BEHIND THE CONSTRUCTION FENCES | CONSTRUCTION DETAILS | TECHNOLOGY

PEMA 2

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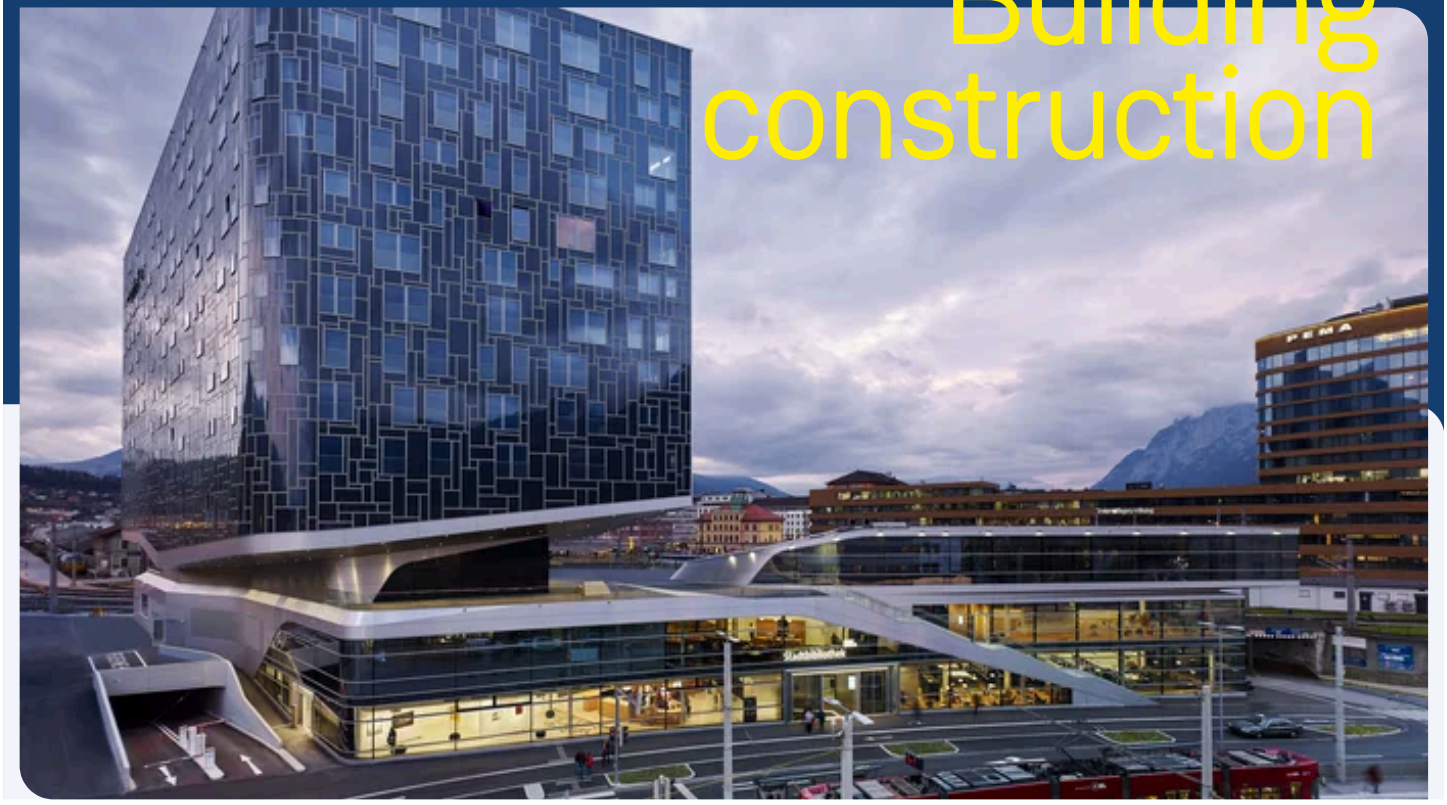
Building construction



Factbox

Client: Pema Group

Contractor: PORR-Ortner-Elin Consortium

Architect: LAAC Architekten – PORR Design & Engineering GmbH

Contract Type: General contractor

Project Type: Building construction/Residential building

Scope: Erection of a mixed-use building with residential and commercial space, comprising 173 accommodation units, deep basement with three basement floors

Contract Volume: approx. EUR 30 m

Construction Start: 06/2016

Construction End: 09/2018

In Innsbruck, PORR has constructed a mixed-use, architecturally sophisticated high-rise building on a particularly constricted construction site.

The site's location immediately adjacent to train lines and their overhead wires presented additional challenges during the construction phase. For instance, tracks had to be taken out of service, while the confined space available meant that creative solutions had to be found for site facilities.

The project parameters were extremely challenging: the plot acquired by the Pema Group measures just 3,000m² and is directly adjacent to the tracks leading into Innsbruck Hauptbahnhof, the city's main train station. The site also borders a busy arterial road with bus and tram traffic and a complex road-crossing system.

Yet, on this cramped site, the Pema Group drew up plans to construct a 50-metre-high mixed-use residential building. Following a call for proposals, the project put forward by the architectural firm LAAC won out over the competition. Named "Urban Hybrid", the winning project impressed the judges with building geometry that would prove challenging in the execution phase and a complex, elaborately designed glass façade.

PORR Design & Engineering GmbH was commissioned with execution planning for the building, with LAAC remaining responsible for design supervision.

Preliminary work and order expansion

Originally, PORR was awarded a contract exclusively for excavation of the construction pit. The complex temporary construction pit system consisted of a combination of bored piles, jetcrete and anchors. In close collaboration with PORR Design & Engineering GmbH, numerous optimisations were planned so that, although the building's height remained unchanged, it would include another floor of residential space. As this significantly increased the returns from the project for the client, PORR was awarded a contract to serve as main contractor in a consortium with Ortner and Elin.

> The riser zones in the apartments were realised with prefabricated instablock elements. This eased their installation and reduced the construction period.
>
> **Wolfgang Feichtner**
> Team leader, PORR Bau GmbH

Complex logistics

The building, classed as a high rise, was planned as a reinforced concrete structure. For economic reasons, the extremely strong base plate was created using a combination of 75 continuous-flight auger piles to a depth of up to 19 metres and a reduced base plate. Given the lack of storage space available outside of the construction pit, in light of the spatial conditions, the decision was taken to divide the building into the “tower section”, which was erected first, and the “plinth section”, which was constructed later. Single-sided formwork was installed with a separating layer on the external walls of the basement car park and then secured to the jetcrete reinforcements.
As the distance to the railway lines’ overhead wires fell significantly below the permitted safety clearances for the upper floors, a safety concept was drawn up in advance in close collaboration with the Austrian Federal Railways (ÖBB). In this document, it was agreed that the track situated only around 5m from the building would be taken out of service for two months.

For its part, PORR committed to erect the ground floor and up to the third floor of the building in this time.
In collaboration with Doka, an overhanging protective platform was created that projected from the ceiling above the second floor to protect the track below against falling objects once it had been put back into service.
The exterior of the plant room was another highlight of the project. Its inclined ceiling slab, which connects the third floor with the fourth, forms the protruding base of the tower above it. The entire jetty of the tower area projecting from the ceiling above the second floor was created using a staxo load-bearing structure up to 12m high.
The riser zones in the apartments were realised with prefabricated instablock elements. This meant that all required connections, such as for showers and toilets, could be factory-installed, which significantly eased their installation and reduced the construction period.

> The exterior of the plant room also presented a particular challenge: Its inclined ceiling slab, which connects the third floor with the fourth, forms the protruding base of the tower above it.
>
> **Wolfgang Feichtner**
> Team leader, PORR Bau GmbH

Confined surroundings

PORR also had to find a suitable solution for the locations of cabins for site management, sanitary equipment, the foremen and the site team. As there were also no spaces available for the cabins on neighbouring sites during the shell construction phase, PORR decided to place the cabins on a staxo support structure. This elevated the cabins to the level of the third to fifth floors, which significantly reduced the distances employees had to travel.
The client awarded the contract for the building’s entire glass façade to an external contractor for reasons of economy. However, PORR was again commissioned with construction management and implementation duties.
Work to fit out the apartments from the 3rd to 13th floor began in July 2017. The kitchens directly ordered by the client were installed from March 2018.

The projecting architecture makes PEMA 2 truly eye-catching. Source: PORR Bau GmbH

Library to meet the highest standards

The fitout of Innsbruck's new city library, which is on the ground floor and first floor of the plinth section and has a total surface area of approx. 4,000m², became particularly challenging. The architectural firm LAAC was again responsible for the architectonic design of the library. The original design, which was relatively simple, gradually evolved to incorporate sophisticated equipment that required execution work of the highest order. At the same time, all changes in the execution phase had to be reported promptly to the client.
In late September 2018, PORR received the order to fit out an additional office space on the first floor that is now used by the Mozarteum. This space was completed in mid-December 2018.

Summary

In PEMA 2, PORR successfully realised a project that was the subject of considerable public attention – starting with the exposed location at the centre of a traffic hub, continuing with the spectacular construction pit and finishing with the building's unusual size for Innsbruck and its special geometry. The best possible use was made of the wide range of resources available to the PORR Group during the project.

Gallery

Technical data

Gross floor area	29,280m²
Reinforced concrete	2,200 t
Plot area	approx. 3,000 m²
Construction pit depth	10.00 m to 14.00 m
Car parking spaces	189
Volume of material excavated	30,000 m³
Bored piles	75x CFA piles
Concrete	20,000 m³
Enclosed space	approx. 100,000 m³