MINDA | KALLESOE | REX | WEINIG GRECON Flexible co-production

Producing glulam and KVH on commission with industrial throughput The new production line at Estonian laminated timber specialist Palmako takes up more than a third less of hall space than before while production became more flexible and order related. This time, the line concept was created by a syndicate of worldrenowned specialists.

🖉 & 🔯 Robert Kittel





The continuous glulam and KVH line in Estonia was designed and built by Minda, Kallesoe, Rex and Weinig Grecon

Palmako, a Lemeks group-related company located near Tartu in Estonia, has been producing materials for its in-house garden shed and timber construction production since 1997, commercial laminated timber productions since 2007, and pellets since 2013. With four factories, the group has an annual production output of around 51,000 wood houses, 24,000 m<sup>3</sup> of impregnated garden timber and 46,000 t of pellets as well as 27,000 m<sup>3</sup> of laminated timber. The glulam production was supposed to grow; therefore, in the summer of 2017, the decision was made to replace the second-hand bought and by now slightly ageing glulam production line in its entirety by a new investment, head of production Silver Simenson remembers: "We had simultaneously become aware of a trend towards order-related smaller batches at an increasing demand." For the design, therefore, flexible product changeover was the main focus. Before that a detailed planning process had taken place that fundamentally questioned both the previous plant concept as well as the adhesive system in use.

## **Cooperation of renowned specialists**

The result was a highly flexible system for the production of glulam, duo, trio, KVH and log house planks – for batch production as well as order-related production on commission. What is special here is

that the design and construction of new system was assigned to a syndicate of specialists which reads like a who's who of the sector: German industry plant manufacturer Minda from Minden was responsible for mechanization, manufacturing control engineering and project management, Kallesoe Machinery, Lem/DK, supplied the high-frequency press, the planing units come from Schwarzbeck, Pinneberg/DE, and Weinig Grecon, Alfeld/DE delivered the trimming machine and finger-jointing unit. The advantage of this solution is self-evident: For every area of the facility, Palmako chose the preferred supplier. All system components are perfectly synchronized and coordinated. Furthermore, the syndicate took over the entire project management including interface coordination.

### Feed in packages

The lumber used for processing is kiln-dried and unsorted lumber from external suppliers, Simenson explains: "A forklift is loading the lumber in packages at two feed stations." The packages are destacked and isolated layer by layer by means of vacuum lifters. Boards that fail the subsequent moisture measurement are discharged. Afterwards, the heart-side is determined, and a turning station turns the boards according to the classification.

De-stacking: Layer by layer by means of vacuum lifters



### Sorting with dimension changes

Flaws are marked by hand at two different spots. The next position features a metal detector to protect the machines and tools that follow.

Next, the marked boards go through a net length measurement, are registered by the production calculator and sorted into a 3-level grade buffer to optimize wood yield. A Weinig Dimter Opticut 450 is automatically cutting out marked spots.

**Trimming:** The Weinig Dimter OptiCut 450 is an automated crosscut saw working at very high speeds



Material feed: Two feed stations are charged with lumber packages





**Grade buffer:** On 3 levels, marked boards are sorted into several grades and batches





Finger-jointing line: A Weinig Grecon PowerJoint 15 is processing the lamellas into a continuous strand

Press: The Vario press by Kallesoe is gluing with high frequency. It can process different lengths in the same press cycle

### Finger-jointed continuous strand

In the next step, the trimmed-out board portions are finger-jointed on the face, glued on one side and pressed into a continuous strand with the Weinig Grecon finger-jointing unit Power-Joint 15. Subsequently, the lamellas that are cut to length are brought into the 3-level curing station.

### Unmanned lamella planer

Fetching cured lamellas from this buffer to the Rex lamella planer by Schwarzbeck and the subsequent glue application unit is done according to the glued truss structure or the press filling specified in production planning. In line with the plant concept designed for small batch sizes, the Rex Bigmaster lamella planer is designed for unmanned operation with fully automated control of all axes. Manual adjustments at the machine that do not take place automatically via control programs can be made outside of the soundproof cabin so that there is no need to enter the security zone. This means that machine operation is not interrupted. Upstream of the lamella planer, there is also a bypass for KVH and log house planks: "KVH can be passed by the high-frequency press. After high-frequency gluing, half glulam beams









- Finger-joints are produced and glued with a Weinig Grecon Power-
- Quality assurance: The grade of finger-joints and their gluing are automatically evaluated
- Lamella planer: The Rex Bigmaster runs in unmanned operation
- All settings can be made externally without having to enter the cabin
- Gluing station after planing

# HF press line and batch size 1

To avoid long press and throughput times, Palmako decided to use a high-frequency press. "With a HF press, gluing is quick, but changing to different dimensions used to be time-consuming up until

now," Simenson says. For the new line, Palmako therefore opted for the Vario press by Kallesoe Machinery, Lem/DK: "With its minimal intake width of 240 mm, this press can even press individual glued trusses of this height, and at a throughput width of 1260 mm, different lengths can be processed within the same press cycle." For this, lamellas are aligned at their end faces to fill out the press. Changeover time for a dimension change is shorter, as well, according to Simenson: "Height adjustment of lateral thrust plates is semi-automatic which saves us time."



### **Continuous feed**

With a capacity of 150kW, the "microwave" generator ever so slightly exceeds common household power requirements, Simenson smiles. In fact, however, with a total power rating of 318kW the power demand can be called moderate when considering the annual output per shift of the HF press of about 32,000 m3. This makes glulam with lamella lengths between 4 and 18m, thicknesses between 60 and 240 mm and widths between 60 and 1260 mm possible. The feed is continuous. Of course, with every change

# "Es ist eine flexiblere Produktion als bisher möglich." Silver Simenson, Produktionsleiter









in thickness or width a new press cycle must be started. The entire press line can be set up and controlled from a central control stand with very little set-up times. Since high-frequency technology merely warms up the glue in the groove and no heat must be inserted exter-

nally with great losses, the press line also does not need a cooling buffer - the goods can be forwarded directly from the press to further processing.

### From the press to the package

Downstream of the press, a fully automated transport takes the pieces to the cutting and finished planing area with an onsite horizontal band saw, a cross-cut saw for single and group cutting and the Rex high-performance finished planer. To optimally process this variety of products, minimum and maximum cross sections and truss lengths, the Supermaster finished planer has a number of flexible options such as the fully automated control of all axes, direct drive of output shafts and rotational speed control. The machine can travel in parallel which not only allows for uniform utilization of the working width but also ensures uniform use of tables and pressure units when processing smaller dimensions. The powerful forward feed can even handle very large trusses with ease while still operating delicately enough for clean machining of smaller dimensions. >>



Kommissionierung: Ein Vakuumkran kann einzelne Binder zusammenstellen

### Patching up without a backlog

The great diversity of components was also an extraordinary challenge when designing the patching station. In order to avoid backlogs especially with small, short components that can be pressed with a high cycle output, two workstations were realized on two levels with large buffer areas.

## Commissioning of individual packages

The fact that the entire plant is designed for both production on commission up to batch size 1 as well as batch production becomes apparent at the discharge of the system. Standard packages are formed with a conventional stacking unit. Flexible customer commissions can be compiled individually from single parts in an area storage space with a vacuum crane according to the package based on planning.

### More flexible than before

In any case, head of production Sivler Simenson seems to be quite taken with the design: "Compared to what we had before, we can now produce a lot of products more efficiently. There is less special production and a more flexible production is possible." //

The finished planing unit, a Rex Supermaster, is configured flexibly to process the very diverse parts





Commissioning: A vacuum crane can order-pick individual trusses

*In addition* to batch stacking, packages can also be commissioned individually

