

Siempelkamp's OSB benchmarks:

From multi-daylight press to continuous production

ContiRoll® OSB



Presses as high as eight-story buildings, with capacities that could cover 17 soccer fields daily – there are practically no limits when it comes to Siempelkamp’s press concepts for OSB production. In the last 30 years the Krefeld company achieved numerous milestones which impressed OSB manufacturers from North America to Asia. Our history demonstrates: Often, we were the equipment provider supporting plant operators with their first OSB production run. Just as many times, the dimensions of our press lines were record breaking. And even more often, Siempelkamp technology was the first to be used.

By Andreas Woestheinrich

OSB multi-daylight press for Weyerhaeuser: innovations for orienting and separating processes

In 1980 Siempelkamp supplied one of its first OSB plants in America to Weyerhaeuser, a big player in international forestry enterprises. The company owns and manages enormous forests, especially in the USA and Canada. These resources are made into such products as construction timber, pulp, paper and packaging.

The 8x16’ press with 16 daylights was installed at the Grayling location in Michigan to process aspen wood. It is one of the first OSB plants that Siempelkamp supplied. The highlight of this project was the mat-forming machine which was developed by Siempelkamp in the beginning of the 1980s as a pioneering achievement. Thus, the Krefeld company met the increasing demand for oriented strand board. The production of such panels had only recently started replacing plywood in America and in Scandinavia for use as construction panels. The main reason for this development was increasing costs for peelable logs.

The advantage: For panels made of oriented strands, lower quality logs with smaller diameters can be used. The maximum wood usage reaches up to 85 percent. In contrast, with veneer plywood, wood utilization amounts to about only 50 percent. A significant advantage of oriented strand

board is that its product strength can be tailored to the intended end use and that it is dimensionally more stable than natural wood.

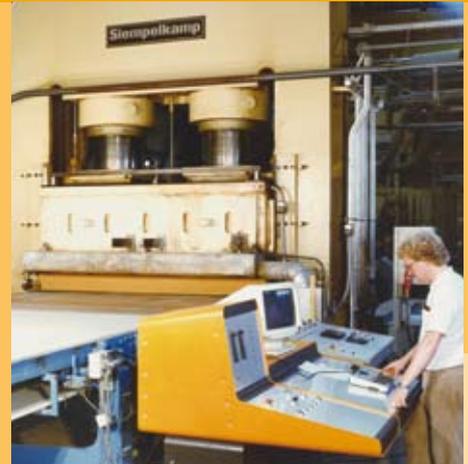
With the strand transport across a disc roller orienter head with discs set at various gap widths, Siempelkamp achieved an innovation. Strands could not only be oriented but also separated. Thus, long strands were arranged on the surface while fines made up the core layer of the new oriented strand board. This resulted in optimal bending strength.



Weyerhaeuser, 16-daylight press

OSB mat-forming





Top: steam press in the test field, Krefeld
Left: Pamplona Redwood OSB

1983: OSB plant for Asia

Three years later Asia was ready for OSB production. In 1983 Pamplona Redwood in the Philippines ordered the first OSB plant for Asia from Siempelkamp. An 8x48' single-daylight press was built to process red Lauan wood.

Multi-daylight press for Norbord Ltd.:
Siempelkamp sells OSB plant in Europe

In 1984 Siempelkamp set another milestone in OSB history by supplying an 8x16' press with eight daylight. This order from Norbord Ltd. for the location in Inverness,

Scotland, represented the first order of an eight-daylight OSB plant for Europe. The Toronto, Canada, based company is one of the worldwide leading manufacturers of wood-based materials specializing in OSB. The company's products are mainly used for modern timber house construction, in the areas of renovation and restoration, the packaging industry and in the do-it-yourself sector.

Kronopol, Zary, Poland



Steam injection press for Weyerhaeuser LSL – second generation of OSB competence

In 1990 Weyerhaeuser LSL in Deerwood, Minnesota, ordered the second generation in OSB know-how. Following the multi-daylight press, Siempelkamp introduced the steam injection press to the market which would apply steam and heat to the mat. Due to its moisture content and temperature, the injected steam causes the bonding agent to cure. The 8x35' single-daylight press for Weyerhaeuser was built for processing aspen wood. In the United States, the OSB panels produced on these steam injection presses are typically used for frames and framework in house construction.

Siempelkamp OSB press lines: Statistics

Total plants sold:	50
thereof North America:	35
Europe:	11
Asia:	2
New Zealand:	2

A first: Kronopol uses first OSB-ContiRoll®

Following daylight and steam injection presses, Siempelkamp started in 1996 to establish the third generation of OSB presses, a ContiRoll press for the continuous production of OSB. The first customer to incorporate the new technology was Kronopol Sp. Z.O.O. The company that belongs to the Swiss Krono holding, a leader in the wood-based material industry, took over the state-run particleboard plant in Zary in 1994.

With a budget in the millions, the investor changed the entire technology and completely modernized the machinery. Siempelkamp was involved as the driver of innovation in three instances. In 1996 a particleboard production line including the first ContiRoll press in Poland was installed at the Zary plant. An investment on a global scale was made according to Kronopol in 1997: The first of its kind, a ContiRoll line for the production of OSB was put into operation. Thus, Kronopol entered the market for building materials. One year later, a ContiRoll line for the production of MDF started operation.

First OSB ContiRoll® with preheater for Huber Spring City

Also in 1996 Siempelkamp installed an OSB ContiRoll at Huber Engineered Woods in Spring City, Tennessee. The enterprise's product spectrum ranges from the raw



Preheater for Huber during production at Krefeld

Production capacity at top levels

For the last 20 years Oriented Strand Board (OSB) has experienced a triumphal march just as particleboard has since the 1960s and MDF since the 1980s. The USA and Canada are regarded as the OSB domains: Between 1990 and 2006 the production capacity of OSB in North America has more than tripled from 6.8 million m³ to 23.3 million m³. After, in the course of the financial and mortgage crisis, OSB production dropped to 13.7 million m³, the production has been gaining momentum again and is anticipated to increase to 21 million m³ in 2015.

In Europe a record high OSB production capacity of more than 3.8 million m³ was recorded in 2010. Since the 1990s, OSB has become increasingly accepted on the German market*

*Source: BIS Shrapnel Pty Ltd-Study "Plywood and Oriented Strand Board In the Pacific Rim and Europe: 2011–2015", North Sydney NSW 2010



Huber ContiRoll® and preheater during assembly



OSB forming and press line, Egger, Wismar

material production to paper and forest products to plastics and building materials as well as associated services. With its head office in Charlotte, North Carolina, this Group has developed into one of the most innovative OSB producers in North America.

At the company's Spring City location, the patented ContiTherm® method, a process recommended for the production of thicker OSB, was used for the first time. A mixture of hot air and steam is applied to the mat directly before it enters the press. Pre-heating the mat in this way results in an increase in press capacity. By means of adjusting the ratio between hot air and steam, the target temperature of the mat is precisely set. The mat is plastified in the pre-heater reducing the specific pressure needed in the ContiRoll® press. In addition, the moisture content of the mat is raised resulting in lower thickness swell of the board and better board properties.

Huber Broken Bow receives "Complete Package" with screen imprint system

In 2003 Siempelkamp set a next record in the OSB business with its customer Huber Engineered Woods in Broken Bow, Oklahoma. With a total investment of more than \$130 million, construction of an OSB plant on a greenfield site started in 2002. Next to the 8'x60.3 m ContiRoll® for OSB, Huber ordered the dryer system, the mat-forming station, a cooling and stacking line, a finishing line and the automation from Krefeld. A yearly capacity of 550,000m³ was intended with this complete package.

According to the typical Siempelkamp design, the strand mat is formed in such way that the largest strands are placed in the outer face of the mat, where they contribute most to the properties of the board.

Some products require the typical screen imprint on one side of the board. Therefore, Siempelkamp equipped the Broken Bow press with the patented screen imprint system. If needed an endless screen is running simultaneously with the top steel belt through the press. This produces a perfect screen imprint, which is identical to what customers are used to seeing from boards made on multi-daylight presses.

World's largest OSB multi-daylight press for Slocan(Canfor)-LP

In 2005 another record was set: Siempelkamp equipped the world's largest producer of OSB panels with an OSB multi-daylight press which was the largest of its kind at this time. The Joint Venture of the companies LP and Slocan (was sold to Canfor in 2004) ordered for the Fort Saint John, British Columbia, location a 12x34' multi-daylight press. With twelve daylight this press produces OSB panels with a

OSB: Slim is beautiful

OSB is characterized by its long, slender and flat strands. They give the panel a significantly higher bending strength than in regular flat-pressed panels. These relatively large strands are arranged by special mat forming machines in cross-oriented layers. The strands of the surface layers are generally oriented in the longitudinal direction of the panel while the strands in the core layers are arranged crosswise.

Even though OSB is made up of relatively large strands, the surface is relatively smooth which makes OSB interesting for decorative uses. For the production of OSB, softwood as well as hardwood can be used.

thickness ranging from 6 to 32 mm and board sizes of 12x32 to 34'. The scope of supply also included the dryers, mat-forming machines, the finishing line and the automation.

A technical challenge for the production of these large volumes of OSB is the drying of the strands. To meet the demands at Fort Saint John, three single-path drum dryers were required. With this order Siempelkamp implemented, once more, the proven CombiLine, which had been supplied to North America 16 times already in 2005.

A comparison to visualize the enormous dimensions of this press: With its twelve (12) daylight, the press is as tall as an eight-story building. Eight hydraulic press cylinders, each with a piston diameter of more than one meter (3.3 feet), generate a force of 210 MN. In one day this press can produce more than 2000 m³ of OSB. This is equal to the size of 17 soccer fields combined and covered with 19 mm thick panels.

These press dimensions require a design with a very high fatigue strength. The high fatigue strength is ensured by a number of design innovations as well as the use of nodular graphite cast iron. The press was built using a new design. Heavy and robust, the press stands for reliability. Siempelkamp Foundry cast the



Canfor-LP, 12-daylight press during assembly

Canfor-LP multi-daylight press after completion





Clarke County assembly of multi daylight press

upper and lower cross beams as well as the vertical tensile members of the frame from nodular graphite cast iron. These beams were designed to absorb the entire press forces.

The economic efficiency of this plant is demonstrated by its high production volume. Another advantage: Due to the fact that the press has few movable parts, the customer benefits from ease of maintenance. Furthermore, the modular design of the press frames allows for simple and quick transport and assembly processes.

OSB competence for Norbord: most important OSB location in Southern USA

In 2005 Norbord once more decided to go with Siempelkamp's OSB competence and signed a contract for the supply of an OSB plant including an 8x24' 16-daylight press. This plant was integrated into an existing plant in Cordele, Georgia, which had been equipped with another Siempelkamp line in 1991. With a yearly capacity of almost 900,000 m³, Cordele advanced to one of the largest OSB locations in the Southeast USA.



Norbord mat forming machine

2007: Tolko receives record-size ContiRoll press

In 2007 the Canadian Tolko Industries Ltd. ordered a forming and press line with a ContiRoll® for a new OSB plant in Slave Lake, Alberta. With a length of 70.3 m at a width of 8.5', this was the longest installed ContiRoll® press up to this point in time.

The extraordinary length of this press and the preheating system make a feed rate of up to 1,300 mm/sec possible which results in a yearly capacity of approx. 730,000 m³ of OSB. The scope of supply also included two particle dryers, a cooling and stacking line, a storage system and packing lines. The triple diagonal saw downstream from the press represented a highlight of this order. Even at full speed, it can produce eight-foot panels.

Kalevala: first OSB plant for Russia

A good 30 years after the sale of the first OSB presses and many records later, Siempelkamp achieved another highlight: In 2010 OOO DOK Kalevala signed a contract for the first OSB plant in Russia, which will be built at the Petrozavodsk location in the Karelia province.



Norbord Inverness, Scotland

Here, Siempelkamp positioned itself as a single-source provider. Next to a 9'x50.4 m ContiRoll press, the large order for our new Russian customer, headquartered in St. Petersburg, incorporates a comprehensive Siempelkamp product range. The scope of supply includes the complete equipment for the front-end area ranging from the wood-yard, to the de-barker, to the chipper, to the dryer, to the screens, to the gluing system to the green and dry material storage bins. Downstream of the forming and press line with the ContiRoll press are two double-diagonal saws, a cooling and stacking line, a high-stack storage system, a cut-to-size line as well as a packing line. Siempelkamp's "all from

one source" concept for this order also includes a complete energy plant from Siempelkamp Energy Systems (SES) and a dryer from Büttner. Sicoplan will be responsible for the planning, engineering, and start-up for this project.

The Kalevala plant will produce OSB in different sizes. Board thickness will range from six to 40 mm. A tongue and groove board line, which will also be installed, will produce flooring boards. These boards will be used within the group. As a part of the building group Kompakt, OOO DOK Kalevala has a high demand of OSB, which it uses in the construction of large industrial buildings.



Norbord, 16-daylight press

My home is my OSB

OSB as building material is widely used and especially popular in the USA. The largest share of OSB is used as building material in wall, roof, and ceiling constructions. Simple to manufacture, OSB is characterized by its good technical properties, for example, high bending strength and low thickness swelling.

Because of good mechanical properties, OSB is especially well suited for load bearing structures. In North America, OSB is used in the area of wood-frame construction as wall reinforcement, roof sheathing, and sub-flooring. High volumes of OSB are also used in I-Joists.

OSB plant, design by Sicoplan

