

Precast at the CORE of the 2Ten Hotel

The new six-storey 2Ten Hotel is immediately noticeable by the slender and elegant vertical and horizontal lines that traverse the full length and width of the east, west and south walls of the structure.

Lean horizontal and vertical strips of precast concrete coping on the perimeter of the north side seamlessly blend in with the exposed concrete columns and roof slabs, as well as other building materials, to complete the external aesthetics. The look is enhanced by the rounded chamfers, as well as smooth and silky finish of each precast concrete panel and coping that makes up the external façade of the new hotel.

The façade of the structure was the most complex aspect of Corestruc's involvement in this project, which entailed accurate installation of more than 800 m² of precast concrete wall panels and coping.

By August, the Corestruc team was finalising minor aspects of its contract, while the various specialist trades had already commenced operations.

Corestruc's team started working on the façade earlier this year after completing the bulk of the superstructure – precast concrete columns, beams and slabs.

George Magwabeni, developer of 2Ten Hotel and owner of EMM Convention Centre, was introduced to the company's modular construction system by Paul Botha the structural engineer on the project. Representing VBL Consulting Engineers, Botha had previously worked with Corestruc and CORE Group companies on a successful project.

The professional team agreed that the system would meet the client's requirements for a durable build that would add value for many years, while providing a modern and sophisticated look.

A modular approach would also overcome complexities associated with in-situ construction techniques, especially on this extremely congested site. In addition to the EMM Convention

Centre to the right, the site abuts another building expansion programme to the north. Only a few metres separates the west wall of the new 2Ten Hotel from the existing EMM Convention Centre's boundary.

Willie de Jager, MD of Corestruc, says a precast concrete system eliminated the need to erect scaffolding, to have large shuttering and formwork teams on site, and to co-ordinate building material deliveries.

"From the outset, we were aware that the success of the project relied on close co-ordination between our teams and CoreSlab, the manufacturer of the system. During the early design phases, we worked closely with our sister company to determine the optimal construction sequence, which relied on timely supply of the precast concrete items," De Jager tells *Concrete Trends*.

Meticulous attention was paid to the connection system designed and manufactured especially for this project to avoid unnecessary handling of the panels and coping, while striking a balance between cost and site conditions.

A template to guide the installation teams was also finalised, and work commenced with bolting and grouting the coping into the hollow-core slabs at each floor level of the structure which, in turn, support the large wall panels to complete the external precast concrete shell.

Up to nine wall panels were delivered to site and installed in a day, and accuracies between two millimetres (mm) and three millimetres were achieved by Corestruc's installation team.

They were dispatched by CoreSlab on a just-in-time basis due to the severely constrained working conditions. There was just enough space for the tower crane laydown area behind the structure, while deliveries also had to be co-ordinated via the main entrance to the EMM Convention Centre. Once on site, trailers had to be separated to allow the truck to manoeuvre around the tower crane.



Jaco de Bruin, MD of CoreSlab, says a special self-compacting concrete mix was designed for this project to ensure swift turnaround times at the batching plant, and has since been introduced to all the company's other projects.

Precision in the casting process was also facilitated by the specialised forms that were imported from Australia.

As is the case on all of the company's projects, a system of pre-checks and post-checks are undertaken throughout the production cycle, while sensors inside the sophisticated plant constantly monitor the temperature and moisture content of the concrete mix.

Only aggregate from reputable suppliers enters the production cycle and silica fume supplements a portion of the cement to create a denser concrete micro-structure. A separate steel-fixing yard ensures high-quality reinforcing.

The skills of Corehire, a CORE Group specialist in heavy lifting, was appointed to erect the tower crane once the foundations had been cast. Positioned in the middle of the site, it provided adequate reach to help Corestruc's team of seven, including the crane operator, erect the precast concrete structure successfully.

Extending all the way from ground level to the roof of the hotel, the internal continuous columns vary between 60 and 80 MPa, with each column bearing about 400 tons, including structural steel, as well as the precast concrete floor slabs and beams.

The latter span from 5,5 m to 8 m between the centre columns, thereby optimising the use of floor space. They are connected to the perfectly aligned columns that were installed according to a template placed on top of the foundations in the very early stages of the column installation.

De Jager says that, as is the case on all of the company's projects, nothing was left to chance. A total station was used to align the columns to achieve the desired levels, demonstrated by the small tolerances in height achieved by the installation teams at this stage of the build.

Once the beams were in place, the floor slabs were laid and then filled using a non-stitching self-compacting concrete designed by Corestruc to provide high weatherproofing properties. This is in addition to the extremely good curing characteristics of the grouting.

Corestruc took ownership of the site when the foundations had already been completed by another contractor. These needed to be demolished and rebuilt by Corestruc, adding time pressures to the works programme. The professional team had to contend with unpredictable and heavy rainfalls in Limpopo. The notorious clay ground conditions in the area, when wet, make it impossible to operate heavy equipment, halting deliveries to the site.

2Ten Hotel will open in June 2018, by which Magwabeni will have almost doubled available room capacity at the very popular EMM Convention Centre in Sibasa.



Visitors will enter 2Ten Hotel via a wooden bridge spanning a swimming pool to enjoy the amenities, which include a bar, restaurant and gymnasium. The top floor provides spectacular views of Sibasa's rolling green topography. ■

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