

MONDI IN SOUTH AFRICA

DONALD G. MEADOWS

MONDI LTD. IS ONE OF TWO companies that dominate the South African pulp and paper industry (Sappi, the other company, will be featured in the May 1999 *TAPPI JOURNAL*).

In Europe, through Mondi Minorco Paper, it has joint control of the Austrian paper company Frantschach and roughly half interest in the Neusiedler group. It also has equal ownership with SCA of the Aylesford recycled paper mill in England. Further interests include the Swiecie mill in Poland (see p. 51 of the February 1999 *TAPPI JOURNAL*), the Syklyvkar mill in Russia, and 28% voting share in Aracruz Cellulose in Brazil (see p. 67 of the November 1998 issue).

Joint shareholders of Mondi Ltd. in 1998 were the Anglo-American Industrial Group, Anglo-American Corp. and de Beers. In South Africa, the company's operating divisions encompass forestry, sawmills, timber products, recycling, pulping, paper and board manufacturing, distribution, and marketing.

MEREBANK

The Mondi Paper division is based at the Merebank mill, just south of Durban, South Africa's second largest city and most important export harbor. Merebank exports about 40% of the paper it produces, primarily to Australasia, Sub-Saharan Africa, and South America.

Construction of Mondi Paper's Merebank mill began in 1969. Start-up of the first of Merebank's five paper machines was in 1971. As of 1998, it had an overall capacity to produce 566,000 metric tons of paper a year.

Merebank employs about 1250 people. In the South African market, it is the only producer of supercalendered magazine paper, telephone directory paper, and carbonless copy paper.

The mill has five paper machines, all trimming at 5.5 m wide, with 1998 capacities as follows:

- PM 1—120,000 metric tons/year of magazine paper in the range of 48.8-60 g/m²; speed: 950 m/min
- PM 2 — 90,000 metric tons/year of fine paper (bleached kraft, continuous stationary, envelope, photocopy) in the range of 58-120 g/m²; speed: 450-650 m/min
- PM 3 — 120,000 metric tons/year of fine paper (photocopy, carbonless base, book printing) in the range of 40-80 g/m²; speed: 750-850 m/min
- PM 4—120,000 metric tons/year of newsprint (education grades) in the range of 45-48.8 g/m²; speed: 1000-1050 m/min
- PM 5—110,000 metric tons/year of newsprint and telephone directory paper in the range of 36-48.8 g/m²; speed: 1020-1120 m/min.

PM 1 was rebuilt in 1990-1991 to allow the division to enter the overseas SC market. The advantages did not last long, however, and the machine underwent another rebuild in 1995. Quality upgrades were made to PM 4 and PM 5 that same year.





A science fiction television program inspired the name for this paper machine at Merebank.

Merebank had a new wrapping line, a sixth winder and an A4 sheeter installed in 1996. The next year, PM 2 and PM 3 were converted to alkaline sizing. Before the changeover, a conversion team of mill and supplier members visited mills in Europe to evaluate processes already in use. They also got a lot of technical support from Neusiedler. A lot of effort was then devoted to training before the actual conversion.

While Specialty Minerals SA was building a precipitated calcium carbonate (PCC) satellite plant at Merebank, the mill went ahead and converted to alkaline sizing using clay, before switching to PCC. The PCC is produced using lime from the northern Cape Province and CO₂ from mill flue gases that have been cooled and scrubbed.

Subsequent upgrades were made to PM 3, including a Valmet distributed control system, and a new coater was installed. An ABB quality control system was installed on PM 2 at the beginning of 1998 and an ABB hole detector was installed on PM 3. Additional online monitoring equipment was installed by Valmet for retention systems,

Lechintech for charge measurement, Value Systems for porosity measurement, and BTG for freeness on PM 3. An NDC gamma gauge was also added to the PM 3 forming section.

As part of the projects, Siemens provided a combination of AC variable speed and DC drives, along with programmable logic controllers. A new Andritz Sprout Bauer 42-in twin flow refiner, equipped with an ABB motor, was added to handle short fiber.

The 1997 upgrade of PM 3 included the installation of a Valmet Symsizer, followed by an air turn. A Küsters Beloit Multi-HV single nip calender was also installed. Blow boxes, transfer boxes and an additional slalom run in the drying section were among additional improvements reported.

In 1998, a re-reeler was added and the mill took further steps to reduce water consumption. Merebank's water usage equated to a reported R65 per ton of newsprint produced that year. (US\$ 1 = about R6.0). Annual consumption is around 11.5 million m³ of water, about half of which now comes from purified sewage and recycled effluent. Clarified effluent is reused in the vacuum pumps, for example, saving as much as 10,000 m³ a day.

Merebank commissioned its recycled fiber and deinking plant in 1991. The plant converts approximately 85,000 metric tons of recovered newspapers and magazines into 70,000 metric tons of pulp for newsprint each year. The main components used for recycling at Merebank include a batch pulper, two gyro cleaners, and a flotation cell with six primary and two secondary compartments. The paper for recycling comes from Cape Town, Durban and Johannesburg.

A drum debarker in the woodyard is used to process about 500,000 metric tons/year of Patula pine (*Pinus patula*) logs. Bark is sent to the Richards Bay mill to be



Views of the paper machine at Merebank



Process control at Merebank

burned. Merebank's chip handling system is designed for 75,000 metric tons/year.

Merebank uses a two-stage refining system for thermomechanical pulp. Roughly 200,000 metric tons of pulp are processed using four primary refiners, four secondary refiners, and four reject refiners. The pulp mill also produces 120,000 metric tons/year of groundwood pulp using 13 atmospheric stone grinders and one reject refiner. Supplies of chemical pulp are brought in from Mondi Kraft's mill at Richards Bay.

RICHARDS BAY

Mondi Kraft is Mondi Ltd.'s other main pulp and paper division. Its largest facility is located at Richards Bay in northern KwaZulu Natal, near the busy, deep water port at Richards Bay, South Africa.

The Richards Bay mill was established in 1984. The pulp mill produces approximately 350,000 metric tons of bleached eucalyptus hardwood market pulp annually. The facility's linerboard machine manufactures about

170,000 metric tons of white-top and unbleached kraft liner a year.

In addition to the Richards Bay facility, Mondi Kraft operates the 100,000 ton/year Felixton mill near Empangeni, just west of Richards Bay, and the 125,000 ton/year Piet Retief mill in Mpumalanga, South Africa. Felixton was the first paper mill in South Africa to process bagasse and recycled fibers to produce fluting. The Piet Retief mill, which produces high quality linerboard, has a unique ultra-filtration and reverse osmosis system for effluent treatment.

As a division, the mills have been ISO 9002 certified since 1993. They were to be assessed for ISO 14000 certification during the first quarter of 1999.

Mondi invested R128 million a few years ago to increase pulp production at Richards Bay. That project was completed in 1996.

About 70% of the mill's bleached kraft pulp is exported, mainly to Europe, for use in bond and copy paper, as well as uncoated wood-free paper. More recently, its use has expanded to tissue and white top liner.

Within South Africa, the Merebank mill is the biggest customer for the pulp.



A closer look inside one of Merebank's paper machines



Roll wrapping in Merebank's finishing area



Rolls await shipment from Merebank's warehouse



Peter Leah, technical manager at Richards Bay

The main species used for making pulp at Richards Bay is *Eucalyptus grandis* from clonal plantations. Mondi owns or manages about 600,000 ha of forests in southern Africa, of which a third is maintained as national heritage lands or is unusable for plantations. About 55% of the usable portion is devoted to hardwood (eucalypt) production, the rest is used to grow softwood (pine). Mondi Forest division has recently received FSC accreditation.

About 60% of the wood used at the mill comes in by truck, the rest is transported by rail.



Wood delivery to Richards Bay

Richards Bay is striving to be among the lowest cost producer of eucalyptus pulp in the world, said Peter Leah, the mill's technical manager. It is the preferred supplier to many of its customers, even though its total annual production of eucalyptus pulp is relatively small compared to the 8 million tons of eucalyptus pulp available, he said.

Mondi Kraft is undertaking a R550 million upgrade of PM 2 at Richards Bay. Valmet is the main supplier for the rebuild, which is scheduled for completion by September of 1999. The rebuild includes two hydraulic SymFlo head-boxes, a SymFormer MB, a SymBelt press, a SymSizer, and OptiSoft calender, plus dryer, reel and winder modifications. The mill's linerboard capacity will increase to about 235,000 metric tons/year after the rebuild.

Valmet Automation is supplying an NT-based Damatic XDi process control system for PM 2, for control of stock preparation, and as part of an upgrade of PM 1. A Paper IQ system with two frames and six sensors is being installed, along with a PaperMap quality reporting system and Sensodec 6S condition and runnability monitoring system.

As part of the improvement project, Kvaerner will install an additional chemical recovery boiler having a daily capacity of 900 metric tons of dry solids. That will supplement the existing Götaverken recovery originally designed for 1750 tons/day of dry solids and upgraded to 2400 tons/day of dry solids in 1996.

Richards Bay is equipped with 14 batch digesters positioned in two rows of seven each, with a 235 m³ capacity. That arrangement gives the mill additional flexibility to make a variety of pulp grades, according to Peter Leah. The mill can run four of the vessels with softwood and the rest with hardwood, or any combination, he noted.

After the digesters are three blow tanks—one for pine and two eucalypt pulp. The mill averages 66-70 blows a day, at 22-23 tons per blow, Leah said. The pine pulp goes through a separate filter and two Sunds slurry presses to high density storage.

Two washing lines, with four drums each, follow the blow tanks. After washing, pulp passes through slotted and perforated screens to a decker and then storage.

Richards Bay has a straight through bleach plant rated at 1350 tons/day. For its European customers, the mill became capable of elemental chlorine-free (ECF) bleaching a couple years back through a R65 million upgrade of the bleaching plant. For ECF pulp, the mill uses a DoEoD₁ED₂ bleaching sequence. It doesn't use oxygen delignification, but has been looking into using peroxide for added brightness. Otherwise, the standard sequence substitutes CD for the first stage, with 50% to 70% chlorine dioxide substitution.



Inside the mill at Richards Bay



Pulp washing at Richards Bay.

The mill imports about 8000 tons of salt per month from Namibia, for use in producing chlorine, ClO_2 , caustic soda and other chemicals on site.

A further R30 million was spent to reduce odor and particulate emissions. That effort included the installation of a fourth electrostatic precipitator on the recovery boiler, one on the lime kiln, and an incinerator to burn noncondensable gases.

For each ton of pulp produced, the mill uses about 54 m^3 of water. After primary treatment, the effluent is used

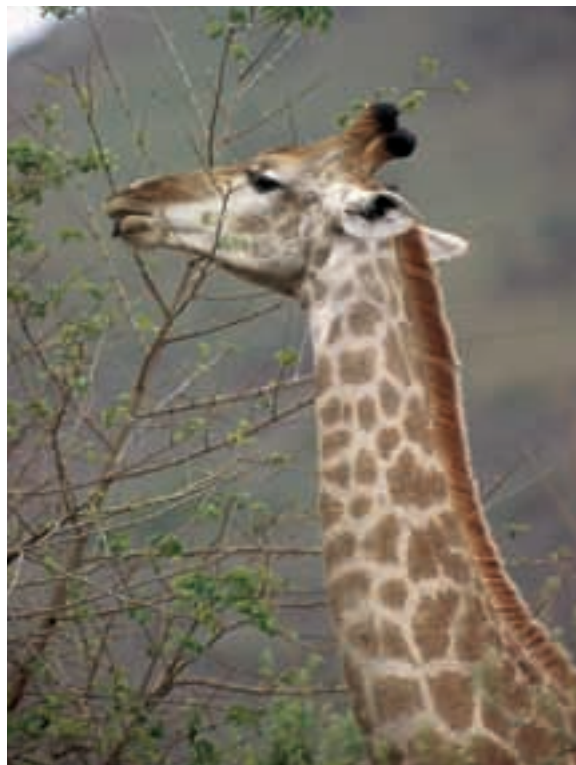
as a diluent by other manufacturing companies and the Municipality of Richards Bay and is eventually piped out to the Indian Ocean.

The division also operates the SilvaCell wood chip mill at Richards Bay, with production exceeding 1 million tons/year. **TJ**

Meadows is editor of TAPPI JOURNAL.



About 100 km to the north of Richards Bay is Hluhluwe-Umfolozi Park. The 96,000 ha game park comprises Africa's oldest game reserves, dating back to 1895. The park supports a rich variety of plants and bushveld animals. Among the animals seen at the park are elephants, black and white rhino, giraffe, zebra, buffalo, hippos, antelope and gazelles. Harder to spot, though also found at the park, are lions, cheetah, leopards and other predators.



A Mondi perspective on South Africa's pulp and paper industry

The pulp and paper industry is playing a significant role in the South Africa's new business environment, says John R. Barton, deputy managing director of Mondi Ltd. and general manager of Mondi Paper. "The industry is a true global competitor, cost effectively producing paper and board products of world class quality. It has gone from being a net importer of timber and timber products in the early 1980s to a net exporter." Exports came to approximately R3.4 billion in 1997, mostly in value-added products.

Especially during the last 30 years, the South African industry has experienced remarkable growth, he noted in his keynote address at TAPPSA'S Ninth Biennial International Conference and Exhibition in Durban last fall. "While world production of paper and board has grown by an average annual rate of 3.0% per annum since 1970, the South African industry achieved an average growth rate of 5.2% per annum. It has production capabilities of about 2.5 million tons of pulp and 2.4 million tons of paper and board."

Although significant for Africa, it barely amounts to 1% in world terms. "Our consumption is also relatively small at 49 kg/capita, just under the world average of 53 kg/capita, but well under first world levels of 150-200 kg/capital."

In consequence, South African manufacturers have been forced to look overseas for expansion opportunities, both through asset acquisitions and the export of locally manufactured products. The benefit is that local manufacturers have had to become fully capable of meeting the technical standards and qualities expected in the global market, he noted. South Africa exported 780,000 tons of pulp and 480,000 tons of paper in 1997, raising over R3 billion in foreign exchange.

But there are also concerns. Having developed very rapidly, particularly in the 1970s and early 1980s, there has been no investment in "new capacity" in South Africa for well over a decade. (Considerable amounts have been spent on rebuilds and quality/technical upgrades.)

"The end result is an industry, particularly paper and board, which is 'very mature' and will need increasing levels of investment if it is to remain competitive," Barton said. The country's current paper and board output of 2.2 million tons is produced at 14 different locations on over 20 separate paper machines.

"From a technical and commercial point of view, local manufacturers may well be forced to abandon their current wide range of product offerings for a more focused and less market friendly approach," Barton said.

Anticipated reductions in import tariff protection will also challenge local manufacturers' competitiveness and bring a further focus toward commercially viable products.

For the industry's long-term survival, a major concern is the nation's economic environment and business structure.

South Africa has great potential to be one of the world's top manufacturing country, Barton noted. It has low energy costs and massive natural resources. It has developed social and planning skills to deal with complex social issues. It's near the growing markets of Africa, the Middle East and Southeast Asia and geographically can trade equally with Japan, the United States, Australia and South America.

However, "over the course of the five years since our independence, the South African government has been tabling and promulgating an immense amount of legislation, the scope of which has and will have a profound impact on business." That pending legislation covers resource and land use, labor and competition. It may ultimately discourage investment in plantations and the industry.

In addition, pending, and existing, labor laws are "making it more difficult, costly and indeed risky both to hire and, where necessary, to dismiss workers," Barton said. They "represent a substantial disincentive to job creation."

"Our industry provides direct employment for 13,000 people in the manufacturing process and supports approximately 100,000 jobs in upstream forestry and downstream converting activities. Its high multiplier effect indirectly creates an additional 70,000 jobs in service and other supporting industries," Barton said.

All is not gloom, however. There are many opportunities and advantages on which the industry may build. Chief among those is the eucalyptus tree, from which comes the favorite short-fiber chemical pulp for fine papers. South Africa has an ideal climate for growing eucalyptus and the industry is making good use of it.

In addition, the printing industry of South Africa has reportedly invested more than R1.78 billion in new printing technology over the last five years. Much of this is in the high-volume, high-speed newspaper, magazine and commercial printing areas. That, in turn, "will put pressure on our papermakers to improve the qualities of our products to run on their more demanding high speed presses."

New developments and new technology will be required to facilitate either an improvement in existing grades or the production of totally new products. The industry must also use technology to reduce the real cost of paper for consumers.

Another challenge facing the South African industry is to develop and retain paper and board making skills. The South African industry spent around R50 million in 1997 funding education and training. A hopeful sign is that Natal University is going to begin offering pulp and paper technology graduate courses.

-Don Meadows