

INDIA

OLD GIANTS REARM IN NORTHERN INDIA

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*IMPROVEMENT PROJECTS ARE UNDER WAY AT STAR PULP AND PAPER
AND BALLARPUR'S SHREE GOPAL FACILITIES.*

BY RAIL AND BY ROAD, THE RAW MATERIALS FOR PULP and paper are delivered to Star Paper Mills' production facility in Saharanpur, India. In the morning, outside the gates, the line of trucks, tractors, and ox-carts waiting to deliver their loads stretches for blocks. Inside, workers unload bamboo stalks by hand from box cars.

At more than 50,000 tons/year capacity, Star's mill is one of India's larger—and older—paper manufacturing facilities, dating back to the late 1930s. The mill produces a variety of printing, writing, and industrial grade paper. It also makes specialty papers such as braille paper, wax match tissue, and barrier paper. It became part of the Duncan Goenka Group in 1986. The parent company has interests in tea, paper, fertilizer, chemical, cement and other markets.

Star is one of three mills in India that are ISO 9001 certified. In 1993, the mill earned the India Ministry of Industry's Energy Conservation Award.

Star claims to have the biggest chipper in India, capable of producing 50 tons of chips per hour. A smaller chipper processes the bamboo and wood waste. Wood and bamboo are transported from as far away as 500 km. About two days' worth of chips are stored on site.

About 80% of the pulp fiber processed at the mill is eucalyptus, 15% bamboo, and 5% pine. All fibers are cooked together and bleached in a CEHH sequence. The integrated mill uses all of the pulp it produces and about 5% of imported pulp.

Chlorine is still widely used by Indian mills for bleaching. S. C. Garg, vice president—technical, estimated that India is perhaps 10-15 years behind Europe and the United States in widely adopting chlorine-free processes, including the use of oxygen delignification and ozone. As

yet, Garg doesn't see that the newer technologies can economically produce the high-brightness pulp required in India.

The mill's four paper machines have a combined average capacity of 135-140 metric tons/day, though actual production is closer to 150 metric tons/day. The No. 1 machine produces machine-finished (MF) paper, Nos. 3 and 4 machines produce machine-glazed (MG) paper, and the No. 2 machine can produce

either. PM 2 is also computer-controlled. (Management operations—purchasing, inventory records, production figures, etc.—are all maintained on computer, as well.)

Current production is about 54,000 metric tons/year, up almost 20% from a couple years ago. When complete, a Rs 100-crores (about US\$ 30 million) modernization should increase capacity to 59,500 metric tons/year. A rotary lime kiln and 300 tons/day recovery boiler were under construction earlier this year. Electrostatic precipitators were also being installed to reduce particulate emissions. Plans call for a doubling of PM 2's capacity to 140 tons/day. At some point the mill also wants to add a fifth paper machine of about 60,000 tons/year capacity, Garg said.



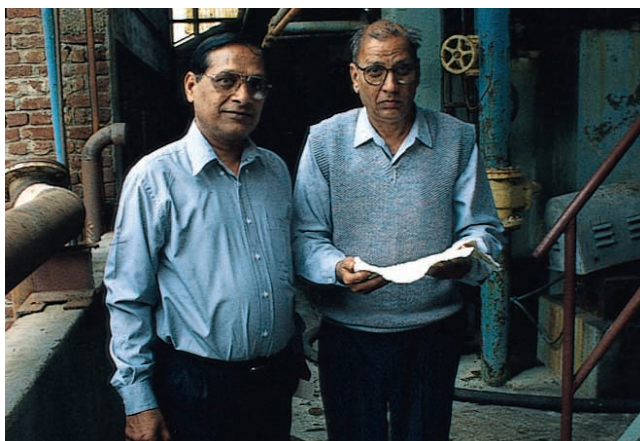
The Star paper mill in Saharanpur, India



Various fibers being delivered for pulping at Star



Bamboo being unloaded from boxcars at Star



S. C. Garg (left) and B. N. S. Agarwal, pulping manager



One of Star's paper machines

Coal from the northern interior of India is transported by rail and used to fuel the recovery boiler. Unfortunately, the coal has a high ash content and low heat value. The lime kiln will help the mill reduce its solid waste discharge, Garg explained. The mill produces about 40% of the power it uses and buys the rest.

The mill operates 364 days a year. The one day it's shut down is "Holi," a festival day in the spring when colored water is thrown and could tint the paper.

Effluent from the mill goes to a primary clarifier, then to an aeration basin and on to a secondary clarifier. Star treats about 5 million gal of water each day.

The company is very cost conscious and keeps inventories of finished goods to absolute minimums at the mill. Star also gears its production to allow its customers to maintain low inventories. About 90% of the finished paper shipped from the mill goes by truck, Garg said.

About 2000 people work at the Star mill. Of those, at least 200 are qualified engineers or technologists and other professionals, Garg said. Others provide support services in engineering, production, accounting, administration, or marketing. Of roughly 1400 workmen, about 1000 are skilled or semi-skilled, he said. Unskilled workmen

primarily perform manual labor or material handling.

Being literally across the tracks from the Central Pulp and Paper Research Institute (CPPRI) and the Institute of Paper Technology (IPT) does have advantages for all parties, Garg admitted (see related story, p. 91). Students from CPPRI and IPT get training at the mill. In turn, the mill has a pool of graduates to recruit from who are well-trained and already familiar with the mill. Lignin from the mill is also used in a variety of experiments at the institutes.

THE SHREE GOPAL MILL

About an hour's drive west of Saharanpur, in the town of Yamunanagar, Ballarpur Industries Ltd. operates the Shree Gopal paper mill. The integrated pulp and paper mill produces about 200 metric tons of paper per day, using wheat straw, bagasse, eucalypts, pine, and other plant materials to make pulp.

Within that mix, about 30 tons/day is agro-based pulp; 80 tons/day is wood-based pulp (eucalyptus, pine, and sawmill waste); and the remainder is imported, purchased pulp (22,000–24,000 tons/year).

The mill keeps enough wood-based fiber to last about 60 days. Agro-based fibers present more of a challenge



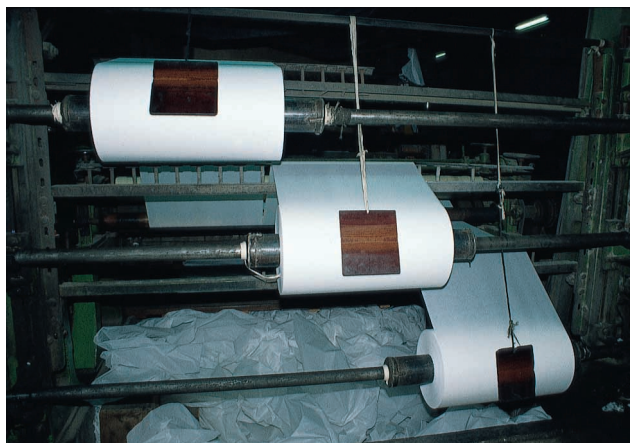
Coal storage and the recovery area at Star



The town of Yamunanagar



A. N. Pathak (seated), Ballarpur's vice president at Shree Gopal, with his managers, Indra Mohan Agarwal, S. K. Goel, and M. B. Jauhari



Finished rolls of paper at Shree Gopal

because availability varies more with the season. Stockpiles of grasses are also more prone to catch fire as they decompose, so they must be stored more carefully, pointed out M. B. Jauhari, chief general manager in R&D.

The 60-year-old mill produces premium-quality printing and writing papers, base paper for laminates and carbonizing, watermark papers, electric transformer paper, and other specialty grades on its six paper machines, said A. N. Pathak, Ballarpur's vice president at Shree Gopal. Roughly 40–45 tons of the daily output is coated paper produced on air-knife, off-machine coaters. Shree Gopal is currently India's largest producer of black center board for playing cards.

Shree Gopal mill was in the midst of a modernization project this spring although part of the project, a major rebuild of the mill's Kleinewefers supercalender, had been postponed for further review.

The mill has been using a chlorine-hypo-hypo sequence for bleaching. Within a year it expects to be using chlorine dioxide for bleaching in a D/CE₂DD sequence, with eucalyptus as the main fiber being

processed in its new pulp mill. That pulp will take the place of the short-fiber pulp Shree Gopal now imports. Jauhari expects the new pulp mill to begin operating by this November. Its pulp will be pumped 800 m for paper-making.

To supply the pulp mill, a chlorate storage area, chlorine dioxide plant, and oxygen production facilities were also being built on site.

The mill pumps its water from 22 wells. Effluent goes through primary and secondary treatment before being discharged to a nearby stream.

The mill generates nearly all its own electricity—about 18 MW—using coal to fuel a high-pressure boiler to create steam to drive a turbine generator.

Of the mill's six paper machines, three are used exclusively for printing and writing grades. One, PM 4, will be shut down in October or November for a major rebuild planned to increase machine speed from 300 m/min to 600 m/min. The project will add an on-machine BTG coater, soft calender, and Combi-press to the machine, along with a new sheet-cutter in the finishing area. Trials on the revamped Valmet paper machine are expected to begin by March 1998.



Testing for quality at Shree Gopal



Shree Gopal's secondary clarifier for effluent treatment



Construction of the new pulp mill at Shree Gopal

Shree Gopal's newest paper machines date back to 1983. PM 6 and PM 7 are used for specialty grades. PM 6 is used for lightweight (20 g/m²) carbon base paper. PM 7 is mostly used to produce colored paper for laminates, as well the company's 91-92 ISO brightness "Executive Bond" paper.

Most of the mill's paper machines use phosphor-bronze wires for the forming section. Average life for bronze wires on a 20 tons/day machine is about 60 days, Jauhari said. Only two of the machines use synthetics.

About 2500 people work at Shree Gopal. Most operations are manually controlled at present. Pathak expects to add a distributed control system and sensors for quality control after the current modernization projects are completed.

Careful records are kept for all paper produced at the mill. Each roll is tested for critical parameters. The lab reports the results every 8 h to production staff and trend analyses are compiled each month.

Shree Gopal is one of the only mills in India using calcium carbonate as a filler for premium quality printing and writing papers, Jauhari said. Trials began a couple years ago in a quest to boost the brightness of its paper. Along the way, the mill has switched to neutral pH for at least some of its paper machines.

Other R&D efforts at the mill are geared toward expanding the range and quality of its products, evaluating existing technologies for use at Shree Gopal, and further reducing pollution from the mill.

Ballarpur Industries has operated four other mills in India: Ashti at Illur and Ballarpur (Chandrapur District) in Maharashtra, Choudwar at Daulatabad (Cuttack District), and Sewa at Gaganapur (Koraput District) in Orissa.

Ballarpur is part of the Thapar Group, one of the largest business conglomerates in India. Thapar undertook a major cost-cutting program earlier this year, according to reports in *The Economic Times* of India (Feb. 6, 1997). As part of that move, an interest in the Ashti paper-sacks mill would likely be sold to a foreign investor, the newspaper reported. More emphasis will be placed on specialty papers. The head office for the paper division was also expected to move to Faridabad in Haryana, outside of Delhi. **TJ**

Meadows is editor of TAPPI JOURNAL.