The Department of Wood Science & Forest Products at Virginia Tech
Volume 4 Issue 24 — Monday, October 5, 2009

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Inside VT Wood

WOOD 2104 – Principles of Packaging Tour Pepsi Bottling Plant

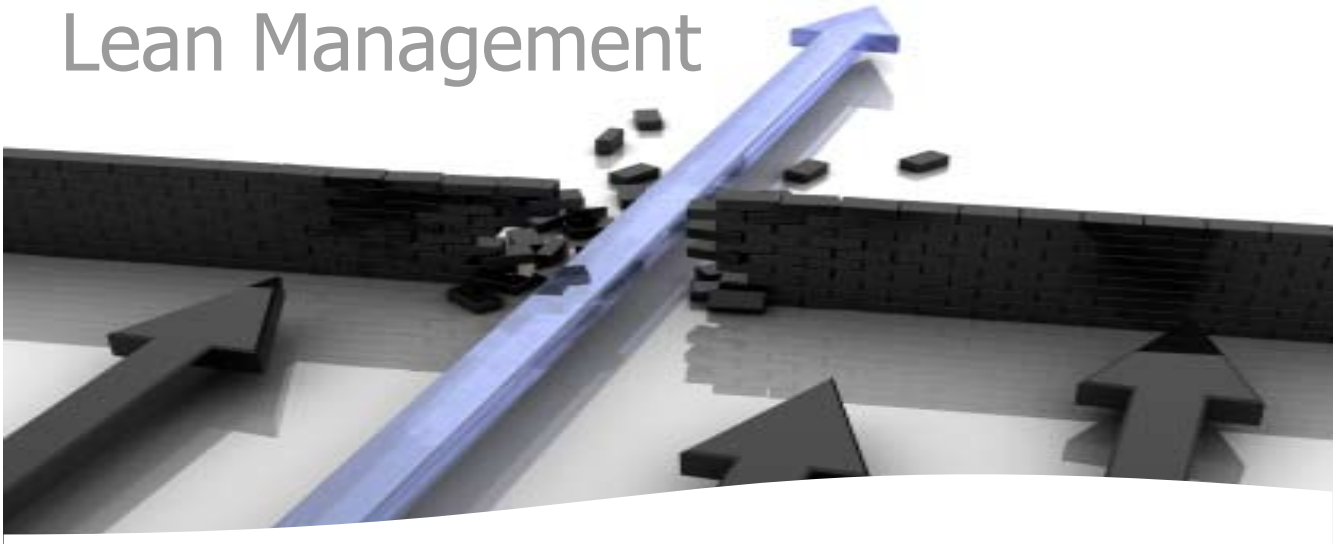
Row 1: Russell Carr;
Row 2: Elizabeth Brown (Raw Materials Manager), Matthew Russell, Kelsie Liberman, Tyler Matusevich, Scarlett Sanchez, Susie Hogan;
Row 3: Matt Dierkes, Alex Hagedorn (Instructor), James Lassiter, Josh Chandler, Jim Bisha, Julia Legard

On Friday, October 2nd students toured Pepsi's bottling plant in Wytheville, VA. At this highly automated facility, plastic preforms were blow molded into bottles, cleaned, filled, capped, labeled, and unitized on pallets for distribution at astonishing rates. In addition to bottles, the facility also specializes in aluminum cans and the preparation and packaging of fountain drinks. Hair nets were required.

Workshop: International Marketing for Forest Products Industries – October 20

The Department of Wood Science and Forest Products is organizing a workshop on International Marketing for Forest Products Industries. The event is scheduled for October 20, 2009 in Princeton, WV. The workshop is sponsored by the Wood Education Research Center, Virginia Cooperative Extension, Virginia Department of Agriculture and Consumer Services, Purdue University, and Virginia Forest Products Association. This workshop is designed to assist wood products companies from primary and secondary sectors to better understand and seize exporting opportunities. Speakers will cover aspects ranging from marketing principles to logistic issues in preparation to capture international markets will. For more information go the web site http://www.woodscience.vt.edu/workshops/intl_marketing/ or contact Henry Quesada at quesada@vt.edu

Lean Management



Wood Science and Forest Products Department Seminar

Wednesday, October 7 at 1 p.m.
Brooks Center Classroom

What is Lean?
History, principles, business applications, methods

Lean Management Instituut (Netherlands)
Purpose, people, philosophy, projects, success stories, experience

Lean Global Network (founded by D.T. Jones and J.P. Womack)
Non profit organizations/affiliates are dedicated to research and to spread lean knowledge

René Aernoudts is founder and chairman of the Lean Management Instituut (LMI) in the Netherlands and ExCom member of the Lean Global Network (LGN) in Boston, MA.
He is a guest lecturer at universities and professional educational institutes.

Workshop: Introduction to Business Process Management – November 19

Presented by Henry Quesada, Assistant Professor of Business Management, Department of Wood Science and Forest Products, Virginia Tech

Workshop description:

Business Process Management (BPM) is defined as an improvement framework that relies on the concept of value chain management by Michael Porter. By implementing basic principles from methodologies such as balanced scorecard, lean thinking, six sigma, total quality management, and process automation, BPM can help your organization to increase customer satisfaction levels, align your business processes with your strategy, and increase the productivity of your internal operations.

Participants in this workshop will learn what value chains are and how to recognize them within their own company. Concepts, definitions, methodologies, and information technologies that support the BPM process will be taught in this workshop. Participants will learn how to represent their value chains in the context of business process management. Also, an overview of most important requirements of BPM information technologies will be presented so participants will know what technology is most applicable to their own needs.

Course outline:

- BPM principals: The Value Chain Concept
- Process Basics
- Business Performance
- Business Improvement Frameworks
- Tools for Process Modeling
- Information Technologies for BPM
- Examples and Applications of BPM

Location and Registration:

Workshop is scheduled for November 19 from 8:30 am to 4:30 pm at the Roanoke Higher Education Center http://www.education.edu/ . Registration is $35 and includes coffee breaks, and materials. Lunch is on your own. Please contact Henry Quesada at quesada@vt.edu for registration or further details.

Workshop: Introduction to Decision Making Techniques: Applications for Forest Products Industries

Workshop description:

Decision making techniques can be defined as a collection of qualitative and quantitative analytical tools that allows business and process managers to outline and analyze potential scenarios when searching for solutions given a specific problem or situation. The focus of decision making start with the data at the manufacturing level and how this data is collected manipulated or transform into valuable information for those who make decisions. Besides quantitative data, qualitative input should also be considered. Aspects such as legal issues, technology and human resource criteria are difficult to quantify so qualitative analysis should be brought into action to complement quantitative analysis.

This workshop will address the most important decision making techniques in the areas of financial management and operations research from a manager point of view. Participants in this workshop will learn that decision making is a multistep process that involves problem definition, model developing, data acquisition, solution development, solution testing, output analysis and solution implementation.

Participants will discover in this workshop that the successful use of decision making techniques will yield proper solutions that are precise, flexible, economic, reliable and easy to understand and implement. The majority of concepts and techniques are supported by examples and applications that use spreadsheets which can be adapted to their own business situation.

Course outline:

- Basics of decision making
- MS Excel basics
- Inventory control models
- Capital budgeting techniques
- Linear programming
- Activity based costing management
- Examples and Applications of Decision Making techniques

Location and Registration:

Workshop is scheduled for November 5, 2009 from 8:30 a.m. to 3:25 p.m. at the Virginia Tech National Capital Regional Campus at Falls Church, VA (http://www.ncr.vt.edu/). Workshop is FREE OF CHARGE but you need to RSVP before November 2, 2010. Coffee breaks and materials are provided but lunch is on your own. To register or further details please contact Henry Quesada at quesada@vt.edu

Facility Construction Proposal Overview for the USDA Forest Service/Agricultural Research Service Bioenergy Pilot Plant

Nationally, there is need to reduce carbon emissions believed to cause climate change and reduce US dependence on foreign oil. Use of renewable and alternative fuels can substantially mitigate these problems. National goals, as set out in the Energy Independence and Security Act of 2007 (EISA), call for producing commercially-viable advanced biofuels from agricultural and woody biomass. Under the Renewable Fuels Standard goals found in EISA, 21 billion gallons of the Nation's alternate fuel needs are to come from sources other than corn starch by 2022. Achieving this goal requires significant technology improvements through research, development and deployment to improve conversion efficiencies and permit collection and use of a wide variety of differing types of biomass feedstocks.

Increasing global energy demand is putting greater pressure on easily extractable fossil fuel reserves. In addition, as fossil fuel usage increases, liquid fuels and chemical feedstock produced from renewable and sustainably grown agricultural and woody forest biomass are also becoming more desirable. For example, trees are one of the best sources of biological fuel and chemicals—they grow in soils that may not be suitable for other plants; use less fertilizer, herbicides, or pesticides as compared with agricultural materials; and can accumulate biomass for numbers of years before being harvested. Currently, large areas of forestlands in the US contain unnaturally high accumulations of forest biomass. Fires on these overstocked forests have proven to be more intense and harder to control. An estimated 8.4 billion dry tons of material should be removed from our Nation's forests and a significant portion of this could be available for production of wood products, chemicals, and energy. We need to find profitable uses for the removed forest biomass to reduce the cost of forest management.

Combustion of fossil energy resources is increasing the atmospheric concentration of carbon dioxide and other greenhouse gases, which in turn can lead to profound climate change. Fuels derived from biomass are generally regarded as greenhouse gas neutral. As international concerns over global change and greenhouse gas generation rise, support for biomass-based fuels will likely increase and reduce investment risks.

The cost effective conversion of biomass into fuel and chemicals requires innovative breakthrough research, development and deployment in several areas such as:

- Improved methods that reduce biomass collection and transportation costs
- Pretreatments that make more cellulose available for enzymatic saccharification and derive value from lignin
- Efficient ways to use the five-carbon sugars in hardwoods
- Value from resistant cellulose
- Co-production of specialty chemicals with greater value than ethanol and paper pulp
- Improved pyrolysis and gasification with less char and a higher energy yield
- Transportation fuels and higher value chemicals from producer gas and pyrolysis oils

The USDA Forest Service (FS) and Agricultural Research Service (ARS) are well suited for research to improve the economics of producing fuel and chemicals from biomass. For example, development of economically-viable biorefineries will help reduce the cost of forest management, dependence on fossil fuels, and production of greenhouse gases. Building on a long history of fundamental cellulose science, handling and treating agricultural and woody biomass, and our ability to develop strong multidisciplinary teams, USDA FS and ARS experts in cellulose chemistry, microbial fermentation, biochemistry, and engineering will work together with university and industry partners to develop and scale-up economical bio-conversion and thermo-conversion technologies for biomass into an array of biofuels.

Proposed Facility

The purpose of the proposed USDA FS/ARS Bioenergy Pilot Plant is to provide a research facility and pilot plant for the development, scale up, and evaluation of technologies for commercially viable conversion of agricultural and

woody biomass into biofuels, alternate energy sources, and related chemicals and products. The envisioned facility is approximately 50,000 square feet with research and analytical laboratories, computer laboratories, high-bay pilot plant space, and facility and occupant support spaces. The proposed location is on the north end of the main USDA Forest Service, Forest Products Laboratory campus in Madison, Wisconsin.

The projected cost of the proposed project is $73 million ($5 million design/engineering, $34 million construction, and $34 million equipment)

Microbial and Biochemical Technology

Recent technological and economic developments have greatly advanced biorefining as a viable approach for agricultural and woody lignocellulosic residues. However, further progress is required to improve the efficiency and economics of biorefining. Biorefining requires an effective pretreatment, efficient enzymatic hydrolysis and high-yield fermentation of the resulting sugars. While several technological approaches are available at the laboratory scale, they have not yet been proven at the pilot and commercial scales. Moreover, commercial implementation will require evaluation of many different types and combinations of agricultural and woody biomass, residue types, regional variants and harvest cycles. In addition, biorefining has the potential to make high-quality fibers, biopolymers, and lignin byproducts that will need to be tested at a relatively large scale. Research in molecular biology will also be conducted to cost effectively ferment sugars derived from biomass. At pilot scale, typical activities include fermentation to evaluate strain stability and performance at a one one-hundredth to one tenth of commercial scale.

Thermochemical-Conversion Sciences

Thermo-conversion of woody biomass to fuel involves using gasification or pyrolysis to recover gaseous and/or liquid products of combustion in an ultra-efficient manner to produce energy. Depending upon the temperature and other conditions used, the process yields syngas or syngas/pyrolysis oil. Refinement/further processing of syngas and pyrolysis oils results in various fungible fuel products. Thermo-conversion to syngas with hydrogen enrichment is quite flexible, tolerating a broad range of biomass resources (e.g. corn stover, switchgrass, municipal yard wastes, and forest vegetation treatment residuals, including tree limbs, tops, needles, leaves and other woody parts). Thermo-conversion research objectives includes such things as scale up of an innovative bench-top gasifier to pilot scale gasifier with the ultimate goal of developing a scalable distribution gasification unit that may be operated efficiently at a 1-10 megawatt scale in remote areas. Commercial utility providers could scale up a successfully demonstrated mobile gasification unit to provide input fuel for a power plant of up to 300-megawatt capacity at a centralized location.

Project Summary

The Nation's aggressive goals for renewable and alternative fuels production cannot likely be met without commercial production from a variety of biomass types. USDA scientists are poised to initiate development and scale-up of biomass into liquid transportation fuels, but lack the facilities to prove such technology to industry partners. The proposed pilot plant would facilitate improved development of innovative technologies and expedite scale-up and commercialization of existing bench-scale processes for conversion of cellulosic materials to fuel. Because the facility will focus on conversion of all types of biomass to fuel, along with fiber and polymer byproducts, it will not duplicate pilot facilities in other laboratories. Currently, USDA does not have such a comprehensive facility to support its research, development and deployment programs.