B.T. innovation GmbH, 39116 Magdeburg, Germany

Much simplified assembly of precast concrete outer walls in construction of new hotel

The Hilton Garden Inn Hotel with 15 storeys and an overall height of 47.60 m is currently under construction directly adjacent to Terminal 2 at London's Heathrow Airport. Whilst the first three storeys were constructed using the cast-in-situ method, the remaining 12 storeys will be erected using exclusively precast concrete elements. The prestressed hollow core slabs, precast walls and further precast concrete elements are being designed, manufactured and assembled by the O'Reilly Concrete Group from Ireland. For the assembly of the outer wall elements the company is using for the first time BT turnbuckles from B.T. innovation of Magdeburg, Germany.

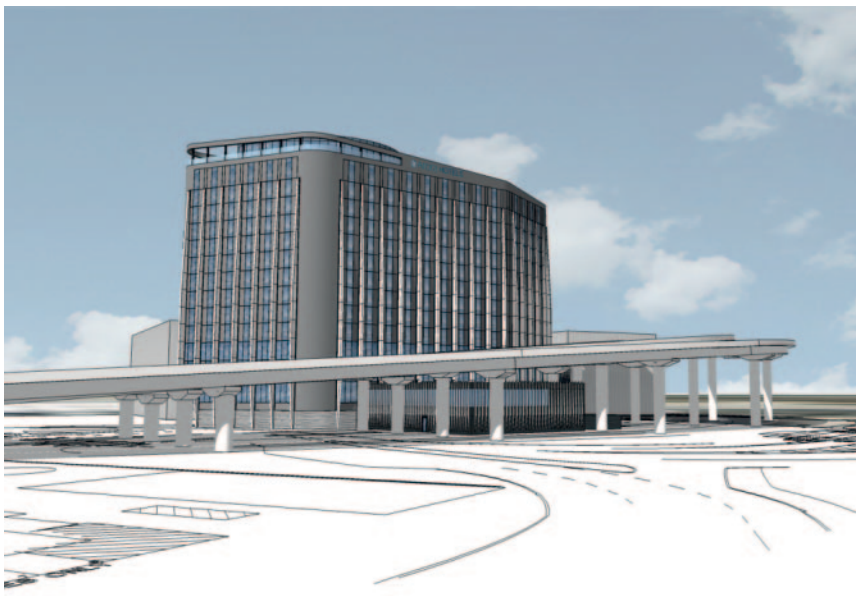
O'Reilly Concrete specialises in the construction of buildings from precast concrete elements as complete frame constructions, which are designed as 3D models for every conceivable scenario using the Tekla software from Trimble. In addition, the company offers a wide range of precast concrete elements such as precast walls, precast beams and columns, stairs and floors, both prestressed and untensioned. The method of construction using only precast elements has been and is employed by O'Reilly Concrete for various types of buildings, including schools, residential buildings, multi-storey car parks, commercial buildings, office blocks and student's accomodation.

Originally established in 1939 as a small sand and gravel business, the company has developed over the course of the decades into one of the largest precast manufacturers in Ireland and Great Britain. The company, which is still owned by the O'Reilly family, has retained its basic values and its dedication to the delivery of quality, reliability and customer satisfaction with every single project.

O'Reilly has recorded growth in its precast business over the last five years in Ireland and Great Britain. With a strong and experienced design team, the company has experienced significant growth in Great Britain and is today one of the market leaders in Ireland and Great Britain.

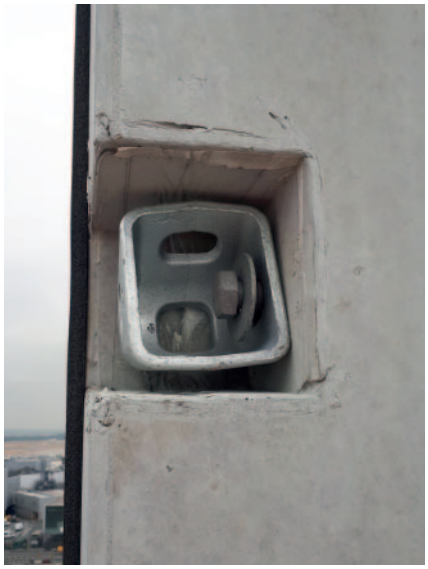
4,800 precast concrete elements and 1,200 turnbuckles for the Hotel Hilton Garden Inn

Overall, the construction schedule of the general contractor, the Toureen Group, envisages 93 weeks for the complete project, wherein 30 weeks are planned for the assembly of the

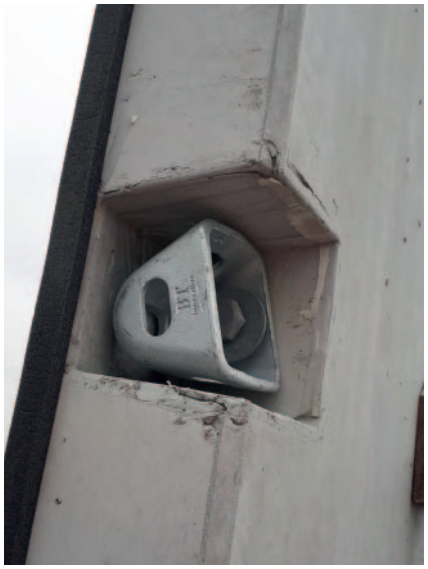


The Hotel Hilton Garden Inn with 15 storeys and an overall height of 47.60 m is currently under construction directly adjacent to Terminal 2 at London's Heathrow Airport.

The complete hotel was originally to have been built using the cast-in-situ method. Now 12 storeys will be built exclusively with precast concrete elements.



Pre-assembled BT turnbuckle in the recess provided for it



With RubberElast a further product from BT innovation creates tight precast concrete element joints

precast elements. During this time O'Reilly Concrete is responsible for the assembly of a total of 1,100 wall elements with a total area of 14,000 m^2. O'Reilly has also produced 12,200 m^2 of prestressed hollow core slabs for the new hotel using the Max-Truder modular extruder. O'Reilly will produce, deliver and assemble a total of 4,800 precast elements for this job.

To make the assembly of the outer walls much simpler, the O'Reilly Group is installing currently a total of 1,200 BT turnbuckles – four per outer wall element. "Through the use of the turnbuckles the bracing of the outer walls is no longer necessary and the outer walls are secured directly after positioning. In this project the turnbuckles are not regarded as static connections; in fact, they are mainly used for safety reasons as temporary connections for the outer walls. And that has greatly simplified the assembly of the outer walls. The use of the BT turnbuckle has made it possible to reduce the temporary bracing, increase safety and shorten the assembly time for the outer walls", explains Richard Kowalski, Group Technical Director of the O'Reilly Group, who has been with the company for 14 years.

The turnbuckles are tightened in parallel and in a criss-cross pattern using a ring ratchet wrench.

"In comparison with our other precast projects there are a great many special requirements here at Heathrow Airport. The most important of these are a short assembly programme and very high safety and security requirements that have considerable effects on the construction method. Therefore there were no other reasonable options for the assembly of the outer walls. Due to access restrictions – because we are directly in the airport security area – we had to choose mechanical connections that require no access from the outside. And the BT turnbuckle met these requirements to the full", Richard Kowalski continues.

For Richard Kowalski the BT turnbuckle is a product that suits the O'Reilly Group well. "We are constantly testing new products and trying to find new solutions that will help us to improve our design, the assembly process and safety on site", he says, describing the innovative spirit of the family-owned company.

BT turnbuckle

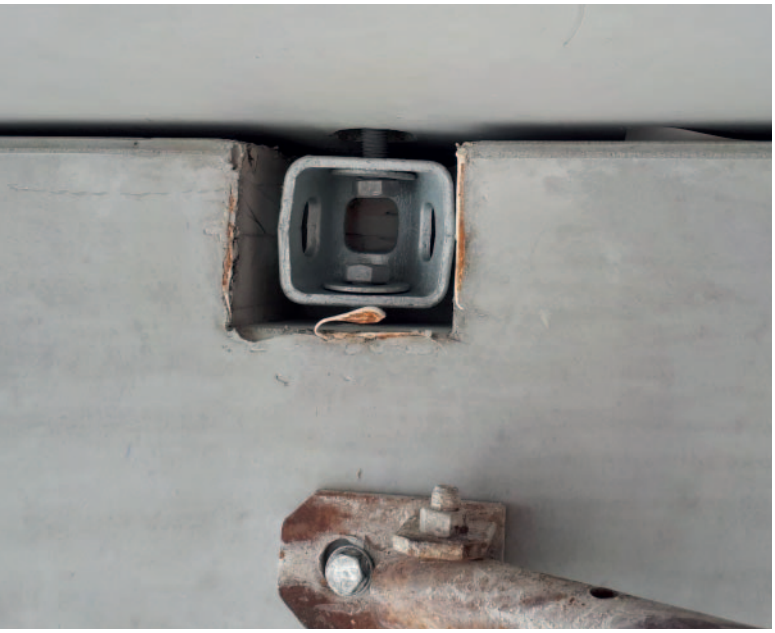
The BT turnbuckle is part of a tensioning system that includes bolted joints and anchors recessed in the precast concrete elements. The BT turnbuckle enables the economical, simple and precise assembly and permanent structural connection of precast concrete elements in the case of predominantly static loads in the pulling and shear directions.

Due to its specific shape and the highly stressable cast material used for its manufacture, the BT turnbuckle is also suitable for high loads. Using the BT turnbuckle, which is available in three sizes (M20, M16, M12), precast concrete elements can be connected without further additional materials and aids. The connection can accept the full load immediately without consideration of curing times.

Formation of the recess in the precast plant

First of all, bolts, blockout element and anchor are assembled into a unit. The blockout element is then positioned on the formwork table in the appropriate place. The anchors can be placed easily and economically through markings on the formwork and the blockout elements.

The built-in magnets simplify the placement of the blockout element on the steel formwork. The associated reinforcement of the element is then installed and after that the concrete is



Fully assembled BT turnbuckle

Once the precast concrete elements have been tensioned, the recesses can be sealed with grout.

poured. Once the concrete element has cured, the blockout elements are removed. The recess created is now used to attach the turnbuckle to the set anchor.

Assembly of the precast elements on the building site

The precast concrete elements are placed against one another so that the turnbuckles can be inserted. The bolted joints are aligned and can be fixed loosely by hand.

Using a ring ratchet wrench the turnbuckles are tightened in parallel and in a criss-cross pattern until the specified joint width is reached or the compression bearings (shims, elastomer bearings) is firmly clamped.
Once the precast concrete elements have been tensioned, the recesses can be sealed with grout. The joint area can be sealed with the appropriate sealing materials and the outer filling of the precast concrete elements can take place.

Sealing with RubberElast

A further product from B.T. innovation, RubberElast, is also being used in the construction of the new Hilton hotel. This is a sealing tape for precast concrete element joints. It is mounted on site quickly and virtually independently of the temperature by simply pressing it on in the joint area, where it seals the joint watertight under pressure through the contact pressure of the precast concrete elements.
RubberElast is highly impermeable to water and gases and is highly resistant to weather-related and mechanical wear. ■

FURTHER INFORMATION

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