

Starting up a

DREAM



The opportunity to work on a greenfield mill project is the dream of many people in our industry. The people who helped create the 1.5 million t/a Puma Mill exactly on time certainly lived the dream. This includes ANDRITZ, which was recognized as being the best performing supplier in the project.

It seems that all the stars were aligned for the birth of the Puma Unidade (mill) in Ortigueira. The speed with which the project progressed from construction to completion (24 months) was remarkable. The virtually error-free start-up and ramp-up of the mill not only pleased Klabin's shareholders, but gained the respect of the international pulping community.

At the mill's inauguration in June, large banners gave a hint of Klabin's secret for success:

Dream + Execute
Klabin's formula for achieving extraordinary results

The Puma Mill (named for mountain lions that live in Klabin's preserved native forests and were spotted in the area during the

pre-feasibility studies) was carved out of Klabin's 270,000 ha of forests in Paraná state. "There was nothing but trees and hills here when we arrived," says João Braga, General Manager for the Puma Project. "The amount of earth we had to move to level out this site makes this the largest earthmoving project that we know of in the industry."

Transportation is a major issue for any mill. The existing roads to the site were not good enough, so Klabin built a new road to improve access, a 22 km long railway to connect the mill to the existing network, and another road with a bridge over the Tibagi River to accommodate logging trucks without having to put traffic on public highways. As part of the project, Klabin also built 100 km of power transmission lines.



“The dream has been achieved and it will help Klabin keep growing.”

João Braga
 Project General Manager, Klabin

Overview of the ANDRITZ woodyard with one of the two 360° stacker reclaimers in the foreground and four chipping lines in the background. ▶

(L to R): Klabin's João Braga, General Project Manager; Edemilson Pagano, Project Manager for the fiberline; and Rodrigo Santos, Project Coordinator for the fiberline in front of the DD Washers. ▼



◀ In the white liquor plant, there are two kilns (capacity 650 t/d each). The recausticizing plant is designed to produce 16,000 m³/d.

“Considering that we have four debarking lines, two fiberlines, a large energy plant, and an extra converting machine for fluff pulp, we estimate that there is about 40% more equipment in this mill than a normal single-line eucalyptus mill,” says Francisco Razzolini, Director of Industrial Projects and Technology,

“Even with this, we started production exactly as planned two years ago,” says Braga. “Our target was to feed chips to the hardwood digester on March 1st and we did it.”

Fiber advantage

“We use short and long fibers from the two ANDRITZ fiberlines in ways that give us both technical and cost advantages,”

Razzolini says. “Annual production capacity will be 1.5 million tonnes (1.1 million tonnes of hardwood and 400,000 tonnes of softwood). A sizable portion of the softwood will be processed as fluff pulp.”

Brazil mostly imports its fluff pulp today. Interestingly, Klabin produced small amounts of fluff back in the 1990s.

“Resuming production will enable Brazilian customers to source fluff pulp locally,” Razzolini says.

A shift in strategy

The Puma Mill marks a change in Klabin's business strategy, which has been focused on packaging papers and corrugated boxes. “We move from being a 1.8 million t/a paper and boxboard supplier to a 3.5 million t/a company producing paper, board, fiber, and green energy.” Total investment in the project was BRL 8.5 billion (EUR 2.33 billion), the biggest investment in the company's history.

Another Brazilian pulp producer, Fibria, will be the exclusive sales partner for most of Klabin's hardwood pulp (900,000 t/a) in countries outside South America.

Energy exporter

The new mill has the two largest turbine-generators ever built for the pulp and paper industry. The units have generation capacity of 270 MW. Biomass accounts for about 20% of the energy generation. “We started

commercial sale of our power (50 MW) to the national grid in July,” Razzolini says. “Our plan is to increase this to 150 MW by the end of the year.”

Local labor – local employees

“In order to be successful, one of the things we had to do well was to manage the huge amount of people working on-site,” says Razzolini. “At the most hectic time, there were 12,000 people here. We were also building roads, transmission lines, railways, etc. nearby which added another 3,000 people.”

Since many of the new employees are local and did not have specific pulping experience, Klabin elected to use the IDEAS dynamic simulator from ANDRITZ. IDEAS models the operation of the fiberlines, bleach plants, white liquor plant, evaporation plant, recovery boiler, and power boiler (some of this equipment is outside ANDRITZ's scope of supply) to check out the DCS loops and then train employees in a “virtual” environment before the mill started up.

Best available

“We are using the best available world-class technologies to maximize yield and minimize emissions and effluents,” Razzolini says. “The ANDRITZ DownFlow Lo-Solids cooking process gives good flexibility and excellent quality pulp; their DD washers are well-proven in reducing chemical consumption.”

For wood processing, Klabin also selected ANDRITZ. The Puma Mill will process about six million tonnes of wood each year with four large chipping lines from ANDRITZ. The average distance from forest to mill gate is only 72 km, which ensures a low total fiber cost. “These chipping lines are the largest equipment that ANDRITZ makes,” Razzolini says. “We use three for eucalyptus and one for pine.”

On the white liquor side, Klabin opted for two smaller ANDRITZ kilns rather than one large one. “Bringing in make-up lime to this mill would be difficult,” Razzolini says, “so we wanted to have redundancy in this area to increase our operational flexibility.”

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Francisco Razzolini
Director of Industrial Projects and Technology
Klabin





▲ Close-up of the 360° stacker reclaimer at ANDRITZ woodyard and two ANDRITZ fiberlines in the background.



▲ Percio Pereira, ANDRITZ Project Manager for the white liquor plant, standing in front of the two lime kilns.

Best supplier

“In addition to being on time, the start-up was smooth,” Razzolini reports. “The ramp-up is better than we planned, and the safety record is better than any project that Klabin has done in the past. The commitment of all our suppliers was very high – all were working to the same goals with us.

“We consider ANDRITZ to be the best overall supplier on this project,” Razzolini says. “From the beginning, they put excellent people on this project and managed all aspects of their work very well – both here and abroad. There were very strong and positive relationships between ANDRITZ and our project managers. Their support in training our people and the quality of their team during start-up was excellent. This project also had high visibility and support from the top managers at ANDRITZ.”

Braga shares a similar view. “ANDRITZ has a very good project organization,” he says. “They man-



▲ ANDRITZ delivered two fiberlines for the mill: a 1.1 million t/a hardwood line and a 400,000 t/a softwood line. Much of the softwood will be used for the production of fluff pulp.

aged the work of three different civil construction companies and three different mechanical erection companies. It meant more coordination work for their team, but it reduced project risks and maintained competitiveness. I think that was smart.”

Complete cooperation

Braga and his team had weekly meetings with key suppliers. “If we found any deviation from the plan, we acted immediately,” he says. “We all worked together. When a supplier had a problem, we all had a problem, and we all worked to recover.”

A good example of the joint cooperation, according to Braga, was when Klabin faced some earthmoving delays in the white liquor plant area. ANDRITZ could not start its soil survey work until the area was ready. Valuable time was being lost. “ANDRITZ immediately went to work with a recovery plan,” Braga says.

“We discussed with Klabin and came up with a solution,” says Percio Pereira, ANDRITZ Project Manager for the white liquor plant. “We decided to move the entire plant 21 m to a part where the earthmov-

ing was completed and we could do the soil survey and civil engineering. We put more labor effort in and all the lost time was made up.”

Engineering coordination

“We were under a tight time schedule erecting two fiberlines in the same time that a single line would normally be built,” says Andre Ehlke, ANDRITZ Project Engineering Coordinator for the fiberlines. “We had to get the engineering done on time, and it had to be right to avoid rework in the field. So, we set up our project organization a little differently and created the role of project engineering coordinator.”

A system was developed to have better information about, and control of, basic engineering. The project engineering coordinators monitored the amount of data that was being entered into the software for developing flowsheets and other documents. “This gave us a measure of engineering effort, both internally and with our external engineering companies,” says Ehlke. “It also showed how much work remained to be done, so we could focus on areas that needed attention. This close

monitoring kept us on schedule and saved us considerably in change orders with our suppliers.”

Dreaming ... and then executing

“For me personally, this project has been a dream come true,” Braga says. “It was a wonderful professional challenge for me and a great opportunity to be part of the largest investment in my company’s history. The dream has been achieved and it will help Klabin keep growing.”



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ANDRITZ pumps up

PUMA'S SUCCESS



▲ These single-stage centrifugal pumps are used as process pumps in various areas of the pulp mill. With efficiency of up to 90% and the ability to transport pulp suspensions of up to 6% b.d., these pumps are true all-rounders.

About 425 process pumps and specialized pumps – virtually all the pumps at Klabin’s Puma Mill – were supplied by ANDRITZ.

The start-up and ramp-up of Klabin’s Puma Mill in Ortigueira has special significance for the Pumps Division of ANDRITZ HYDRO, one of ANDRITZ’s main business areas. Not only are the pumps installed in one of

the largest and most advanced mills in the world, the order for 425 centrifugal pumps – containing 19 medium-consistency pumps – was one of the largest orders the Division has received from the pulping industry.

The decision to utilize ANDRITZ pumps resulted in a frame agreement through which the EPC contractors at the Puma Mill could specify ANDRITZ pumping systems for its various process areas. In total, there were nine EPC groups plus Klabin with specific needs, delivery times, etc., coordinated by ANDRITZ HYDRO.

In addition to the logistics of order handling, ANDRITZ specialists were in demand for pump sizing, drawings, documents, and other engineering tasks.

Most of the pumps were supplied through ANDRITZ HYDRO’s Brazilian subsidiary. The pumps were manufactured at ANDRITZ factories in Austria, China, and Germany.

ANDRITZ pumps were installed from the raw water intake system, through the mill, and to the wastewater treatment process. Five two-stage vertical line shaft pumps were installed on a floating barge (first time in the pulping industry), combined with five booster split-case pumps (750 kW motor

and flywheels) to transport water to the mill from the nearby Tibagi River.

A large portion (99) of the ANDRITZ pumps are installed in the fiberline. Of these, the majority are single-stage centrifugal pumps of various designs with efficiencies up to 90% capable of transporting suspensions up to 6% consistency. Two high-pressure pumps are also installed in this area. The medium-consistency pumps move pulp suspensions up to 16% consistency without difficulty.

In addition, dozens of process pumps from ANDRITZ were installed in the boilers, evaporation plant, drying plant, and chemical preparation plant delivered by other EPC suppliers. Six split case pumps, weighing nine tons each and driven by 1,000 kW motors, were installed in the cooling tower system.

Installation, commissioning, and start-up were supervised by field technicians from Brazil and Austria. The Puma Mill started

production exactly as planned when the original contracts were signed.

In order to be able to respond quickly to maintenance and servicing of the pumps, Klabin set up a store in the mill with ANDRITZ recommended spare parts and wear parts. ANDRITZ is also collaborating with Klabin to develop an innovative “shop-in-company” concept at the Puma Mill.

Such a huge project demanded a lot of interaction between HPU locations. Communication was a key to success. The lessons learned have also prepared the team for similar projects in the future.

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◀ These low-maintenance pumps have been optimized for use in the pulp and paper industry, where they operate with an efficiency of over 90% with low pulsation.



The ANDRITZ MC-pump was developed specially to convey viscous media. It can transport pulp suspensions of up to 16% b.d. without any difficulty. They reach an efficiency of over 70%. ▶