

Masa GmbH, 56626 Andernach, Germany

# Saint-Gobain Weber's concrete block plant in Finland starts up again after serious fire damage

Saint-Gobain Weber has a production site for the production of Leca concrete blocks in the Finnish town of Oitti. The concrete plant was equipped only a few years ago with modern and high-performance production equipment by the Masa company from Andernach, Germany. Through a chain of unfortunate circumstances – a short-circuit in one of the wheel loaders parked in the production hall was the cause – a large fire broke out in July 2011 that completely destroyed the entire plant. Only the concrete silos for the aggregates survived the fire. The Oitti site was designed for two-shift, all-year-round operation and accordingly produced large numbers of Leca concrete blocks. A second block plant in Oitti then ramped up to three-shift operation in order to compensate the sudden lack of capacities. Nevertheless the resulting gap had to be closed as fast as possible by the reconstruction of the plant. Following the clearing up work, only the foundations and the concrete silos remained from the burnt-down concrete plant. Everything else had to be rebuilt promptly: a well-insulated production hall for continuous operation, even in winter, as well as a new concrete block production line including mixer and dosing technology. As the main supplier for the mechanical engineering, the Masa company was once again commissioned to install a complete production line. Saint-Gobain Weber's declared goal of already being able to resume production in midsummer in June 2012 was a big challenge for everyone involved, especially due to the long, cold winter in Finland. Nevertheless the first concrete block was produced before the expiry of this tight deadline. Thanks to meticulous planning and modern production machines of the latest generation, it was even possible to increase the capacity of the concrete plant in Oitti.

■ Mark Küppers, CPI worldwide, Germany ■

Saint-Gobain Weber operates in 46 countries around the globe and is thus internationally very well set up. With nine concrete plants and four regional large warehouses in Finland, Saint-Gobain Weber also ranks as one of the largest suppliers of concrete blocks on the Finnish market. In Scandinavia and the Baltic countries Saint-Gobain Weber is the market leader in concrete blocks made of lightweight concrete, especially Leca concrete blocks.

Saint-Gobain Weber is one of the most important companies in the building materi-

als industry for the markets in Europe, Africa, Asia and South America. Saint-Gobain Weber, whose head office is in Servon near Paris, achieved turnover of about € 2.3 billion last year with around 10,000 employees worldwide. Saint-Gobain Weber belongs to the French Saint-Gobain Group, which has reached a worldwide turnover of around € 43 billion.

With an investment of nearly 10 million Euros, Weber erected one of Europe's most modern concrete plants for concrete blocks made of lightweight concrete in Finland. More than 1 million Euros were accounted for by fire prevention measures as a conse-

part of the safety periphery. Insulating panels with a significantly higher fire resistance were selected for the outer shell of the new production hall.

Saint-Gobain Weber produces a new generation of concrete blocks in the plant – the Leca Lex Block. This innovative product from Finland was adopted into the product range for the first time in 2009 and convinces an ever growing circle of customers by its lightness, simple laying and good thermal insulating properties. In the course of the short period of time the Leca product range has been continuously extended. Today, for example, there are also sandwich blocks with integrated insulation or the newest type, Leca EasyLex. This block is considerably thinner than the Leca Lex Block and was presented in the autumn at the FinnBuild.

## Modern block production line and mixing technology from one source

The Masa company has acquired a great deal of know-how through decades of manufacturing plants and machines for the production of high-quality paving stones, kerbstones and blocks made of lightweight and normal concrete. The appropriate concrete quality to meet the specific requirements of block production is prepared in the dosing and mixing machines. The production machines and plants are dimensioned according to the desired output quantities and make very high production numbers possible.



The newly built concrete block plant in Oitti



After the fire the plant was completely destroyed. Only the concrete silos could be preserved.

quence of the accident as well as by environmental protection and the reduction of noise.

Fire prevention was improved considerably in many regards. For example, an automatic fire extinguishing system with direct alarm signalling to the local fire brigade is now



The silos have two discharge openings. Dosing takes place volumetrically. A spraying system is attached to each belt for the moistening of the raw materials.

#### Modern dosing technology for the desired concrete mixtures

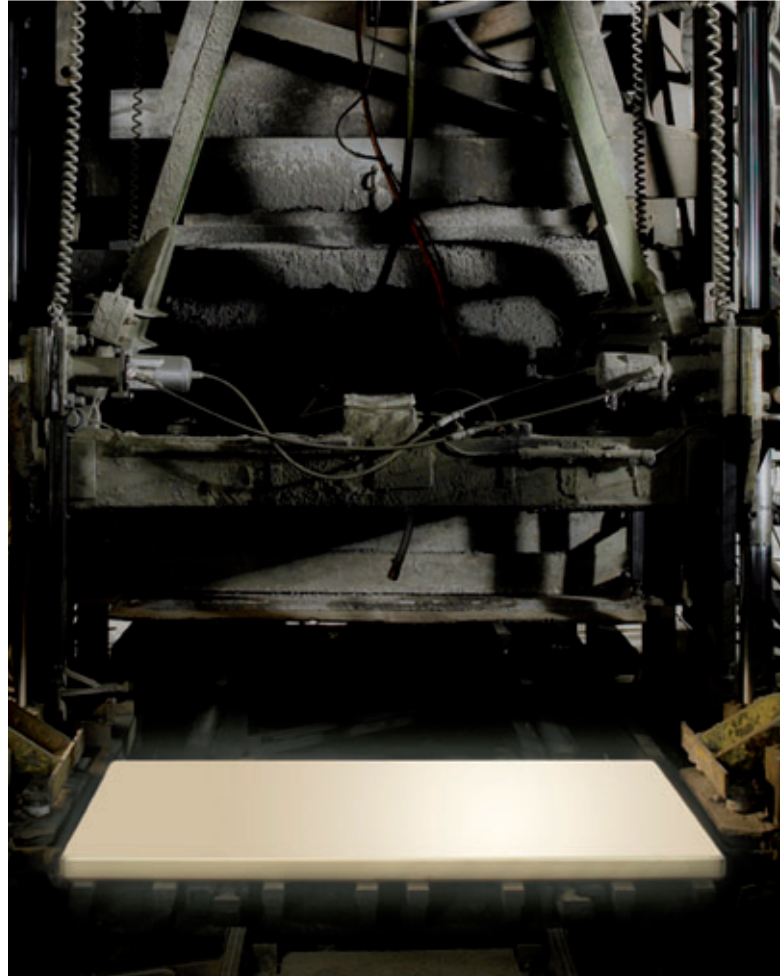
As already mentioned, only the concrete silos for the aggregates remained from the original concrete plant and were saved by strengthening measures for the new production. Today, a total of eight silos, six old and two new ones, are fed by a newly installed bucket conveyor. The six larger silos each have two discharge openings in order on the one hand to avoid segregation and on the other to enable fast, accurate dosing. The two smaller silos each have one discharge opening. Dosing takes place volumetrically. The raw materials used in the production of lightweight concrete can sometimes absorb large quantities of water, which can lead to problems with the mixing process if these raw materials remove mixing water from the mixture. Therefore all dosing belts are equipped with spraying devices that spray the dosed aggregates with water, thus saturating them with water for the mixing process. The raw materials fall from the dosing belts onto a conveyor belt, which transports the entire material to a bucket elevator. The filled bucket drives to the mixer level and empties itself into the mixer.

The cement is conveyed from three cement silos to the mixer via screw conveyors and precisely dosed using cement scales.



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Masa XL 9.1 concrete block making machine

#### PH 3000/4500 concrete mixer

On account of good experience with the Masa PH 3000/4500 horizontal compulsory mixer, the customer selected the same mixer once again for the new plant; it supplies the block making plant with sufficient quantities of quality concrete. The PH 3000/4500 horizontal compulsory mixer from Masa was specially developed for the production of earth-moist concrete, as is required for the production of paving stones or blocks. The mixer has two discharge openings as standard. Modern

water dosing systems measure the current moisture levels in the mixture and control the addition of water accordingly. The total added water is made up of the preliminary water, which is added via water meters, and the main water, which is added from a water weigher using the difference method due to short mixing cycles. Apart from good concrete quality, the mixer is characterised by short mixing times and a high mixing capacity of up to 60 m<sup>3</sup>/h.

The mixer has four mixing stars, which ensure thorough mixing of the concrete. The PH 3000/4500 can be opened from two sides via two large doors. This considerably facilitates the cleaning of the mixer and lowers the risk of injury if manual work needs to be carried out in the mixer.

For unrestricted winter operation both truck deep silos and the material silos can be heated. In addition, the mixing water can be heated up to 80 °C. Modern weighing technology ensures accurate dosage of the water quantities. The mixer empties into a storage bunker under the mixer platform. The block-making machine is then fed with concrete from the storage bunker via a conveyor belt. The arrangement of the storage bunker permits a continuous supply to production.

#### Concrete block making machines from Masa in the XL version

High-performance, reliable production technology is required where large quantities are produced. Modern concrete block making machines are characterised by a high degree of automation and correspondingly high availability. Apart from the

robust design of the components, a customer-orientated operating concept and extensive safety technology are above all the essential success factors in this respect. When it came to the concrete block making machine, Saint-Gobain Weber chose the Masa XL 9.1, with which almost 25,000 hollow blocks can be produced in an 8-hour shift. With modern and matured technology, the XL version represents the top model in Masa's range of block-making machines. Decades of experience and continuous further development flow into the technology of this model series.

In addition, the XL version also stands for the production of concrete blocks of all kinds with very accurate heights, short cycle times and very high outputs with very high product quality.

The height accuracy in particular was a decisive quality criterion for Saint-Gobain Weber. The previous Masa block making machine, which fell victim to the flames last summer, had already convinced the company in this respect. After the initial experiences with the new Masa XL 9.1 this new unit seems to have raised the bar even further in terms of height accuracy, much to the delight of Saint-Gobain Weber.

The standard scope of delivery of the XL series from Masa includes an automatic mould changer with automatic height adjustment of core and facing filler part. The levels in the concrete silo of the block making machine are continually measured by weighing cells, so that concrete is always requested promptly and automatically.



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*Transfer of hardened concrete goods to the lowerator on the dry side*

The entire hydraulic system of the plant is integrated into a noise-reducing container, the so-called hydratainer. All control cabinets in the electrical system are also installed in their own container, the Powertainer. Both containers, together called the Combiteiner, stand coupled together on top of the control room for the complete plant, which is similarly built in a

container design. The entire production on the wet and dry side can be monitored and controlled in the control room. Numerous touchscreens and other monitors are available for this here.

Saint-Gobain Weber mainly uses moulds from Rampf for the production of the concrete blocks with the Masa XL 9.1. They are manufactured on steel boards. The cycle times for large blocks are around 12 seconds, depending on the product.

In accordance with the Saint-Gobain standards, great importance is also attached to optimal noise insulation. The complete block-making machine is surrounded by an acoustic enclosure, which leads to a reduction in noise outside the acoustic enclosure of lower than 80 dB and thus to improved working conditions. However, the production sequences can be followed at close range through a wide window front in the control room.

**Air-conditioned drying chamber**

The freshly produced, vibration-sensitive Leca blocks are transported by a purely electrically driven walking beam conveyor from the block making machine to the elevator and collected there. An important item for the constantly good quality of the Leca blocks is a weighing facility integrated in the walking beam conveyor, which displays the weight of the freshly produced blocks. Once 18 steel boards have been taken up, the finger car automatically takes the fresh products to the drying rack, which was supplied by H & S Anlagentechnik. A ventilation system ensures that the climatic conditions in the drying chamber are homo-

geneous, so that the concrete products harden under the same conditions in each compartment of the rack.

The rack system offers capacity for a total of 4446 production pallets, thus permitting continuous production on the wet and dry sides in multi-shift operation.

A finger car puts the fresh concrete blocks into storage and removes the hardened blocks again. While with elevator is being loaded with fresh product, the finger car transfers eighteen steel boards with hardened concrete goods to the lowerator. The sheets are then transferred separately by the lowerator to the packet assembly line on the dry side.

**Transport and packet assembly components**

Masa's scope of delivery also includes the complete handling systems on the dry side. The steel boards with the hardened products run synchronously via a servo-motor-driven walking beam conveyor to the next station, the turner with integrated layer doubler. As the name already indicates, this device always places two layers of blocks on top of one another. To do this a horizontally rotating gripper first pushes a layer of blocks together, picks it up with its four clamps, rotates it horizontally by 90° and sets the complete layer down on the reforming line arranged parallel to the conveyor. A second layer of blocks is placed on top of this first layer in the same way.

The empty production boards drive on automatically and subsequently pass through a cleaning station with scrapers and rotary



*Clearly arranged and equipped with extensive safety technology: the new Masa concrete block production plant at Saint-Gobain Weber in Oitti, Finland*



*The winters in Finland are long and hard. In order to be able to produce continuously despite that, the complete hall has been lined with flame retardant insulating elements.*



Hardened concrete blocks on the dry side

brushes. After cleaning, the steel boards are placed in a buffer magazine again, ready for the next production cycle. An automatic oiling station is arranged directly in front of the block making machine. This applies the necessary release agent.

On the reforming line, which consists of an electrically driven pushing system and the reforming belt, the block layers can be increased or decreased in size in the direction of transport in new layers of any desired layer size. The reformed block layers are transported by the reforming belt under the pick-up point of the packet assembler. The reforming line is designed in such a way that it is faster than the block making machine even with unfavourable layer sizes.

The block layers do not have to run via the reforming line, but can also be picked up directly from the packet assembler by the walking beam conveyor.

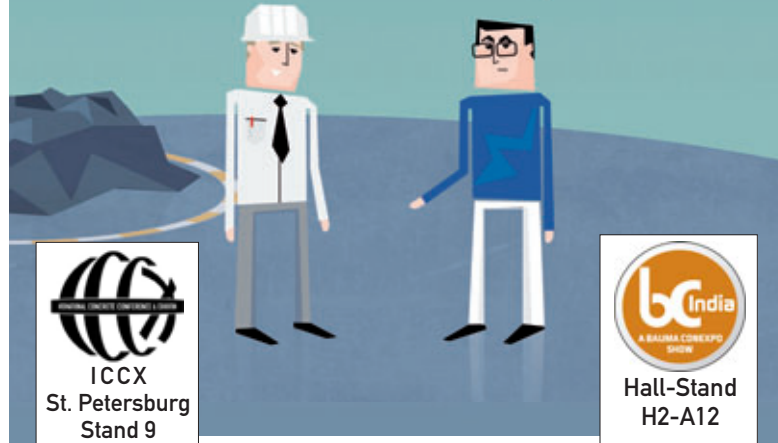
As used successfully for years in all Masa packet assemblers, the clamping baskets are implemented here as four-sided servo clamps. The packet assembler picks up the double layer securely and places



The second gripper robot takes up two block layers, which had been prepared by the layer doubler beforehand, and makes block packets out of them on the track located behind.

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*The rotary suspended gripping and clamping device with electrically-driven four-sided clamp*

it on a third transport line arranged in parallel. The first double layer of a block packet set down is placed in each case on a wooden pallet. A wooden pallet is automatically supplied for each new block packet from the wooden pallet magazine, which has a capacity of approx. 60 pallets and is fed by a fork-lift truck.



*Block packets can be prepared 'lying down' with the tilting table.*

The packet assembler is characterised by very high performance and can easily match the speed of the concrete block making machine.

Further double layers are subsequently placed on top of the growing block packet until the desired height is reached. The block packet moves automatically via a roller track out of the stacking station and a new wooden pallet is inserted for the next concrete block packet.

The rotary design of the gripper plus the arrangement of a tilting table, with which the complete concrete block packet can be rotated by 90°, allows versatile packet assembly to suit all needs.

Before the block packets are driven out of the production hall, they can optionally be provided with stretch hoods in the next station. Before leaving the hall, each finished packet is automatically marked by a labelling machine with a label for quality control purposes. This allows the exact production time and also the product specifications to be checked even months later. After that the packets are transported out of the hall into the outdoor area and are taken to their allotted place in the outdoor store by fork-lift truck. In order to be able to work without complications and above all safely, even in winter, the loading area in which the fork-lift trucks take over the packets is roofed over and fenced in.

#### Smooth implementation despite tight scheduling and long winter

"Building permission was given in October and the first machines and control components were already installed in February. The test phase was then successfully started in June", says project manager Juhani Ahonen of Saint-Gobain Weber Oy Ab, who is very satisfied with the successful implementation of the project. The new production line also enables more varied production and progressive product developments can be adopted into the product range from Oitti without problem.

In addition, apart from the fast and unproblematic implementation of the project, the increased production capacity also impresses. It was possible to increase the production output in two-shift operation with the new production line, which did not take place at the expense of the height accuracy of the concrete goods, however.



No corners were cut in Oitti where safety technology was concerned. All stations were planned and implemented to very high safety standards.

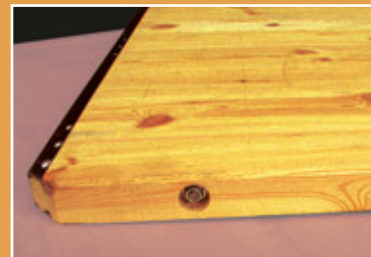
Hence, Saint-Gobain Weber Oy Ab has already determined after the first few weeks of production that the requirements for both quality and quantity have been met to its entire satisfaction.

What Saint-Gobain Weber Oy Ab and Masa have in common is their efforts to ensure maximum work safety. Saint-Gobain Weber Oy Ab has even received a Finnish safety award from the respective body for its exemplary efforts to achieve very high work safety. Although the safety standards in Finland have already been set very high by the legislator in comparison to the worldwide average, Saint-Gobain Weber Oy Ab exceeds them significantly. Hence, the standard in Oitti includes not only indispensable safety technology such as light barriers and door contacts on all mechanically driven plant parts.

In addition to modern plant technology for high-quality concrete goods, Masa attaches great importance to work safety in the handling of its machines. Hence, it was not a problem for Masa to implement the demanded safety technologies as desired and to build an ultra-modern and safe concrete block plant together with Saint-Gobain Weber Oy Ab.

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**weber**  
SAINT-GOBAIN

Sain-Gobain Weber Oy Ab  
Savilaukuntie 1 · 12100 Oitti, Finland  
T +358 10 4422891  
[www.e-weber.fi](http://www.e-weber.fi)

**Eckart Holz GmbH**  
**Holzbe- und -verarbeitung**

Kallbachstraße 48  
36088 Hünfeld-Michelsrombach, GERMANY  
Tel.: +49 (0) 66 52 - 25 77 · Fax: +49 (0) 66 52 - 55 55  
E-Mail: [Info@eckart-holz.de](mailto:Info@eckart-holz.de) · [www.eckart-holz.de](http://www.eckart-holz.de)

