

A stack of papers is shown, with a magnifying glass held over one of the pages. The magnifying glass focuses on a vibrant green image of a landscape or forest. The background shows other pages of the stack, some with text and some with images of insects.

Publications Paper Spotlight Focused On Lightweight Groundwood Grades

LWC, ultra-LWC, SG papers are being progressively substituted for coated free sheet grades in North America as postage rates and distribution costs rise.

By Ken Patrick, Editorial Director

In the lightweight coated and supercalendered publication papers sectors, the “European approach” has come to North America in a big way during the past five or six years. Following UPM-Kymmene’s acquisition of Blandin Paper in the late 1990s and its subsequent purchase of the Miramichi, N.B., mill from Repap, Stora Enso also became a major player in this hemisphere with the acquisition of Consolidated Papers in late 2000.



The “European approach” being used by most North American groundwood publication paper producers today focuses on optimized filling and coating formulations for maximum performance and minimum costs.

In addition to Consolidated’s six coated publication and SC paper mills in the Paper Valley states of Wisconsin and Minnesota, Stora Enso has continued to upgrade its Port Hawkesbury operations in Nova Scotia, where a new TMP plant came online in 2004 supporting the world’s largest SC machine there. Today, Stora produces 17% of its total global output in North America, most of that being in the lightweight printing and publications papers arena. This is no small commitment since Stora is considered in many camps to be the world’s largest paper company.

Generally, the European approach discussed in this article centers around the use of groundwood base sheets combined with the highly effective use of minerals and other coating and filler ingredients to achieve maximum print performance at minimum costs, often competing as a direct substitute for more costly higher grades of coated publications papers. The name of the game is high brightness, opacity, gloss, and bulk combined with lighter weights to reduce postage and distribution costs for printers and publishers.

Many North American mills in the lightweight publication papers arena, especially those without direct European

connections, are finding that supplier companies with extensive European backgrounds can help fill the “experience gap” and provide valuable technological direction and support in this regard. Omya, for example, has extensive minerals applications experience gained during the alkaline “revolution” that swept Europe’s free sheet markets during the 1970s as well as the lighter weight groundwood sectors in recent years.

To explore lightweight publication paper developments in more detail, specifically in relation to the rapidly changing scene in North America, *PaperAge* recently met with Mike Strutz, paper technical service manager, and Steve Stueck, director of marketing—Paper, Omya. With a production and technology base in both ground and precipitated forms of calcium carbonate, Omya has been at the center of neutral/alkaline papermaking developments for many years, in both filler and coating applications, for free sheet as well as groundwood grades.

NORTH AMERICAN SCENE

Today, many North American publication paper mills without direct or acquired European heritage are using their own, somewhat modified version of the European approach to produce superior lightweight and ultra lightweight printing papers. Native producers such as Kruger’s Wayagamack mill, for example (see PM 4 Update, page 54), started up the first coated groundwood paper machine in North America in 15 years at Trois-Rivières, Quebec, Canada, in the fall of 2003 (*PaperAge* cover story, Jan/Feb. 2004).

Employing an online film coater and supercalendering system on its new PM 4, the Wayagamack mill has been producing more than 200,000 mtpy of high quality LWC and ultra-LWC papers in the 41 to 60g/m² range (26 – 36 lb/3,000 ft²) since startup. Now the second largest producer of ultra-lightweight grades in North America behind IP, which recently announced a strategy taking it out of this position, the privately-held Kruger sells PM 4 production mainly to printers in the U.S.

The ultra-LWC Krucoat product made on Wayagamack’s PM 4 competes primarily with No. 5 LWC. As detailed in the “PM 4 Update,” the mill has recently been able to further boost the brightness of some of these neutral ultra-lightweights (targeted at the magazine, catalog, and insert markets) from 72 to 76 ISO brightness, making it even more competitive with No.5 LWC papers in North American marketplaces.



PM 4 UPDATE

According to Daniel Trembley, mill manager at Kruger's Wayagamack mill, PM 4 has been running almost constantly at full speed (1,500 m/min) on the lighter weight offset grades in recent months, operating with just one Metso WinBelt L winder. This has caused some problems when producing heavier weight 59 - 60 g/m² (36 lb) papers. The one winder just can't keep up.

The mill is investigating a second winder to help correct this problem and also allow the machine to increase sustained production speeds to 1,800 m/min. Trembley expects the project to be presented by the end of this summer. Designed to produce 200,000 mtpy, PM 4 is budgeted at 235,000 metric tons for 2006.

A 76 ISO brightness paper has recently been produced on the new machine, beginning with the 56 gram (34 lb) papers and then the 52 gram (32 lb) weights, followed by various other weights. The higher brightness product has been well received in the market, Trembley reports.

Brightness of Wayagamack's Krukote offset grades is normally in the 70 - 72 ISO range. At least two points of the gained brightness comes from a new technology developed by the University of British Columbia, which Trembley says cannot be discussed at this time because of pending patent complications. The new technology, however, involves a product added to the mechanical pulp, he says, resulting in the two-point bump in brightness.

Trembley adds that maximizing the coating formulation ratio of carbonate and kaolin has allowed the additional brightness gain. Depending on grades, he says the carbonate portion in the formulation is ranging from 70 parts with the heavier grades to 40 parts with the lightest weights. Maximizing the ratios has also allowed a reduction in calendaring while still getting desired gloss properties.

Neil Falco, Kruger VP of Coated Paper Sales, based in Greenwich, Conn., points out that "while there are competitive grades available at this brightness level, Kruger's ability to manufacture them in these lower weights has given those customers who want to save money on postage and distribution, but who don't want to sacrifice higher brightness, a special new grade."

The only negative problem impacting the otherwise continuing success story for PM 4, is, of course, the strength of the Canadian dollar, especially considering that most of PM 4's production is targeted at magazine publishers, printers, and catalogers in the U.S. "The steep rise in the Canadian dollar has made it imperative to be a low cost producer to survive," Falco says. "And PM 4's ability to cost-efficiently run basis weights as low as 28 lb at the highest quality level in the industry has played a major role in our survival."

LWC and SC papers

As Strutz and Stueck explain, an on-going shuffling and blurring of grade distinctions has been intensifying in North America for some time now, with SC-A grades as well as ultra-LWC papers, such as those made at Wayagamack, substituting in many cases for LWC No. 5 grades, No 4's substituting for No. 3 coated free sheet papers, etc. This upward encroachment of groundwood-based publication papers has been fueled by the continuing advancement of pigment technologies.

The growth of ultra-LWC coated capacity in North America during the past decade has been accompanied by a simultaneous expansion of SC and SC-A capacity. From only a spotty few SC machines in the early 1990s, today there are at least 10 major North American mills producing supercalendered papers, some making SC-A, SC-A+, or SC-A++ grades that have also been competing very successfully as a substitute for No. 5 LWC grades.

Many of these uncoated SC mills are still operating "acid," using mainly kaolin clay fillers, while others have transitioned to neutral or alkaline using precipitated or ground carbonate fillers. Strutz and Stueck report that more activity involving carbonate usage in SC paper production is planned.

According to Strutz, coating formulations for groundwood grades in North America today are in the 40 - 60 parts carbonate range, "but there are some applications up in the 70s," he says, adding that clay/carbonate ratios in these grades are approaching that for coated free sheet papers. More than half of the North American coated groundwood market is currently alkaline, with some 60% of paper machines producing neutral or alkaline, he notes.

Not a lot of filler is being used in coated LWC base sheets, Strutz points out, with 2% - 3% carbonate being typical for buffering to neutral pH, and an additional 5% - 7% coming in through the recycled broke, for a total of 8% - 10%.

BALANCING ACT

Omya worked closely with the Wayagamack team from the very beginning, Strutz emphasizes, running extensive pilot coater trials in cooperation with Metso and other suppliers. Kruger was highly organized moving into startup of PM 4, and even afterwards, working out problems and optimizing coating formulations.

Runnability of the metering size press on PM 4 was a major issue for Wayagamack, along with maximum brightness, Strutz recalls. "The focus was on how much carbonate would be needed to balance runnability and brightness for

maximum advantage. This is an issue on most coated groundwood machines, for that matter, especially the ultra-lightweights,” he adds.

Stueck points out that although the rounded carbonate particle morphology is highly conducive for maximizing runnability and brightness at the same time, there is certainly some synergy considerations for using other pigments as well in formulations, such as clay, TiO₂, and various engineered pigments. “There has to be a balancing of runnability, printability, brightness, gloss, and the general structure of the coating,” he points out.

Looking across the broad spectrum of coated products, “you see board manufacturers running 70 - 80 parts carbonate and 20 -30 parts clay, and similar for coated free sheet with 60 – 80 parts carbonate and 20 -40 parts clay. But the coated groundwood sector is just now getting up to these ratios,” Strutz explains.

“The thinner coatings on these lower brightness, lightweight groundwood base sheets can create coverage issues, and traditional wisdom says that a platy particle, such as clay, will lie down better and give enhanced coverage,” Stueck says. “But some of our engineered carbonates are giving similar optical results while improving brightness, and with these, we expect carbonate ratios of the ultra-lightweight groundwood papers to eventually get up to those of the other groundwood grades.

“We have to find ways with these very low coat weights to get the coverage and produce a sheet that runs well in both offset and rotogravure applications, where you need a very smooth and compressible surface. We’re putting a lot of effort into this important area right now, and I think that soon producers of roto grades will be able to provide high carbonate sheets with all of the brightness advantages they previously haven’t been getting,” Stueck says.

In the offset area, some North American printers using sheets with progressively higher levels of carbonate have encountered a problem with highly acidic fountain solutions causing milking problems on the press. Stueck notes that this problem was solved for European printers some time ago, by modifying their fountain solution compositions to a higher pH in the 4.5 – 5.0 range.

Strutz adds that, actually, the problem has been very limited in North America to those printers not used to running alkaline free sheets and coated groundwoods. While most printers here are used to these sheets and have learned to



The name of the game for coated publication papers today is high brightness and gloss on lightweight and ultra-lightweight groundwood base sheets that provide maximum opacity and bulk.

adjust, some offset printers now going to the ultra-lightweight, high carbonate groundwoods may be running fountain solution pH's in the 3.8 range, and could encounter problems they haven't dealt with before, Strutz continues. “Based on our extensive European experience with this specific problem, we can offer some help to these customers.”

As has been the case with coated free sheet and the heavier coated groundwood grades, brightness continues to be the main driver pushing conversions to carbonate in the ultra-lightweights, along with the postage hikes implemented several months ago. “Today's printers and publishers have long specified groundwood papers for mailing because of the higher opacity of their base sheets. Now, with the increasing use of carbonates, they can also get higher brightness,” Stueck points out. ■