



ONE TEAM ONE GOAL

FIBRIA TRÊS LAGOAS,
SECOND PULP PRODUCTION LINE



A STORY FROM
SPECTRUM ISSUE NR. 37

ANDRITZ

ENGINEERED SUCCESS



ONE TEAM ONE GOAL

It sits like a gleaming city surrounded by a sea of green. Fibria's Três Lagoas pulp mill is now one of the world's largest pulp making facilities. With the new Horizonte 2 line starting up at the mill in August 2017, the company is on target to produce over 7.25 million tonnes a year of top-quality, prime eucalyptus pulp.

Something extraordinary has taken place at Fibria's Três Lagoas pulp mill in Brazil over the last three years. Two groups of immensely skilled people from Fibria and ANDRITZ were brought together as one team, and with one goal: to design, create, and build Horizonte 2, the world's largest pulp line, using only the very best-in-class, supersized technology.

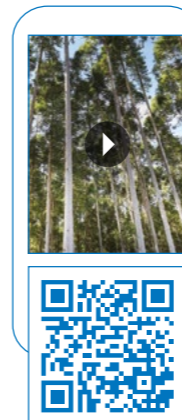
The line started up in August 2017, and is already breaking records for a single line pulp mill. The mill at Três Lagoas is now set to produce over 3.25 million tonnes of pulp a year, making it one of the world's largest pulp production sites.

"This was the first time that Fibria had ever engaged a sole supplier to carry

out any of its projects," says Júlio César Rodrigues da Cunha, Fibria's Project and Engineering Director, "and we must admit there were a couple of minor worries to begin with in using just the one supplier, especially on a project of this scale. But it soon became clear there was no need for concern as ANDRITZ gave us absolute transparency on everything relating

For more information about Fibria's Três Lagoas pulp mill, view the video on your smartphone.

Scan this QR-Code!



to the islands and lines they were supplying. This spirit of cooperation continued throughout the project and was particularly effective when we encountered any challenges."

Joel Starepravo, Project Director for ANDRITZ, says, "This was the biggest pulp project in the company's history, and I have to admit for me it was the biggest challenge I have had in my entire life. From 'day zero', we wanted this project to be the absolute benchmark, and we were amazed at the full cooperation we were given, even main board members of Fibria and ANDRITZ got involved. The motto of the project *One Team, One Goal* was absolutely evident from the top down and from start to finish of the project."

THE TRÊS LAGOAS MILL

The mill itself is just outside the city of Três Lagoas located in Brazil's Mato Grosso do Sul state, which is around the size of Germany in area. Viewed from the air, the land around the city is mostly flat and predominantly dedicated to the



ANDRITZ delivered a complete wood processing plant with four chipping lines, each consisting of the world's biggest horizontally fed HHQ-Chippers.

growth of eucalyptus, giving the impression that it is completely surrounded by lush, well-manicured lawns.

Fibria started the first line in Três Lagoas, Horizonte 1, in 2009, now producing around 1.3 million tonnes of pulp per year, and such was the success of the first line that it was decided to immediately begin planting eucalyptus in readiness for a second line.

"We have several different clones of eucalyptus that we manage ourselves in Fibria," says da Cunha, "and we are harvesting our trees in around six years, which is very fast."



ANDRITZ teamed up with Fibria to build Horizonte 2 Project – the world's largest pulp mill with a single fiberline. The ANDRITZ scope in this full turnkey project included everything from the woodyard to the drying machines and the whole recovery island.

Da Cunha adds that across the whole of Fibria, the nurseries are planting six seedlings per second to satisfy the need of eucalyptus at its mills.

The pulp itself is transported from the mill to Porto Santos, some 1,250 kilometers away on the Atlantic coast, first by truck to a hub located 160 kilometers away and then by rail to the coast for export.

THE PROJECT

The run-up to the order being placed for Horizonte 2 was a hectic period, as is usual

in the awarding of such huge engineering and technology contracts. Da Cunha comments, "During the negotiation period, we had all the suppliers staying in hotels so that we could discuss all the demands of the project, and had decided that all the contracts for this project would be awarded in that particular week. There were a lot of people here from all over the world, and it was an intensive period.

"Originally we were negotiating a 26-month implementation plan for the project with talks going on day and

night. At the beginning of day three, the ANDRITZ negotiating team came in with a big surprise; they announced that ANDRITZ would complete the project in 25 months, and, crucially, it would also increase the capacity of the line by 200,000 tonnes a year – as long as it was awarded the full turnkey project.

"It was an offer we could not refuse," says da Cunha.

The order for the supply of Horizonte 2 was placed in July 2015 with the scope of supply

including everything from the woodyard to the drying machines, and crucially for all involved in the project, it would be the largest single line in the world, with an initial planned capacity of 1.95 million tonnes. Start-up was to be in 25 months from the signing of the contract.

The complete scope of supply included: the wood processing plant, hardwood fiberline, two pulp drying lines, evaporation plant and recovery boiler, white liquor plant with single-line recausticizing plant and two lime kilns, chloride

and potassium removal system, and a liquid methanol plant for the production of biofuel.

REAL TEAM SPIRIT

As the project kicked off, the *One Team, One Goal* philosophy immediately began to pay off, and became a vital added ingredient, particularly when challenges presented themselves. The main problem that occurred was a delay of the recovery boiler, potentially holding up the project by six weeks. There was also some damage to a

lamella package in one of the evaporators when a cable snapped during installation, necessitating some emergency engineering. Another added problem was the delivery delay of one of the four huge DD-Washers, due to a road being washed away in a rain storm.

Says da Cunha, "When any major challenges came up during the project, we immediately created a War Room. This, of course, was not a place where we all came to fight; this was where project

MARCELO CASTELLI
CEO, Fibria

"With this project we have the best technology available, installed in the largest single pulp line in the world."



JÚLIO CÉSAR RODRIGUES DA CUNHA
Project and Engineering Director, Corporate Engineering
Fibria

"We had the mill delivered on time, in budget and with an excellent ramp-up."





A From left to right: Rogerio Pachecho, Fiberline Site Manager, ANDRITZ; Newton Kozak, Fiberline Project Manager, ANDRITZ; Joel B. Starepravo, Project Director, ANDRITZ; Alexandre Figueiredo, Commissioning and Start-up Manager, Fibria

B This ANDRITZ HERB Recovery Boiler is the largest in Latin America and the second largest in the world.

directors and team leaders from both companies came together to collaborate and concentrate intensively on any problems at hand, to see where we could reduce the hold-ups and find other areas where we could speed things along. The meetings included all senior Fibria and ANDRITZ people instrumental to the project on the ground, as well as senior management from both companies.

"This intensive problem-solving activity really worked well; we brought down what looked like a six-week delay on the recovery boiler to just seven days at first oil fire. We also brought in new lamellas to the site in record time, and even organized the building of a new road to get the DD-Washers here on time. This problem solving was all down to our collective collaboration at those meetings."



The pulp drying plant is designed for a specific plant capacity of more than 390 tonnes per day and meter of working width, which has been very well-proven for ANDRITZ pulp drying plants all over the world.



Alexandre Figueiredo, Commissioning and Start-up Manager, Fibria

Starepravo adds, "This was the great thing about being open and transparent from the very beginning. We shared any problems we had with Fibria as they happened, then the senior management and all the key players jumped into action; we created an hourly and daily strategy, and together we managed to solve any problems and still get an early start-up."

"The team work was amazing during this project," says Jean Willian de Moraes, Project and Engineering Manager, Corporate Engineering, Fibria. "And this shared goal has been a critical factor for the success of the project. At the meetings, far from being a lot of worry and stress, there was an absolute sense that we were all in this together, right from the senior management of both companies across the whole project to the people on the ground. Everybody was pulling together on this project, like a family would."

One of the key areas *One Team, One Goal* philosophy succeeded was in the implementation of the ANDRITZ "Safety First" program, which demands strict control over all operatives and contractors at the site. The program involves intensive regular training, security briefings, and compulsory site induction training. Da Cunha says, "Safety for us at Fibria and for ANDRITZ

during the project was the number one attention point. It was made absolutely clear to everybody on site right from the start that everything must be done only in the very safest way possible. We had a number of dedicated safety people on site during the project, and the result was that we created a record benchmark in safety that was even better than the benchmarks when running a stable operation."

A PULP MILL – SUPERSIZED

One of the major obstacles the project leaders had to overcome was the sheer size of some of the equipment involved – after all, this is the largest pulp mill with a single fiberline in the world; it has to have the equipment to go along with it.

The scope of supply for Horizonte 2 at Três Lagoas included the largest

DD-Washers ever supplied and the largest digester in the world.

Starepravo says, "We had to think of the logistical challenges way in advance, especially when it came to getting equipment to the mill from the port – some 2,600 kilometers away – having to deal with some of the poor infrastructure that Brazil has in certain regions. The DD-Washers, in particular, were demanding to bring to the mill from the port because of the sheer diameter of them. There was only one road we could use.

"We managed to get three of the DD-Washers to the mill perfectly and then there was a sudden deluge of rain and the only road was washed away!"

Again, the *One Team, One Goal* mission and spirit was put into place, with Fibria sending one of its own experienced road building teams to fix the road and make sure that the DD-Washer could arrive on time at the mill.

"The motto of the project *One Team, One Goal* was absolutely evident from the top down and from start to finish of the project."

JOEL B. STAREPRAVO
Project Director
ANDRITZ



In terms of largest and highest capacity equipment ever, the list at Horizonte 2 is impressive:

- World's biggest horizontally fed HHQ-Chippers (400 m³ solid-under-bark per hour)
- Highest single fiberline capacity (6,120 adt/d)
- Largest black liquor evaporation plant in the western hemisphere (evaporation rate 1,950 t/h)
- Largest recovery boiler in Latin America - second largest in the world
- Most energy efficient and largest white liquor plant in the world (18,900 m³/d white liquor production)

COMMISSIONING AND START-UP – NO SURPRISES

When it came to commissioning and start-up, the well-planned execution of the project came to the fore as Fibria reports that there were "no surprises" at all in the commissioning and start-up phases, with everything going according to plan.

Alexandre Figueiredo, Commissioning and Start-up Manager, Fibria, says, "We



The new hardwood fiberline ensures low operating costs, low emissions, extremely high washing efficiency, and excellent fiber quality. The capacity (6,120 adt/d) is the highest in the world for a single fiberline.

managed to start up the mill three weeks before the original schedule; one of the key reasons for this was the commissioning phase, which went exactly according to plan. We faced no big issues, problems, or surprises related to the start-up.

"In the commissioning of the fiberline, we made all the digester tests one month before the schedule and, despite the DD-Washers being the biggest ever supplied, again there were no surprises in the commissioning or the start-up."

One new added resource of expertise utilized with some success during the commissioning and start-up of

Horizonte 2 was the ANDRITZ Metris Customer Support Center, located in Kotka, Finland. This enabled experts to collaborate closely and in real time with the commissioning and start-up teams on the ground at the Fibria site. Using video wall technology, along with the very latest in modern communications systems, data gathering, and diagnostic tools, dedicated experts at the center provided support for commissioning and process tuning at the site. The Customer Support Center can also be utilized during production ramp-up, aiding stable production, as well as being a vital resource for the troubleshooting of technical and process issues.



Mauricio Miranda Pereira, General Mill Manager, Trés Lagoas, Fibria

Roberto Furtado, Overall Commissioning and Start-up Manager, ANDRITZ, says, "There are several factors that can be put down to the successful start-up of Horizonte 2. First of all was the integration with Fibria; it was so important for us to have a customer that we could really collaborate with on a deeper level, particularly when there were occasional challenges. We really did have the commitment of the whole team across the mill.

"The occasional problems we had could easily have resulted in delay, but because of the dedication of the teams and the drive to make this project a success, we always managed to recover any time lost. In the fiberline, from our point of view the commissioning

went perfectly, again down to good planning and team work, and the drying line also started up without a hitch."

All in all it seems that Fibria and ANDRITZ are delighted with the results achieved with the Horizonte 2 project, proving that the *One Team, One Goal* philosophy really does work when it is put into place with dedication and integrity from all the players in the team. Mauricio Miranda Pereira, General Mill Manager, Trés Lagoas, Fibria, concludes, "It was very clear to us as this project progressed that ANDRITZ has incredibly knowledgeable people in all the process areas, and despite one or two little problems at the beginning, there was fantastic transparency and sharing all the way throughout the erection, construction, commissioning, and start-up phases.

"Even now we have the ANDRITZ board and senior management asking for figures and looking for performance details; it is as if the *One Team, One Goal* continues on into the future."

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MARCELO CASTELLI: "A SEAMLESS OPERATION"

Marcelo Castelli, CEO of Fibria, talked to SPECTRUM at Fibria's headquarters in São Paulo about the unprecedented growth of the company, the strategy it implements, and the success of Horizonte 2.



"Historically, our growth has always been based on the consistent fundamentals of operating in a global commodity market; to always use the best in class technology and to be focused fully on efficiency, safety, and reliability," says Castelli. "Our mills being located where they are in South America mean we are in the perfect region to apply this strategy and to grow and produce high quality pulp – and, of course, we are able to deliver our products to every point around the world.

"Our growth strategy is driven by our optimism for the future demand of pulp – with the world population growing to 7 billion, a burgeoning middle class in emerging regions, and a remarkably sustainable product, we believe there is an excellent long-term future for our industry. And when it comes to expansion and investment, we always aim to bring in the right partners and, most importantly, get things right the first time."

Castelli comments on the appointment of ANDRITZ as the sole supplier to the Horizonte 2 project, "Putting all our eggs in one basket, so to speak, is not something we do frequently when investing in large projects but during negotiations ANDRITZ came up with an excellent offer in terms of extra capacity and a shorter delivery schedule

that made an agreement very appealing. We have also had a number of successful projects completed by ANDRITZ at our other mills, so there was already a positive history."

It seems those consistent fundamentals Castelli talks about were closely adhered to during the latest project at Horizonte 2 in Trés Lagoas. Since the line started up, it has broken all sorts of records, including production and cost per tonne, and it has even created a new benchmark when it comes to safety in delivering a project of this scale.

And how did the Horizonte 2 project go from Castelli's standpoint? "From the outset it was very important to us that the right atmosphere and attitude was created for this project. At Fibria we like to work as one seamless organization, including when working with partners. When we awarded the contract to ANDRITZ, we created the motto: *One Team, One Goal* – as these

words expressed our sentiments exactly. This motto was adopted enthusiastically and successfully by all the teams of people from both ANDRITZ and Fibria throughout the project."

It certainly seems as if the *One Team, One Goal* motto has hit the mark when it comes to combined success – latest reports from the mill suggest that Horizonte 2 is well ahead of the start-up curve and is likely to go over the design capacity of 1.95 million tonnes. Castelli concludes, "We are delighted with the Horizonte 2 performance so far; this result will further our position in the market and will give us even more production capacity than first expected.

"With this project we have the best technology available, installed in the largest single pulp line in the world, and we are aiming to create the best reference in the world in terms of dollars per tonne inside the fence."

GETTING TECHNICAL

GETTING TECHNICAL

ANDRITZ'S COMPLETE SCOPE OF SUPPLY TO FIBRIA'S HORIZONTE 2, TRÊS LAGOAS

WOOD PROCESSING

A complete wood processing plant with four chipping lines, each consisting of the world's biggest horizontally fed HHQ-Chippers with a capacity of 400 m³ solid-under-bark per hour. The scope also includes the chip screening station, chip storage with a round pile stacker-reclaimer, which also provides chips to the first pulp production line, and bark handling. The unique HHQ-Chipper contributes towards providing the highest and most uniform chip quality, which significantly increases fiber yield both in woodyard and in fiberline operations.



FIBERLINE

A hardwood fiberline comprising a TurboFeed chip feeding system, Lo-Solids continuous cooking, screen room and bleaching, and DD-Washers, which ensure low operating costs, low emissions, extremely high washing efficiency, and excellent fiber quality. The capacity (6,120 adt/d) is the highest in the world for a single fiberline.

PULP DRYING

Two energy-efficient pulp drying lines (working width of 8,004 mm and design capacity of 3,060 adt/d each) based on the high-capacity Twin Wire Former technology and airborne dryers. The approach system includes a full cascade screening plant and ensures homogeneous pulp feed to the subsequent process stage. The pulp dewatering machine comprises a dilution-controlled headbox, Twin Wire Former, and press section with combi-press and PrimePress X shoe press. The drying plant is designed for a specific production of more than 390 tonnes per meter and meter of working width, which has been well-proven for ANDRITZ pulp drying plants all over the world. The ANDRITZ airborne dryer is the most energy efficient of its kind.



The ANDRITZ Cutter/Layboy provides the pulp bales to be further processed in the high capacity baling lines, where the final pulp bales are produced.



EVAPORATION PLANT

The largest black liquor evaporation plant in the western hemisphere (evaporation rate 1,950 t/h), which concentrates black liquor to a dry solids content of 80% for efficient combustion in the HERB recovery boiler. The plant is equipped with the latest of ANDRITZ's innovations in secondary condensate quality enhancement for 100% reuse in other departments of the mill. Furthermore, the evaporation plant is integrated with the recovery boiler, which has an energy-efficient boiler feed water heating system.

RECOVERY BOILER

The largest recovery boiler in Latin America with a peak capacity of 8,250 tds/d. The ANDRITZ HERB recovery boiler is equipped with state-of-the-art combustion technology to minimize the emissions and maximize green energy production. It is capable of burning and destroying all the harmful non-condensable gases and the methanol produced in other process areas of the mill. The HERB recovery boiler supports and provides steam and power for the complete pulp mill and generates a large electricity surplus, which is to be distributed through the national grid.



WHITE LIQUOR PLANT

Energy-efficient and largest white liquor plant in the world (18,900 m³/d white liquor production) meets the highest environmental standards and provides top performance and excellent availability under any process conditions. The white liquor plant consists of the single-line recausticizing plant and two lime kilns (840 t/d each), designed to burn oil, natural gas, and syngas.



In addition, ANDRITZ has delivered a chloride and potassium removal system to enhance the chemical recovery process and a liquid methanol plant for production of biofuel.



ANDRITZ AND FIBRIA: ONE TEAM, ONE GOAL

It sits like a gleaming city surrounded by a sea of green. With the new Horizonte 2 line starting up in August 2017, Fibria's Três Lagoas pulp mill is now the world's largest pulp mill with a single fiberline. ANDRITZ teamed up with Fibria to build Hotizonte 2 full turnkey project, with a scope including everything from the woodyard to the drying machines and the whole recovery island.

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