Elematic, 37801 Akaa, Finland

Enterprise resource planning software: a key role for Norway's Block Berge Bygg

Block Berge Bygg AS is a major Norwegian precast concrete manufacturer and contractor. Established in 1966, BBB today is a part of Veidekke ASA, with 22 000 m² of production and storage area, and 130 employees in concrete production. Vital to help manage all production, storage and transport of finished products – to ensure quality and timely output, is Elematic ELiPlan.

Patrick J. Reynolds, United Kingdom

This year, construction gets underway on one of Scandinavia's largest car showroom and workshop centres, and turnkey construction of the entire complex, near Stavanger in Norway, is entrusted to Block Berge Bygg AS – one of the region's major precast concrete manufacturers and also a total building contractor in the local area. Five major car producers – Ford, Toyota, Volvo, Lexus and Mazda – will be housed in the showroom centre in Forus, just outside Stavanger. The huge building project by Brødrene Kverneland Eiendom AS calls for 23,000 tonnes (approx. 9500 m³) of precast concrete in total.

Elematic's equipment and EliPlan software is playing a key role in fulfilling the very large job – and others of various sizes, and requirements, that Block Berge Bygg has constantly underway. 'We have 10-15 ongoing projects at the same time, mixed between total building contracts and providing structures only,' says Block Berge Bygg's factory manager, Terje Skårland.

Concrete casting for the car showroom contract began at Block Berge Bygg's factory near Klepp, to the south of Stavanger, in January; precast production is programmed to last until June. Tightly following the production schedule, erection work on site is scheduled to run from February to July. Then, the total "Bilsentrum" complex is to be fully fitted out and completed for handover – being one of Block Berge Bygg's comprehensive, fast-track "cast-to-key" contract services – by May 2016.

The complex will have five different showrooms, most with their own dedicated workshop. To create the huge precast concrete structure, the building design calls for production of hollow core slabs, beams, columns, indoor walls, staircases and facades (with both load bearing capability and polished surfaces). Combined with the erection, building and fit-out services, Block Berge Bygg's contract is valued at NOK 330M (excl.VAT).

Also due for completion in mid-2016, Block Berge Bygg was most recently awarded an even larger job, in terms of concrete volume – approximately 25,000 tonnes for the expansion of Sjøkanten shopping complex, in Harstad, in northern Norway. The NOK 163M (excl VAT) contract package from Verkstedveien Eiendom AS is for construc-

Photos: Eirik Halvorsen, Block Berge Bygg AS

Located in near Stavanger in Norway, Block Berge Bygg AS today has about 22 000 m² of production and storage area, with 130 employees in concrete production.

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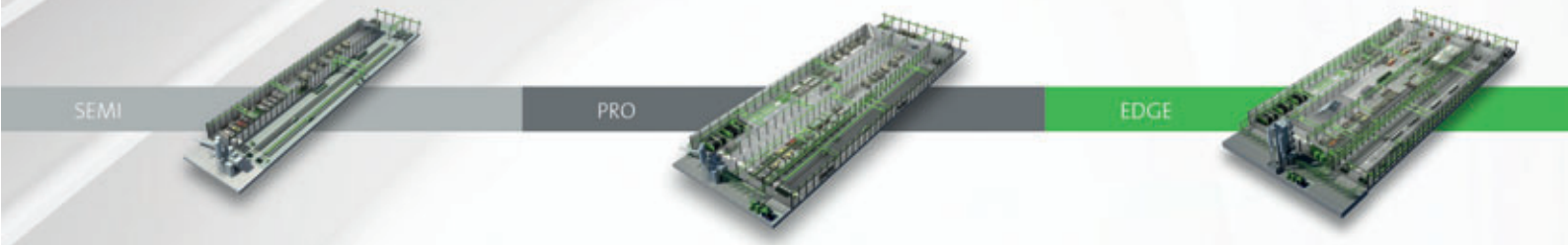

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EliPlan supports project management, production management, product and materials handling, and also handling in storage

Production output for the entire factory is typically 750 tonnes/day, drawing upon the solid capabilities of EliPlan since 2002. For façade production alone, the factory has 25 tables (10 m x 4 m), each able to cast up to 450 mm thickness.

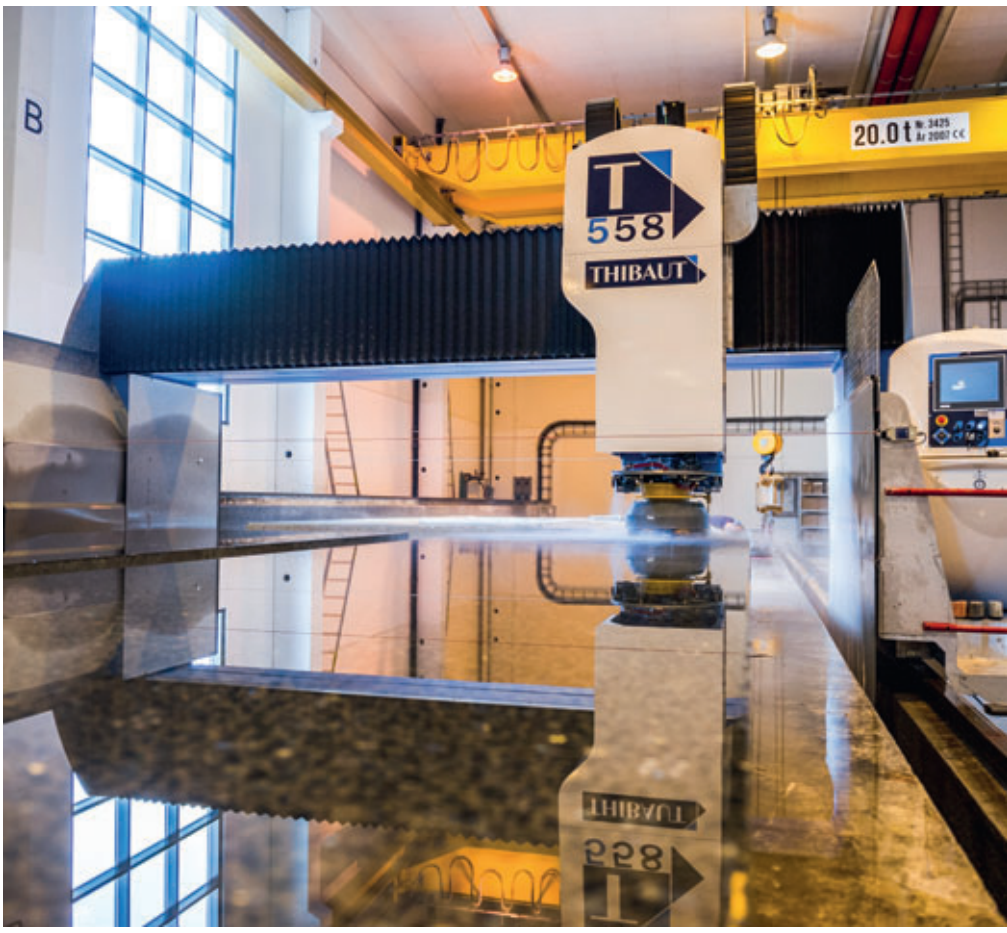
tion of the watertight shell, including escalators and elevators, although the job is not full turnkey. Distance to site presents no little challenge as concrete elements will need to be shipped in 12 freight cargo loads far up the west coast to site.

In early 2015, production for the two projects will take up much – and yet still not more than half – of the large factory's capacity.

Business Strength

Block Berge Bygg was established in 1966, and the factory based at the current site a few years later. In 1999, the company was acquired by major Norwegian contractor Veidekke ASA. Since then, a total of NOK350M has been invested in the site, making it one of Scandinavia's most modern and efficient precast concrete production facilities.

The numbers of production halls were gradually increased to 10, and the oldest building has been in use since the early 1970s. In total, Block Berge Bygg has 22,000m² of area for both production and protective storage of raw materials. Additional space is available outdoors to briefly store finished products. The company has a techni-



Grinding and polishing is carried out with Thibaut machines

cal workforce of 130 employed in concrete production – just over a third of its total employees.

In the region around Stavanger – Rogaland, Block Berge Bygg can offer everything up to turnkey supply of total building packages (structure plus roof, windows, utilities, M&E, doors, flooring, lighting, etc); and, for customers farther afield it will supply the concrete elements wanted, transporting by the most effective means to site, including by road, rail and ship.

Previous large projects served far from the factory include delivery of concrete elements for a coastal apartment complex in Jarlsø, near Tønsberg on the other side of southern Norway, and not so far from Oslo. The large scheme has been in development for almost 10 years, and is continuing; Block Berge Bygg has produced and delivered concrete elements to all of the apartment buildings on the island – including a 12-storey tall building at the front.

Large single items are also manufactured and supplied, such as 22.5 m long, hollow beams, a total of 26 of which were transported by road recently to another turnkey project in Forus. In section, the 4-cell beams are 1200 mm wide by 500 mm deep. The building complex for D. Danielsen AS included offices and cooling storage for cold transport, and the long span beams were vital to create large, column-free space. The beams were transported, one by one, on special trolleys with a follow-car, between 9am and 3pm to avoid rush hour.

The majority – about 60% – of turnover comes from total building solutions, and almost a third from supplying contracted packages of concrete elements to projects beyond the local area. About 10% of turnover comes from select packages and elements to meet the needs of refurbishment projects.

Vital to help manage all production, storage and transport of elements – to ensure quality and timely output – is Elematic EliPlan, says Skårland. He introduced the system in 2001 following Block Berge Bygg's discussions with Elematic, already its prime equipment supplier.

At the time, Block Berge Bygg had made a strategic decision to invest in production systems for façades, which have a strong local market. To help meet that goal, and support even greater production capability – and do so smoothly, Elematic had EliPlan as an additional offering that complemented its precast equipment systems. The partners have not looked back, and are building further on the EliPlan system.

Production Muscle

Since 2012, Block Berge Bygg has had three concrete mixers and their typical combined output is 300 m^3/day, working 12-14 hours runs from early morning, usually only on weekdays. The majority of mixer output is for hollow core slabs – about 180 m^3/day – with one mixer dedicated to this production stream, the two remaining mixers supplying mixes for other products.

Concrete is delivered by dedicated, Haarup monorail and a wagon transfer system to the different halls, which house mainly Elematic equipment for the various concrete production processes.

With Halls 4 & 5 dedicated to hollow core slabs, and recently producing 5000 m^2/week, the other halls focus on different products: about 1500 m^2/week of façade elements emerges from Halls 3 and

Keeping track of finished products is easy and simple, thanks to the barcode system that EliPlan enables.

6 to undergo grinding and polishing (with Thibaut machines) in Hall 10; about 600 m/week of prestressed beams (Elematic mould) and also columns are produced in Halls 7 & 8; from Hall 9 comes varied balconies, staircases, landings and other specialty elements; Halls 1 & 2 are primarily for raw materials (rebar, plates, hooks, etc).

EliPlan supports project management, production management, product and materials handling, and also handling in storage – 'especially important for hollow core slabs,' says Skårland. Able to achieve 2 casts-per-bed within 24 hours, the factory is producing about 110 m² of 1200 mm wide hollow core slab per casting, he adds.

The companies have worked together and tailored the EliPlan system to Block Berge Bygg exact needs, such as the types of reports wanted to match its working processes – e.g. quality checklists for every component; dispatch lists, including details of destination and site information; and, labelling stickers that show details like weight, size, casting date of each element, and have identification barcodes.

Skårland says: 'It holds total control of projects, production and delivery, and also holds key economic costs control data,' – ie materials and labour costs. Further, all raw materials incoming from suppliers are also managed in EliPlan.

'It is very effective.' An Oracle-based system, EliPlan has little use of graphics and is easy to run, he adds – 'It is very stable.'

The solid, reliable and yet flexible system enables Block Berge Bygg to plan for concrete production to satisfy multiple, varied scheduling needs within the factory – and allows accurate capacity investigations to help enquiry and tender discussions being held by the sale department.

For some products, the planning can go out 1-2 weeks ahead, but for others – such as hollow core slabs – 'it can be day-to-day,' and with perhaps only needing 2-3 days lead time. The factory produces hollow slabs of 1200 mm width, which are then cut to desired lengths. Slab depths are 210 mm, 270 mm, 320 mm, 400 mm and the largest, 500 mm.

Detailed view on a surface treated precast concrete element

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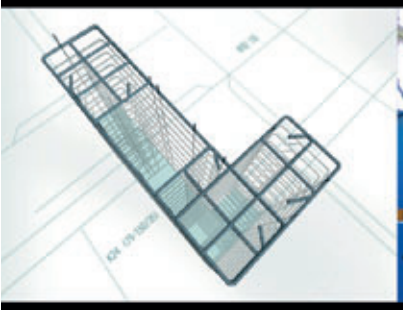

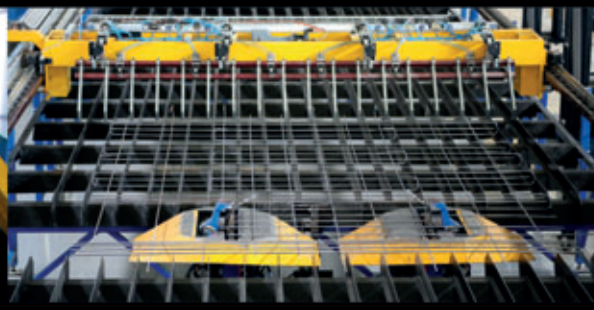

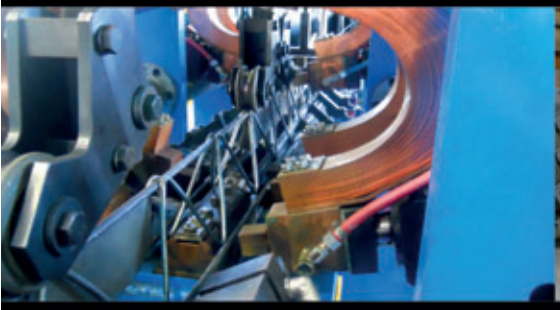

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Further Steps

Key next steps for Block Berge Bygg, in which it will draw even more upon the services and capability of EliPlan, include:

- implementing the EliPlan Tendering Module;
- increasing its already growing use of Building Information Modelling (BIM), which boosts information flow and efficiency of the entire design and construction process as a consequence; and,
- support for more product development, including concepts such as thin-walled, non-loadbearing wall panels.

Tendering Module

'We are looking forward to start implementing the Tendering Module in the near future,' says Skårland. The step would be a relatively large task to undertake, he adds, but Block Berge Bygg will be working with Elematic to achieve the goal.

'We must work closely together and try to develop the best possible solutions for the future,' he says. 'Our 50-year long production history and knowledge about concrete elements needs to be implemented, and inputted, in the calculation system for new projects. This way we can use real-time data to calculate costs.'
Getting the correct price 'is the most important thing,' he adds. Working with the Tendering Module 'will give us the correct price and help us to stay competitive in the market.'

BIM

Skårland says BIM has a role in its operations, and its use is growing for Block Berge Bygg as the accurate information and data the systems hold are then directly imported into EliPlan.

'Everything is usable for us immediately,' he says.
Unlike before, the information management processes, enabled by the development in BIM systems, eliminates the need for manual data entry, and so improves speed as well as accuracy. The BIM systems currently used are software from Tekla and Impact, respectively. The systems have evolved as part of a larger construction industry effort, to which both Block Berge Bygg and Elematic have contributed.

Terje Skårland, Factory Manager at Block Berge Bygg says: Elematic EliPlan is vital to help manage all our production, storage and transport of elements to ensure quality and timely output.

Skårland says the BIM systems hold different parts of a project's information together so everything matches – it must all fit in the virtual models. Then, the systems produce accurate drawings which is good for casting concrete element: there's even less failure in production and erection.

'It's all easier and more correct from the start,' he says.

He adds that using BIM also means further improvement in ordering raw materials, ensuring what is needed is available on schedule and there are no stock issues affecting worker activities in steps in the factory processes. BIM working with EliPlan helps to reduce costs, including man-hours in making concrete elements. It is a lean manufacturing approach, and gives greater efficiency, he says.

Product Development

In south west Norway, the building market has a especially strong for load-bearing walls, or façades. Block Berge Bygg produces about 300 m² - 350 m² per day, and the elements need more curing time compared to other products. The existing strong demand is leading the company to examine product development in façades, investigating possibilities to expand its already strong offering to the market by adding non-loading bearing panel products.

'Everything is custom ordered,' says Skårland. 'It's all taken. Nothing is made for long storage.'
Using EliPlan, Block Berge Bygg's bar code system has four gates to check progress in production and delivery of a concrete element: 1) confirm casting; 2) readiness for delivery; 3) scheduled for dispatch; and, 4) sent to be delivered. Also, with its support for effective logistics, only one person is needed to manage hollow core storage and dispatch.
'EliPlan is a very big system,' says Skårland. 'There's a lot of choice and modules. We're using, in our own way, those most important for us.' 'EliPlan is more or less vital to Block Berge Bygg being effective and strong in the market,' he adds.
But Skårland says the firm also aims to bring even more of EliPlan's capability into service. He plans to introduce the Tendering Module into Block Berge Bygg's production and business processes (see box).

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FURTHER INFORMATION

Elematic
Airolantie 2
P.O. Box 33
37801 Akaa, Finland
T +358 3 549511
F +358 3 5495300
sales@elematic.com
www.elematic.com

Block Berge Bygg AS
Bedriftsveien 6
4353 Klepp Stasjon, Norway
T +47 5178 9900
F +47 5178 9901
post@blockberge.no
www.blockberge.no