SUCCESS STORY

Conversion of a plug screw feeder to the world's first adjustable design

PANELBOARD

WORLD'S FIRST ADJUSTABLE PLUG SCREW FEEDER

ENSURES PRODUCTION WITH DRY AND WET WOOD

ANDRITZ

ENGINEERED SUCCESS

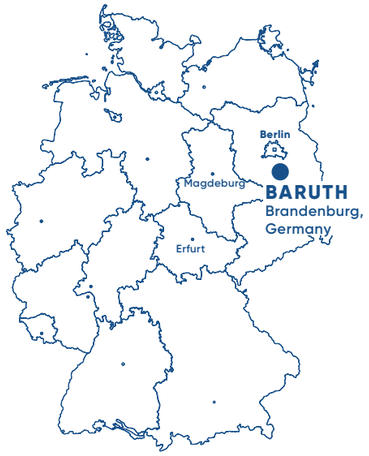
From left to right: Evgeni Savov, Project Manager ANDRITZ ; Florian Grünberger, Sales Manager ANDRITZ;
André Trebuth, Technical Director and Maintenance Manager, FBB Baruth; Özgür Senay,
Deputy Maintenance Manager, FBB Baruth; Dietmar Ulm, Product Manager ANDRITZ

“Dry or wet, it keeps on running.”

Every panelboard plant operator knows the feeling - watching the power in the plug screw feeder get higher and higher, until at some point, the screw will jam and production will stop. At one plant in Germany, this problem is a thing of the past.

The Classen Group’s Fiberboard MDF plant in Baruth, south of Berlin, had been looking for a solution to dewater fibre with variable moisture content, and it also wanted to solve a few issues, such as variable compression levels and frequent maintenance needs. “In the past, the screw used to stall at higher revs,” explains Christian Dümichen, Fiberboard’s Production Manager. Fiberboard, which produces MDF in thicknesses of 6-14mm, turned to ANDRITZ because “they had a complete solution,” explains Christian Dümichen. A solution that features world’s first breakthrough technology – multiple times over.

THE CLASSEN GROUP’S FIBERBOARD MDF PLANT



Adjustable Plug Screw Feeder

“In the past, the screw used to stall at higher revs.”

CHRISTIAN DÜMICHEN,
Fiberboard’s Production Manager

Flexible options

The main part of the solution at Baruth is the ANDRITZ Adjustable Plug Screw Feeder (“Adjustable PSF”), a patented world-first invention, which has a screw that can be moved backwards and forwards on its axis, by up to 10cm. This makes it possible to vary the size of the gap at the feeder exit, to raise or reduce compression, while production continues. A new screw nose design with an upturned lip/restriction ring expanded the compression range even further, as well as preventing clumping.

The new system makes it possible to adjust compression according to the fibre’s moisture content, to optimise effluent volumes and temperature requirements, giving control over energy costs and CO2 emissions. The flexibility to operate with dry or wet wood means it can help fiberboard producers in all regions of the world, and even makes it possible to use a recycled wood as a raw material.

Another option is to operate the Adjustable PSF with a constant pre-set level of motor power, with automatic adjustments ensuring the system stays at that precise power level. ANDRITZ Product Manager, Dietmar Ulm explains, “Fiberboard used to run the motor at 45-50% of capacity, now it’s at 35% for the same throughput.” Christian Dümichen also points out that, “Alternatively, we can use the same energy as before and get more compression. It gives us the option of varying the mois-ture content to match the dryer and boiler requirements. It depends how we want to use the plant - we can now process far more flexibly and better.”

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DIETMAR ULM,
ANDRITZ Product Manager

Florian Grünberger, Senior Sales Manager, ANDRITZ and Evgeni Savov, Project Manager, ANDRITZ planning the inspection with Özgür Senay, Deputy Maintenance Manager, FBB Baruth.

Stable and able

The Adjustable PSF is cylindrical, but as Baruth was already operating a cylindrical screw, there was no need to change from a conical design. The screw diameter was increased slightly, however, from 24 to 25 inches (from 610mm to 635mm), and the screw housing was modified to accommodate that. These diameter changes were also a world first, marking the first commercial installation of the ANDRITZ PSF 25. The screw and housing were also connected to a new bearing unit, to accommodate the world’s first hydraulic adjustment mechanism. A new, reinforced drive and a clutch with upgraded Torsion Vibration Damper handle the Adjustable PSF’s axial forces.

The new geometry and screw design maximise the volume of fibre between the threads, and the upgrade has increased the PSF’s capacity from 52 to 60 (bone dry) tonnes per hour. Although as Florian Grünberger, Senior Sales Manager at ANDRITZ, points out, this project was not just focused on increasing throughput capacity and adjusting the compression rate in operation: “One of the main goals was to make the production line more stable at the plug screw feeder, and as we learned from the customer, we achieved a 100% stable system in the end, which we are proud of.”

“The goal was to make the production line more stable at the plug screw feeder, and we have achieved that.”

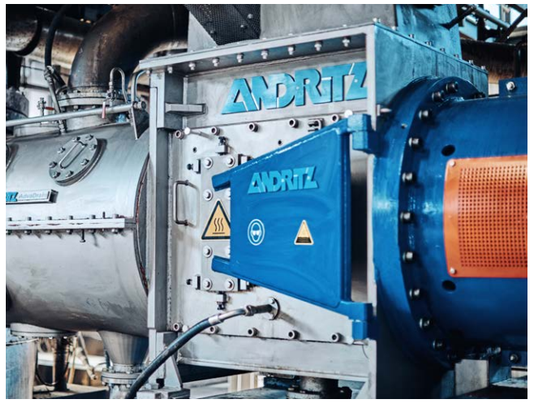
FLORIAN GRÜNBERGER,
ANDRITZ Senior Sales Manager

Open the door

Upstream from the PSF, Fiberboard also replaced the wood infeed chute with a regular, slim design, feeding into the new Swing-Door Inlet Housing – another revolutionary world-first ANDRITZ innovation.

With the ANDRITZ Swing Door Inlet Housing, the Swing Door can simply be opened and the screw removed and replaced sideways. “We used to have to dismantle the housing and take the screw out of the back. Now, the drive stays in place and we just open part of the housing,” explains Christian Dümichen. Installation and changeovers will now require less than half the time and labour cost.

Downstream, Fiberboard installed an additional ANDRITZ measurement unit at the top of the digester, which can now be filled completely. Christian Dümichen explains, “ANDRITZ suggested a second measurement unit to extend the cooking time, which has gone up by 50%, from 3 to 4.5 minutes. We have now improved product quality by cooking out more impurities.”

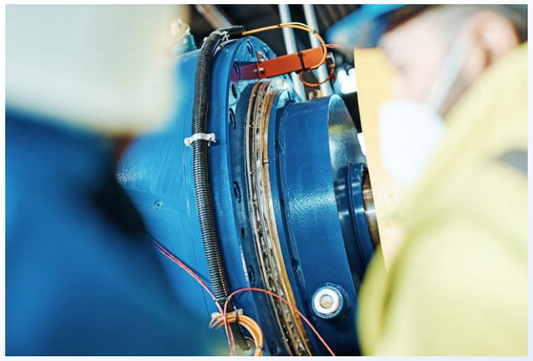


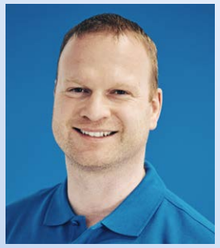
ANDRITZ Swing Door Inlet Housing

A new split-circuit lifting system also makes the entire system more resistant to vibration.

Fast work

With just half a year from order (December 2020) to installation (June 2021), and only three days available to install the equipment, timing was a huge challenge. The process, explains Dietmar Ulm, was "unusually fluid and fast. It's a new construction, with so many new parts, a bigger, axially-adjustable screw in a new, hydraulically-adjustable housing, with a new wood-in-feed chute, new drives and a new restriction ring. There were a lot of nerves – the plant needed to produce, because they had full order books. But we did it!" Andre Trebuth, Technical Director and Maintenance Manager at Fiberboard, confirms, "The mechanics and installers worked day and night and it all worked."





"The mechanics and installers worked day and night and it all worked."

ANDRE TREBUTH,
Technical Manager and Maintenance Manager at Fiberboard

Honest answer

So how has the new system been operating?

Christian Dümichen says, "ANDRITZ kept their word. They said we would not have to stop production when we change wood types, and it is true. Whether the wood is dry or wet, it keeps on running. We thought there would be a lot of adjustments to be made, once the new compression ring was in place, but no. We can adjust the load and the speed, it's easy." Andre Trebuth adds: "All of the machine operators are giving us positive reports, saying they are no longer seeing any conveying problems at all."

In addition, Fiberboard inspected the Adjustable PSF in April 2022, and found "very little wear," according to Andre Trebuth. Dietmar Ulm explains that since the first inspection in August 2021, there has been virtually no wear – and "that's not subjective. We measured the screw, and the diameter hasn't changed at all."

Commenting on the project overall, Christian Dümichen says he is most pleased that "We had close cooperation with ANDRITZ, with honest answers about problems. This meant we were able to make a success of the project with no major issues." Andre Trebuth concludes, "It has been a positive investment. We are very satisfied."

As Christian Dümichen says, "We switch it on and it works. Simple. We thought it would be more difficult."

WORLD FIRSTS

It's not every day we have the pleasure of reporting a world first, but at Fiberboard in Baruth, there were three.

- **The main one is the new Adjustable Plug Screw Feeder, which uses axial movement and a restriction ring to vary compression levels. This puts an end to fibre jams in the PSF, as well as enabling moisture, effluent and energy management.**
- **The Swing Door Inlet Housing is also a revolutionary world first, dramatically simplifying and reducing the time and manpower required for screw changes.**
- **The PSF 25, a 25-inch screw, with the alteration of the housing to fit that size, was also a world first.**

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