members. The project was conducted by a graduate student and two of our faculty.

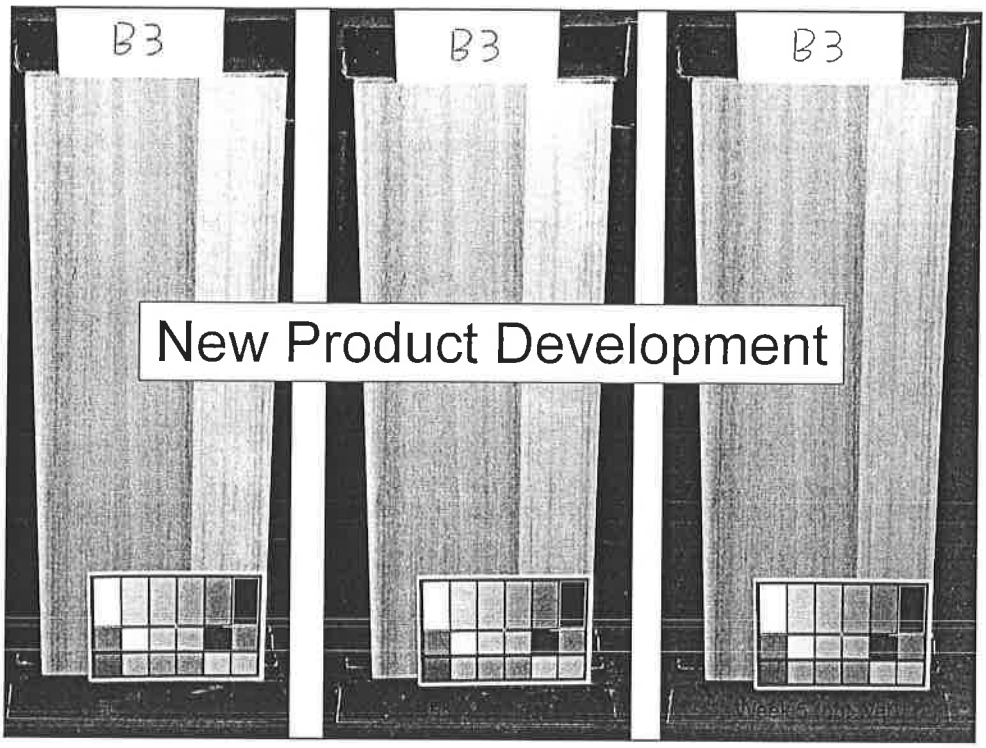
As reported by the co-op leaders:

"through you we were able to hire Louis Leatherman [OSU grad student]... he was the one who actually contacted New Seasons and began the firewood program for us. Last year we grossed over $35,000 in bundled wood sales. We are on track to double our 2011 sales and other store chains are beginning to look hard at our products."

"..we have found that your report - particularly the section on value-added wood (i.e. furniture and cabinetry) has given us better perspectives on this area of potential income. Our current partnership with Northwoods Figured Woods (producing and marketing burls, turning blocks, figured lumber, etc) certainly reflects the influence of your involvement..... you inspired us to innovate!"



This is a project being conducted for Greenwood Resources and Collins Companies. The companies are interested in evaluating the properties of the wood in their hybrid poplar plantations near Boardman, OR. The two undergraduate students shown here have been conducting the research. They are looking at things like, how does the hardness and machinability of the wood vary between and within trees? Projects like this are a real win-win in that the companies benefit by getting valuable technical data they can use in their marketing and product development efforts. And the students benefit by being able to directly apply the concepts they are learning in their coursework to real-world questions in the renewable materials industry.



9Wood, Inc. of Springfield, OR was working on a project to produce eucalyptus ceiling panels for a customer in a hot, humid climate. The customer stipulated that the panels must not change color while in-service as well as that the glue joints remain strong despite significant stresses from shrinking and swelling as the humidity fluctuates.

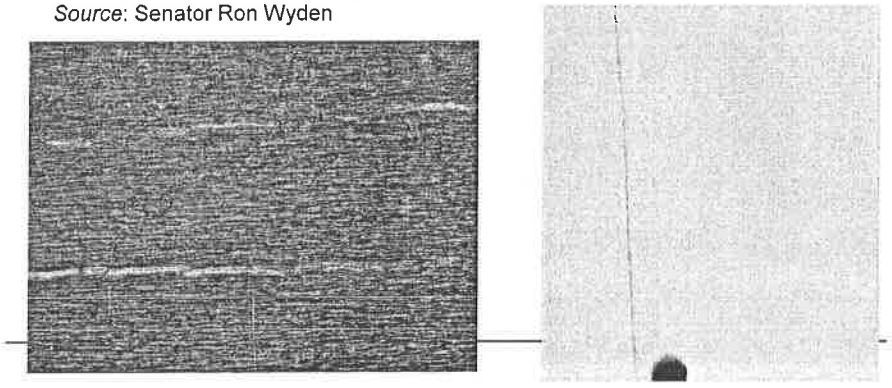
Groups of test panels were subjected to varying temperature and humidity conditions in our environmental chambers. To assess color change, we established a special photo booth with consistent lighting conditions so that an undergraduate student worker could capture high-quality images of each of the 36 panel specimens on a weekly basis, for a total of 10 weeks. Glue joints were examined, and panel dimensions (width, thickness, and warp) were measured weekly as well. A report of the final results was provided to 9Wood, Inc.

Jonathan Gates, with 9Wood, Inc.'s R&D department (and OSU alum), stated that the project was very helpful to them in demonstrating due diligence to the customer. For example, one shipment of panels arrived at the customer's facility with a significant amount of 'blushing' (cloudy discoloration of the finish). 9Wood, Inc. was able to respond specifically and scientifically to the customer's detailed questions and concerns about performance. As such, they were able to maintain good customer relations by demonstrating they had 'done their homework' with respect to how varying temperature and humidity conditions affected the surface appearance and dimensional stability of the panels. As Jonathan stated, "Being able to show the customer that we have tested our product with a reputable third party is huge for making the sale and keeping customers satisfied."

Product Performance:
Cracking of furniture & cabinet panels

- "…approximately 70% of North America's hardwood plywood is manufactured by companies headquartered in Oregon"

Source: Senator Ron Wyden



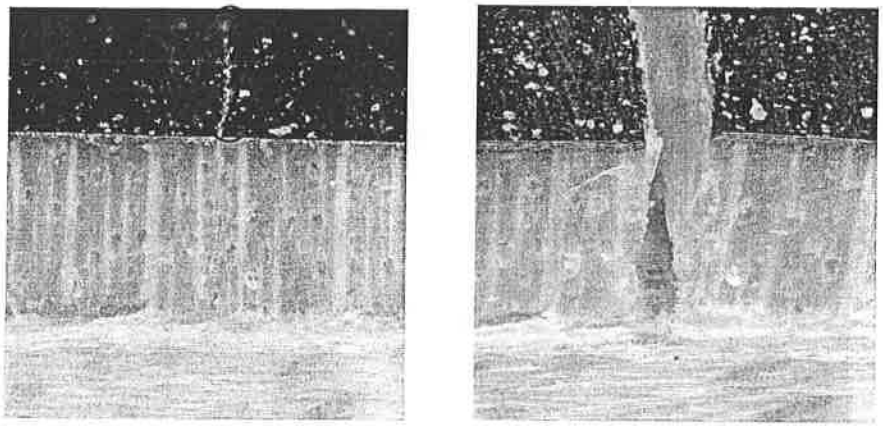
Checking (cracking/splitting of the wood on the surface) is increasing in frequency and is a costly problem for hardwood plywood manufacturers. The problem often occurs in-service in finished products like cabinets and furniture; as such, the plywood manufacturer may be expected to pay for the full cost of removal and replacement. We're working to help firms identify methods of production that will minimize the occurrence of cracking.

This problem is particularly relevant for Oregon - "Noting that approximately 70 percent of North America's hardwood plywood is manufactured by companies headquartered in Oregon, U.S. Senator Ron Wyden today called on three federal agencies to investigate alleged abuses by the Chinese that have greatly harmed the domestic hardwood plywood industry."
http://wyden.senate.gov/newsroom/press/release/?id=a6e2807f-855d-4b65-b506-bd3bdeacfc11

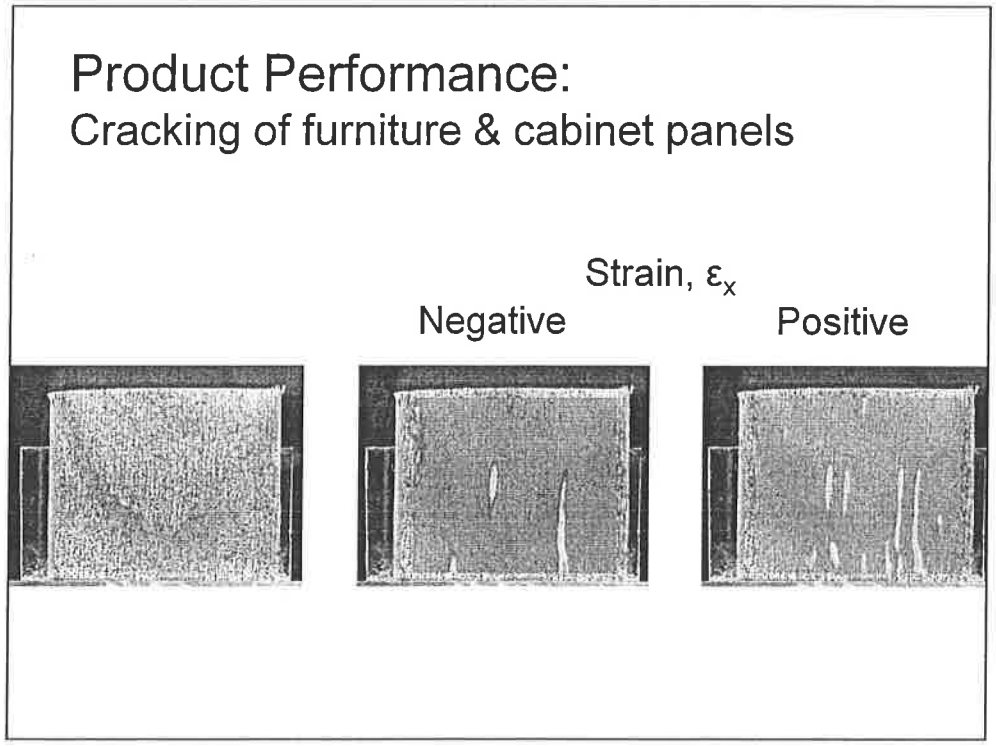
Principal Oregon firms include: Roseburg Forest Products, Columbia Forest Products, Murphy Plywood, Timber Products, and States Industries.

Product Performance:
Cracking of furniture & cabinet panels

After 115 hrs. in hot/dry chamber



Microscopic images (200x) of hardwood plywood before and after exposure to dry conditions. The crack/split is barely visible in image on the left but is quite visible after 115 hours at 87°F and 30% relative humidity. At the least, we know that we can replicate the problems in the lab.



Graduate student Mike Burnard is using a technique known as digital image correlation (DIC) to monitor cracks in hardwood plywood as they develop. His M.S. project is exploring 5 key variables related to how hardwood plywood is produced; DIC will allow him to conduct the most comprehensive research on the problem to-date (over 1500 test panels!). The results will help Oregon plywood manufacturers determine the optimal production methods to minimize cracking in-service.

Future efforts

- Undergraduate Student Research Project Coordinator
- Exploring options for a Wood Innovation Signature Research Center
  - Collaboration with Architecture at U of O and Oregon Sustainability Center at PSU
  - Emphasis on 'energy'

Undergraduate Student Research Project Coordinator – faculty member that will work to select, mentor, and supervise student workers on industry-sponsored research projects.

Wood Innovation Signature Research Center – emphasis will be on energy:

• development of innovations to improve energy efficiency in harvesting and transportation of logs, residuals, and finished products

• " related to reducing the embodied energy in structural building products

• " in building materials to reduce energy use in-service

• " in bio-based energy generation and distribution

Oregon Wood Innovation Center

Connecting People, Ideas, and Resources

Oregon Wood Innovation Center
119 Richardson Hall
Corvallis, OR 97331
http://owic.oregonstate.edu

Scott Leavengood
(541) 737-4212
Scott.Leavengood@oregonstate.edu

Chris Knowles
(541) 737-1438
Chris.Knowles@oregonstate.edu

OSU
Oregon State
UNIVERSITY