KRUGER'S NEW PLANT MAKES RECYCLED PULP WITH STYLE

Flotation and washing are keys to its success

BY SUSAN STEVENSON, MANAGING EDITOR

W E'RE GOOD AT WHAT WE DO, and proud of it." That was the word from Alain Labonté when PULP & PAPER CANADA visited the new $50-million de-inking plant at Kruger Bromptonville, Que. Labonté, vice-president corporate affairs, explained that Kruger has been in the recycling business for 30 years. The requirements of its U.S. customers for recycled content in newsprint presented a challenge which Kruger has met with enthusiasm.

The Bromptonville mill produces 600 tonnes per day (t/d) of newsprint, on three paper machines. The virgin fibre comes in purchased chips. The need to include recycled fibre in Kruger's Canadian newsprint mills was the driving force behind the construction of the 150-t/d de-inking facility, Phase 1 in the company's recycling strategy for Bromptonville.

Roland Cyrenne is Kruger's executive vice-president and CEO. He sees the de-inking capability as part of the company's global strategy. "The addition of this new technological dimension gives Kruger the edge on quality in the recycled newsprint market. Since our principal customers are the high-circulation daily newspapers, it was imperative that we produce a pulp which did not have that "recycled look" but was comparable in brightness and strength to that of virgin fibre." Cyrenne added that the Bromptonville de-inking plant started up in June 1992, exactly one year to the day after construction started.

URBAN FOREST

It is many years now since the late Andrew S. Fleming, Domtar, coined the phrase 'the urban forest'. For Kruger Bromptonville that's the source of its fibre supply for the new plant. With the company's long experience with the recycled side of the pulp and paper business, Kruger has studied the supply of old newsprint (ONP) and old magazine grade (OMG) available in North America.

One conclusion in a 1990 paper by R.B. Kerr, Kruger's director, corporate technical department, was that sufficient recyclable fibre may not be available for all the companies that want it (P&PC 92:10 (1991) T239). Kerr said that "as we divert reclaimed newspapers to newsprint papermaking, it is important that we use presently unused fibre sources. We don't just want to 'steal'..."
from present users."

With those thoughts in mind, the establishment of reliable sources of ONP and OMG was an essential element in Kruger's plans for Bromptonville.

Looking first in its own backyard, Kruger has been able to organize that about 50% of the tonnage required for the 150 t/d de-inking plant is collected from Montreal and locally around Bromptonville, Sherbrooke and OMG. This recovery area was chosen by Kruger because 80% of its newsprint production is shipped to customers located in the North East. Newspaper publishers in this area presently using Kruger newsprint, will be required by state legislation to increase recycled content in newsprint from the present 7%, to 40% by the year 2000. Eventually, the Albany facility will also collect waste paper from other communities in upstate New York to collect waste paper.

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Consistently high quality recycled fibre is an essential element in Kruger's plans. Dick Loyst, general manager, recycling division, is in charge of the Albany plant and comes to the job with many years of experience in the North American waste paper market.

Loyst says "Our sorting and baling facility in Albany puts us in direct control of the quality and consistency of our recycled fibre. We're controlling our raw material sourcing by closing the loop from the urban forest to the production of recycled pulp at our de-inking plant and the manufacture of quality newsprint at our paper mills. We didn't feel we could rely on consistent quality from outside waste paper brokers."

Waste ONP and OMG delivered to the Albany plant is moved on conveyors to elevated sorting stations. There, sorters pick out the obvious contaminants, and the highly automated system produces about 18 t/h of clean waste paper. A high-density baler produces one-tonne bales which are bar-coded and placed in inventory. These bales are then backhauled by Kruger trucks in a five-hour journey to Bromptonville.

**PROCESS**

Prior to the U.S. legislation requiring recycled content in newsprint, Bromptonville production was made with 100% thermomechanical pulp (TMP). The TMP is made in a plant installed at the mill in 1987. Proportions of 30% OMG and 70% ONP are used for the de-inked pulp production. The OMG contains a certain amount of kraft pulp which, as is well known, adds strength to the sheet. Thus the kraft content in the de-inked pulp is added to the final newsprint stock, making a stronger sheet than the 100% TMP, with better caliper and opacity. The OMG also acts as a wetting agent. It stabilizes the peroxide and prevents the yellowing of the fibres.

However, before the final newsprint sheet is made, the de-inked pulp must be made to the most demanding specifications. Here's how it is done.

In the warehouse, the waste paper is loaded with the desired mix of newspapers and magazines. Below the second conveyor is an electronic load cell which automatically controls the delivery of the waste to the pulper. The conveyor stops when the pulper has sufficient waste in the proportions mentioned before — 30% OMG and 70% ONP.

Pulping is a batch process at Bromptonville, using a Fiberprep Helico pulper. A fixed quantity of hot water flows into the pulper vat from a reservoir above it. About 2.5 tonnes of waste is then added, the pulping action begins and the consistency of the pulp is about 12%. The pulping chemicals are added at this point in predetermined doses.

Pulping is a gentle action to avoid breaking up contaminants such as plastic which can then be removed more easily. In the pulper, the chemicals swell the fibres, the bonds between the ink particles and the fibres break and the gentle agitation lifts the ink, and clay from the OMG, from the fibres.

MacLeod says that the chemicals used at Bromptonville are a standard list:

- Sodium hydroxide is used to break down the oil base of the ink and also helps to swell the paper fibres. It makes the first part of the process alkaline, at pH 9;
- A surfactant in the pulper enables the tiniest ink particles to be wetted and to stay dispersed in the water;
- Hydrogen peroxide is added to brighten the pulp and remove color. It supresses the yellowing action caused by the alkalinity;
- Sodium silicate also acts as a wetting agent. It stabilizes the peroxide and prevents the yellowing of the fibres.

The pulp is then put through a Lamort Poire coarse screen supplied by Fiberprep. This is where the largest contaminants are removed. Then the pulp moves on to one of two soak chests where it is held for an hour to complete the chemical reactions and the fibre swelling.

From this point the process becomes continuous. The pulp passes through a Black Clawson high-consistency centrifugal cleaner, at 4% consistency to remove paper clips, staples, sand and any other small items that are heavier than water.

Next come two sets of primary screening. The first is a Fiberprep CH5 screen with 1.6-mm holes to remove any nondisposable paper and other similar contaminants. Then the pulp passes through a Fiberprep CH7, with 0.35-mm slots.

Flotation comes next, in two Fiberprep de-inking cells, to remove the larger ink particles, 20 to 150 microns. The pulp, now diluted to about 1%, is injected into the de-inking vat along with millions of tiny air bubbles. The ink particles floating in the slurry stick to the bubbles, which in turn float to the surface in a black foam. The foam is then vacuumed off and ink is separated from the air centrifugally.

There are two de-inking cells in series, and because of recirculation, some of the pulp will pass up to six times through the cells.

**ACID LOOP**

The de-inking process began under alkaline conditions which were required to get the ink off the fibres.
MacLeod describes it, "We now separate the system and go through an acid loop. This action is new to the de-inking process. It was first used at the Bridgewater mill in England (P&PC 85:10 (1984)). However, the acid loop is not widely used."

The acid condition causes the stickies to come out of solution and allows them to be removed in the de-inking plant. The alternative is to send the deinked pulp directly to the paper machines where it would first meet with acid conditions. "As you know," says MacLeod, "if the stickies come out of solution on the paper machine, you are in deep stickies!"

To change the pH to acid conditions efficiently, as much alkaline solution as possible must be removed. This is done with a disc filter and a belt press operating in tandem. The alkaline filtrate is recycled back to the pulper.

The pulp off the belt press is about 30 to 35% consistency. Sulphuric acid is added to bring the pulp to a pH of about 5, and the pulp is once more diluted to a consistency of about 1%.

Removal of the smallest contaminants comes next, through a series of cleaners. The pulp goes through Beloit Posiflow forward centrifugal cleaners which remove the fine denser particles. Fine slotted screens, Fiberprep SPM 1000, then take out fibre bundles and impurities with larger surfaces. Finally, Beloit Uniflow reverse centrifugal cleaners remove any impurities lighter than water, specifically plastics and stickies.

The pulp is now clean except for clay content, and for the finest particles of ink, under 50 microns. The new flexographic inks fall into this category and they, as well as UV inks, are tricky to remove. However, with two Holder Pa-

**WHAT NEXT**

This de-inking plant is Phase 1 of Kruger's plans for recycling at Bromptonville. Phase 2 includes plans to increase production to 450 t/d. The space is there — timing is the question.

At the end of 1991, Canadian deinked fibre capacity was about 700 000 t/y. By the end of 1992, the total will exceed 1 million tonnes.

Newspaper capacity, on the other hand, is declining. Much has been shut down because of the North American recession. As new federal and provincial pollution regulations come into force, more capacity is expected to be lost.

Through gradual expansion, Kruger intends to be a significant contender in the global newspaper market, becoming a leader in the recycling field and competing in the U.S., South America, Europe, Africa, Asia and the Middle East. Bromptonville has a significant role in that plan.

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