Why the Paper Industry Needs to be More Process Focused
Charles E. Hodges, Keynote Speaker

Paper Machine Energy Considerations
Richard A. Reese, Dick Reese and Associates Inc., Speaker
Conventional papermaking requires high energy consumption. Water that is not removed by free drainage and mechanical pressing must be evaporated using steam or some other energy source. Electrical energy is required to drive the paper machine, refiners, vacuum pumps, stock and water pumps, and other equipment. In many cases there are trade-offs between minimizing energy consumption, maximizing production, and achieving good paper quality. Compromises may be necessary to achieve the best overall paper machine economics. TAPPI conducted a paper machine energy survey in 2005 that helped establish energy use benchmarks. Guidelines for energy consumption on major grades and suggestions for reducing energy consumption are discussed in this paper. A list of references is included to assist papermakers in reducing energy consumption.

Opportunities for Energy Conservation in Paper Drying
Gregory L. Wedel, Kadant Johnson Inc., Speaker
The cost of energy has increased markedly in the past decade. This has reduced the competitiveness of many paper mills, particularly those that have not been focused on energy conservation. Significant amounts of energy are consumed in the paper drying process. This paper focuses on opportunities to achieve significant reductions in the use and waste of energy in the drying process. Case studies are presented to highlight the potential for improving drying operations. These case studies include the results of Research trials conducted to quantify the potential improvements and the results of commercial projects in which these results have been achieved.

Roundtable
Jeffrey R. Reese, International Paper, Roundtable Moderator
A roundtable discussion will follow the kick-off presentations in the opening session for the Paper Machine Energy Conservation track. Participants will be asked about expectations for the track and initial questions. A list of expectations and key questions we want to address during the sessions will be posted on the walls of the meeting room.

University of Georgia Superintendents Competency Study
This is a review of a multi-mill study, performed by the University of Georgia Consulting Team that identified and outlined 12 competencies needed by paper machine superintendents to effectively perform their jobs. This in depth analysis can be used as a basis for personal development and also offers an evaluation tool on measuring these competencies based on actual behaviors. We all know the Supt’s job has changed over the years, but to what? This session will show the results of a UGA study listing the key competencies required of today’s supt and identify benchmarking tools for those competencies. Knowing these competencies can help improve position descriptions and development plans. This will be followed by a panel discussion with current and former supts and their managers.

Competency Study Review
Wendy Ruona, University of Georgia, Speaker
**4/25/2006 10:00 a.m. - 12:00 p.m.**
**Bill Babbington Maintenance Roundtable**

The Bill Babbington Maintenance Roundtable is an open forum for discussing maintenance and reliability issues in our industry. The focus of this spring’s roundtable is lubrication systems. The Asset Management Committee has developing a TAPPI Lubrication Manual, a collection of best practices which offers guidance for achieving world class lubrication practices. An overview of the manual will be provided at the start of the roundtable.

10:00 am **Maintenance Roundtable**

Jerry D. Kahn, JK Consulting, Speaker
Wade G. Parks, SEPA Automation, Speaker

**4/25/2006 1:30 p.m. - 4:30 p.m.**
**Session: 5 Monitoring and Benchmarking**

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<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Speaker</th>
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<tr>
<td></td>
<td>You can’t manage what you don’t measure. This paper will</td>
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<td></td>
<td>discuss key areas to monitor in the area of paper machine</td>
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<td>energy consumption, including lb steam/ton paper, kW/ton,</td>
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<td>$/ton, MMBtu/ton, and % condensate return. Key factors</td>
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<td>that affect these indices on individual machines will also</td>
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<td>be discussed, including dryer section venting, condenser</td>
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<td>operation, air and water heating, and sheet moisture.</td>
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<td>2:00</td>
<td><strong>Mill-Wide Energy Conservation for Process Optimization</strong></td>
<td>M. Hassan Loutfi, P.E., Jacobs Engineering Group Inc., Speaker</td>
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<td>Yolanda Ruzicka, Jacobs Engineering Group Inc.</td>
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<td>The efficiency of the energy systems of a paper mill are</td>
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<td>critical to the financial success of the operation and</td>
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<td>can provide it with a definite competitive advantage. The</td>
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<td>key to making processes and energy systems efficient is</td>
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<td>to optimize both as a single, integrated system. The best</td>
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<td>way to accomplish the recommended total system optimization</td>
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<td>is to execute a process optimization audit. There is</td>
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<td>considerable potential for cost-effective energy use</td>
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<td>reduction in existing mills. Benchmarking is one of the</td>
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<td>first steps a mill should undertake as it enables</td>
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<td>comparative performance with similar mills or with a</td>
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<td>model mill representing the current best practice. It</td>
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<td>provides the motivation for looking at energy</td>
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<td>conservation opportunities in mill operations. Process</td>
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<td>Analysis and Energy Optimization using computer</td>
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<td>simulation of the mill-wide mass and energy balance</td>
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<td>allow “what if” scenarios and precisely identifying the</td>
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<td>net effect on overall mill energy consumption. Process</td>
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<td>integration tools, such as pinch analysis, identify the</td>
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<td>minimum theoretical energy consumption level of a process</td>
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<td>and provide guidelines for the modifications required to</td>
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<td>reach that minimum level. Energy savings can be achieved</td>
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<td>by selecting and controlling process equipment such as</td>
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<td>pumps and fans in a cost- and energy-effective manner.</td>
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<td>Additional savings can be gained by careful management of</td>
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<td>the energy purchasing strategies regarding sourcing,</td>
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<td>pricing and environmental concerns.</td>
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<td>Paper mills have several areas that can waste energy.</td>
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<td>Steam, electrical, and mechanical systems can cause</td>
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<td>energy losses. We will review case studies of losses in</td>
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<td>each of these systems which include:</td>
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<td>- PV coil steam leaks that cannot be seen with the naked</td>
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<td>- Small to large steam leaks.</td>
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<td>- Hot motors</td>
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<td>- Hot bearings on paper machines.</td>
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<td>All of these areas can lose thousands of dollars each</td>
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Implementing a Paper Machine Energy Audit
Daniel Parker, Parker Messana & Assoc. Inc., Speaker
This paper covers the process of implementing a paper machine energy audit. The paper informs the reader of the steps and details to be considered in performing energy audits in the paper machine area. This will include planning, data collection, data validation & analysis, identification of energy conservation measures (ECM's), and implementation of ECM's. Examples of typical issues encountered in energy audits will be presented, and unintended consequences of energy conservation measure implementation discussed.

Energy Conservation Needs Multi-faceted Approach
Theodora Retsina, American Process Inc., Speaker
Energy conservation to reduce production costs is more necessary now. Many consultants and mill personnel concentrate on one aspect of a multifaceted problem. Some concentrate on heat recovery, “low-hanging fruit”, or purchasing practices. To develop effective, long-lasting reduction in energy costs, an all-encompassing approach must be developed. This must include all aspects of energy costs and an educational aspect. This ensures that changes and improvements are sustained and energy conservation becomes a way of life.

Assessing the Slice in Terms of Turbulence Control and Sheet Quality
Timothy Wei, Rutgers University, Speaker
Hannu Eloranta, Tampere University of Technology
Pentti Saarenrinne, Tampere University of Technology
T. Y. Hsu, Rutgers University
While the slice is less often used for fiber control, it remains part of many working paper machines. The issue addressed in this study is whether the slice reduces the effectiveness of the headbox turbulence as flow passes onto the wire. Highly resolved Digital Particle Image Velocimetry measurements were made in a headbox model. Turbulence data and field experience indicate that removing the slice can significantly improve sheet quality. Specific physical mechanisms are provided.

Towards to a Better Understanding of Pulp Suspension Flows
Leandro Salgueiro, Jr., Ecole Francaise de papeterie Grenoble, Speaker
Martine Rueff, Ecole Francaise De Papeterie
Jean-Claude Roux, Ecole Francaise de Papeterie
In the papermaking process, the pulp flow is subjected to a series of accelerations, aiming at deflocculating the suspension, followed by decelerations. This results in energy consumption. However, the literature does not clearly account for the fraction of energy that is used for deflocculation. Pulsed Ultrasound Doppler Velocimetry and High Speed Video were applied in order to get a better understanding of flow in pipes, using an experimental loop. The results were compared to Computational Fluid Dynamics simulations. The same techniques were then utilized with a headbox pilot.

In all the cases, it was found that, even at high shear rates, energy consumption contributes to get a better fluidized pulp without breaking all fiber flocs. Indeed, though a reduction of the size of the flocs was obtained when the flow velocity was increased, many flocs were still present in the near the wall region, showing that the fibres were not as well dispersed as could be expected from the velocity profiles and pressure loss measurements.
Development of Flexible Fiber Simulations
Dewei Qi, Western Michigan University, Speaker

A simulation method for fibers with inertia is developed. For fluid domain, simulations are based on a lattice Boltzmann equation. For solid domain, a slender solid body is discretised into a chain of consecutive spherical or cylinerical segments. A constraint force algorithm is proposed to warrant constant bonding distance between two neighboring segments and non-slip velocity conditions at their contacting points so that the filament moves and rotates as a whole body. The fiber could be bended and twisted. The present flexible fiber method is tested by using a rigid particle method when the fiber stiffness is very large and by comparing the present results with theoretical and experimental results. It is demonstrated that the present results have a reasonable accuracy and that the computational results are consistent with the existed experimental results at nonzero Reynolds number flows. The method could be used to simulate many fibers in a headbox of paper machine.

Effects of Counter Blades on Paper Properties: Newsprint
Jimmy H. Jong, PAPRICAN, Speaker
Vaughn J. Wildfong, Johnson Foils

In this report, we summarize the effect of counter blades in the former of a pilot machine on the physical properties of newsprint. The variables in counter blade applications include loading intensity, the number of counter blades and their positions. The effects of these variables on formation, tensile strength, porosity, Scott internal bond, drainage and fines retention are addressed. We found that counter blades improve formation if properly applied. The number of counter blades had the following effects on sheet properties: two counter blades improved formation, the third and the fourth counter blades improved formation marginally, but the fifth counter blade impaired formation. The application of more than three counter blades decreased the tensile strength and Scott internal bond strength. The sheet also became more porous. We also demonstrated that counter blades must be positioned strategically with reference to sheet consistency. The positive influence of counter blades on sheet properties appeared to depend on the consistency at which the counter blades were applied. The effect of loading intensity was also examined. The best formation results were demonstrated with very gentle loading.

3-D Simulation of Paper Structure in View of Optimizing Paper Production
R. Vincent, EFPG - Tembec, Speaker
Martine Rueff, Ecole Francaise De Papeterie
Christian Voillot, Ecole Francaise de Papeterie

A new computational model of 3-D paper structure was developed in order to simulate the effect of fiber morphology upon paper properties. Indeed, depending on the wood species, the dimensions of the fibers may vary by a factor two or three, which directly influences paper structure and properties. Knowing the size distributions of the fibers, our model creates virtual pieces of handsheets made of real pulps that can be visualized and manipulated. The simulator was validated by quantitative determinations. For a given basis weight, the model calculates the number of fibers in a sample and the main texture properties, i.e. thickness, apparent density, porosity and roughness. The relative bonded area, apparent specific surface and pore size values, which are important factors for assessing mechanical or transport properties, can also be determined. In a relatively short computational time, the model gives the evolution of a property as a function of the variations of one morphological parameter, e.g. fiber length, which can be used in an optimization problem.
Optimizing Sizing and Retention Efficiency in Bleached Board Applications
Lester W. House, MeadWestvaco Corporation, Speaker
Michael T. Plouff, MeadWestvaco Corporation
Henry J. Kiel, MeadWestvaco Corporation

Rosin sizing at pH between 4.2 – 5.5 remains the dominant means of imparting basesheet water repellency for the bleached board market in North America. While rosin sizing agents based on either liquid or dispersion sizes are fairly inexpensive, readily available, and their response on-machine is quick while having a gradual dosage-response curve, they generally require alum or another multi-valent cationic species as a mordant. Controlling the alum dosage is critical to the success of these products, and alum hydrolysis is a key aspect of their functionality.

The same alum chemistry which assists in sizing of bleached board has made the use of drainage and retention aids for enhancing machine production a challenge. Typical microparticle programs based on colloidal silica can encounter problems in efficiency at lower pH due to interactions with excess dissolved alumina. A niche for improving drainage and retention in bleached board manufacture exists, and should be compatible with alum chemistry. One means of satisfying this need is to combine the benefits of traditional rosin sizing with an inorganic microparticle into a single product that is also compatible with cationic flocculants. StaFlex is a DSA technology (drainage and sizing aid) which not only enhances vacuum and free drainage but also provides for more efficient rosin sizing. The product also meets the requirement of being easy to meter and handle on-machine.

Immediate and Efficient Mixing of Wet End Additives Close to the PM Headbox
Jouni P. Matula, Wetend Technologies Ltd, Speaker
Jari Käyhkö, Lappeenranta University of Technology
Timo Ruuska, Lappeenranta University of Technology

An immediate and effective mixing with TrumpJet™ mixing system makes it possible to inject papermaking additives e.g. retention aid and sizing chemicals into stock very close to the headbox. The results of operation in lab and mill scale tests and in normal production show increased efficiency or reduced consumption of the chemical better or same quality of paper and freedom to select optimum location for chemical. Also fresh water saving is given.

Tracking and Optimizing Reel to Winder Productivity in a SuperCalendered Paper Mill
Robert K Stevens, LSZ PaperTech Inc, Speaker
Stuart R Loewen, LSZ Paper Tech Inc.
Brian Delvecchio, St Mary's Paper Ltd

Results of automated tracking and optimizing of dry end productivity for a papermill producing supercalendered grades and having multiple papermachines, supercalenders, winders and mixed process lines is reported. The use of modular operator and data collection stations, together with RFID or Bar-Code automated reel tracking and a central database, allowed all paper slab and machine time losses to be automatically followed through the process path. The resulting accurate, automated and quick display of trends of left-on-spool and other slab losses provides the information operators need to use the reel sizing calculator tools most effectively. Floor inventory data and production run tracking aid in order fulfillment accuracy and reduce the costs of over and under runs. Reliable loss data provides focused information needed to minimize dry end slab and time losses. Some unique challenges related to the widely differing wound-in-caliper changes for supercalendered versus non-supercalendered grades were encountered, and overcome. The combination of reliable and precise visibility of losses together with unique operator tools for optimal sizing and consumption of reels resulted in 1.5 to 2% reductions in dry paper losses. Unaccounted slab losses, from before and after implementation, are shown along with current detailed monitoring results.

Impact of Mill Water Closure on Microbial and Odor Control: What Stinks?

Minimizing Odors in the Papermaking Process
Janet H. Woodward, PhD, Buckman Laboratories Inc., Speaker
M. Tod Stoner, Buckman Laboratories Inc.

Odors in the papermaking process can be of either chemical or biological origin. Two major drivers to increased odors are the continued efforts to close up mill water systems and the increased use of recycle furnish. This paper will discuss the microorganisms that can produce odors, conditions that are conducive to odor production, and ways odors can be minimized in the overall papermaking process.
Off Odors in Finished Paper and Paperboard Products
Linda R. Robertson, Nalco Company, Speaker
Changes in manufacturing have increased the occurrence of foul odors in the finished paper products. The paper will discuss various odiferous chemicals found that have caused problems. Sources of the odors include poor pulp washing, microbial spoilage, spilled chemicals, etc. Since many odors are not detected prior to shipment, customers can be alienated by shipment of tainted product. Several case study examples will be discussed. In addition, the paper will discuss steps that can be taken to minimize future outbreaks.

Roundtable Discussion

MütekTM RET-20 Retention Analyzer
Roland Berger, BTG Americas Inc., Speaker
In 1992, BTG introduced its first analyzer for measuring headbox and white water consistency. Utilizing this long experience in online retention measurement a new analyzer was designed which meets the sophisticated specifications of the paper industry in terms of highest measurement accuracy combined with low maintenance and low operation cost. The MütekTM RET-20 Retention Analyzer measures true filler consistency and total consistency precisely by modern optical measurement technology at up to 3 different sampling points. The analyzer can handle all sampling conditions in the constant part of the paper or board machine, because of its advanced sample treatment. Easy start-up and basic calibration which lasts only one day enables the user to apply the instrument as well for temporary paper machine trials as for closed loop control applications.

L&W Fiber Tester
Håkan Karlsson, Lorentzen-Wettre, Speaker
Basic measurements of the new fiber analyzer are fiber length, width, coarseness, deformations and fines. The image analysis system is also well suited to determine content of vessel cells in chemical hardwood pulps. Analysis of fiber mixes based on length/width distributions is an useful feature of the system.

"2D Formation Systems" a Consistent and Easy Way To Identify Paper Formation Issues
Joseph J. O'Leary, Techpap Inc., Speaker
Techpap has been on the cutting edge of Paper Technology for over twenty years now and has introduced sensor that have revolutionized Papermaking. One of these instruments in the 2D Formation Sensor (On-Line and Lab versions). This formation system was developed using the Windows operator interface which makes it very adaptable to standard operation networks and extremely user friendly. In addition to the global floc index, this new system gives a real and reliable floc size distribution in 6 different class sizes, the mean floc shape, size and orientation, the average floc size for a test group and the standard deviation for a test group. This new system also includes an on-line periodic mark detection and trending package as well as a paper sheet visualization window.

A New Optical Approach To Surface Roughness Measurement
Kenneth W. Corscadden, OPTTest Equipment Inc, Speaker
This presentation introduces a new optical method for the measurement of surface roughness. The method provides valuable information about the spatial variation of surface non-uniformity. It can be applied to a wide range of paper types, even specialty papers with laid lines or other imposed structure in the surface.

PARIS a Decision-Making Tool for Optimizing Pulp and Paper Mill Operations
Steve Rutherford, American Process Inc
PARIS consists of a mill-wide model that includes all major departments and equipment, storage capacities and a mathematical formulation of the Power and Energy contracts. Optimization techniques are then applied to minimize production cost considering all applicable constraints and objectives. PARIS™ then outputs optimal production rates for defined time periods.
9 - 6  Introducing the new Concept 3 Forming Board
Marc F. Foulger, GL&V USA Inc., Speaker
The new Perplas Concept 3 Forming board can increase early table activity generation without
draining the sheet too quickly. It can improve formation without adversely affecting first pass retention,
and can provide flexibility for machines that run a wide range of grades and speeds.

9 - 7  High Performance Press Fabric with Super Stratified Batt Fiber, Hitting the Pressision Target
Kenneth A. Walker, Albany International, Speaker
Pressision press fabrics are hitting customer performance targets thanks to an innovative batt fiber
stratification technology. This presentation will review Pressision’s unique product features of super
stratified batt structure and extremely uniform paper pressing surface. Global case studies will
illustrate how these characteristics are delivering dewatering performance, fast start-ups and paper
quality.

9 - 8  UniDryerV2: Lowest Energy Consumption for Non-Contact Drying After Metering Size Press and
Coating Stations
Georges J. Quenard, Bekaert, Speaker
Bekaert formerly Solaronics has introduced the UniDryer concept, 7 years in the market with more
than 30 references. The latest version, UniDryer V2 is now launched. Unmatched efficiency of 68%
without any external heat recovery system. Gas consumption reduced to minimum, and electricity
consumption can be reduced to 50% compared with conventional air dryer technologies. Extreme
Compactness; ease of integration; turnkey costs can be reduced up to 60% versus conventional non-
contact drying systems

9 - 9  Porous Combustion Radimax
James I. Greene, Jr., Richland LLC, Speaker
Existing infrared gas burners are limited by physics to energy density of 150-200 kw/sq. meter
radiating surface. GoGas has patented and licensed to Richland, LLC a new kind of combustion
technology which takes place in a 3-dim area instead of on the surface allowing for higher energy
density.

9 - 10  RotoSweep™ Dryer Fabric Cleaning Technology by Vibre-Tech, LLC
William D. Petitt, Vibre-Tech LLC, Speaker
The RotoSweep™ technology affords clients the opportunity to address
dryer fabric contamination issues mechanically as opposed to products which utilize high pressure
pumps, filters, nozzles, costly chemicals and ever present on going maintenance costs.
A traversing cross machine brush assembly and connected Cyclone Dust Collection System remove
and evacuate contaminants from the paper machine while maintaining dryer fabric permeability and
operating efficiency.

9 - 11  Parsytec Espresso SI: From Inspection information to Production Intelligence
Ralph Ice, Parsytec AG, Speaker
Parsytec AG announces espresso SI, the next generation of web inspection. Many built-in features
such as fast-track commissioning and WWW operation make espresso SI the world’s fastest and best
usable product. Beyond every single line inspection task, it is also ready to build system by system a
company-wide inspection infrastructure.
Third Generation Camera System Enables Proactive Break Prevention
Kari K. Hilden, Papertech Inc., Speaker

The web imaging technology, break event capturing and interpretive capabilities of online camera systems have advanced significantly over the last ten years. In 2003, Aylesford Newsprint Ltd. investigated the improved capabilities of these systems as part of a task force program to increase the productivity of PM 14 newsprint machine at our mill in Aylesford, Kent, UK. PM 14 is a 9930 mm width (366 inch) Valmet (Metso) machine installed in 1995. PM 14, which produces 42.5 g/m2 to 48.8 g/m2 newprint, is already one of the most productive newprint machines in the world. It reached the mile per minute threshold speed in August 1996 and set a world record newprint production speed of 1682 m/min (5517 ft/min) in January 1998.

The productivity enhancement program involved various papermaking issues, but our focus on the causes and solutions of web breaks and associated lost time was a major part of the team's effort. PM 14 was originally equipped with a video tape recording and playback system. About 6 years ago it was replaced by one of the paper industry's first digital, computer-based systems with 15 cameras. However, the system's poor image quality and lack of software-based break diagnostic capabilities led us to consider newer technology. It was unable to identify specific break causes and only identified their location. The origins of most of the breaks were categorized as unknown and therefore were not useful for our break reduction program.

The task force therefore set out to evaluate and purchase the most capable break event recording and analysis technology.

MSK ClearView® Innovative Packaging Technology for Paper Products
Irfan Oezdemir, MSK Covertech Inc

The system is designed to film wrap paper products especially on pallets. Using this new packaging system, the competitiveness will be increased by reducing costs and damage return, while increasing marketing effect. The new technology includes handling machines, bar code readers, film wrapping machines followed by a shrink machine, pressing unit, labeler etc.

Benefits of Paper Machine Clothing Application on Energy Consumption
Jim D. Maggard, Scapa Dryer Fabrics Inc., Panelist
David G. McVey, Albany International, Panelist
Daniel Hedou, AstenJohnson, Panelist
Luc Farly, Weavexx Corporation, Panelist

Several paper companies have experienced significant reductions in energy consumption by optimizing paper machine clothing applications. Energy savings typically are much greater than the higher cost of running energy-efficient fabric designs. A panel with representatives from Albany International, AstenJohnson, Voith Fabrics, and Weavexx will present case histories of forming fabric, press fabric, and dryer fabric installations that have resulted in reduced energy consumption.

Developing Successful Supervisors
The New Supervisor Requirements: Coaching Shift Managers to be Leaders

Where do great Supervisors spend their time? The answer might surprise you. This session will look at the latest research in the area of supervisory skills and review the pitfalls awaiting new supervisors. In addition, we’ll look at preventative treatment for supervisors. Specifically we’ll look at the coaching, support, training and performance evaluation supervisors need to be successful.

Are Great Supervisors Born or Made?
The Supervisor and the Time Trap
Perils and Pitfalls for New Supervisors
Even Peyton Manning Needs a Coach
In order to stay competitive in today’s global markets, it is imperative that North American pulp and paper producers provide their customer with a higher quality product, at a competitive price. A cost effective way to obtain this objective is to reduce variability. The objective of this work was to determine the potential of fibre quality measurements to optimize final product quality and to reduce the frequency of downgraded product, in an unbleached sack Kraft mill. The results of this report show that multiblock PLS is a useful tool for identifying sources of variability in a pulp and paper mill. Based on the relationships identified between fibre quality and product quality for the mill in this study, a fibre quality optimization strategy was implemented, resulting in a significant increase in total tear strength and an 85% reduction in downgraded product.

Consistency Control: Systematic and Scientific Design Leads to Many Different Strategies
Jack C. Tippett, Emerson Process Management, Speaker

Consistency control is one of the most important and yet common controls in the wet end of a paper machine. Nevertheless, it is at the same time one of the most poorly implemented loops on many paper machines. In this paper, several typical but different process objectives with appropriate control strategies will be considered. These strategies take into consideration varying demand, varying dilution line pressure, limited measurement capabilities and varying stock properties. What will be shown in the paper is that although there is no single ideal strategy, that at times the simple two element strategy is best, but at other times, dilution flow ratio, proportional only dilution flow, recirculation or adaptive gain controls are better choices.

Optimizing Press Section and Paper Machine Performance
Louis Gentile, Lorentzen & Wettre USA Inc., Speaker
Andy J. Kahra, Lorentzen & Wettre USA Inc.

The objective of this paper is to show the importance of using the necessary tools to collect, evaluate and take the necessary actions to improve and optimize not just head box but overall paper machine performance to produce quality paper at low operating costs. It has been proven that one cannot rely on on-line dry end scanners alone, since the information obtained is too late in the process to make necessary changes. Since certain problems exist in the press section, such as moisture streaks, that on-line sensors cannot measure, a study was performed on the wet end of the paper machine using dedicated tools to detect these issues. By adjusting certain head box parameters and addressing some of press section problems we were to achieve substantial cost savings. This study focuses on the impact as well as the results from the adjustments performed on the paper machine. The study was performed at a mill experiencing among other issues wrinkles, which resulted in both machine and winder run ability issues thus affecting production. Wrinkles, which typically originate from uneven moisture profiles in the press section, can actually worsen with increased machine speed. A higher than normal frequency of web breaks, which may be caused by severe wrinkles or by improper pressing, was also a major concern. This paper will point out recommendations for further improvements to machine efficiency and additional economic benefits that can be achieved by proper utilization of these tools.

Optimizing Machine Efficiency Through Fiber Quality Management
Andrea Hagedorn, PARPRICAN, Speaker
Jose Antonio Orccotoma, PAPRICAN
Peter Schueler, Tolko Manitoba Kraft Papers
Bob Snow, Tolko Manitoba Kraft Papers
Juha Jarvinen, Tolko Manitoba Kraft Papers

In order to stay competitive in today’s global markets, it is imperative that Canadian pulp and paper producers provide their customer with a higher quality product, at a competitive price. A cost effective way to obtain this objective is to reduce variability. The objective of this work was to determine the potential of fibre quality measurements to optimize final product quality and to reduce the frequency of downgraded product, in an unbleached sack Kraft mill. The results of this report show that multiblock PLS is a useful tool for identifying sources of variability in a pulp and paper mill. Based on the relationships identified between fibre quality and product quality for the mill in this study, a fibre quality optimization strategy was implemented resulting in a significant increase in total tear strength and an 85% reduction in downgraded product.
The Role of Paper Machines in Mill-Wide Energy Conservation Efforts - Panel Discussion

Increased fuel prices have resulted in increased emphasis on energy conservation and reducing energy costs. Paper company representatives will discuss efforts their company is making to reduce the effects of increased energy pricing and the role paper machine energy conservation plays in mill-wide and company-wide energy strategies.

13 - 0  2:00 pm  **Panelists**
Paul M. Tucker, International Paper, Panelist
Scott B. Pantaleo, Weyerhaeuser Company, Panelist
Thomas E. Wroblewski, Stora Enso North America, Panelist

Making the Most of Your Knowledge

The Keys to Successful Evaluations. Leadership and Project Management
Sal Mirza, Buckman Laboratories Inc., Speaker
David R. Jones, Buckman Labs. of Canada Inc.
Rosa M. Covarrubias-Mirza, Buckman Laboratories Inc.

Many a great idea has failed due to poor planning and project leadership. Even with the right additive, equipment upgrade, or process improvement idea, success is not guaranteed unless these components are accompanied by the appropriate leadership, planning, and implementation process. The most important aspect of planning is to have clearly defined objectives. All goals need to be explicit, measurable and documented, including those that mark progression. The keys to a successful evaluation are a project management systems approach and the leadership to ensure that the prescribed plan is followed and stays on track. To ensure that preparation, planning, and implementation continue, a system is required. Examples will be used to demonstrate how complete and documented planning will maximize the chances for a successful evaluation.

Forming Tutorial: New Forming Technology Forum

Principles and practices of fourdrinier, hybrid, and twin-wire forming will be reviewed in presentations by three invited speakers, followed by a panel discussion.

Fourdriner:  Principles and Practices
Ronald J. Buck, Albany International, Speaker

Principles of Twin-Wire Forming
Richard J. Kerekes, University of British Columbia, Speaker

Overview of Top-Wire Forming
Vaughn J. Wildfong, Johnson Foils, Speaker

Electrical Energy Conservation

Energy Considerations for New and Existing Paper Machine Vacuum Systems
Douglas F. Sweet, P.E., Doug Sweet & Associates, Speaker

Paper machine vacuum systems can have from 500 to over 8000 installed horsepower. However, many of these systems are not well managed and their operation and contribution to the dewatering process are often misunderstood. Inefficiencies within the vacuum system can increase the operating power requirement for a few or all of the vacuum pumps within a system. Studies of over 80 vacuum systems over the past 5 years have revealed opportunities for energy savings in almost every system. Energy reduction potential has varied from fifty to several hundred horsepower per system. Examples are presented and discussed to demonstrate where energy consumption can be reduced within the vacuum system. Vacuum system audits are the necessary tool used to uncover the often hidden problems. Solutions are usually cost effective and examples are presented within. Energy savings for all of the examples presented are based on a utility cost of $0.04 per kWh ($260/hp-year).
Strategies for Improve Pump Efficiency and Life Cycle Performance
Mike Pemberton, ITT Goulds Pumps / PumpSmart Control Solutions, Speaker

In today's business environment, paper companies are looking for new avenues to lower energy and operating costs. There is a growing awareness that centrifugal pump optimization can significantly reduce electrical energy demand while improving pump and process reliability. Proper pump selection, sizing and operation are important to mill economic performance. Historically, pump design has focused on mechanical performance; today, the focus must shift to pump system performance in order to achieve available life cycle cost savings. These potential savings are a significant portion of mill operating cost. Motor and valve performance improvements can have a major impact on the bottom line.

Stock Mixing in the New Millennium
Kurt Schneider, Manchester Machine Works, Speaker

This paper seeks to bring to the reader the state of the modern stock mixer and its relative status as a consumer of energy. The paper will explore the various types of impeller technologies and what the cost/benefit ratios are for employing these types of impellers. The paper will also discuss the cost/benefit ratios of retrofitting existing machines with more modern hydrofoil technologies and what types of technologies are more reliable to use in specific applications throughout the mill.

Energy Savings Through Optimized Refining
Shawn R. Berg, J&L Fiber Services, Speaker

The cost of energy for refining on a typical fine paper machine can exceed $1.0 million per year. A typical linerboard machine can exceed $3.0 million per year. By using a system-wide optimization strategy to match hydraulic capacity, plate patterns, and alloy to the needs of the paper machine, significant savings can be found. In addition, the proper mechanical condition, use of new technologies and upgrades can also reduce energy requirements. Overall, 10% to 20% energy savings can be realized through an optimized refining strategy.

Joerg Bauboeck, Andritz AG, Speaker

Increasing energy prices necessitate more careful use of energy in all applications and especially in the drying of tissue paper. Effective usage of energy is needed to minimize operating cost. Considerations of effective energy usage begin with machine design and must be borne in mind during daily operation of a tissue machine. Therefore the topic is split in two parts, the first part deals with design and layout considerations, air system, heat recovery and use of cogeneration exhaust. The second part deals with questions of practical operation in daily business. Tissue drying uses steam for heating the Yankee, gas for heating impingement air in the hood, and electricity for fans in the hood circulation system. The main heat source on a high performance machine is gas, followed by steam, and with electricity in third place. Gas is not only the main energy source from the thermal point of view but also the main cost factor. It has become more and more important as the development of gas price in the US (fig. 1) during recent years shows. There has been a steady increase in price. The situation changed dramatically in 2005, when gas price doubled in only few months (fig. 2). In other countries the situation has been not as bad – the prices were at a higher level already – but they increased markedly all over the world. High gas usage and its high price focus special attention on possibilities of gas savings, although real energy cost differs from mill to mill due to special tariffs and situations.

Part 2: Practical Ways to Assess in Field Energy Deficiencies of Yankee Hood Hot Air Systems
George Nowakowski, Andritz Fiber Drying, Speaker

Matters of the practical operation of a hot air system are very important for energy savings. Energy losses may be caused by leakages, by inefficient design of details or by improper assembly of the air system. Beside this an inefficient operation might be a source of unnecessary high energy consumption. A guideline to the practical assessment of energy losses in the hot air system operation will be discussed. Big savings can be normally achieved with relatively simple corrections and adjustments. This can be done with low investment in the most cases. Optimisation measures will be given. An example shows the fuel energy benchmarking before and after system adjustments and after the correction of deficiencies.
Tissue Energy Roundtable
Jeffrey R. Reese, International Paper, Roundtable Moderator

Session: 18  4/26/2006  4:00 p.m. - 6:00 p.m.
Recent former installations and rebuilds showcasing new technology will be presented. Presenting companies include Metso, AstenJohnson, Voith, GL&V and MHI/Paperchine

18 - 1  4:00 pm  Case Study: Vibrating Foil Technology Improves Drainage and Sheet Structure on Corrugating Medium
Gary J. Peterson, Smurfit-Stone Container Corp., Speaker
Marc F. Foulger, GL&V USA Inc.
Guy Bedard,

18 - 2  4:25 pm  Former Rebuild: Khanna Paper PM4, Amritsar, India
Anil Budhiraja, Khanna Paper, Speaker
Vaughn J. Wildfong, Johnson Foils

18 - 3  4:50 pm  Former Upgrade, Daehan Paper PM3
Frank X. Swietlik, Metso Paper USA Inc., Speaker

18 - 4  5:15 pm  Hamburger Spremberg PM1, Gap Former for Linerboard
James A. Smith, Paperchine Inc., Speaker
Akihito Nagano, Mitsubishi Heavy Industries Ltd.

18 - 5  5:40 pm  Forming Sections-Quality and Productivity Potentials
Kenneth C. Stager, Voith Paper, Speaker
C. Mraz, Voith Paper
T. Ruehl, Voith Paper
G. Bacovsky, Voith Paper

Session: 19  4/27/2006  8:00 a.m. - 9:30 a.m.
Water Conservation

19 - 1  8:00 am  Energy and Water Savings from the Paper Machine Saveall
John O. Milliken, P.E., GL&V Pulp and Paper, Speaker
Improving efficiency of the paper machine saveall reduces energy, material and water costs per ton of finished paper. Saveall efficiency is related to both capacity to filter excess paper machine white water and quality of clear filtrate obtained for showers and effluent from the paper machine loop. Key factors for saveall efficiency include installation parameters such as size and dropleg design, operating conditions such as feed properties and shower efficiencies, and maintenance conditions of sector covers and seals. This paper describes how to estimate energy, material and water savings, and how to implement a saveall audit and improvement program.

19 - 2  8:30 am  Energy Savings Through White Water Reuse in Paper Machine Showers
David R. McGowan, Kadant AES, Speaker
There are significant economical benefits associated with replacing fresh shower water with recycled white water in the forming and press section showers of a paper machine. Showers were surveyed on a 390” linerboard paper machine, and a whitewater conversion risk category of low, medium or high was assigned to each. The savings associated with substituting fresh water with white water in each of these three risk areas has been detailed. Energy savings due to the decreased demand for hot water was found to contribute $3.5 million, or about 77.5% of the total projected savings of $4.5 million for the three risk categories combined. Until the recent introduction of the PetaxTM fine filtration system, limitations in solid/liquid separation technology prevented the use of white water in the high risk applications such as the high-pressure showers, which contributes $846k, or about 19% of the total $4.5 million savings.
Water and Energy Conservation in the Stock Preparation of Paper Machines
Helmuth Gabl, Andritz AG, Speaker

The paper industry and those supplying it are generally considered as being rather conservative when it comes to introducing new processes. When developing and designing new machines and production processes nowadays, consumption of water and energy play a major role. In the past, the common technique was so-called final treatment of the effluent water. Applying a suitable separation technique in the various sub-process stages becomes important in terms of • total investment cost, • operating costs, • energy demand, • overall losses, and • recovery rate of fibers and fillers. Awareness of customers' "true" needs and a clear knowledge of the production process enable us to define new processes complete with integrated water cleaning equipment. The newly designed processes with internal separation equipment should attain • further closure of the water circuits at • reduced water consumption, • maintain the process temperature, and • increase the yield. It is essential to involve all new technologies including membrane filtering techniques in setting up the process. The paper describes two different system set ups: one DIP and one OCC line, comparing energy demand, and specific water consumption.

Increase Smoothness, Decrease Energy
Dennis G. Gaddy, AstenJohnson, Speaker

The demand for paper with better smoothness properties has led press fabric manufacturers to develop products that have better sheet side finishes. These smooth finishes are obtained by using special batt fibers with enhanced needling to improve pressure uniformity between the felt and the sheet, which delivers better water removal and better smoothness. The increased water removal will allow for the reduction of steam to dry the sheet which results in reduced energy costs.

Innovative Paper Machine Clothing Improves Machine Efficiency
Bruce W. Janda, AstenJohnson
James E. Heaton, AstenJohnson, Speaker

This paper describes two approaches in the design of paper machine clothing to create a “Smart Surface.” Smart surfaces can reduce the tendency of contaminants to adhere, improving the cleaning process and thereby improving machine efficiency. The technology employed in each example is very different. Dryer fabrics produced from micro grooved yarns create a structured surface making cleaning more effective. Forming and TAD fabrics coated with nanotechnology create yarns with a structured surface on a much smaller scale that both improves showering effectiveness and reduces the tendency of water to carry in the interstices of the fabrics. Although the technical approaches are quite different, the principles employed to create a “Smart Surface” are very similar. They offer the papermaker increased opportunities for improving machine efficiency.

Stora Enso Rebuilds For Energy Savings: PM 35 Case Study
Thomas E. Wroblewski, Stora Enso North America, Speaker

This paper will focus on the dryer section of the paper machine, and will present a case study of several dryer system improvements made to one paper machine, will detail the scope of improvements, detail the steam energy consumption benefits, and the cost vs. benefit analysis.
Optimizing the Whole - Making Complex Operations Make Money
James McNutt, Ctr. Paper Bus. & Ind Studies, Speaker

The North American Pulp and Paper Industry is not the low-cost producer on most grades, and high-volume grades have significant substitution threats. In addition, a large share of N. A. assets are aging and approaching the end of their economic lifetime. Participants must learn to thrive under these negative conditions. The overall industry will probably not fare well, but the individual companies can thrive if they use the next short-term upturn to embrace and leverage innovation. Innovation is imperative to create value. Typical North American pulp and paper companies have shutdown their innovative capacity (if it ever existed). As a result, in part, industry performance has been dismal. Investment is spiraling downward and competitiveness is eroding. However, individual suppliers and paper companies can leverage innovation to outperform the industry and create value. To restart the innovation machine, we need to open the culture to allow practices that drive innovation, become more comfortable with different risk/return ratios by adopting an investors’ mentality of portfolio management, and become more intellectual through leverage of market-driven inventing and valuation/portfolio management tools.

Papermakers Roundtable

The Papermakers Roundtable allows you the opportunity to discuss with your peers papermaking equipment, process, operating problems and their personal experiences. The roundtable is open to all operating personnel, mill technical and process personnel, suppliers and others. The Papermakers Roundtable allows you the opportunity to get a specific answer you may need that is not addressed in the other sessions. Come prepared with questions and the willingness to contribute to the discussions.

Engineered Nip Design
Eric J. Gustafson, Stowe Woodward, Speaker
Glen Harvey, Stowe Woodward

Engineered Nip Design is the comprehensive analysis of a paper machine press section as it relates to optimizing moisture removal, improving sheet quality, and improving machine uptime through proper design and selection of press section roll covers and press felts. The objective of the Engineered Nip Design is established through mill interviews and machine equipment surveys. Engineered Nip Design defines the conditions existing in the press nips through the use of analytical computer programs. These conditions are then compared to Stowe Woodward’s Application Guidelines for the grades of paper being produced on the paper machine, and the objectives established in the Engineered Nip Design process. Through the use of superior roll covering materials and proper cover hardness and thickness, objectives can be reached by developing ideal nip conditions at optimal press loadings.

Energy Efficiency of Steam Showers
Philip H. Wells, Wells Enterprises Inc., Speaker

Steam showers heating the sheet during the forming and pressing process can remove more steam from the dryer than they are supplied with but the primary financial payback comes from improved sheet properties, machine runnability and dryer limited production increases. This paper documents dryer load reductions achieved by heating the sheet or press fabric on machines making pulp, linerboard and fine paper along with economic justifications of using steam showers. It discusses the most efficient locations to install a steam shower for various grades and machine configurations as well as recommended operating techniques. It also offers suggestions on how to optimize performance of a steam shower, evaluate benefits and justify the costs of installing and operating one.

Reduction in Energy Costs by Press Section Optimization
Paul McCarten, Voith Paper, Speaker

Pressing performance affects the operating costs and efficiency of a paper machine. In the press section water is removed by the action of mechanical compressive forces in various nips. Water that has not been removed by pressing must be eliminated from the sheet by drying, an energy intensive and expensive process. The careful and correct choice in roll cover materials, hardwoodness and surface designs has led to increased post-press dryness and energy savings.
Effects of Chemistry on Paper Machine Energy Consumption

This session contains technical papers on the effects of chemistry on paper machine energy consumption. Presentations are expected to be focused upon paper machine applications of specialty chemicals which result in documented energy savings.

24 - 1 10:00 am Novel Wet End Technology Simplifies System Chemistry, Improves Performance, and Reduces Energy Consumption
Robert C. Yule, Hercules Inc., Speaker
Frank J. Sutman, Hercules Inc.

Papermakers are continually searching for ways to improve operating efficiency and reduce energy costs. Paper machines are frequently dryer or drainage limited. They can also have sheet strength issues. Additionally, the desire to reduce basis weight, substitute fiber, and reduce the use of wet end additives further complicates matters. In today’s competitive environment, papermakers require a comprehensive solution for such problems. Recently, Hercules introduced a series of products that provide a powerful combination of strength, drainage, retention, and charge control. In addition to enhancing sheet strength, increasing speed, improving retention/drainage, and reducing energy consumption, the technology makes wet end simplification a reality. It has allowed many papermakers to reduce or eliminate the use of certain wet end additives, including starch, drainage and retention aids, and charge donors.

24 - 2 10:30 am New Efficient Mixing System of Papermaking Additives Cuts Fresh Water Consumption
Jouni P. Matula, Wetend Technologies Ltd, Speaker

Wetend Technologies Ltd has invested during past years on development of chemical and additive mixing into stock close to headbox. A TrumpJet™ jet injection and mixing system for papermaking additives eliminates completely additive post dilution with fresh water in PM Approach system process. Additives are mixed effectively into the process by exploiting circulated headbox feed stock. The system gives considerable energy savings as well as reduction of CO2 emission case by case. Overdosing of additives will be also avoided. This results to chemical savings. About 130 systems are already in operation world wide.

24 - 3 11:00 am Fiber Modification with Enzymes: Improvements in Energy Consumption, Fiber Rationalization and Quality
Philip M. Hoekstra, Buckman Laboratories Inc., Speaker
Douglas W. Yoder, Buckman Laboratories Inc.

Extensive laboratory work has shown that enzymes can be used to reduce the amount of energy applied in refining, while maintaining the desired pulp and final paper characteristics. A discussion of the theory, examples of the laboratory work and current application case histories are discussed. As well, ideas on managing the practical application of an enzymatic fiber modification program are discussed.

24 - 4 11:30 am The Effect of Polymer Conformation on Microparticle Efficiency in Drainage and Retention
Michelyn McNeal, Institute of Paper Science & Technology, Speaker
Hiroki Nanko, IPST @ Georgia Tech

A novel transmission electron microscopy (TEM) technique developed for the visualization of polymers adsorbed on secondary fines has been used to examine the effects of microparticle addition in drainage and retention applications in papermaking. The adsorption behavior and conformational characteristics of the cationic polyacrylamide retention aid (CPAM) are integral to the microparticle mechanisms. A clay-filled bleached kraft pulp slurry was used in Dynamic Drainage Analyzer (DDA) runs to determine the appropriate dosages of CPAM and Polymeric microparticles for optimal drainage and retention. Test runs indicated a dosage requirement of 3 pounds per ton for the CPAM. Subsequent addition of microparticles resulted in reduced retention and drainage efficiency. Microscopy observations indicated an absence of extending polymer strands in the slurry prior to microparticle addition. A second series of DDA runs was performed using a poly-DADMAC pretreatment on the slurry. The additional polymer allowed the CPAM dosage to be reduced and subsequent microparticle addition enhanced drainage and retention efficiency. Observations of this slurry using TEM showed extending polymer strands prior to microparticle addition. The CPAM must extend outward from the surfaces of fine particles in order to interact with the microparticles and effect improvements in drainage and retention.
Jan Youtie, Georgia Institute of Technology, Speaker

The need to enhance innovation capacities has received growing attention in recent years. This paper aims to profile innovation methods within the pulp and paper industry based on a survey of Georgia manufacturing establishments. Pulp and paper respondents are compared with those in other industries in terms of their introduction of new or significantly improved products, processes, and organizational approaches and differences in firm size and type of pulp and paper operation are noted. Three unobserved dimensions of innovation—intellectual property-based, supply-chain based, and business process based—are identified through exploratory factor analysis and differences by sector are highlighted. Pulp and paper firms are generally found to lead other sectors in supply chain and process innovation, but lag in intellectual property based innovation.

Inventory, Price, and Output in the Linerboard Industry
Haizheng Li, Georgia Inst. of Technology, Speaker
Zhang, Feng, Georgia Inst. of Technology

In this study, we investigate the market dynamics in the linerboard industry. Using discrete choice modeling techniques, we estimate the probability of price and production response to inventory changes based on monthly data from 1980 to 1999. Our tests show that inventory causes changes in price, but not vice versa. Moreover, price responses to inventory are asymmetric, and upward adjustment in price is "stickier" than downward adjustment. In contrast, production is found to lead inventory change, but a reverse causal relationship exists. It appears that the industry cuts output in response to inventory pressure, but the response seems to be temporary. Moreover, price drops earlier in response to inventory buildup and output drops much later. There seems to be a tendency for the industry to adjust price first before adjusting output. The output adjustment seems to be short-lived and thus does not help remove the price pressure.

Mapping the Morphology of Market Pulps - Worldwide
Alan F. Button, Buttonwood Consulting LLC, Speaker

There are over 100 individual pulps available as market pulps throughout the world. To help us understand and communicate, we use broad market pulp categories that are typically defined by a geographical region, level of bleaching, wood type, and pulping process. Northern bleached softwood kraft (NBSK) and southern bleached hardwood kraft (SBHK) are examples. While these commodity pulp categories are useful, they are not quantitative and sufficiently discriminating to provide more than broad indicators of pulp characteristics. To get more quantitative information we do beater curves and make automated fiber morphology measurements. Now we have a large set of numbers that don’t lend themselves to ready analysis. How can we clearly understand what’s available in the marketplace? What type of paper structure will a given pulp produce? Which pulp is going to most efficiently produce the desired performance? This presentation will show an approach to mapping the fiber morphology of a representative sample of the market pulps available throughout the world. Morphology parameters that determine pulp efficiency and paper structure will be presented in a way that makes the relative performance characteristics of each of these pulps clear. The major role that fiber morphology plays will be illustrated by developing its connection to beater curve results and the broad pulp category performance characteristics we commonly see.

An Investigation into Papers for Digital Printing
Mary Anne Evans, Rochester Institute of Tech., Speaker
LeMaire, Bernice A., Rochester Institute of Tech.
White, David A., Georgia Institute of Technology

A survey of digital print providers in the U.S was conducted to identify constraints and potential solutions for improved performance and quality of digitally printed papers. The key factors in printers’ decisions about which paper to purchase were identified as runnability and print quality. The leading paper characteristics considered when making a purchase were found to be toner/ink adhesion, accurate sheet dimensions, dimensional stability, and moisture level. Performance- and runnability-related factors were found to be more important than appearance-related factors. Overall, the price of papers charged by manufacturers to print producers was not a leading factor in the paper selection process. Digital print providers are most interested in an improvement in the extent of the available product range, with more sizes, finishes, and basis weights available for their digital presses.
26 - 1 10:00 am **Attack Your Paper Making Issues With CAT (Cluster Analysis Tool)**
Joel M. Cason, Jr., Albany International, Speaker

Know how, why and when your machine is performing at peak levels. The CAT™ service will analyze billions of bits of data and provide vital and never before available knowledge to the paper maker. Traditional methods of troubleshooting have never been this powerful or this efficient. This tool has the power to analyze tremendous amounts of data from a number of different perspectives revealing with stunning clarity what drives costs and impacts performance.

26 - 2 10:30 am **Benefits and Advantages of Automated Paper Testing**
Michael J. Conlon, Lorentzen & Wettre Ab, Speaker

If the quality data coming from the paper-testing lab is not made available to paper machine operators in a timely manner, then this information can be used for quality verification and not as a tool for short-term process improvement. In the past, the Testing Department's role would have been to provide end-user 'proof' of quality and to determine whether the paper would meet the quality specifications for that particular grade, thus allowing a “GO” or “NO GO” decision to be made. Invariably, re-testing would be required if erroneous or inconclusive information were forthcoming. This could mean delays in shipping to customers, rolls being culled or down graded, and lost production time. To overcome this problem the paper-testing laboratory has now been automated thus becoming an essential production tool for the papermaker. And since the paper-machine is working 24 hours a day, 365 days a year, these automated paper-testing devices have to meet the same requirements and now play a key role in process control. They have also been proven to save money through manpower optimisation, increased production, and lower operating costs. Reducing measurement uncertainty or test variability is at the heart of what an automated paper testing system provides the modern paper mill. In today's competitive market place, costs have been cut to the bone. The largest potential for cost savings now comes from incremental changes in the paper making process. To achieve these cost savings accurate and frequent measurements of the product are required. The only way to achieve this level of reliability, consistency and accuracy is through the use of automated paper testing systems.

26 - 3 11:00 am **Physical Property Prediction using StatMorf**
Joseph J. O'Leary, Techpap Inc., Speaker
Christian Bermond, CTP
Thierry Lamboley, CTP
Guy Eymin Petot Tourtolet, CTP

With the introduction of fiber analyzers that can produce literally hundreds of data points, the question now becomes, how can laboratory or production engineers narrow this data down to a fit/no-fit decision. To rapidly exploit the very rich amount of data points developed by fiber analysis, CTP has developed an additional layer to the fiber characterization platform. This new software has as its primary function the quick and convenient exploitation of the total data sets developed by the fiber analyzer to identify properties that would lead to certain paper characteristics. In addition to a pulps morphological characteristics, research centers measure physical properties of the produced and commercial pulps using handsheets. Additionally, this statistical tool is a practical building block of mathematical models relating physical to morphological properties. Therefore, researchers are able to predict the papermaking properties of an unfamiliar pulp and classify the results simply from a rapid analysis of the pulp fibers with a comparison to a know database.
The dryer section is the largest steam user in a paper mill. The majority of steam energy is used to evaporate water as heat is transferred to the paper through the dryer shell. Steam consumption can be well above good performance levels depending on how the dryer steam and air systems are designed and operated. Many opportunities exist to reduce steam consumption by optimizing the dryer system. The first step in optimizing dryer steam consumption is to benchmark steam use against production data. Benchmark values are established for dryer consumption, system losses, and dryer air systems. This paper presents practical methods to determine savings opportunities and introduces a framework for defining an energy efficient dryer system. Case histories are provided to show examples how steam savings can be achieved through system optimization.

The dryer section is the largest energy user in a paper machine. Significant steam savings can be achieved by upgrading the steam & condensate system and converting to modern stationary siphons. This paper presents results achieved in real life projects, as well as a theoretical study of a generic test case.

In the energy-intensive process of drying paper, air plays a major role as both the medium for absorbing water vapor evaporated from the sheet and also the vehicle to transport water vapor out of the process. To ensure optimum machine drying efficiency and minimal energy usage this air volume must not only be minimized but also effectively introduced into the drying environment. Heat recovery should also be maximized to further diminish expensive energy inputs.

This paper studies three typical paper machine hood configurations (e.g. open hood, closed hood, high humidity hood) and compares the relative operating costs of each in terms of the dryer section air systems. Optimization of the air systems can return significant energy savings resulting in an improved "cost per ton" index. For the case study, the conventional hood proved to be 43% less costly to operate compared to a canopy type hood. The high humidity hood is 55% more cost effective than the canopy hood, and 22% more energy efficient than the conventional hood. In terms of hood heat recovery potential, the canopy hood "heat recovery performance index" (annual savings $/m² surface area) is approximately $437/ m² of heat recovery surface area, compared to $518/ m² and $744/ m² for conventional and high humidity hoods respectively. There are significant cost savings potential with the high humidity hood compared with other hood technologies.