PULP SAFARI 96—FINLAND: THE INFORMATION HUNT

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A SYSTEMATIC APPROACH TO GATHERING DATA FROM THE MILLS VISITED STREAMLINED THE INFORMATION QUEST.

AS A PARTICIPANT from Boise Cascade on Pulp Safari 96—a tour of five pulp mills in Finland—my goal was to gather detailed information on the Finnish pulping processes, as well as share nonstrategic information with others on the tour. This type of technoshare can create a win-win result for all involved. Following is a short discussion on a data-gathering technique used during the mill presentations and tours and a review of some interesting findings at each mill.

DATA GATHERING

Pulping processes tend to be highly specific. It's difficult to compare your own process with another s that may have different product end uses,equipment types, wood species, quality requirements, and cost structures. One way of avoiding the confusion of multiple information flows is to record each one, as they occur, in a Process Flow Information (PFI) Sheet (**Fig. 1**).

ENSO Gutzeit from the top

Organizing the process flows can provide a good explanation of why the next step in the operation is run the way it's run.The significant statistics about a process are frequently the result of demands by the next customer down the line. Interviewing the key operating people from your mill on specific issues that are eating your lunch is a good way of determining where you should focus the questions.

The enemy here is time.In many cases getting all the details you need to solve your own mill issues takes longer than the 1–2 hours available to both tour a mill complex and ask questions. The PFI sheet is a useful tool because there are very few people who are experts in all processes of pulping and papermaking.By interviewing your fellow work-

The wood yard at Metsä Botnia

ers about *what they need to know* and organizing the data accordingly, the tourist is armed with multiple perspectives and will get the most out of the tour.

METSÄ RAUMA

The dominant theme behind this mill is to build the best mill money can buy and compensate for high variable cost (chemicals, etc.) through low fixed cost and high operating efficiencies.

Rauma was the only mill running 100% totally chlorine free (TCF) of the five mills visited. Running 80% pine to kappa no. 18 kappa with some of the most advanced equipment available presents great challenges. It appears that the new technologies have not solved the soap/foaming problems associated with running a high pine content.The PFI sheet was a useful tool at this stage of the tour, as we focused on washer design, air entrainment, pulp mat discharge, and mixing,to mention a few key variables of a foaming problem. SuperBatch™ cooking, on-line kappa control, and high-efficiency brownstock washing make for a very clean brownstock to the bleach plant.

Bleaching is accomplished via a four-stage (ZQ) P (ZQ) P sequence to an 88 ISO brightness pulp. Because of its recent startup (March 1996),no cost numbers were available. Latest technology includes SuperBatch™ cooking, Ahlstrom DD brownstock washers,oxygen delignification, and ozone/peroxide bleaching. Both high-volume/low-concentration (HVLC) and low-volume/high- concentration (LVHC) noncondensable gases are burned continuously with back-up incineration.

Rauma is actively working at improving TCF pulp strength,which is admittedly lower than elementally chlorine free (ECF) pulp strength.Rauma has one of the lowest effluent pulp mills in the world at only 10–15 m^3 of effluent per a.d.ton.

Metsä Botnia: view from the top

WISAFOREST (PIETARSAARI)

The Wisaforest mill is typical of what you would find in the United States: approximately 1000 a.d. tons pulp/day of softwood from spruce and fir and 800 a.d. tons pulp/day of hardwood from mixed species (mostly birch).

Wisaforest, which employs the HQ chipper, had excellent accept chip quality and a noticeably narrow chip-size distribution. They claim longer, thinner chips improve digester runnability.

Brownstock washing is accomplished via the Ultrawasher, which they claim requires high maintenance but offers a high washing efficiency. Brownstock screening is done in two stages using both holes and slotted screen baskets.

Wisaforest mill

Wisaforest claims it requires 6% more wood to make a ton of TCF pulp than ECF pulp.This was confirmed at the Enocell mill. All of the mills that produced any TCF pulp noted its lower strength properties.

On the recovery side, the mill is very pleased with their Ahlstrom X-filter for green liquor. Also, by preheating their black liquor they are able to achieve a solids firing rate of 78%.

The spreadsheet information recorded at this mill showed the importance of green liquor quality and the problems you can have at high contamination levels,such as more ring formation in the kiln and low inlet mud solids due to precoat filter contamination.Simply recording the information is not enough. Discussing the operational benefits and shortcomings of new technologies leads to information you can use to resolve your own mill issues.

METSÄ BOTNIA AT KEMI

Kemi got my vote for the most impressive, cleanest, most efficient, and quietest woodroom. You could have had a clean, comfortable picnic on the operating floor.

Several observations on new technology were made at the Kemi mill that was not seen at the other mills. One example was a laser measurement and computerized system for measuring the wood volume on truck deliveries, which they claim works well.I know of several mills that wrestle with calculating wood yield,pulp yield,or both.Use of the spreadsheet to gather some of the key information about this technology was helpful.

Another technology employed at this mill takes the secondary sludge and mixes it with black liquor for burning in the recovery boiler. Several articles are published on this topic. The sludge makes up about 10% of the total flow of black liquor to the boiler. The recovery boiler is a Tampella 6 million lb/day BLS boiler equipped with black steel tubes in the furnace bottom to prevent cracking. Black liquor solids are fired at 85% and the boiler is not experiencing the potassium/chloride issue, as are many other recovery boilers operating today. Kemi also claims that burning the higher black liquor solids has no effect on the pollutant load to the electrostatic precipitators (ESP).

ENOCELL OY

The Enocell mill produces both ECF and TCF pulp with some of the same results—higher wood consumption and lower strength—as the Wisaforest mill.This was the only mill we toured that did not have chip thickness screening and claimed it was not a problem. Interestingly, this was the only mill with four stages of brownstock screening compared with two stages at the other mills.

Scenes from Enocell

The Kamyr digester was shut down and replaced with SuperBatch™ cooking. There was an extremely high inventory of wood on the mill site due to Russian contracts to deliver whether the mill needs the wood or not. The mill produced 30,000 tons of TCF in 1995 and will produce less in 1996.There was a very noticeable reduction in color and COD across the effluent treatment plant. Environmental engineers attribute the reduction to the use of urea. Mill officials don't favor TCF over ECF but like the concept of totally effluent free (TEF).

ENZO GUTZEIT

Enzo is the world s largest producer of liquid packaging. A full 86% of their production is exported to the Far East.

The Enzo mill is in the ECF production camp with a D-E-EP-D-E-D bleaching sequence that gives an 88 ISO brightness. They expressed the same concerns with TCF as other mills (wood consumption,cost,and strength).

The mill was built in 1935 but many capital improvements have been made.They produce approximately 1300 tons/day of hardwood pulp and 600 tons/day of softwood pulp. Approximately 65% of their energy comes from two recovery boilers burning 73% black liquor.

REFLECTIONS

The talented Finnish pulp producers are not necessarily more highly skilled in people terms, but they have made a commitment to the new technologies and that commitment is in the form of capital investment.Because of those investments they are able to operate at higher levels of efficiency and in many cases at lower cost.I get the sense that their vision extends over the next 10–20 years,while we are calculating the 1–5-year economic value added (EVA) returns on our investments.

Likewise, they are taking a higher risk for assuming the technological leadership role; for example, Rauma s US$700 million TCF pulp mill.In a few years some graduate business student will be doing a thesis on the comparison of long-term risk taking investment vs. shorter-term (1–3 year) financial performance to determine which approach serves which stakeholders best.

Finally, I know that all of the participants want to give a special thanks to the Finland Trade Center, Ahlstrom Inc., KONEWOOD, Tamfelt Inc., Tampella Power, and Valmet Automation. The technology that these companies offer has made the paper industry the technological success it is today.

Also, none of us will ever forget Kari Nettamo, president of Pulp and Paper Technology Inc., who guided the tour. Kari found the perfect balance of work and fun in a hectic five-day schedule.Kari's experience in these mills coupled with the historical knowledge of his native land was what made the trip a complete success.

A sincere thanks from all of us to all of you. **TJ**

Boudreau has worked in the paper industry for 15 years and is currently the technical superintendent for pulp/bleach/recovery at Boise Cascade in Rumford,ME.

Longwood Fibre's Jim Stacie views the ozonator at Wisaforest.

Scene from Enocell

Wisaforest mill and wood yard

	PULPING	RAUMA MILL
Wood	Delivery	Small family-owned wood operations
	Species	Pine 80% + spruce 20%
	Quality control	
	Bark content	Low due to deicing—fresh and mill water 120–130° F
	Processing	All belt conveying 350 m3 per hour drum=35 m x 5.5m
	Cost per ton	
	Wood yield	45%
	Other	
Chips	Size	3–7 mm
	Rejects	Overs are resliced,fines mixed with bark and sold
	Method of delivery	Belt conveyors
	Other	
Cooking	Batch/continuous	SuperBatch
	Kappa no.	12 or approx.18
	Digester type	SuperBatch
	Production rate	500,000 tons/year
	H factor	
	Pulp yield	43%
	Automation/instru m AQ	Kajanni on-line kappa control
	Other	No
Washing	Method	Wash press—fine screen—2nd wash press
	Manufacturer	Ahlstrom
	No. of stages	2
	Efficiency	90+
	Solids % to rec.	18
	Defoamer	Yes
	Dispersant	Yes
	Pitch problems	Some but lots of foam (80% pine)
	Specific loading	
	Soap	Lots and it s a problem
	Cond.to bleach plt.	Low—good washing
	Consistency vat/mat	Good—new washers 7–8% cons. feed 25% cons.discharge
	Other	
Screening	Type	Ahlstrom
	No. of stages	3
	Efficiency	95+
	Rejects recovered	Yes—sold to make core stock
	Brownstock cleaners	No—but they clean BS filtrate and send solids to landfill
	Other	