

PaperCon '09

Welcome to St. Louis

PIMA International Leadership
TAPPI Coating & Graphics Arts
TAPPI Papermakers

Measuring Paper Machine Performance
Wrap-up Roundtable

Quotes of the Week

- “The most important machine is the invoice printer.” – Jim Thompson
- “TAPPI has a slogan ‘Pride in Papermaking.’ I think that it should be ‘Pride in Profit Making.’” – Jim Thompson
- “Green dividends are environmental stewardship projects that result in cost savings” – Tom Easterday
- “Great papermaking is attention to details.” – Dick Reese
- “Some of the basics are gone. Nine times out of ten it comes back to blocking and tackling.” – David Buchanan
- “If you cannot measure it, you cannot improve it.” - Lord Kelvin – Engineer/Natural Philosopher, 1824-1907 (quoted by Dick Reese)
- “I think we all have too many local gauges on our machines. You should just have ports and bring a gauge with you.” – Steve Smith
- “The data that is available today is just incredible....The use of that data is sometimes less impressive.” – Eric Diamond
- “Long term goal is to have all paper mills in the world use the same production reporting system.” – Dick Reese
- “Average production should be within 10% of record production.” – Dick Reese

Quotes of the Week

- “Do your shifts work together? Are you running one machine or four machines?” – Ken Hall
- “Anyone who runs a paper machine today is a very busy person.” – John Neun
- “People’s brains and skills control every bit of this.” – Ken Hall
- “We really recommend some engineering if you’re going to put together a system.” – Mike Robichaud
- “Paper machines are not run by computers necessarily, they’re run by people.” – John Steen
- “Paper machine energy champions pay for themselves many times over.” – Tom Wroblewski
- “Vacuum is defined as a state of isolation from outside influences – sounds like the US Congress.” – Doug Sweet

Quotes of the Week

- “We don’t sell freeness, we sell strength” – Al Button
- “Imagining you can use any fiber source because it is cheap is a recipe for failure.” – Al Button
- “The most important thing about consistency is being consistent.” – Shaun Berg
- “Stability is the prerequisite for agility.” – Seyhan Nuyan
- “Everything that happens in the process is recorded in the final product.” – Seyhan Nuyan
- “If you don’t have a decent saveall, you’re paddling upstream.” – Dick Reese
- “There is no free lunch in dryers!” – Ian Lang
- “The saveall and insulation people complain that they get no respect. Ventilation is the first place where the money is cut.” – John Nielsen
- “It’s up to the mills to listen to all of us vendors and utilize our equipment efficiently.” – Philip Wells

Quotes of the Week

- “Maintenance is 98% common sense and 2% rocket science.” – Magnus Pousette
- “Successful safety training involves the human soul.” – Magnus Pousette
- “Reliability means able to be trusted to do what is expected or has been promised” – Christer Idhammar
- “The total cost of maintenance is often hidden. (Lost production, wasted energy, increased capital spending, safety, late deliveries)” – Christer Idhammar
- “People cannot be more efficient than the process they work in allows them to be.” – Christer Idhammar
- “If it ain’t broke, don’t (mess) with it.” – Dick Reese

Quotes of the Week

- “There are no two machine processes exactly the same.” – Jack Rumel
- “In general paper machines have more problems on the edges than in the center.” – Gary Cothran
- “The market that we are in often doesn’t allow logic in purchasing decisions.” – Jack Audus
- “Do what you can with what you have, where you are.” – Teddy Roosevelt, 26th President of US (quoted by Dick Reese)
- “Insulation deals with hot flashes, cold spots, and excess gas.” – Ron King
- “There is absolutely nothing sexy about mechanical insulation. It is the Rodney Dangerfield of energy conservation.” – Ron King
- “Incorrect data input can bias results.” – Kalle Riihimaki (you had to be there!)

Quotes of the Week

- “If you’re not running, we’re not running. This is very much a team survival thing.” – John Neun
- “Normally laser pointers are nervometers.” – John Neun
- “If you think about these things a little bit, there are some pretty cool hints about operations.” – John Neun
- “Many people and many machines have too much Uhle box vacuum because that’s what we do when we design these machines.” – John Neun
- “Steambox spillage is not one of my favorite things because I have to spend a lot of time on the upper levels of press sections.” – Dave Burton
- “Steambox spillage is just a sign that you are not operating properly.” – Philip Wells
- “Equilibrium temperature of a felt will essentially be the shower water temperature.” – John Neun
- “Not loading your presses is just lost opportunity.” – David Buchanan

Quotes of the Week

- “TAPPI should always schedule PaperCon around the Stanley Cup finals.” – Kalle Riihimaki
- “My wife told me that I’m not a part of her wildest dreams.” – Tom Easterday
- “Energy bills can be reduced by 10% without any capital investment costs.” – Humbert Kofler – Andritz AG (quoted by Dick Reese)
- “You may be getting too old to play volleyball.” – Everybody and his brother
- “Learning is not compulsory, neither is survival.” – W. Edwards Deming (quoted by Dick Reese)
- “Do not let good performance keep you from achieving great performance.” – Dick Reese

The Most Important Machine

- The invoice printer is the only legal way your company can collect money.
- Three objectives should be:
 - Find companies willing to accept your invoices
 - Tie everyone to the invoice printer
 - Assist the customers' desire to accept your invoices.
- Simpler is better.
- We do not operate in isolation.
- Ways to personally affect invoice printer:
 - What can you do to affect quality and price?
 - Speed raw materials to finished products.
 - Eliminate and/or speed up processes.
 - Develop different kinds of products.
 - Improve uptime of mill.
 - Improve transportability of product.
 - Slow invoice printers of raw material suppliers.

Jim Thompson

Overall Machine Performance

- % Uptime
- % Saleable
- Overall machine efficiency
- Headbox Consistency
- Steam Box Steam Consumption
- Flatbox Vacuum
- Couch Consistency
- Consistency After Last Press
- Steam Consumption
- TAPPI Drying Rate
- Basis Weight Profile Variation
- Moisture Profile variation
- Water Consumption

Dick Reese

PPRC (CPPA) Newsprint Machine Comparison

- Machine speed
- Average trim
- Average basis weight
- Production per operating day
- Operating efficiency
- Production per operating day
- Percent maximum trim
- Moisture percentage
- Drying steam
- Furnish
- Percent loss-non-controllable
- Percent loss-sheet off wire
- Percent loss-sheet on wire
- Percent loss dry end
- Percent loss miscellaneous

Dick Reese

Metso Survey Information

- Scheduled downtime %
- Unscheduled downtime %
- Total downtime %
- Broke %
- Breaks %
- Breaks per day, number
- Time efficiency %
- Total efficiency %
- Shrinkage %
- Productivity in tons/day/inch
- Area efficiency

Dick Reese

Pulp Quality

- Fiber strength –
 - Zero-span breaking length
- Fiber morphology –
 - Length
 - Coarseness
 - Fines and curl
- Handsheet properties (Bonding) –
 - Tensile breaking length
 - Bulk
 - Scattering coefficient
 - Stretch
- Ratio of fiber coarseness to length (C/Lw)
- Drainage properties –
 - Freeness
- Appearance –
 - Brightness and dirt
- Chemical properties –
 - Cationic demand (pulp, filtrate)
 - pH and moisture
- Automated measurements:
 - Kappa
 - Brightness
 - Shives
 - Conductivity
- Rapid measurements:
 - Fiber strength
 - Fiber morphology
 - Appearance
 - Cationic demand

AI Button

Refining

- Critical refining variables
 - Refiner Pressure (inlet and outlet)
 - Flow rate
 - Motor load (Power)
 - Amps
 - kW or HP
 - Consistency
- Monitoring refiners
 - Freeness (CSF)
 - Paper Machine Vacuum
 - Fiber Length
 - Finished Product Testing
- Freeness drop per hpd/t
- Control Strategies
 - Manual
 - Power (Constant and Specific Energy)
 - Drainage
 - 65-70% of machines use hpd/t control.

Shawn Berg

Wet End

- Web strength
- Cleanliness
- Stock flow
- Consistency
- Charge
- Retention
- Level
- Conductivity
- pH
- Redox
- Temperature
- Turbidity
- Total and ash consistency
- Tray and headbox consistency

Seyhan Nuyan

Maintenance

- Reliability Index
- Mean Time Between Production Loss
- Tons Lost/Number of Production Losses
- Overall production reliability
- Overall equipment effectiveness (OEE)
- Total Maintenance Cost

Christer Idhammar

Energy Use Factors

- Venting from thermocompressor or cascade sections.
- Any additional steam venting.
- Condenser water valve output/condensate flow.
- Differential pressure (especially for early dryers).
- Steam valve positions for water heating.
- Basis weight versus standard.
- Press solids-usually requires grab samples.
- Press section weir flows.
- Size press starch solids.
- Pocket ventilation temperature.
- Temperatures through hood exhaust heat recovery systems.
- Warm water flow from pulp mill.
- Fiber Loss
- Cleaner Diameter
- Vacuum Pumps
- Press Shower Temp
- Trim Loss
- Wet End Dryers
- Reel Moisture
- Moisture to Size Press
- Starch Solids
- Condensate Return

Dick Reese

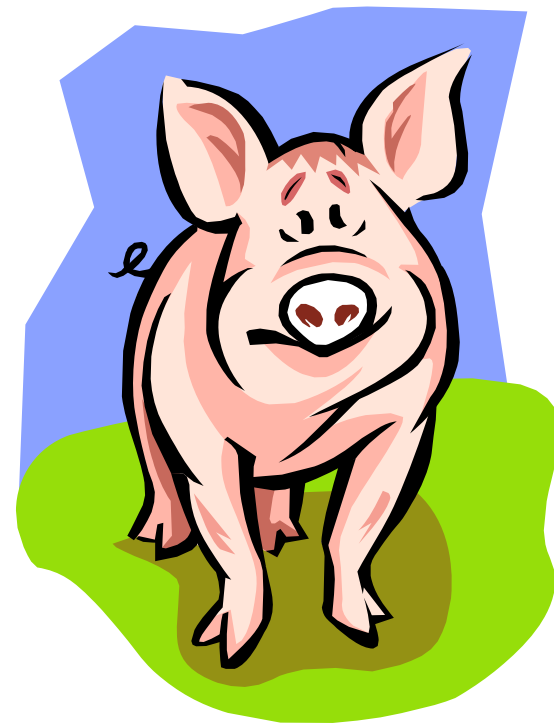
Energy Use Factors

- Steam consumption (kg or lb steam/ton of paper).
- Electricity consumption (kWh/ton).
- Natural gas consumption (m³ or kscf/ton).
- Total energy consumption (kJ or MMBtu/ton).
- Water consumption (m³ or gal/ton).
- Compressed air consumption (m³ or kscf/ton).
- Condensate return to power house (%).
- Total energy cost (\$/ton).
- Steam system vent valves
- Steam valves for heating whitewater
- Mill water make-up into stock, whitewater, or warm water systems.
- Broke system monitoring
- Batch pulper operation
- Whitewater Temp.
- Couch Solids
- Press Solids
- PV Temperature
- Drying Steam

Dick Reese

Energy Hogs

- Steam & condensate systems
- Drives
- Vacuum systems
- Refiners
- Fiber makedown
- Pulp screening & cleaning
- Freshwater use
- Compressed air systems
- Boilers, utilities, WWTP



Tom Wroblewski

Emerging Energy Technologies

- VFD on low-consistency refiner
- Yankee Dryer Turbulence Enhancement
- High Efficiency Thermocompressor
- Yankee Automated Control System (YACS)
- Absorption Chiller (ET for pulp & paper)
- Inline fiber analyzer
- Fiber filler technologies
- Steam Box: new, improved designs
- Organic Rankine Cycle (ORC)

Tom Wroblewski

Reduce Energy Consumption

- Evaporators and impact of scaling
- Lime kiln and lime mud dewatering
- Paper dryer and press dewatering

Lisa Wesoloski

- Direct steam heating can provide an alternative to indirect steam.

David Degelau

- Modern agitator designs can use half the energy of conventional side-entry agitators.

Marc Moseley

- Proper dryer fabric selection and operation can improve heat transfer and reduce pocket humidity.

Ian Lang

- Use of stock or whitewater for wet end chemical injection.

Jouni Matula

- Evaluate full life-cycle cost of ventilation (and other) systems.

Kalle Riihimaki

Paper Machine Energy Successes

- Stationary siphons
- Dryer management system
- Reduced steambox vacuum and sped up 25 fpm
- Air pressure audit
- Heat exchangers to recover heat from water
- Heat recovery audit on dryer hood ventilation
- Higher pressure motive steam to reduce venting.
- Rebuilt thermocompressors to save high pressure motive steam.
- Air-to-air heat exchangers and/flash steam in PV system – hard to use heat
- Reduce PV system temperatures
- Make sure filters not plugged
- Steam leak detection – traps, heaters
- Changed press fabrics – sped up 200 fpm
- Tiny turbines on headbox recirculation lines

Energy Roundtable

Paper Machine Energy Successes

- Getting steam asking for
- Desuperheater temperature (25-50 F)
- VFD on couch pit agitator
- Shut down one on dry end pulper
- Dryer audit
- Heat recovery
- Stationary siphons – especially for lead dryers going to condensers
- Waste heat off Yankee exhaust to heat water
- Energy KPI dashboard across corporation
- Reduced PV air temperatures
- Reemphasis on dryer fabric permeability profiles

Energy Roundtable

Paper Machine Energy Successes

- Proper dryer fabric permeability
- Increase filler loading
- Know limits of fabric tensioning system
- Rebuilding vacuum system – shut down 3 big pumps
- Removed flatboxes
- Wet end flash section – vacuum leaks
- Proper blowthrough for wet end dryers
- Reducing rewetting off the forming fabric

Energy Roundtable

Vacuum System Myths

1. More vacuum capacity and/or higher vacuum levels are always better.
2. We can save a lot of money if we don't install a vacuum separator between the uhle boxes and vacuum pumps.
3. Let's use filtered whitewater for vacuum pump seal water. There is plenty of it and it's essentially free.
4. Vacuum pump cooling towers are foolproof.
5. We keep the valves partly open between the flatboxes, couch and suction press just in case one pump trips out. Then we don't break the sheet.
6. We keep running those old vacuum pumps because they are just indestructible. They don't make them like that any more.
7. You cannot get the sheet to the reel with a poorly operating vacuum system.
8. There is nothing wrong with our vacuum system.
9. We don't graduate our flatbox vacuum because we are at drive load limits for the table.
10. We need to add a vacuum pump to the couch, flatboxes, press, or uhle boxes because our vacuum factor is low compared to the TAPPI factors.
11. Optimizing vacuum won't save us money.

Doug Sweet

Steambox Optimization

- It takes a lot more energy to heat water than fiber
- Steambox clearance should be 1/2=3/4" at skirt and 1 1/2" in center.
- Graduated vacuum is important under steamboxes.
- Teflon coating is not a substitute for good housekeeping.
- Profiling is usually better as close to the nip as possible.
- A profiling steambox will reduce (but not eliminate) the need for water spray moisture profiling devices.
- It is better to have too much than not enough superheat.
- A warmer sheet consolidates better in the steambox.
 - Bulk reduction is less if steam applied after first nip.
 - Indirect heating of felts does not have as much of a bulk impact
- A modern box will reduce steam flow ~15% compared to older designs.
- Modern actuators should have 20-year life.
- Any steam spillage is wasted steam.
- Proper conditioning and approach piping are key.
- Tell suppliers of fabrics, doctor blades, and roll covers when planning to install a steambox.

Steambox Panel

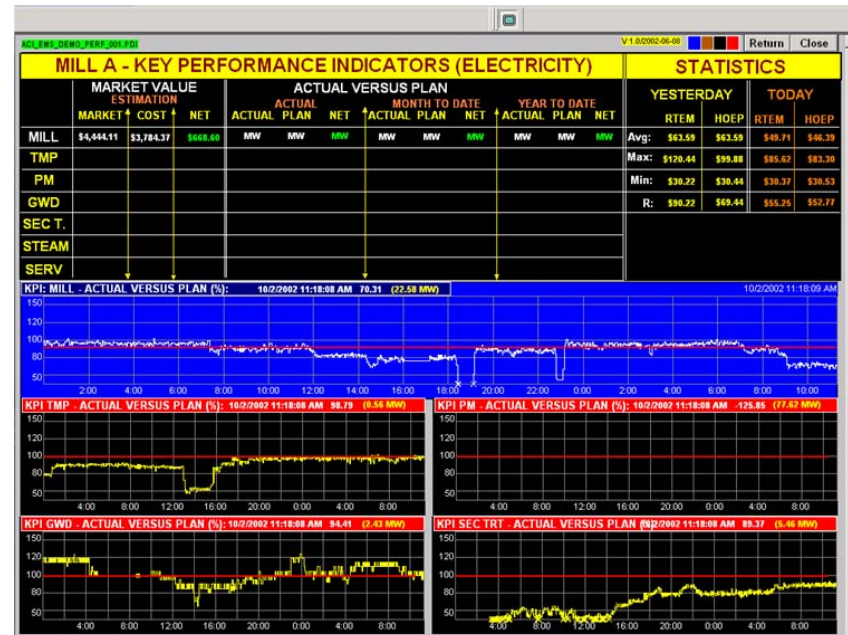
Monitoring Tools

- Stock tracking
 - How pulp is processed affects performance on the machine.
- Centerlines
 - How is the machine performing vs. history or targets
- Real time costs
 - Are we making any money?
- Frequency analysis
 - Is my process cycling?
- Waterfalls
 - How is my machine clothing performing?
- Loop analysis / loop tuning
 - How are my control systems performing
 - How can they be improved.
- Process modeling, state identification & prediction
 - Predict paper physical properties, runnability, costs.
- Maintenance systems
 - Has this problem occurred in the past
 - Is maintenance working on this already
 - What is the status?

Ron Baldus

Monitoring System Requirements

- Availability
- Reliability
- Interoperability
- Scalability
- Extensibility
- Security



Dave Stockford

Real-time Costing Users

- Machine operators for continuous cost optimization
- Shift leaders to monitor abnormal cost and consumptions
- Production management for key performance analysis
- Product development for new product trials
- Process engineers to detect erroneous flow meters and measurements
- Accounting department for monthly closing process
- Mill management for production decisions

Jim Pigott

Dryer Performance Indicators

Traditional

- Drying Rate
 - Of value, but says nothing about energy efficiency
 - “Drying Efficiency” and “Energy Efficiency” are independent performance variables
- Steam Use Per Pound of Water Evaporated
 - Requires accurate calculation of evaporation load
 - Misleading because of “latent heat” effect
- Steam Use Per Pound of Paper Produced
 - Of value, but says more about evaporation load than about dryer section energy efficiency
 - Press moisture has dramatic effect on this variable.
 - Starch or coating applications affect this variable.

Energy-Focused

- Energy losses to condenser or atmosphere
 - Less than 2.5%
- Energy use for heating dryer section supply air
 - Less than 12% if no air-to-air heat recovery
 - Less than 6% if air-to-air heat recovery present
- Flash steam losses to atmosphere
 - 0%
- Energy losses from dryers to surrounding air
 - Less than 10%

Jeff Chaloux

Opportunities to Reduce Drying Energy Loss

- Converting from rotary syphons to stationary syphons to reduce blowthrough and/or differential requirements.
- Replacing poor-performing thermocompressors with more efficient or correctly sized units.
- Installing differential pressure control on dryers draining directly to a condenser.
- Managing differential pressures as a function of machine operating conditions.
- Improving the accuracy of differential pressure indication.
- Replacing or rebuilding old vent valves that leak.
- Improving management of setpoints on cascade type steam systems (so that proper “cascading” is maintained) through application of well-designed supervisory control systems.
- Upgrade of steam joints to a modern design that is less prone to failure and leaks.
- Upgrade old piping that has thin-walled areas and is prone to leaks.

Jeff Chaloux

Dryer Section Survey Measurements

- Hood Balance
 - Air flow, temperature and relative humidity values of Supply and Exhaust Air streams to and out from the dryer section
- Pocket Ventilation
 - Single Point measurement – Air flow, temperature and relative humidity values of each pocket at about one metre distance from front
 - CD Profile - Full CD profile of air flow, temperature and relative humidity values of each pocket
- Cylinder Surface Temperature
 - Single point measurement at about one metre distance from front
 - CD Profile across cylinder width
- Web Temperature
 - Single point measurement on both sides of the web at about one metre distance from front
 - CD Profile
- Condensate Flow
 - Rise Test of each Condensate Collection Tank
- Amounts of water used in Moisturizer (VIB Spray or similar system)

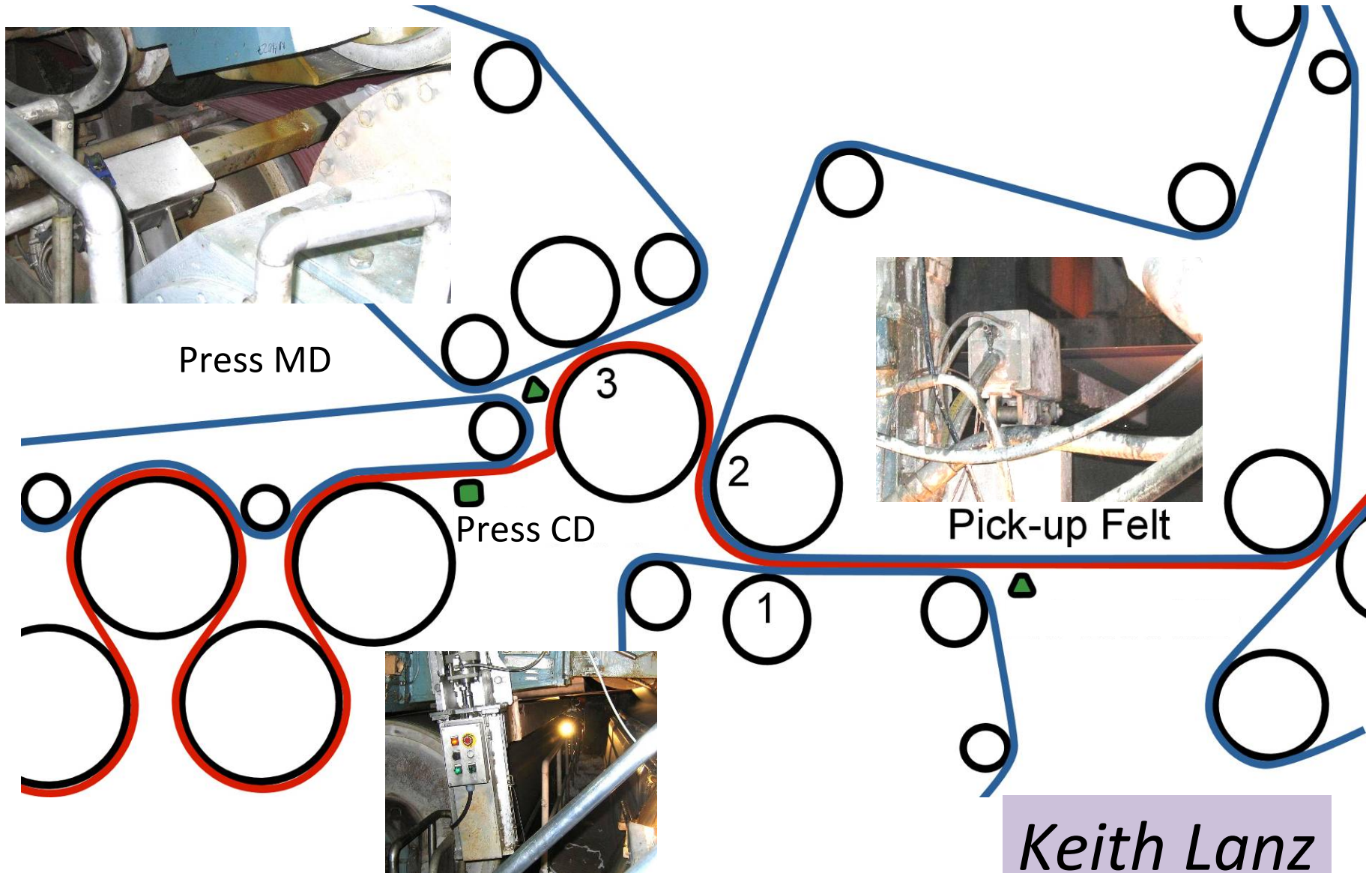
Ajit Ghosh

Factors Affecting Press Section Variation

- Press fabric permeability and caliper versus time
- Press fabrics versus specifications
- Moisture off the couch
- Vacuum
- Showering
- Press loads
- Stock conditions
- Wet end chemistry
- Steam showers

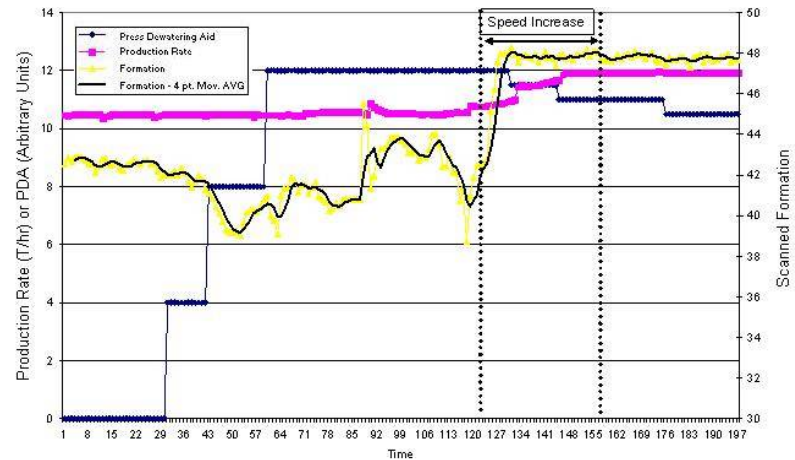
Daniel Hedou

Moisture Monitoring at Multiple Locations



Press Section Optimization

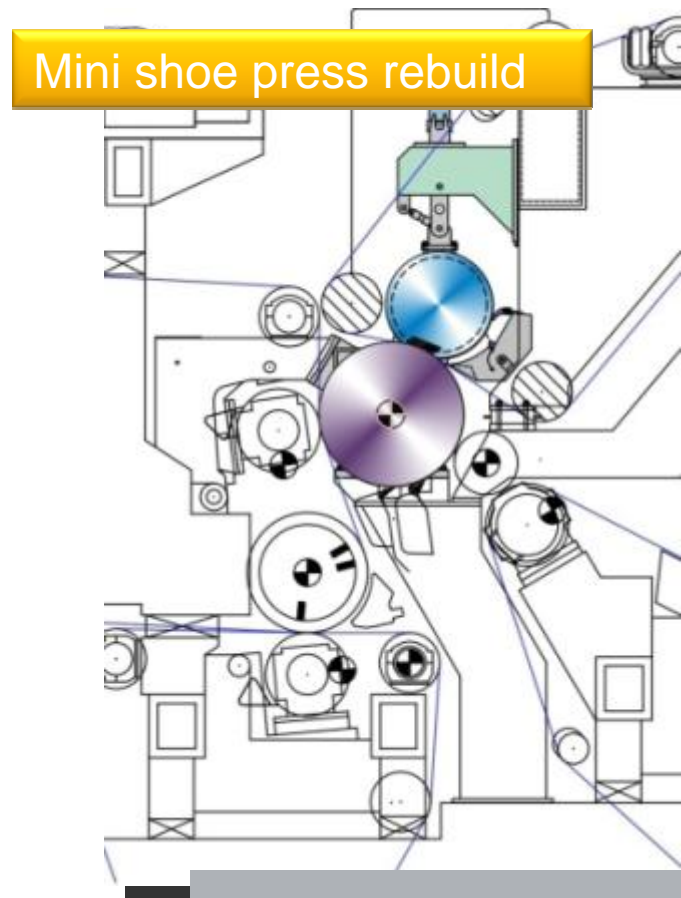
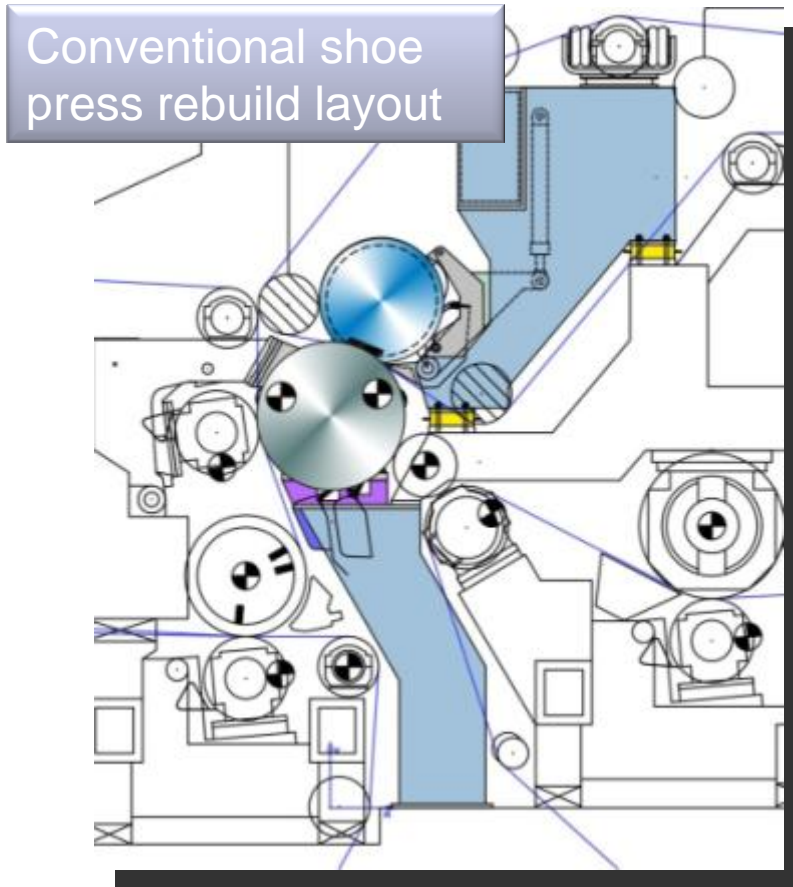
- Mechanical capabilities of the machine
- Operational considerations of the mill
- Chemical implementation and tuning



Rob Lowe

Mini shoe press rebuild

Minimal changes to existing structures = easy and quick



TAPPI 2009 FXS

Frank Swietlik

Reasons to Insulate

- Reduce energy cost
- Reduce polluting emissions
- Control condensation, mold & Corrosion Under Insulation (CUI)
- Provide work place safety and life safety
- Improve work environment
- Improve process control
- Use with sustainable design initiatives
- Improve facility lifecycle costs
- Provide exceptional Return on Investment (ROI)

Ron King

Press Section Monitoring

Routine Monitoring

- Wire tension
- Felt caliper and length
- Gamma gage fourdrinier drainage profiles
- Felt moisture profiles
- Felt permeability profiles
- Press mass balances
- Walk around

Press Audits

- Vacuum system (low vacuum and high vacuum)
- Dryer operations
 - Steam
 - Humidity
 - Air movement
- Vacuum application
 - Forming
 - Pressing
- Drive
- Cleaning and conditioning
- Vibration/pulsation
- Papermaking

John Neun

Press Optimization

- Fabric design
- Draw
- Vibration
- Trim squirt position
- Pick-up roll alignment and position
- Sheet transfer geometry
- Doctor blade leakage
- Debris hang-up
- Press temperatures
- High-pressure shower nozzles
- Density of felt in returned fabric analysis
- Oscillator stroke and speed
- Edge cleaning

Dave Burton

Water Balance Study

- Wet end gamma gauge mass balance
- Sheet
- Showers
- Roll specifications
- Nip loads, pressures, widths, dwell time, and impulse
- Roll and Uhle box vacuum conditions
- Press fabric specifications and operating parameters
- Roll and felt (new and compacted) excess void volume
- Recommendations to impact press exit solids and cost
- Comparative paper machine data
- Process and production data
- Press water balance
- Dryer steam calculations
- Roll data
- Vacuum survey
- Press felt moisture scans

David Buchanan

Clothing Optimization

- Focused opportunity (hard benefits vs. soft)
- Understand the clothing potential
- Model the situation – data utilization
- Mathematically predict the results
- Set up a data plan
- Utilize traditional performance tools to monitor operation
- Accumulate data
- Analyze data
- Close the data
- Benchmark

Eric Diamond

On-Line Vibration Monitoring

- System requirements
 - User interface
 - Network distribution to get the right information to the right personnel.
 - Highly configurable
 - A minimum sampling rate of 25 kHz
 - Minimum 14 bit A/D.
- Key hardware features
 - Simultaneous data acquisition (minimum of two channels)
 - Integrated supply of ICP sensor power
 - System self-checks with operating status indicators
 - Programmable gain settings.
- Appropriate sensor inputs
 - Accelerometers
 - Tachometers
 - Dynamic pressure indicators.
- Software systems should be extremely flexible and easily upgraded and/or customized.
- The success on any on-line vibration monitoring system depends entirely on the engineering
 - Selection
 - Installation
 - Configuration of hardware and software.

Mike Robichaud

Evaluating Machine Room Ventilation

- Are there signs of corrosion on the building structure?
- Is there any condensation along the underside of the roof or upper walls?
- Does water vapor spread into the truss area above the forming and press sections?
- Is there fog or condensation during cold weather?
- Are the dryer section hoods spilling?
- Is the building under a high negative pressure? Do the personnel doors slam closed or are they difficult to open?
- Are there cold spots in the building during cold weather operation? Conversely, are there hot spots during warm weather operation?
- Do temperatures and humidity levels exceed the recommended levels?
- Is the current energy consumption greater than previous years?

John Nielsen

Machine Room Ventilation Surveys

- Condition of the equipment:
 - Are motors operating without drive belts?
 - Do air make-up units have plugged coils or filters?
 - Is the equipment condition beyond repair?
 - How well is the equipment being maintained?
- Exhaust and supply air flow rates:
 - Compare fan performance to design conditions and identify fans operating below rated capacity.
 - Determine building air balance.
- Dryer section hood:
 - Exhaust air flow rates, temperature, and humidity – Are the conditions appropriate for the hood type and construction?
 - Is the hood being operated with open doors at ground or operating floor levels?
 - Supply air balance
 - Null point height along the hood
- Exhaust system effectiveness
 - Determine system effectiveness in containing water vapor and heat at sources.
- Airflow paths:
 - Points of introduction of supply and infiltration air flows
 - Building and operating floor balance
 - Ground floor to operating floor air paths
 - Is make-up air being short-circuited to the exhaust streams?
- Temperature and humidity distribution
 - Do the temperature and water vapor concentrations coincide with air flow paths?
 - Establish a benchmark for comparison of future improvements.
- Control strategy
 - Is there a cold/warm weather control strategy in place for operating fans?
- Comparison to performance indices.

John Nielsen

Roughness Measurements

- Air leak (Sheffield, Bendtsen, Parker Print Surf)
 - Inferred measure
 - Leakage across & through sheet
 - Measures wavy and rough components combined
- Stylus Method
 - Direct measure of paper surface
 - Insensitive to gradual changes in topography (wavy domain)
 - Measures rough component over short spans

Louis Gentile

Roundtable Topics

- Measurement techniques to replace gamma gauges
- Press section optimization
- Moisture sensors out of the press section
- Incoming nip rejection on board shoe presses
- Testing for roll adhesion
- Plybond on middle ply
- Relative humidity off machine, through sheeting, and at printing press
- Dryer section warm-up rates
- Long-lasting pressure gauge
- Wireless gauges

Papermakers Roundtable

Roundtable Topics

- Chemical injection systems
- Chemical additives for saveall capacity
- Clarifying water from drum savealls for shower usage
- Strainer rebuilds
- Water reduction projects
- Draw locations
- QCS systems and markets on machines
- Hpd/t control
- Tear test

Papermakers Roundtable

Neat New Things

- Calender metallurgy capable of oil temperatures up to 600 F
- Breast roll shakes
- Drives that set and adjust speed precisely
- Improved press roll designs with no water cooling
- Adjustable table
- Managed differential pressure control
- Water jet turn-up device
- Air doctors
- Revival of thermocompressor steam and condensate systems in Europe
- More efficient thermocompressors
- Dry end steambox with water prior to

Papermaking Specialists

Paper Machine Performance Measurements – Mill-wide

- No discarded earplugs
- Employee involvement
- Margin
- Fiber cost
- Communication
- Communication between crews
- Lost time accidents
- Morale
- Rounds
- Troubleshooting sessions completed
- Work orders
- Cost reduction
- Profitability
- Inventory time
- Adherence to SOPs
- Operating by guidelines
- Safety and housekeeping

Kick-off Roundtable

Paper Machine Performance Measurements - Overall

- Midnight calls
- Empty reel spools
- Tons of saleable paper/day
- Cost/ton – steam, stock, filler – real time
- Overall machine cleanliness
- Tpd/in. for a given basis weight
- Speed
- Furnish – species mix
- Shift-by-shift comparison (one machine or four)
- Sewer losses
- Scheduled outage performance – work performed, jobs cut, schedule adherence
- Percentage of planned work
- Percentage completed
- % of loops in automatic
- Percent of time steam limited
- Start-up time after outage

Kick-off Roundtable

Paper Machine Performance Measurements - Efficiency

- Breaks/day
- Grade change beater (broke)
- Winder losses
- Threading time
- Hours per day lost due to deposits
- Causes of breaks
- Bad days and what happens on bad days
- Thread-up efficiency
- Average lost time per break
- Source of sheet breaks
- Turn-up efficiency
- Tpd efficiency
- Off spec
- Winder breaks
- Unplanned downtime
- Sheet break recovery time/cull losses

Kick-off Roundtable

Paper Machine Performance Measurements - Paper

- Wet web tensile strength
- Tensile/burst strength
- Variability of grammage
- % ash
- Breaks per hundred rolls at customer
- Hole count
- Defect counts
- CD profiles – moisture and basis weight – 2-sigma and peak-to-peak
- Time required to reach a decent profile
- Number of scratches
- Customer complaints/returns

Kick-off Roundtable

Paper Machine Performance Measurements – Wet End

- Broke tower level
- System temperatures
- Refiner energy consumption – hpd/t
- Freeness – CSF/fiber length
- % plastic in furnish
- Wire pit steam valve position
- Impingement angle
- Rush/drag variation
- Trim squirt cleanliness
- Drive horsepower

Kick-off Roundtable

Paper Machine Performance Measurements – Press Section

- Steambox and rewet shower actuator positions
- Couch solids measurements
- Press solids measurement
- Clothing lifetime
- Link to making money – clothing as total cost per ton
- Press roll life
- Fabric tension
- Rewetting and shadow marking
- Press shower water temperature
- Press vibration
- Overall vibration level
- Plugged showers
- Doctor alignment
- Uhle flows, nip flows
- Uhle box pressure
- Machine draws
- Dryness – press section

Kick-off Roundtable

Paper Machine Performance Measurements – Dry End

- Dryness – press section, size press
- Dryer efficiency – pocket ventilation, build-up of condensate
- Exhaust humidity
- Rate of dryer warm-up temperature – 1-1.5 deg F per minute
- Dryer vent valve positions
- Size press and coating solids
- Number of dryers out of service
- Blade changes – Yankee creping blade
- Rope life

Kick-off Roundtable

Paper Machine Performance Measurements - Energy

- Condensate return rates
- Energy consumption – lb steam/ton paper (or gas)
- Electricity consumption
- Tons coal/ton paper
- Drying kJ steam/kg water evaporated
- Unknown steam losses
- Motive steam consumption
- Wire pit steam valve
- Dryer section venting

Kick-off Roundtable

Paper Machine Performance Measurements - Variability

- Stock flow variability – consistency, flow, freeness
- Stability of profiles
- MD variation
- Stock flow pulsations
- Wet line location and appearance
- Dry line

Kick-off Roundtable

Paper Machine Performance Measurements - Chemistry

- Chemical consumption
- Chemical usage – lb/ton
- Pulp conductivity
- Cleaning chemical usage
- Bug counts
- Chemical composition of whitewater

Kick-off Roundtable

Paper Machine Performance Measurements – Not-so-key?

- Yesterday's golf score
- Clothing cost/ton
- Couch vacuum –
(gauges don't work)
- Pocket humidity level
- Measuring felt life in
days instead of cycles
- First pass retention???
- Felt moisture
content???
- Meeting time
- Freeness? (recycled)
- Overreliance on
computers
- Overreliance on people
- 2-sigma tightness

Kick-off Roundtable

Lessons Learned

- Pay more attention to pocket ventilation
- Look more closely at showering
- Take a harder look at water systems.
- Be more conscious of opportunities to reduce energy consumption by improving insulation.
- Look into heat recovery from IR dryer exhaust.
- Look more at the fabric effects on heat and mass transfer.
- Investigate different mixer designs.
- Schedule a DOE paper machine energy survey at my mill.
- Look into Uhle box steam boxes.
- Look into switching from Sheffield to Emveco.
- Metso vacuum box.
- Stowe-Woodward smart technology
- Correct misconceptions about use of steam showers.
- Feedforward consistency control.
- How to structure your business for 20% lower revenue coming in.
- Fix consistency cycle causing pressure variation.

Wrap-up Roundtable

Lessons Learned

- Recycle product, people, and ideas in our industry.
- Industry has gone away from focus on quality and gone to survival – has changed supplier service and focus.
- Trim squirt and pick-up penetration.
- On-line stickies control.
- On-line porosity sensor.
- Good enough is opposite of agility.
- If we don't do R&D, don't assume that innovation results will be constant.
- Work on improving the basics – showers, temperatures, rounds
- Press section solids scanner
- How Sappi values training – SAPPI academy – 4 months. Six sigma since 1970s.

Wrap-up Roundtable

Lessons Learned

- Community colleges letting us down with regard to vocational training.
- Work with maintenance to become partners in production.
- Try to optimize my steambox operation.
- Clothing panel confirmed that need to convince mills more to optimize their press sections.
- Investigate heat recovery opportunities.

Wrap-up Roundtable

Word of the Week

Champion

- Go back to your job, take the lessons you've learned, and be a champion of improvement to ensure continued operation of your invoice printer!
- Ensure that the right measurements are made and available to the right people in the right way.
- Analyze the data to do the right things to drive stability, agility, and continuous improvement.

Session 10 - Paper Machine Measurement and Performance Kick-Off

Session Chair: Jeff Reese, International Paper

Monday June 1, 1:00 pm

- 10.1 "Don't Forget the Most Important Machine..."
Jim Thompson, Talo Analytic International
- 10.2 "Measuring Paper Machine Performance"
Richard A. Reese, Dick Reese and Associates
- 10.3 PM Measurement and Performance Kick-off
Roundtable
Jeff Reese, International Paper

Session 16 - **Pulp & Wet End PM Measurement & Performance**

Session Chair: Philip Wells, Wells Enterprises Inc.

Monday, June 1, 3:30 pm

- 16.1 "Papermakers, Are You Getting the Pulp Property Information you Need?"
Alan F. Button, Buttonwood Consulting, LLC and World of Market Pulp
- 16.2 "Refiner System Monitoring and Control Strategies"
Shawn R. Berg, J&L Fiber Services
- 16.3 "Best Practices for the Stability and Agility of a Production Line"
Dr. Seyhan Nuyan, Metso

Session 23 - **Reliability Measurement & Performance**

Session Chair: John Neun, Albany International

Tuesday June 2, 8:00 am

23.1 "Take the Fudge out of Paper Machine Performance Calculations"

Mark Latino, Reliability Center, Inc.

23.2 "Reliability and Maintenance Performance Measurement"

Christer Idhammar, IDCON, Inc.

23.4 "Enhancing Productivity through Improved Maintenance Operations: Case Study of How a Strategic Partnership Took a Paper Machine from Worst to First through Improved Operational Performance"

Daniel Konstantinovsky, ABB

Session 31 - Steambox Measurement & Performance - Panel Discussion

Session Chair: Timothy Patterson, Ashland Hercules Water Technologies

Tuesday June 2, 10:30 am

Panelists:

Jack Rumel, Honeywell

Jack Audas, VIB

Philip Wells, Wells Enterprises

Ankur Gupta, Metso

Session 38 - Paper Machine Data Management

Session Chair: Keith Kemp, AstenJohnson

Tuesday June 2 1:30 pm

38.1 "Integrated Tools Help Maximize Machine Performance"

Ron Baldus, Dean Ferguson, Capstone Technology Corporation

38.2 "Energy Management using a Real-time Enterprise Infrastructure "

Dave Stockford, OSIsoft

38.3 "Tools for Pulp and Paper Manufacturers to Control Costs and Increase Profits Enterprise-wide"

Jim Pigott, Tieto

Session 46 - **Press Section Measurement & Performance**

Session Chair: Ian Lang, AstenJohnson

Tuesday June 2, 3:30 pm

46.1 "Reducing Variability in the Press Section"

Daniel Hédou, AstenJohnson

46.2 "Press Section Performance Monitoring"

Keith Lantz, Ross MacHattie, Honeywell

46.3 "Maximizing Machine Efficiency in the Press Section for Graphic Papers"

Robert M. Lowe, Melissa Callejo, Terry Lemerande, Bob Barlow, Nalco Company

46.4 "Extending the Press Section Lifetime through a Mini Shoe Press Rebuild"

Frank Swietlik, Timo Pirinen, Jori Onnela, Jorma Snellman, Metso

Session 51 - Clothing Performance Monitoring - Panel Discussion

Session Chair: Richard A. Reese, Dick Reese and Associates

Wednesday June 3, 8:00 am

Panelists:

John Neun, Albany

Eric Diamond, Weavexx

David Buchanan, Voith

Dave Burton, AstenJohnson

Session 59 - **Papermaking Roundtable**

Session Chair: Gary Nyman, International Paper

Wednesday June 3, 10:30 am

Session 64 - Paper Machine Auxiliary System Measurement & Performance

Session Chair: Jon Kerr, Andritz

Wednesday June 3, 1:00 pm

- 64.1 "Practical On-Line Vibration Monitoring for Paper Machines"
J. Michael Robichaud, P.Eng., CMRP, Bretech Engineering Ltd.
- 64.2 "Paper Machine Room Ventilation Guidelines"
John E. Nielsen P.E., BE&K Engineering Co., LLC
- 64.3 "EMVECO Profiling to Reduce Smoothness Variability"
Louis Gentile, Gary Cothran, Lorentzen & Wettre, USA

**Session 67 - PM Measurement & Performance Wrap-up -
Roundtable**

Session Chair: Jeff Reese, International Paper

Wednesday June 3, 3:30 pm

Session 26 - Paper Machine and Vacuum System Energy Conservation

Session Chair: Jeff Reese, International Paper

Tuesday June 2, 8:00 am

- 26.1 "Measuring Paper Machine Energy Performance"
Richard A. Reese, Dick Reese and Associates, Inc.
- 26.2 "Reducing Energy Intensity in Papermaking Through Energy Efficiency"
Thomas E. Wroblewski, P.E., CleanTech Partners
- 26.3 "Ten Myths Revealed about Paper Machine Vacuum Systems and Related Processes"
Douglas F. Sweet, P.E., Doug Sweet & Associates, Inc.
- 26.4 Roundtable
Jeff Reese, International Paper

Session 34 - **Wet End Energy Conservation**

Session Chair: Martti Tuomisto, Consultant

Tuesday June 2, 10:30 am

34.1 "The Impact of Specialty Chemical Programs on Mill
Energy Use"

Lisa M. Wesoloski, Nalco Company

34.2 "Innovative Mixing of 6%-14% Consistency Stock Vessels
for Improved Quality and Energy Savings

*Dr. Wojtek Wyczalkowski, Marc R. Moseley, Philadelphia
Mixing Solutions Ltd.*

34.3 "Energy Efficiency in Paper Production Using Direct Steam
Injection"

David Degelau, Hydro-Thermal Corp.

Session 41 - **Dryer Section Energy Conservation**

Session Chair: Pekka Kormano, Deublin Steam Systems

Tuesday June 2, 1:30 pm

- 41.1 "Energy Focused Dryer Performance Indicators"
Jeff Chaloux, Kadant Johnson
- 41.2 "A Systematic Approach to Optimize Dryer Performance and Energy Savings – Case Studies"
Ajit K. Ghosh, Visy Technical and Innovation Centre
- 41.3 "Dryer Fabrics and Energy Consumption in the Drying Section"
Ian Lang, AstenJohnson

Session 48 - **Additional Energy Conservation Opportunities**

Session Chair: Jeff Reese, International Paper

Tuesday June 2, 3:30 pm

- 48.1 "Cost Savings with an Effective Chemicals Mixing System at Mitsubishi Paper Hachinohe Mill PM 7"
Jouni Matula, Wetend Technologies Ltd.; Ryouhei Watanabe, Keiichi Sato, Mitsubishi Paper Mills Limited
- 48.2 "Life Cycle Cost Based Optimization of PM Heat Recovery System for Machine Room Ventilation"
Kalle Riihimaki, Balance Engineering Oy
- 48.3 "Insulation, the Forgotten Technology; For Energy Conservation and Emission Reduction"
Ronald L. King, Consultant, National Insulation Association