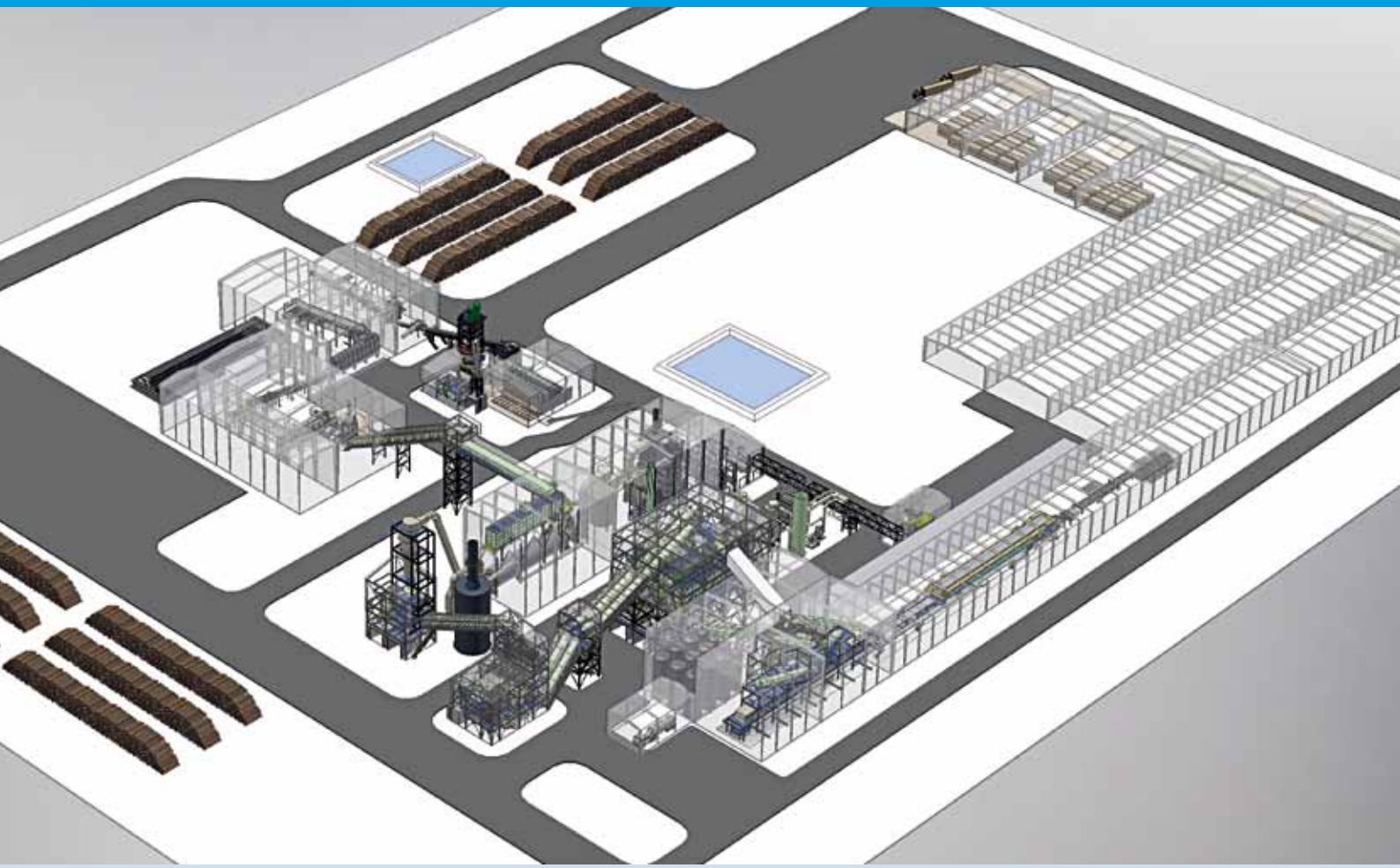
Siempelkamp
Maschinen- und Anlagenbau

Complete provider Siempelkamp builds largest OSB plant in Europe

Going to extremes



Petrozavodsk, capital of the Republic of Karelia, Russia, located 420 km northeast of St. Petersburg, is a city of extremes. While in the summer the sun practically does not set during the so-called "White Nights", the winter is endlessly long. At temperatures that can reach –35 °C only the "Banya" (traditional Russian steam bath) or the occasional ice fishing trip provide a change during the winter months. As of now the city will be associated with another extreme: In Petrozavodsk the largest OSB plant in Europe is being built. This plant is also the first of its kind in Russia. "Completely from a single supplier!" was the order objective of the Russian company OOO DOK Kalevala for this ambitious project. It marks an important milestone for Siempelkamp as a complete solutions provider

by Hans-Joachim Galinski

The plant in the Republic of Karelia – totally encapsulated

In May 2010 OOO DOK Kalevela signed the contract for the first OSB plant in Russia; only one month later the ground breaking was held during a festive ceremony. Dr. Dieter Siempelkamp and numerous guests from politics and industry attended the festivities. The celebration marked the beginning of a large order for which Siempelkamp provided the entire scope of supply.

The scope of supply included the complete equipment for the front-end area ranging from the debarker line to the strander, screens, the resin preparation system and the dryer all the way to the wet particle bunkers as well as the forming and press line with a 9' x 50.4 m ContiRoll®. Downstream from the press is a complete finishing line including a double diagonal saw, a cooling and stacking line, a cut-to-size line, a storage system, a tongue and groove line, a packing line and material flow control. A 50 MW energy plant provides the complete process energy as well as the heat supply for all buildings. Last but not least, Siempelkamp was also responsible for the complete automation as well as the drive and control technology for the new complex.

This scope of supply once more strengthened our status as a complete solutions provider. The order is a successful example for the perfect cooperation of all Siempelkamp subsidiaries and affiliated companies. The engineering of the complete plant was

Signing of the contract

Laying of the foundation stone for Kalevala plant.
Left: Dr. Dieter Siempelkamp

carried out by our Belgian subsidiary Sicoplan; Hombak and CMC provided the largest share of the components for the front-end area. The energy plant and the dryer system were supplied by Büttner Energie- und Trocknungstechnik GmbH. ATR Industrie-Elektronik GmbH was commissioned with the automation for the entire plant. Siempelkamp Maschinen- und Anlagenbau GmbH & Co. KG (SiCo), as the project-responsible parent company, was responsible for the overall coordination of the order as well as for the manufacturing of the key components for the new plant including the strander, the resin preparation and application system, the forming and press line, as well as the components for the finishing line.

Logponds

Siempelkamp's scope of supply for the OOO DOK Kalevala OSB plant:

1. Engineering of complete plant → Sicoplan
2. Debarker
3. Drum chipper
4. Strand bunker
5. Log conveyor

→ Hombak

6. Screens / Silos / Scales → CMC Texpan
7. Strander → SiCo
8. Dryer → Büttner
9. Resin preparation and dosing system
10. Mat forming machine
11. Forming line
12. ContiRoll®
13. Vapor exhaust system
14. Double diagonal saw
15. Cooling and stacking line
16. Storage system with material flow control
17. Cut-to-size line
18. Tongue and groove line
19. Packing line

→ SiCo

20. Energy plant → Büttner
21. Automation system → ATR

Two-phase concept to full plant capacity

Everything started in 2008 with a planning order: An OSB plant with a yearly capacity of 250,000 m³ was to be planned. Part of the order was to develop a concept that would gradually double the capacity of the plant to 500,000 m³ at a later time without interruptions to the operation. Our Belgian project planning company Sicoplan implemented this project with a two-phase concept. After having completed the first project phase, the plant now has a daily production output of 750 m³. After adding a second set of front-end machinery to the plant as part of the second phase, it will almost double its daily capacity to 1,500 m³, that is 500,000 m³ per year. Then, Kalevala will own the largest OSB plant in Europe.

The forming and press line as well as the finishing line are already designed for these maximum outputs. Only the installation of a pre-heating system in this area of the plant still needs to take place during the second phase. The significant expansion regards the machinery for the front-end area. A second debarker, strander and dryer are needed. The energy plant will double its outputs from 50 MW to 100 MW. The expansion will be carried out without interrupting the ongoing board production. The new components can be installed and started up independent of the production. Only the start-up of the pre-heating system as well as the introduction of the additional material to the process will require the production to be stopped for a few days.

This plant concept convinced our customer. However, not only the concept and the comprehensive scope of supply are characterizing for this plant. Numerous innovative components turn this plant into one of the most modern OSB plants in the world.

Rotor debarker

Loghandling and batch feeder for strander

World's largest OSB strander

For the Kalevala order Siempelkamp developed, for the first time, a customized strander – the largest one worldwide. With an engine output of 1,250 kW, it achieves a maximum material throughput of 45 t/h bone dry. Not only the dimensions (length: 20 m, height: 3 m, width: 7.80 m) and the weight of 180 t turn this machine into the largest of its kind. Equipped with 56 knives, an inside diameter of 2,500 mm and a cutting width of 850 mm, the new knife-ring flaker is record-breaking.

The strander is not only large but also fast. With a cutting accuracy of +/– 0.1 mm, the machine operates with cutting speeds of up to 35 m/sec. Furthermore, the loading times of the strander were optimized. Additional special features can be found in the design of the new strander. The front support ring is equipped with a number of high-class wear segments. Furthermore, the optimized knife arrangement improves strand quality. Cutters that are integrated in the knife holders ensure clean-cut edges. Due to special mechanics the clamping force of the knives was optimized (centrifugal wedge principle).

In order to supply a proven product to our customer, the Siempelkamp strander was not only designed and built at the Krefeld plant but also comprehensively tested. The machine with its 10,000 V engine and a rotational speed of 1,000 rotations per minute could only be tested by bringing two mobile diesel generators to the Siempelkamp test area. A direct connection to the Krefeld power supply system would have, with a high degree of probability, strongly influenced the supply of the surrounding parts of the town. Because the strander processes approx. 10 m³ of wood in only 100 seconds to first-class strands, large amounts of log wood had to be provided for the testing.

Not until after an intensive test phase at the Siempelkamp research and development center and a successful trial run in the presence of our customer was the strander released for shipment.

Loghandling and batch feeder for strander

Strander

Strander

Wood-based materials industry in the CIS

The wood-based materials industry has developed positively in the CIS over the last few years. The demand for high-quality wood-based materials has consistently increased and was met by building new highly modern production facilities. Nevertheless, the import of wood-based materials increased by another 30% last year.

This strong upward trend is also recorded for OSB. Through support measures for construction projects by the Russian State, building activities are significantly increasing. Wood-based materials manufacturers predict sales to double in the next three years. As a result the Russian Federation has become one of Siempelkamp's most important consumer markets in regard to MDF and particleboard production plants. The plant for Kalevala is the first Siempelkamp OSB plant on Russian soil.

Compared to other industrial nations, the wood industry of the CIS still has tremendous development potential. Even though Russia is considered the most densely wooded country in the world with 50% of the global forestry reserves, only about 30% of the available timber is harvested. Despite the fact that more than a third of all sold wood products in the country have to be imported, a large part of that number is exported as logs without further added value. The wood-based materials consumption of 43 m³ per 1,000 inhabitants per year corresponds to only one third of the consumption in Western Europe and to only one fifth of the consumption on the American market.

Dryer

Feeder for the metering bins

Metering bin

Dosing scale

Energy plant

Left:
Fuel preparation line

Right:
Storage silo

Siempelkamp energy is environmentally friendly energy

In terms of environmental conservation the Kalevala plant leads by example: The customer requested that the heat energy is to be generated by using waste products from production and purchased biomass. Kalevala decided to buy an energy concept from the Siempelkamp subsidiary Büttner Energie- und Trocknungstechnik GmbH, more specifically a solid fuel system which supplies 50 MW for use as process heat and heat for the buildings after completion of phase one of the project. After completion of the second construction phase the OSB plant will require 100 MW of energy. The supply will be ensured with a second heating block.

The Büttner name stands for reliable and environmentally friendly energy generation: The energy plant provides stable process heat while, at the same time, using wood economically. Primarily production waste such as bark, screening dust, and trimmings are burned as biomass. A drum chipper is used to guarantee the supply of biomass in case of an energy shortage during the winter months. In this case waste wood, off-cuts and wood from thinnings are used. Even the exhaust vapors from the ContiRoll® exhaust are burned inside the energy plant and are therefore not released into the environment. The exhaust gases of the dryer are cleaned. This takes place in a downstream wet electric filter. Suspended particles are also burned in the energy plant.

According to Kalevala's strong sustainability concept we provided environmentally conscious energy production without compromising the economic efficiency of the plant. We supplied an exemplary, responsible and future-oriented complete concept.

ContiRoll® – a success story

The ContiRoll® made by Siempelkamp has been setting benchmarks in the wood-based materials industry since 1985. Optimized installation and start-up times, steep ramp-ups and high reliability have made the ContiRoll® an attractive investment for almost three decades. With more than 250 sold ContiRoll® press systems worldwide, Siempelkamp holds a top position in the wood-based materials industry.

Over the years the ContiRoll® has been continuously adjusted to the growing demands of our customers regarding product quality, user-friendliness and the development of new materials. The focus here has been primarily on the operating efficiency of the plants. Meanwhile, we have introduced Generation 8 of our continuous press to the market. Today there are three designs available featuring widths of 4' to 12' and press lengths up to 77 m. This means each customer can select the optimal press regarding board size and capacity requirements. The OSB plant for Kalevala includes a 9' x 50.4 m ContiRoll®.

Rotary drum blenders

Glue kitchen and dosing system

Siempelkamp plants for the wood-based material markets of the CIS

Since 1990 22 Siempelkamp press lines including 18 ContiRoll® lines were built in the CIS or are currently being installed. These plants produce 3 million m³ of wood-based panels per year. Within the next 1.5 years, an additional 2 million m³ per year will be produced by the plants that are currently being set up. This includes the 500,000 m³ of OSB per year that the Kalevala plant will produce. The bottom line is that Siempelkamp plants will manufacture roughly 5 million m³ of wood-based products per year in the countries of the CIS in the near future.

18 ContiRoll® plants in the CIS since 1990

Products	
MDF	8
Particleboard	9
OSB	1

Plant locations	
Russia	12
Republic of Belarus	4
Ukraine	2

ContiRoll®

Finishing line for specific requirements

Next to the machinery for the front-end area and the press line, the large order for Kalevala also incorporates a complete finishing line including a diagonal saw, cooling and stacking line, storage system with material flow control, cut-to-size line, tongue and groove line as well as packing lines.

After trimming and crosscutting the endless board to master-board length and cooling of the boards in two cooling turners, gripper carriages form jumbo stacks with heights of up to 4 m which are transported into storage. Kalevala decided for a high-stack storage system as a compact and space-saving storage solution. The large storage volume (90 stacking positions for up to 6,300 m^3) is especially well suited for the storage of products from series production. Large batch sizes can be further processed directly off the shelf according to a customer order and according to demand – without frequent product changes.

A state-of-the-art dividing saw with integrated stacking system ensures reliable stacking of board strips with a minimal width of only 635 mm and a thickness of 6 mm. A special fork stacker lifts the packs during stacking and thus avoids the overlapping of the board strips. With this innovative stacking station the customer can handle complex cutting patterns safely. Furthermore, an integrated accumulator allows continuous stack forming during stack change. For Kalevala this means no downtime during board stacking which results in an efficiency increase of the plant.

The downstream tongue and groove line is designed for the production of four-sided profiled flooring. The pre-sized boards are fed from the stack to the angular profiling plant and profiled on all four sides. The stacks of boards leaving the tongue and groove line or alternatively stacks coming directly from the cut-to-size line are packed in two different packing lines. Line 1 is responsible for stacks with board widths ranging between 300 and 1,250 mm; Line 2 packs stacks with a board width of up to 2,500 mm.

Forming line

Double diagonal saw

OOO DOK Kalevala

OOO DOK Kalevala, headed by Klimenti G. Kasradze, is part of the construction group Kompakt with its head office located in St. Petersburg. The company is considered one of the largest construction groups in North-West Russia. It builds hotels and industrial buildings, participates in the construction of floodgates and metro stations, power plants, cargo terminals, as well as airports. Therefore, Kompakt's own usage of OSB is enormous. Furthermore, the general backlog of the Russian construction industry is large and the construction boom continues unfettered. For all these reasons, why hesitate to secure a place in the front row as the first OSB manufacturer in Russia? This decision has led to a total investment of 150 million Euros.

Only local wood sources are used for the OSB production which is primarily pine, but also include aspen, birch and alder trees which are plentiful in Karelia. Aspen wood is liked because of its fine uniform structure and light color but also because of its lack of branches, tree sap, and for the fact that it does not split easily. Furthermore, the wood's low density makes it a preferred material for building panels.

Stacking

Storage vehicle for the high-stack storage

Cooling turner

Customer care plays an important role for Siempelkamp

In May 2010 Kalevala and Siempelkamp signed the contract for this impressive plant. Only one year later the installation work began. The complexity of the project and the remoteness of the plant's location presented huge challenges for all parties involved.

It did not matter whether logistical issues had to be solved, support providing important assembly units and tools had to be given, the personnel had to be increased or climatic conditions had to be dealt with: no effort was spared by both contracting parties to complete the project within an appropriate period of time.

Even the Siempelkamp management – Dr.-Ing. Hans W. Fechner and Dipl.-Ing. Heinz Classen – visited the construction site on a regular basis in order to follow the building progress and to constructively engage in solving problems. "For us this contract is an outstanding business success in the Eastern European market. To be part of such a large project with such comprehensive service range confirms our concept. A beginning-to-end service mentality is part of this concept," says Dr.-Ing. Hans W. Fechner.

Kalevala produced its first board in March 2013. The full capacity of the first construction phase is predicted to be achieved in early summer of this year. After a short break the construction work for the second phase will begin. Extreme challenges for all parties involved are expected. Nevertheless, the objective to build Europe's largest OSB plant in Petrozavodsk is an enormous step in Kalevala's company development. For Siempelkamp the order once more confirms the "all from a single source" philosophy and is proof for the excellent cooperation of all company divisions.

Longitudinal saw

Packing line