



Oregon Wood Innovation Center

Connecting people, ideas, resources

COMING OWIC EVENTS:

- [Wood Composite Science Short Course Series—online](#)
- [Sept 5-6: Wood Adhesion Short Course, Blacksburg VA](#)
- [Sept 10-13: Wood Basics Course, Corvallis, OR](#)
- [Oct 5: PWLA Innovation Summit, Corvallis, OR](#)

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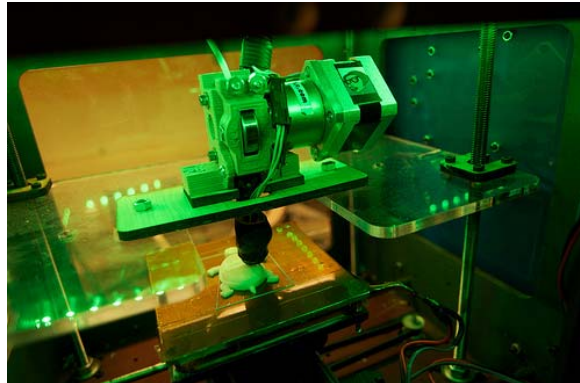
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What If?

One of my 13-year old twin boys has, for his entire speaking life, asked "what if" questions. There are no boundaries to the audacity of his questions and there is no realism requirement; the sky is the limit. I freely admit that his questions drive me crazy, but I don't want to stifle his creativity. With this in mind, and ideas from a recent Economist Special Report on Manufacturing and Innovation, I pose a series of WHAT IF questions for you to ponder as you consider the future of your business and the Oregon forest sector.

3D printing (additive manufacturing) is becoming commonplace with applications across industries. Rather than starting with a block of a given material and machining away what is not needed, the printer simply lays down material, layer-by-layer to create the desired three-dimensional object. This can be done with plastics, metals, and even living tissue. WHAT IF one could 3D print using cellulose?

There is already significant momentum around the world focused on the concept of a biorefinery that turns trees into a myriad of valuable fuels and chemicals. Could one biorefinery product be the raw material for 3D printing? Imagine the possibilities for defect-free structural elements that are 100% biodegradable and recyclable. Might we one day



print the structure of an entire single-family home? Several members of the WSE department visited Joplin, Missouri last summer after the class 5 tornado as part of a post-disaster evaluation team. As with other similar events, one of the main findings was that improper physical connections, for example toenailing instead of tie downs for rafters, resulted in considerable damage. WHAT IF there were no such connections, but roofs and

walls were a seamless structural element!

One of our past Wood Science & Engineering Colleagues, Phil Humphrey, was fond of using a human femur bone when he explained natural composites to kids (and, I suppose, adults). Bones are structurally efficient because of shape, varying density, and fiber orientation. Using

bones as a conceptual model, and 3D printing as a tool, one can imagine a myriad of structural products made from natural fiber. Designers are keen on principles of biomimicry where the patterns and structures of nature are used in product design.

The intersection of biomimicry thinking and 21st century tools such as 3D printing will provide endless opportunities.

Even if 3D printing isn't something the forest sector can implement directly, it can potentially benefit indirectly. A machine center breaks down because of a small but key internal part. The part isn't in inventory and must be delivered from Germany – OR – you can download the specs from the manufacturer and

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print the part on demand from your own office. Instead of 24 hours of downtime, it's a few.

When I teach on innovation topics I use an example from Betty Crocker where they reduced the setup time to switch from one product line to another from four and a half hours to 12 minutes. This was a HUGE improvement. How did they do it? They carefully studied the strategies and tactics of NASCAR pit crews. What might you accomplish if you carefully studied the approach that a totally different industry takes to processes similar to yours? I know of one Oregon primary manufacturer that has done this in the past – even to the point of taking teams of employees to visit another company's site to learn through hands-on experience. It doesn't always have to be about manufacturing. WHAT IF you had truly world class customer service modeled after something like Disneyland?

A good friend of mine, Bob Smith, from Virginia Tech was recently in town to teach the OWIC continuing education course, Selling Forest Products. I asked him to talk with my marketing students about the hardwood industry in the eastern US. I knew times were bad for hardwood lumber producers but until his presentation I didn't realize how bad. Between 1999 and 2010 nearly 90% of the highest value market (furniture) went away. According to the Economist report, we are entering a third industrial revolution (going digital) where manufacturing will return to the developed world. This will happen because we will

have fewer people in manufacturing thus lowering our own costs while at the same time labor costs in other countries will climb as a result of increased living standards. Bringing manufacturing back home will allow us to be more nimble, reacting faster to local tastes. WHAT IF furniture manufacturing returns to the US? New facilities may locate close to urban demand centers rather than traditional industry clusters and the owners may be a very different crowd than the furniture companies of old with non-traditional business models. It will be interesting to see how hardwood lumber producers react to this change.

Our industry has long been characterized as production oriented with a commodity mentality. A VP of marketing for an Oregon forest products firm recently spoke in my marketing class about the evolution of marketing in the industry. He described an industry focused on sales, not marketing. According to his explanation, the industry is far more sophisticated today, but still has significant room for growth. Any moves toward communication down the value chain can help move away from commodity thinking toward "total product" thinking. Some forest products companies are using social media to reach their customers, do you have a social media strategy for your company? WHAT IF the industry was as adept at B2B marketing as Nike is at B2C? WHAT IF the industry embraced "social manufacturing", virtually involving customers, architects, and even final consumers in designing new wood products? This concept is cur-

rently being implemented by companies such as Quirky (<http://www.quirky.com/>) where an individual can submit an idea and others can add their input – eventually creating a commercialized product.

With an industry characterized by commodity thinking, product innovation is typically slow and incremental. Research shows that the main challenge to being innovative in this industry is existing company culture. Culture is a factor of personnel. WHAT IF your workforce were more diverse and more highly trained? Diversity comes in many forms but should include hiring outside of the industry to import ideas and thinking from elsewhere.

The mid-90s saw a near end to harvest from Federal forestland in Oregon. Since that time the industry has continuously focused on increasing harvest from that land base. Even the recent Forest Cluster Working Group report prioritized Federal forest issues ([click here for report](#)). While some progress has been made, it has been excruciatingly slow. I can't help but wonder WHAT IF all the time, energy, and money invested by Oregon's forest sector in this issue had instead been focused on product, process, and business systems innovation designed to meet the needs of the marketplace? It is interesting to contemplate the structure and characteristics of a highly innovative forest sector.

What might these ideas mean for your company? Even if all these are blue sky ideas that have no connection to reality, creative thinking may be the ingredient that keeps your company healthy for the next generation. WHAT IF?

[The Third Industrial Revolution. The Economist. April 21st-27th. 2012](#)

Bamboo Glulams?

Architects, engineers, and builders are constantly searching for innovative materials to cater to the green building revolution. After a field trip to a Bamboo Revolution business showroom in Portland, OR, two Renewable Material undergraduate students, Skyler Mlasko and Danny Way were

fascinated by the material and wanted to gain more insights into potential uses and properties of bamboo.

While looking for avenues to work on bamboo, an opportunity for a Student Sustainability Initiative grant came about. Skyler and Danny teamed up with Arijit Sinha, Assistant Professor of Green Building Materials, to discern whether bamboo can be accepted as a construction material with confidence in the industry. Currently, Sinha along with Way and Mlasko, is leading the research on bamboo at Oregon State University and analyzing the feasibility of using bamboo laminated beams in structural applications. Typically, large span beams are made up of steel, concrete or glulam to support heavy loads in buildings. Through a partnership with Bamboo Revolution in Portland, OR, research is being done to find initial structural values through mechanical testing to see if there is a possibility of bamboo glu-



lam beams to be considered in construction.

On a broader level, this project could possibly initiate further partnerships between OSU and renewable material companies for product development and also to determine the over-

all feasibility of products in real-world uses. Additionally, both the university and partnering businesses will receive recognition for increased use of renewable materials. This further establishes the state of Oregon as a "green" leader in the US, specifically due to the availability of OSU as a potential partner with smaller companies to help bring their renewable products to the market.

The drive for sustainable building practices and decreasing non-

renewable resources have led society to look at alternative methods and materials for construction. Green building is one such ideology, with various programs advocating it. Most of these programs (e.g. LEED, Green Globes) support the use of a fast-growing renewable resource as a material of choice. Bamboo fits the bill as it is unique in its implementation and characteristics. Consumption of bamboo is increasing sharply in the western world and is expected to grow rapidly in the next few decades. Bamboo structural products provide an alternative to conventional building materials, like concrete and steel and is a promising product for the high-profit, non-residential commercial building industry. To gain inroads into the market of non-residential building industry will prove to be beneficial for Oregon's renewable materials industry, and help the forest sector in Oregon

remain competitive. There are many similarities between wood composite processing and manufacturing and processing of bamboo for structural uses. With the present infrastructure, the wood composite manufacturing industry in Oregon has an opportunity to diversify its product portfolio to include bamboo, which might result in increased market share in the building material industry.



Wood Products Business Grows with



Capital

Ask Mike Lipke, owner and CEO of Portland-based Trillium Pacific Millwork, why his small business needs a \$20,000 ShadeFund loan and he'll tell you it's simple: coffee, wine and bread.



His 18-person company turns the signature woods of the Pacific Northwest into high-end, environmentally responsible retail products from flooring, molding and wall paneling to wine boxes and breadboards.

Using the ShadeFund loan as subordinate capital, Trillium purchased a \$70,000 woodworking machine called a CNC router. Portland-based community bank, KeyBank, will finance the remainder of the purchase.

"Our wood is locally sourced, high quality and beautiful. We're incredibly proud of the millwork we do, our commitment to the environment and the team we've built over the years, but we could not make this investment in our business without access to patient capital," said Lipke. "Our alternative financing sources for the

router were in the 18-20% interest range. That is just not something a growing green business can afford to take on."

ShadeFund loans range from \$5,000 to \$50,000. Interest rates range from 4 to 9 percent and vary according to loan amount, available collateral, and credit worthiness. ShadeFund looks at an applicant's credit history and references and focuses on two main questions when reviewing applications: 1) Does the business use natural resources sustainably? and 2) Can the business make good use of a small loan and repay it?

Once an application has been approved, the applicant works with ShadeFund to


create a profile page for the business on ShadeFund's website, which helps market its products, services and commitment to using natural resources wisely

For information on how to apply for a ShadeFund loan, see the ShadeFund website: www.shadefund.org or contact Rick Larson at rlarson@conservationfund.org ph: (919) 951-0113.

THE CONSERVATION FUND
What we do

ShadeFund provides loans for small businesses that support the sustainable use of farmland and forestland.

- Loans can be used for new equipment, facility improvements, inventory, other working capital needs.
- Loan amounts: \$5,000 to \$50,000.
- Interest rates: 4-9%.
- Eligible enterprises must be located in the United States.
- Terms: up to 5 years.



ShadeFund
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Maple Veneer Checking Project

Scott Leavengood and graduate student Mike Burnard visited two veneer producers in the Midwest as part of Mike's M.S. project studying veneer checking in maple ply-

tary peeled maple veneer. As an added bonus, they got a tour of the company's hardwood sawmill as well. The main differences noted in production methods between the

two mills was in how logs are conditioned for peeling vs. slicing as well as in how the veneer is dried and 'pressed'

tioning, such as due to areas where the bark has been rubbed off.

The maple veneer checking project overall is a bit behind schedule due to delays in getting all the materials needed to create the huge (1500+) number of samples for testing. Mike is looking at veneer checking as it is influenced by combinations of veneer thickness, drying method, production method (sliced vs. peeled), core type, adhesive, and veneer lathe-check orientation ('tight side' vs. 'loose side' oriented to the core). We expect things will wrap up by September however. Stay tuned.



wood. Scott and Mike visited Miller Veneers in Indianapolis, IN and learned about half-round veneer production from one of the largest producers of sliced maple veneer in North America. They then ventured north about 600 miles to see Timber Products Company's hardwood veneer plant in Munising, on Michigan's Upper Peninsula. Timber Products is one of the largest producers of ro-

so that it remains flat. The topic of 'pinking' was also witnessed where the veneer will turn a pale pink color in locations where the logs are more exposed to high heat during condi-



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