**SUCCESS STORY**

Conversion of a 30-year-old digester to state-of-the-art technology

PANELBOARD

# UNIFORM FIBER QUALITY WITH CUSTOMIZED ANDRITZ DIGESTER

## IMPROVEMENTS ACROSS THE BOARD

ANDRITZ

ENGINEERED SUCCESS

# Custom-design for better fiber quality

Anyone who operates an MDF plant today knows that raw material quality can be a challenge. Major MDF producer, EGGER, wanted to make sure that wouldn't be a problem at its Bevern plant in Germany, so the firm asked ANDRITZ to install a custom-designed digester, to ensure great fiber quality for years to come.

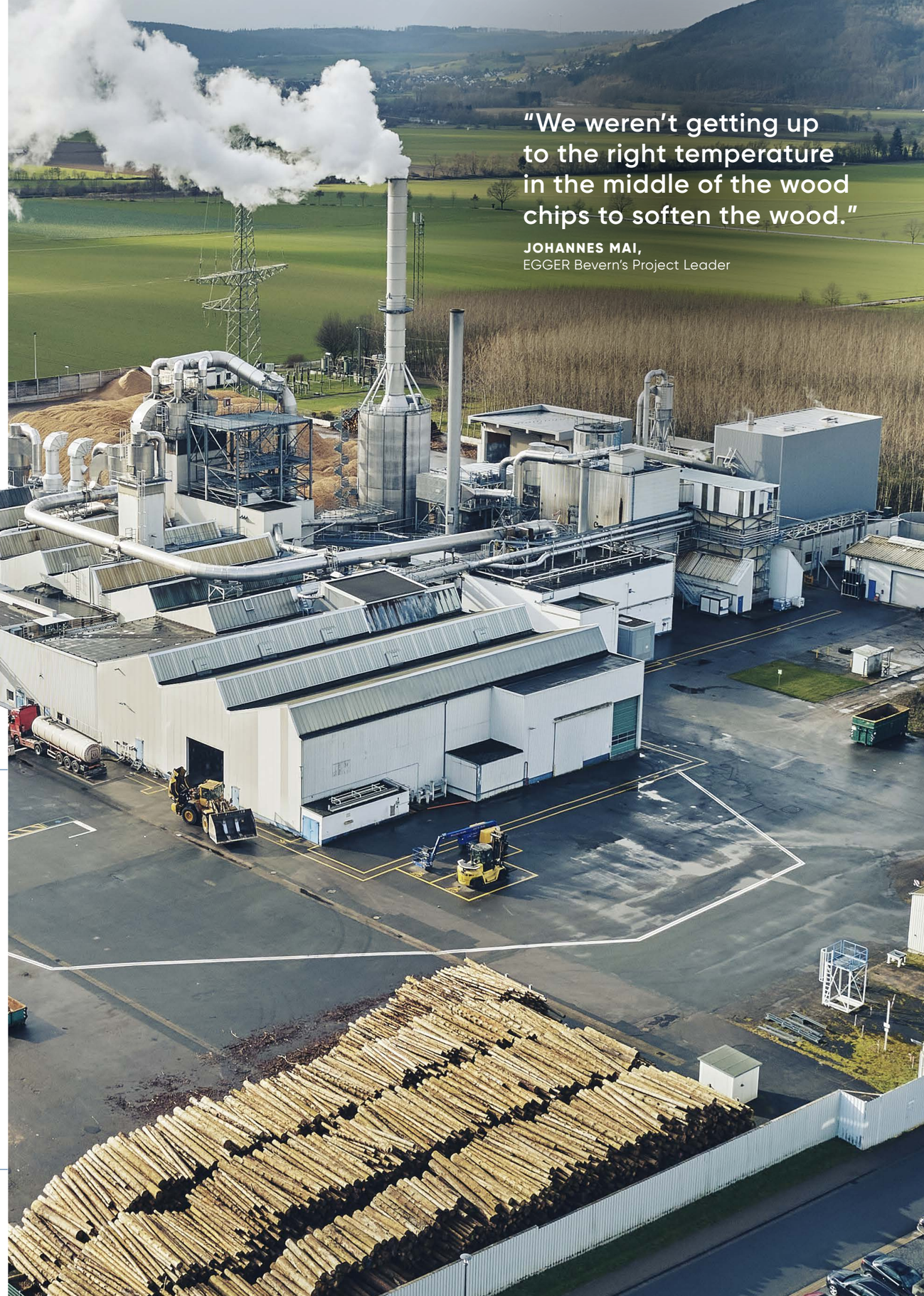
With 18 plants in Europe and 20 in total, EGGER is a global MDF producer, with 18 plants in Europe and 20 in total. In 2021, the firm turned its attention to its original plant in Bevern, northern Germany, where it decided to install a new digester from ANDRITZ.

At Bevern, the company has been producing MDF board from fresh wood chips since the 1990s, but in recent years the quality of the available raw material was decreasing, additional in hot summers they are confronted with very dry raw material. In addition, the plant had been operating its original digester for around 30 years, and by 2019, it was running at its absolute maximum. Even after the longest-possible cooking time, the hydrothermal pre-treatment in the digester was no longer as good as EGGER wanted it to be, resulting in problems with fiber quality and limited flexibility.

As Johannes Mai, EGGER Bevern's Project Leader, explains, "We weren't getting up to the right temperature in the middle of the wood chips to soften the wood, so it could be refined properly. We were getting some shives and dust in the sheet. Jürgen Rose, Project Manager Recycling at EGGER Bevern adds, "Sometimes that could lead to sheet breaks. The digester had become a bottleneck, always running full, and the cooking time was too short."

In this situation, many other companies would simply use more energy in the refiner, but that is not an option here. Bevern produces thin MDF sheets, mostly around 2-3 mm thick, which go to the group's nearby coating plant in Marienmünster, to become panels for cupboards, drawers and shelves. As part of making this, Bevern operates a calender press, which is ideal for thin board. However, it also means that good fiber quality is absolutely vital, because web breaks can occur if the sheet is not strong enough, e.g. if the fibers are too short, due to intense refining. Increased electrical energy use in the refiner was therefore not an option, which - in addition to the fibers being too short - would also lead to high costs.

**Therefore, EGGER decided to modernise, and they turned to ANDRITZ.**




**EGGER MDF PLANT BEVERN, GERMANY**
MDF board from fresh wood chips since the 1990s


Alexander Bekiersz, PM Keyuser; Carsten Ohrmann, Deputy Team Leader Electrics; Johannes Mai, Technologist; Raphael Eichinger, Global Product Manager, ANDRITZ; David Isinger, Mechanical Fitter; Daniel Mehring, Team Leader Mechanics (f.l.t.r.)

# The challenge

As Klaus Riedmüller, Plant Manager at EGGER's Bevern plant, points out, "We work well with ANDRITZ; we trust them. We have ANDRITZ digesters in all our other plants."

However, the project at Bevern was no "normal" upgrade. As Florian Gruenberger, Key Account Manager, explains, "As a service team, we analyze the current situation and the customer's needs, and then try to optimize the existing system to meet the customer's requirements. With minimal changes, without replacing the entire refiner system, but only single parts to eliminate bottlenecks."

What if they could do something that had never been done before – install a new, bigger discharge system, but without replacing (or even moving) any of the rest of the equipment? It would save a lot of time and money, but still produce the desired final result: better and uniform fiber quality.
**The only problem was:**
**No-one had ever done this before.**

**"We work well with ANDRITZ; we trust them. We have ANDRITZ digesters in all our other plants."**

**KLAUS RIEDMÜLLER,**
Plant Manager at EGGER's Bevern plant



# World firsts

So how could ANDRITZ possibly fit a much larger digester into the same space, without even moving anything else? The answer – ANDRITZ re-designed the discharge system, creating a new shape that fits into the limited space available. For this highly-complex project, ANDRITZ also carried out an on-site plant audit, a 3D measurement of the existing plant, plus vibration & strength analyses of the existing digester foundation, to make absolutely sure it was all technically possible.

The proposed solution meant some radical changes. The new digester has a 40% bigger diameter (increasing from 975 mm to 1.375 mm), providing double the internal volume. However, the space at the top and bottom of the digester was limited, because at the top end, the digester inlet still had to be connected to the existing plug screw feeder, while the discharge bottom still had to fit onto the existing refiner at the bottom end, sitting on the same foundation as the original, much smaller digester, with no extra space available.

ANDRITZ proposed to solve this challenge with two innovations. At the top of the new digester, the shape was changed to a new eccentric design at the inlet, customized to fit the space available. At the bottom, the discharge bottom agitator has been equipped with a newly developed chain drive with the gearbox and motor on the outside, which creates space and facilitates maintenance.

Both of these innovations were world firsts in the MDF industry. The new discharge screw was supplied with the latest ANDRITZ Advaprotect 70 hardfacing to ensure highest lifetime. The discharge screw bearing unit has been equipped with ANDRITZ's sleeve design, to ensure an easy exchange of the discharge screw, without a complete disassembling of the bearing unit.

Raphael Eichinger, Global Product Manager and Technical specialist at ANDRITZ, says "This was a challenging project for three reasons: We had to customize the shape of the digester, because it had to be bigger, but the other parts of the system couldn't move. We had to re-design the base of the discharge bottom, to fit it all in a 'too small' space, which is why the drive was re-located outside. And we also had to use a chain drive, which was a world first for a digester discharge bottom, but it was the only way to make it possible."

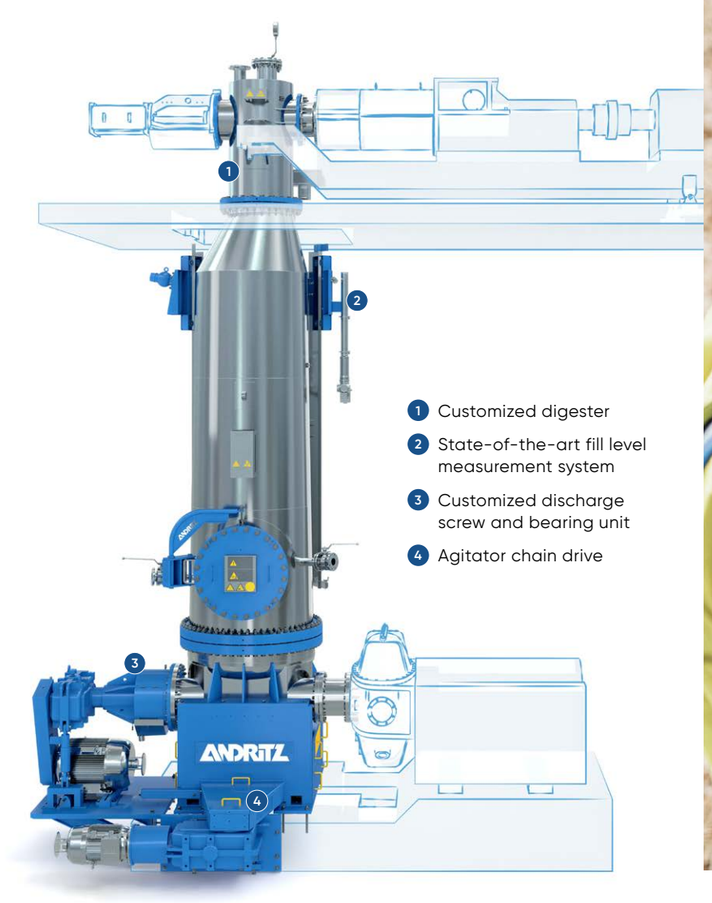

ANDRITZ discharge bottom and digester on-site installation

# Goals achieved

Technical innovation alone was not the final goal, however it had to produce results. The main goals in this case were longer cooking time, to produce better fibre quality, to reduce sheet breaks and ensure quality of the end product.

The new, bigger digester from ANDRITZ now makes it possible for Bevern to cook wood chips for 4-5 minutes, which is 80% longer than with the old system. Johannes Mai says “It works really well. The process has become more stable and we have a constant cooking time.” Jürgen Rose also confirms that, “We have reduced the sheet breaks,” while Klaus Riedmüller agrees, “We now have less downtime and the product is all uniformly better.”

The new, larger digester, with its state-of-the-art fill-level measurement system, also means that “EGGER now has the opportunity to experiment with different fill levels and cooking times,” explains Raphael Eichinger, as it doesn’t constantly need to fill the digester completely to reach the plant’s production targets. “That gives Bevern more flexibility to optimise operations.” The expanded digester volume also means that the plant can increase production, if other parts of the line are upgraded – which EGGER does plan to do. It could now also potentially use recycled wood, because the digester can cook drier wood for longer, which would mean additional cost and environmental benefits.




1. Customized digester
2. State-of-the-art fill level measurement system
3. Customized discharge screw and bearing unit
4. Agitator chain drive

“We definitely achieved our goals with this project.”

**JÜRGEN ROSE,**
Project Manager Recycling at EGGER Bevern

**ANDRITZ MAKES IT POSSIBLE …**

**New wood chips cooking time:**
**4-5 min.**
(80% longer than with the old system)

**Opportunity to experiment with different**
**fill levels and cooking times.**

**Uniform fiber quality.**
**Increased flexibility.**
**Optimised operations.**



Johannes Mai, Project Manager EGGER Bevern and Raphael Eichinger, Global Product Manager Manager, Panelboard Service, ANDRITZ

# Time and money

The replacement of the complete refiner system could have cost up to several million euros. Instead, the new, custom-designed digester and discharge bottom from ANDRITZ only cost EGGER a fraction of it. The engineering and design work has started in Summer 2020 and the order was placed in January 2021. ANDRITZ began production immediately and it was delivered just 6 months later in July and installed in August, taking only 8 days for the full installation (even with COVID-19 safety measures in place).

Jürgen Rose believes that “installing the new equipment in the time available was the biggest challenge of this project, but the preparatory work was excellent and extensive.” Klaus Riedmüller confirms, “COVID-19 meant there were more things to organise and more measures to take. But it went well. It wouldn’t have worked, if we and ANDRITZ didn’t work well together.”

Raphael Eichinger agrees, “It was quite an achievement, to manage all of this in six months. The solution was customised to the individual plant, demonstrating that ANDRITZ Refining Service can help a customer that is using any equipment. It also shows that we can think outside the box, even if it means coming up with ideas and designs that have never been used before.”

“It was quite an achievement, to manage all of this in six months.”

**RAPHAEL EICHINGER,**
Global Product Manager and Technical specialist at ANDRITZ

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