



Cobiax in every nook and corner

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Our hollow body ceiling system used in high-rise construction for pentagonal hotel building.

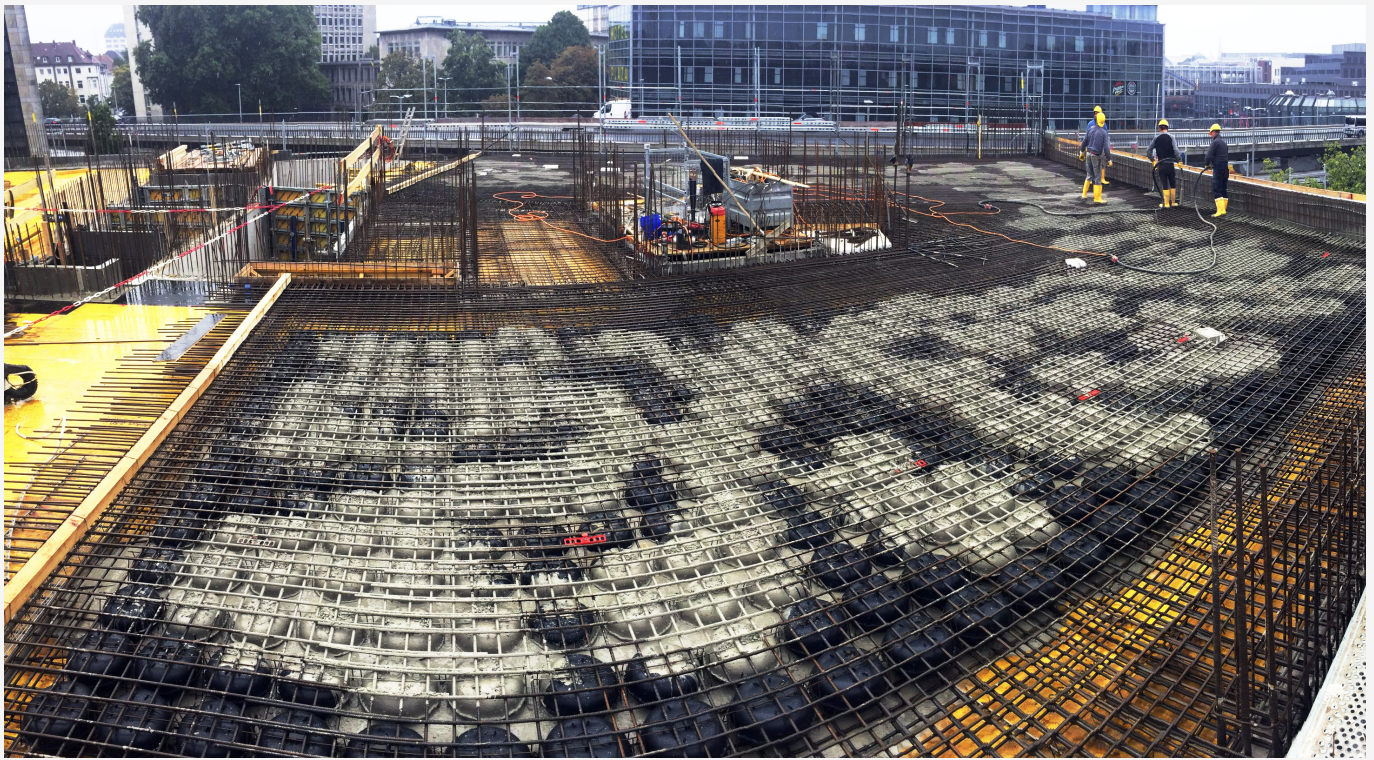
By 2020, the new 55 m high IntercityHotel Hanover East will be built at Andreas-Hermes-Platz near the main railway station. In order to meet the demands of hotel guests for elegance and comfort, the pentagonal high-rise, whose ground plan has only one right angle, is planned to have flat ceilings with spans of up to 8 m as single-span systems. To make the construction even more economical and effective, the ceilings are constructed using the patented hollow body technology of Heinze Cobiax Deutschland GmbH instead of solid concrete. A total of 38,176 Cobiax hollow bodies will be used in this extraordinary project.

Eye-catcher at Andreas-Hermes-Platz

The new IntercityHotel Hanover East, scheduled for completion at the beginning of 2020, will be a new eye-catcher at Andreas-Hermes-Platz. The project is extremely demanding in terms of planning, dimensioning and construction: „The

basic challenge for hotels is that the requirements for use and thus the requirements for the various floors can in some cases differ considerably from one another, which also leads to different floor plans,“ explains Dipl.-Ing. Kai-Uwe Oberdieck of LSM Ingenieure für Tragwerksplanung from Hanover, who is responsible for the project in the capital of Lower Saxony. This is also the case with the new IntercityHotel: on the ground floor, there are the reception area and the bar, on the 1st floor the hotel restaurant and on the 2nd floor conference rooms. „Only from the 4th floor onwards, there are only hotel rooms and the layout of those floors remains the same,“ Oberdieck continues. „This means that in many places, for example on the 13th floor, on which supports could be installed, they would interfere on the lower floors - for example in the bar and restaurant area, which were to remain completely free of supports.“

For this reason, no inner reinforced concrete columns were used at all. The reinforced concrete ceilings were stretched



The flat ceilings with spans of up to 8 m were constructed using our patented hollow body technology. (Source: W. Markgraf GmbH & Co KG)

from the load-bearing outer wall to the inner core, so that single-span slabs with a span of around 8.0 m were created. With the conventional reinforced concrete construction method, however, a slab thickness of at least 32 cm would have been necessary due to the deformation, which - with a total of 15 upper floors - adds up to a heavy weight load for the foundation. „A bored pile foundation was used for the building, in which all loads from the floors above are individually placed on piles,“ explains Oberdieck. „Using solid concrete slabs would have necessitated such a large number of piles that we decided to look for lighter and more economical alternatives.“

Material and weight savings due to hollow body ceiling

In the course of their research for alternative possibilities to solid concrete, the project managers became aware of the patented, environmentally friendly hollow body technology of Cobiax. „The use of our hollow bodies not only saves up to 35 percent in material and weight, it is usually also enables the use of thinner building ceilings and significantly larger spans of up to 20 m,“ explains M. Eng. Jan Cote, project

manager and sales engineer at Heinze Cobiax Deutschland GmbH.

In principle, the Cobiax system allows load transfer in two directions while fully preserving the static performance and external appearance of the hollow body ceiling. „The material saved usually also reduces the costs of the entire load-bearing structure of a building,“ continues Cote. „In addition, the lower volume of concrete also reduces emissions of environmentally toxic pollutants.“ CO₂, for example, can be reduced by up to 20 percent. „Due to the lower ceiling weight and the large displacement volume of up to 35 percent, Cobiax hollow slabs not only reduce the load in the ceilings but also optimize the foundation. For us, this was the factor that contributed significantly to the decision in favour of this solution for the IntercityHotel project,“ emphasises Oberdieck.

Reduced ceiling thickness and fewer bored piles

All in all, from the ground floor up to the 15th floor of the IntercityHotel, 5,476 Cobiax hollow modules of 250 cm each were used, which results in a total concrete saving of 403 m² and a CO₂ reduction of approx. 85 t. In addition to the



By using our Cobiax SL modules, a load reduction of approx. 15,000 kN and a reduction of the ceiling thickness from 32 to 30 cm with the same span width was achieved. (Source: W. Markgraf GmbH & Co KG)

weight saving due to less concrete, the ceiling thickness could be reduced from 32 to 30 cm, as the hollow bodies already support the desired spans with this dimension. „The load reduction caused by these two factors extended over 15 floors down to the foundation and totalled around 15,000 kN,“ explains Oberdieck. „This way we could save about 10 of the 18 m long bored piles.“

Shell construction according to Lean Construction

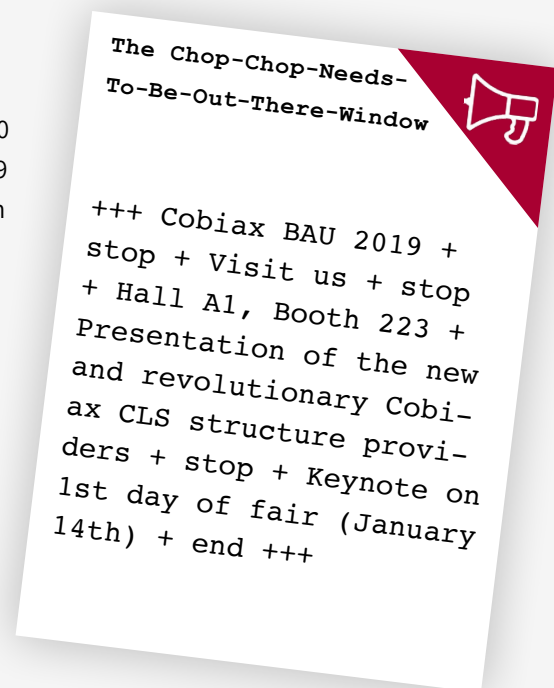
up to the 3rd floor completed

„In addition to simple handling, it was essential for us to reduce the overall construction height and to achieve a weight saving for the ceilings of 20 percent for the foundation and the support beams,“ explains Oberdieck. „The load application points at the corners and at the core were consequentially also relieved. All this has had a positive effect on the punching shear checks.“ In October 2018, the project, which is being built according to the principles of lean construction in accordance with tight cycle planning, had already advanced to the ceiling above the 3rd floor. Thus, more than 9,700 hollow bodies out of a total of 38,176 have already been installed.

Further informations

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