

Tobermore Concrete Products Ltd., Tobermore/Co. Londonderry, UK

1 million m² of high-quality concrete products per year for Ireland, the United Kingdom and the Isle of Man

■ Christian Jahn, CPI Worldwide, Germany

Tobermore, the Northern Irish manufacturer of high-quality concrete products, has commissioned its fourth production plant with equipment from manufacturer of machinery Hess at its headquarters. The entire circulation system is designed for high performance - the prerequisites for this are created by the concrete block machine, a large pallet buffer, buffers on the dry and wet side, and a curing area with individual chambers. A mixing plant with three cement silos and 29 bins for sands and aggregates as well as a shotblasting plant allow a wide range of end products. The circulation system operates continuously 24 h a day, achieving an actual annual capacity of around 1 million m² of concrete products.

It is already the fourth circulation system with a Hess concrete block machine that the leading Northern Irish concrete products manufacturer Tobermore has commissioned at the turn of the year 2020/2021. The investment of around 10 million British pounds (currently equivalent to almost 13 million euros or around 15 million US dollars) in Hall IV will increase the annual production volume at the company's headquarters in County Londonderry by 30 % (in total, Tobermore plans

to invest 30 million British pounds as part of a growth program over the next four years - currently equivalent to around 38 million euros or around 46 million US dollars).

Concrete products produced at the Tobermore site are sold primarily to both the domestic and commercial markets in Ireland, the UK and the Isle of Man, where demand for the high-quality concrete products has grown steadily in recent years, according to Tobermore.

High performance, continuous operation

According to Tobermore's specifications, the entire fourth circulation system is designed for high performance and continuous operation without interruptions: This is ensured by the Hess RH 1500-4 MVA concrete block machine, a buffering system at the beginning of the wet side with 3,240 production pallets, one buffer car behind the elevator and one in front of the lowerator on the wet side and on the dry side respectively, each with 17 tiers (double discharge system) and 14 tons of capacity, and a curing chamber with 15 individual chambers of 510 pallets each and a total capacity of 7,650 production pallets.



The plant site in Tobermore - the new production hall IV can be seen in the background below the wind turbine.



The Hess RH 1500-4 MVA concrete block machine is the heart of the production plant.

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Trevor Smyth, Production Works Manager at Tobermore, is very satisfied with the new circulation system.



Fresh products

The aforementioned components enable fast cycle times and a continuous, high throughput without interruptions – even if, for example, a problem should occur on the wet side and production should come to a standstill there, thanks to the two buffer cars on the wet and the dry side the finger car is free and can continue the process on the dry side for several hours.

„We run the plant in two 12-hour shifts, i.e. uninterrupted 24 hours a day. This gives us an annual production of around 1 million m² of paving,” says Trevor Smyth, production works manager at Tobermore, who is responsible for the project.



Buffer with 3,240 production pallets at the beginning of the wet side.



There is one buffer car behind the elevator and one in front of the lowerator on the wet side and on the dry side respectively, each with 17 tiers (double discharge system) and 14 tons of capacity.

Never change a winning team

During the planning phase of production hall IV with a floor space of 4,416m², Tobermore’s management was guided by the block plant previously built in production hall III (see CPI Worldwide 01/2010).

Following the successful completion of the previous project in Hall III, the proven suppliers for the individual plant components were also retained for the new Hall IV - this time the companies Hess, SR-Schindler, Kraft Curing Systems, HS Anlagentechnik, Rapid International (see “Batching and mixing plant with 29 aggregate bins”), Signode, Lachenmeier and Assyx were again involved.

„We are simply convinced that these companies are best suited for the project. We’ve worked with most of them for many years, and the collaboration has been excellent,” Smyth says. This approach, according to the unanimous opinion of all parties involved, facilitated the cooperation immensely, and it enabled the timely delivery, installation and commissioning of all the equipment - notwithstanding all the adverse conditions caused by the ongoing Corona virus pandemic and the accompanying travel restrictions.

The finger car transports fresh products to the curing chamber.



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Batching and mixing plant with 29 aggregate bins

As part of its recent 10 million pounds expansion, leading UK and Ireland paving and walling manufacturer, Tobermore, has recently invested in a bespoke state-of-the-art Rapid concrete batching plant.

A longstanding customer, Rapid has previously installed six bespoke concrete batching plants over the last forty years at Tobermore's County Londonderry headquarters.

The new Rapid batching plant is comprised of a 20m³ dump hopper to receive aggregates and sand and an inclined 750 mm wide conveyor to convey materials to the shuttle conveyor. The shuttle conveyor subsequently distributes aggregates to each of the aggregate bins. Aggregates and sands are stored in a series of 29 storage bins, of varying sizes, from 4.7 to 100 m³. This represents the greatest number of bins Rapid has ever installed on a plant.



Rapid International's batching and mixing plant in the assembly phase: on the right the mixing tower with the three 150-ton cement silos, on the left the units with a total of 29 storage bins for aggregates and sand.

Two 600 mm and one 750 mm weighed belt conveyors collect materials from the aggregate and sand storage bins and discharge this to the main transfer conveyor, leading to the changeover tower. From the changeover tower, the materials are transported to the mixer house via a 750 mm wide inclined batch conveyor. The batch of aggregates is then subsequently distributed via a diverter shoot to each of the holding hoppers, until required by the mixers. Three 150 ton silos feed the mixer via the screw conveyors.

A series of six wet batch hoppers under the face mix and four hoppers under the back mix, offers an almost endless amount of blending combinations.

The multi-floor mixer platform design allows maximum access for cleaning and maintenance. Designed to house the plants two integral mixers, the platform is also sized to accommodate the travelling wet batch hoppers (backing and face hoppers).

Concrete block machine with minimal cycle time of 10.5 seconds

The heart of the block plant is the Hess RH 1500-4 MVA concrete block machine. The machine in the M version has been developed for high-performance applications. Depending on the product it can reach a minimal cycle time of 10.5 seconds.

Although all cycle times are very short and the machine therefore performs very fast travel movements, the sequence of movements is very harmonious and gentle on the machine's components. This is possible thanks to an intelligent interaction of control technology and high-performance hydraulics. All the axes of tamper head, mould and filler box are precisely controlled in their movements with a resolution of 1/10 mm. The axes also communicate with each other so that the travel movements overlap in a cycle time-optimized manner. In addition, the Hess RH 1500-4 MVA concrete block machine at Tobermore is equipped with a coarse mix silo with double discharge and a face mix filler box planning roller. And the mould exchange takes place automatically, which is also advantageous for fast, continuous operation.

Optimal vibration transmission

The Hess RH 1500-4 MVA concrete block machine can produce products with heights between 25 and 500 mm. In its standard version, the machine works with production boards measuring up to 1,400 x 1,100 mm; at Tobermore, it works with DuroBoards measuring 1,400 x 950 x 45 mm from German quality manufacturer Assyx.

„We use the DuroBoards in all our plants. These are lightweight and at the same time very durable production pallets that transmit vibrations extremely well. Very good concrete products can be produced on them,“ says Tobermore manager Smyth. Assyx has supplied 22,800 DuroBoards to Northern Ireland for all four circulation plants with a Hess concrete block machine to date. The production pallets have a wood core of Kerto-Q LVL laminated veneer lumber, which is hermetically encased in Baydur brand polyurethane.

Curing chamber with fifteen individual chambers

Since the circulation system produces different products from Tobermore's overall product range that require different environmental conditions for curing, Tobermore's management decided against a large single chamber with largely uniform climate conditions and in favour of a curing chamber with fifteen individual chambers in which temperature and humidity can be regulated individually, according to the needs of the product stored in each case.

The fifteen individual chambers were designed, manufactured and installed by HS Anlagentechnik. Each individual chamber is 29 m long, 1.5 m wide and 7 m high. It has 17 levels and space for a total of 510 production pallets with a maximum load of 300 kg of concrete products each. Thus, each individual chamber can store about 150 tons of concrete. In the entire curing chamber with its total of fifteen individual

chambers, there are thus up to 2,250 tons of concrete for a total of 7,650 production pallets.

The rack system in the individual chambers is stable and, thanks to special galvanizing with a zinc-aluminum-magnesium alloy, corrosion-resistant and designed for a long service life. The racks are equipped with lateral support profiles and head profile.

HS Anlagentechnik insulated the outer walls of the curing chamber as well as the partition walls between the fifteen individual chambers with sandwich elements. Each individual chamber can be opened and closed in the direction of the vehicle group by an automatic aluminum roller door.

Ideal climate in the individual chamber

The ideal climate in the individual chambers is ensured by the latest-generation Quadrix Ultra concrete curing system from manufacturer Kraft Curing Systems. The system enables the temperature in the individual chamber to be raised to 45 °C and the humidity to 95 %. The formation of condensate or mist is thus prevented.



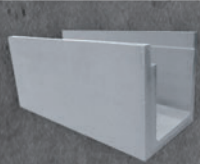
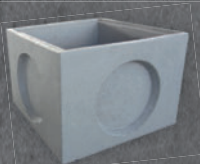
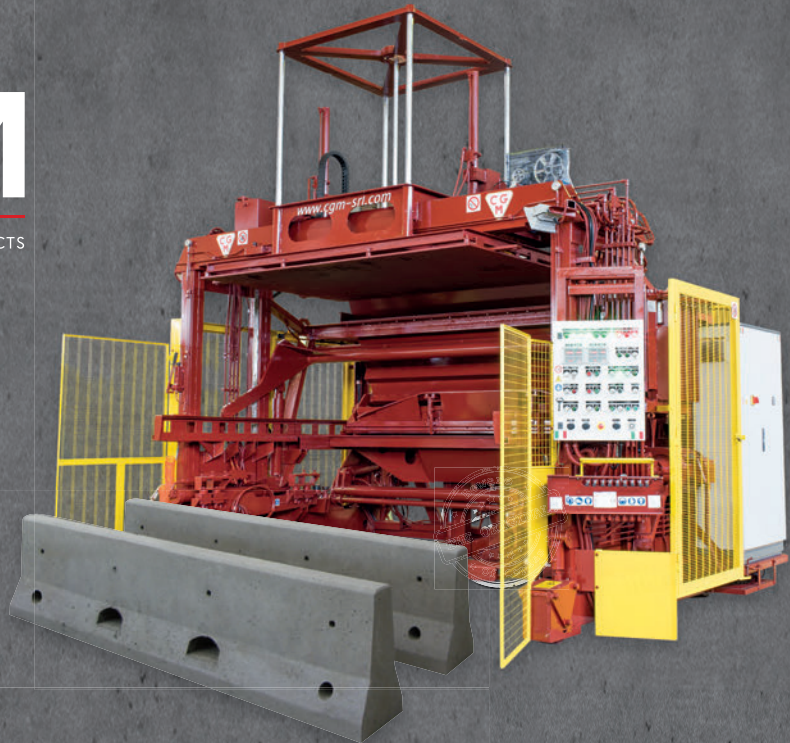
The ideal climate in the individual chambers is ensured by the latest-generation Quadrix Ultra concrete curing system from manufacturer Kraft Curing Systems.



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To ensure that the climate is as uniform as possible throughout the depth, width and height of the single chamber, the Quadrix Ultra system's air distribution ducts are fitted with a large number of inlets and outlets.

To ensure that the climate is as uniform as possible throughout the depth, width and height of the single chamber, the Quadrix Ultra system's air distribution ducts are fitted with a large number of inlets and outlets – there are 20 air supply outlets and ten air return inlets distributed over the 29 m that the single chamber is deep at Tobermore.

Tobermore also wanted the individual chambers to have the option of following the curing phase with an additional drying phase, depending on the product. This may be necessary because some products are still being finished on the dry side after being in the curing chamber. To avoid chipping and breakage, these products must be dry and sufficiently hard. So Kraft Curing Systems additionally equipped the individual chambers at Tobermore with a drying system that draws moisture from inside the chamber during the drying phase, thus reducing humidity.

The additional drying phase has another advantage: concrete products that have passed through this phase have hardly any residual moisture and will no longer form condensation on the surface even under stretch hood foiling and in the sun and rain in the outdoor storage area. Efflorescence should thus be ruled out.

Shotblasting machine from SR-Schindler

For the surface finishing of concrete products, an inline shotblasting plant type SR-1250 from the manufacturer SR-Schindler is installed on the dry side between the lowerator and the packaging line. Its processing section runs parallel to the dry side transport over a length of about 18 m.

The SR-1250 shotblasting machine has a working width of 1,200 mm and processes layers of pavers with dimensions between 800 x 800 mm and 1,200 x 900 mm – layers with a side length of more than 1,200 mm are rotated by 90° and then transported further in the running direction with the narrower side. The maximum product thickness is 200 mm.

In the first step, a cuber Servo 900 takes a layer of pavers from the dry side transport and places it on a transfer table. A layer pusher transports the layer on the extended belt conveyor of the shotblasting machine in front of the infeed entrance lock. The shotblasting machine's rubber conveyor belt is ribbed across the direction of travel, which prevents the concrete products from drifting apart during processing.

The layers are conveyed at a distance of approx. 600 mm from each other through the multi-layer rubber curtains of the infeed entrance lock into the shotblasting chamber.

The chamber of the shotblastig machine in which the finishing process takes place is made of 12 % manganese hard steel to protect against damage and wear caused by the action of abrasive.

In the shotblasting chamber, two frequency-controlled turbines with 18.5 kW power each bombard the surfaces of the layer positioned below with steel or stainless steel beads. This exposes the fine aggregates used in the facing layer and gives the pavers the desired aesthetic surface effect. In addition, the surface is slightly roughened and slip resistance is improved.

Once a layer has been completely shotblasted, it is transported further out of the shotblasting chamber. The abrasive supply to the turbines is automatically stopped and is only raised again as soon as the conveyor belt positions the next layer under the turbines.

In the following cleaning chamber, two high-pressure blowers with height-adjustable slot nozzles remove the last blasting abrasive residues from the surface of the processed concrete products. The contaminated abrasive is collected and cleaned of dirt particles in a cleaning system. It is then made available again in the blasting medium silo for the blasting process.

The cycle time for the entire blasting process at Tobermore is between 13 and 15 seconds.

The processed stone layers are transferred by a second pusher to a conveyor belt to the pickup position. A second Hess cuber picks up the layers again and places them on empty production pallets on the dry side transport.

The second cuber can also place already processed layers on a rearranging table, as required. A void layer is then formed on the table with gaps between the pavers, into which the fork of a forklift truck can reach during a possible later transport operation. After forming the void layer, the second cuber picks up the layer again and places it back on an empty production pallet on the dry side transport.

Strapping and packaging

At the level of the packaging line, a third cuber Servo 900 takes paver layers from the production pallets and forms packs on transport pallets, which are then conveyed on by the conveyor of the packaging line departing at 90° from the dry side transport – the empty production pallets remaining on the dry side transport are meanwhile brushed, turned, stacked and returned from the conveyor to the pallet buffer at the beginning of the wet side.

The packs are strapped horizontally and vertically, then covered with a stretch hood and conveyed out of the production hall. The last two operations before discharge stabilize the packs for transport and protect them from the weather in the outdoor storage area and during transport to the construction site.

Strapping is performed on a TSM-H6500 machine with Jumbo Reel Dispenser and HSM-H3000 head from manufacturer Signode. Main advantages of the machine are efficient use of strapping material, tight strapping, high speed of the process and maximum reliability.

After strapping, a Multi FleX1 stretch hooding machine from Lachenmeier, also a member of the Signode Group, covers the stabilized stone packs with a stretch hood. In addition to its protective function, the stretch hood also provides space for the placement of advertising, such as the Tobermore logo, among others.

The Multi FleX1 easily meets Tobermore’s main requirements: it is highly flexible and can wrap all of the concrete product manufacturer’s four-sided product packages – the packages can have side dimensions between 600 x 400 mm and 1,400 x 1,400 mm and a height of up to 3,000 mm.

With a speed of more than 200 packages per hour, the Multi FleX1 easily keeps up with the cycle time of the circulation system – a condition set by client Tobermore.

Another advantage of the Lachenmeier machine is a patented technology that ensures that the stretch hood is applied in sufficient thickness even on the sharp edges of the packs and does not tear.



One of three Hess cubers Servo 900 belonging to the new circulation system in production hall IV at the Tobermore site



Strapping is performed on a TSM-H6500 machine with Jumbo Reel Dispenser and HSM-H3000 head from manufacturer Signode.



After strapping, a Multi FleX1 stretch hooding machine from Lachenmeier covers the stabilized packs with a stretch hood.

Top quality for the island

Trevor Smyth is very satisfied with the cooperation with the companies involved. „There are always minor problems. But everyone involved has cooperated very well to get the plants up and running quickly and efficiently,” says the Production Works Manager. The after-sales service of the companies involved can also be relied on, he says.



Paver packs strapped, stretch hooded, printed with Tobermore logo, ready for transportation

About Tobermore

The concrete products manufacturer Tobermore, based in the village of the same name in the Northern Irish county of Londonderry, looks back on a history of almost 80 years. The company was founded by the Henderson family, who still own and manage it today. Production at the headquarters has been steadily expanded over the last twenty years – the first Hess plant was commissioned in 2002, the second in 2004, the third in 2007 and the fourth in 2020 (see „1 million m² of high-quality concrete products per year for Ireland, the United Kingdom and the Isle of Man”).

Today, Tobermore employ around 350 highly qualified employees throughout the UK and Ireland.

The company produces concrete products for paving, wallings, and facing brick. Tobermore offers a total of around 2,000 product lines.

Their target markets are both consumer and commercial projects. Tobermore have an extensive range of customers from private individuals, house builders, architects and commercial project developers.

In the last published financial report of Tobermore Concrete Products Limited for the financial year ending April 30, 2019, sales are shown at 50.7 million British pounds (corresponds to around 58 million euros or around 70 million US dollars today) and profit before taxes at 11.9 million British pounds (corresponds to around 13.7 million euros or 16.5 million US dollars today).

Tobermore is proud of its tradition as a family business, its high, excellent product quality and, last but not least, its strong commitment to the environment – 100 % of the electricity from 1,250 solar panels and its own wind turbine is consumed in the company’s own operations; 100 % of plastic, wood and concrete waste is recycled and the concrete quarry is processed and returned to production.

„The new block plant is now running extremely well and we are producing top quality products with it,” says Smyth. With these high-quality concrete products, the company will continue to grow in Ireland, the United Kingdom and on the Isle of Man in the coming years, he adds. ■



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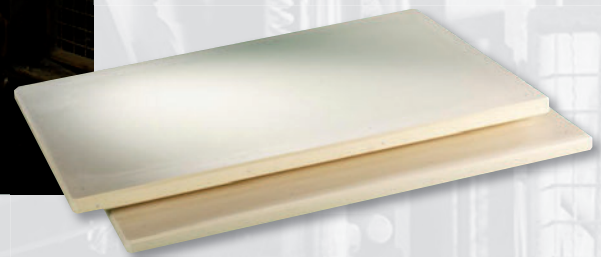
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