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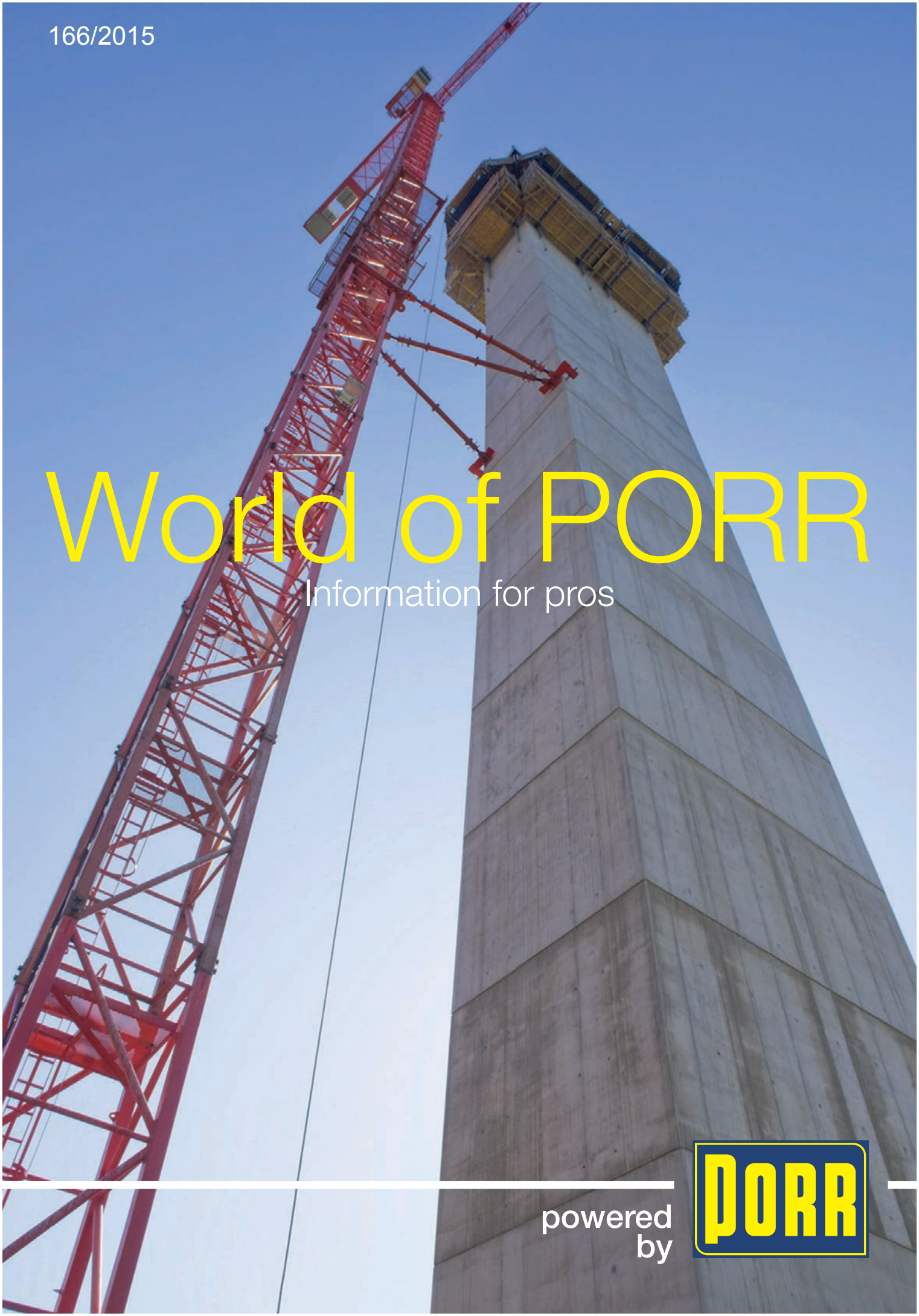

World of PORR

Information for pros

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Foreword

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PORR Updates

CEO Karl-Heinz Strauss

CEO Karl-Heinz Strauss
Image: PORR AG

Dear Readers,
esteemed Business Partners,

in due time before the summer months, we are reporting back to you with a brief project update. We have presented our annual results in late April 2014: For the third time in a row, we have managed to further increase our production output despite still operating in a highly challenging environment. Thanks to our market-leadership in Austria and a good position in the other home markets Germany, Switzerland, Poland and the Czech Republic, we could record pleasing numbers in the first quarter of 2015, too. Our order-backlog and incoming order volume remained stable or could even be extended.

In the field of infrastructure, we are currently processing some of the most challenging projects in our corporate history with the large-scale railway project Stuttgart 21 in Germany, the Koralm Tunnel KAT 3 in Austria and the Green Line in Qatar. Interest in our tunnel construction technology and our own slab track (Feste Fahrbahn) patent continues to be high, especially in the Arab region. With the modernisation of sections on the lines 272 and 273, our colleagues in Poland managed to land two new railway orders. Furthermore, the Slovakian Motorway Administration NDS commissioned us with the construction of the motorway junction Triblavina on the D1 motorway.

Our building construction expertise already scored points three times this year: In Poland, we implemented our 16th hotel project in Warsaw and built a residential and commercial complex in Wrocław. In Germany, we will erect the two towers of the Bavaria Towers ensemble for the Von der Heyden Group and have thus landed our largest building construction project in Germany to date.

So much for the latest acquisition news. And now for the ongoing projects which we would like to present to you in detail this time: This issue once again covers a wide range of topics – from building construction through foundation and specialist civil engineering to bridge, road and tunnel construction. Read, for instance, which solutions our colleagues in Germany have come up with to make the first commercial and residential building designed by celebrity architect Daniel Liebeskind in Berlin, the Sapphire-Libeskind, become reality. You can also read on what is perhaps the largest and most challenging bridge construction project currently under way in Germany: the new Hochmosel bridge. This and many more exciting project updates await you.

I wish you interesting reading and – on behalf of the entire PORR team – a lovely summer.

Kind regards,
Karl-Heinz Strauss
CEO

Salzburg Regional Hospital Multi-Storey Car Park

A sloped multi-storey car park with an exposed concrete façade worthy of an award

Erich Hasitzka, Werner Herzog

General information

The regional hospital of Salzburg, located in the centre of Mozart's city, surrounded by inner-city structures from the past 250 years, faces particularly difficult and cramped traffic conditions which is also a result of its high volumes of customers and visitors.

Existing makeshift parking facilities in the form of a now much too small parking deck and a temporary open-air parking area could no longer cope with the volume of traffic resulting from medical care and project objectives of the master plan SALK 2020. This resulted in the decision to build a new multi-storey car park on the hospital's grounds.

Introduction

Starting with a pre-qualification round in autumn 2012, Porr Bau GmbH, Salzburg branch, successfully applied for the submission of a first tender among a group of strong tenderers. Due to the fact that this park deck will feature components both costly and complex in their structure, it took a second round of tenders in spring 2013 and subsequent assignment on the basis of an extraordinary form of contract to finally start construction and the respective planning in August 2013. The entire order included the planning and erection of a park deck in a functional contract relationship and the construction of an adjoining supply structure on the basis of a flat price contract. A joint-venture with a partner company with expertise in pre-manufactured elements was formed for the purpose of execution.

The basis for the call for tenders for the park deck was a meticulously planned project submitted to and approved by the authorities that included functional demands with regard to the number of parking spaces (at least 1,250), to an overhead clearance of 2.10 m and to the structure's dimensions of approx. 92 m in length and 32 m in width, thus encompassing some 32,000 m² of floor area.

Optional were the choice of foundation type and execution of the superstructure in reinforced concrete as well as the realisation of the open slat façade that is a both costly and unique choice for a park deck supposed to be conceptualised in a cost-efficient way – under special consideration of the visual requirements.

As early as in the tender phase, this resulted in an extensive planning process done twice as well as in park deck plans with a high level of detail. Measures that, through high reaction speeds in case of unforeseen events and, which was a bonus for the client, commissioning one month and a half ahead of schedule, more than paid off during execution.

Geology and foundations

The new park deck is located at the sweeping hospital grounds' northern boundaries, at Müllner Hauptstraße 48 and is situated in the immediate proximity of an existing ÖBB facility featuring a retaining wall and an embankment. This required the use of a gentle settlement construction method having little to no effect on the neighbouring structures.

Construction of foundations using large bore piles
Image: PORR AG

This fact and the geological conditions on site characterised by an approx. 40 m thick strata consisting of "Salzburg lake clay" resulted in extensive and elaborate foundation measures. "Salzburg lake clay" is a foundation soil that is both bad and very sensitive when it comes to settlement consisting of partly consolidated small particle sediments left over from the last ice age that, when dehydrated, assume a seemingly solid consistency yet when coming into contact with water, abruptly become papescent. Due to this unfavourable preconditions, deep foundation was the construction method of choice. Large bore piles with a diameter of 120 cm and a length of 45 m were embedded into the load-bearing moraine layer located beneath the "lake clay" strata. In order to use this costly construction method for more than just statical purposes, the 94 DN 120 bore piles were equipped with devices for harvesting geothermal energy.

This solution to the foundation and settlement problem turned out to be very productive during the final measurements taken at the neighbouring ÖBB facility and at the park deck's supports. At approx. 4 to 7 mm and at a load class of approx. 6,000 kN per bore pile, the vertical deformation rate comes in well below the permissible values.

Construction process and organisation of structural work

The park deck was planned and constructed according to the model of a "ramp garage". In a ramp garage, the parking areas are executed with the same longitudinal and transversal gradient (approx. 4 % and 2 %, respectively) as the traffic areas. This results in a "spiral" access ramp and an interlaced "spiral" exit ramp. In order to keep the traffic ways as short as possible, an additional passage was erected between the spiral ramp and exit in the structure's centre. This yields a very efficient ratio between parking and traffic area and ensures optimum utilisation of the enclosed area.

Construction process – floor slab construction
Image: PORR

Construction process – open slat façade
Image: PORR

The tendered and erected structure consists of a loosely reinforced in-situ concrete flat slab 25 cm thick equipped with intermediate supports positioned in a 8 x 8 m grid. When compared to the original T-beam slab construction with a construction height of 75 cm and a span between supports of some 16 m, this allowed for a 50 cm reduction in slab height, yielding a 4 cm overall reduction in building height. This reduced construction height also meant that the park deck's bottom slab didn't have to be laboriously established at ground water level. Thus, the building soil's already problematic hydro-geological conditions didn't have to be challenged even more with de-watering.

After the entire bottom slab had been constructed together with the respective house technology rooms in early summer 2014, construction of the structural slabs could begin. Due to the exposed concrete requirements to be met for all structural slabs that also had to be synchronised with the exposed concrete requirements towards the pre-manufactured supports on inside and towards the reinforced concrete slat supports on the outside, the execution of the form work for the floor slabs had to be prepared very carefully. In the end, the entire execution of the form work for the floor slabs had to be timed in such a way that the crack-bridging synthetic coating on top of the slab surfaces could be completed before temperatures below 5 degrees Celsius set in, meaning prior to late October 2014. This resulted in the separation of the floor slab surface approx. covering 3,000 m² into four quadrants measuring some 750 m² each. Two diagonally opposing quadrants were formed, reinforced and concreted at weekly intervals. Thus, an entire storey could be erected in two weeks. The cores of the staircases 1 and 2 and the pre-manufactured supports on the inside needed to be constructed in advance. Likewise, the slat supports on the outside which were spaced lengthwise at approx. 1 m from each other had to be installed in advance which further complicated the coordination of form work timing.

This was further impeded by the fact that the exposed concrete requirements towards the slab underside demanded a small-cell, mating-surface optimised form work for the floor slabs that, to make matters worse, also had to absorb up to 14 inherently different longitudinal and transversal gradients. After intensive process planning with the participation of all those actively involved in the project, the form work manufacturers and thanks to in-house experience with already successfully completed projects, this link could be established successfully. The overall slab area of some 32,000 m² was completed on schedule by late August 2014, the slab coating activities performed in subsequence could also be completed as planned in mid-October 2014. The uppermost slab serving as the top storey and parking area, was equipped with a black sealing and an asphalt layer due to wear.

Coating of spiral ramp
Image: PORR AG

Coating of spiral ramp
Image: PORR AG

Due to the fact that the house technology and electro-technical components were to be installed prior to the Christmas break 2014/2015, the technical building equipment consisting of drain pipes and geo-thermal installations as well as the comprehensive electro-technical equipment consisting of lighting systems, fire alarm systems and control equipment were installed at an early stage, immediately after structural work had been completed. Due to obviously swift construction progress and excellent collaborations with the authorities with regard to safety, the structure could be handed over to the client and commissioned six weeks ahead of schedule in mid-February 2015, after an overall construction period of 18 months.

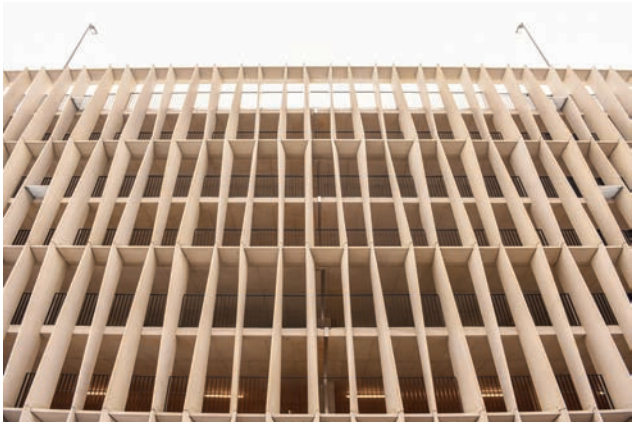
Façade construction

The complex façade design is very special – both in terms of technology and, especially, in economic terms.

The client selected a stainless steel mesh façade with a floral pattern for the face side. A specialised company from Austria that – both in terms of planning and material – successfully performed this stainless steel metal work in an international environment was commissioned with the execution of this high-quality functional requirement. Using stainless steel bands, the floral pattern was weaved into the mesh structure in such a way that it resulted in a sort of oversized pictogram showing a harmonious pattern from a distance corresponding to its size.

Open slat façade on the long side
Image: PORR AG

Open slat façade – support detail
Image: PORR AG



Open slat façade – overall view
Image: PORR AG

Stainless steel mesh façade at the face side
Image: PORR AG

An open slat façade made from load-bearing and non-load-bearing concrete supports that was supposed to show a twisted cross-sectional shape was functionally requested for the longitudinal side. The executing company could freely chose to meet this request using reinforced concrete or an attached sheet steel solution. During several processing steps in the tender phase, this point soon turned out to be crucial for the budget of a future implementation which meant that a special solution needed to be found. This fact led to detailed planning that brought the planned façade construction from a high-priced position into an area of a solution both technologically realisable and economically feasible. All twisted slat supports were incorporated into the superstructure in such a way that they can absorb their own weight and imposed loads in vertical direction and impact forces in horizontal direction. In additional, all details were adjusted in such a way that the possibility of mass production at minimal differences in type was already integrated during the calculation phase. In this stage of the tender process, the degree of detail was already so high that the difficult reinforcement configuration resulting from the use of twisted slat cross-sections could be solved with reinforcement elements from tunnel construction and incorporated into pricing.

Final remark

Thanks to the fact that the entire planning and preparatory work was mostly completed during a very short period in the tender phase, the premium quality and tight scheduling specified by the client could not only be met, but, at a planning and construction period of just18 months, significantly undercut. The façade, showing an elaborate design unusual for park decks could also be executed in an economically feasible way - an undertaking that usually poses a great challenge, especially on park decks.

It would be this project's crowning achievement if the exposed concrete façade "worthy of an award" could actually get nominated for the OEBV's "European Concrete Construction Award 2016.

Project data

Car parking spaces	1,250
In-situ concrete piles DN 120	94 with a length of 45 m
Concrete	12,105 m³
Reinforcements	1,502 t
Park deck coating	29,000 m²
Asphalt layer	3,000 m²
Stainless steel slat façade made from exposed concrete	5,000 m²

Liaunig Museum – Subterranean Extension of a Private Art Collection

Robert Wuggenig, Clemens Bouvier

In 2006, the Viennese architectural office querkraft Architects was commissioned with designing a museum to house the extensive private art collection of the industrialist Dkfm. Herbert W. Liaunig in Neuhaus bei Lavamünd, far away from any urban centre. The building was supposed to attract people and provide them with the possibility to enjoy art in a contemplative way. The 1st construction phase was completed in 2008. The main exhibition wing which is 160 m long and 13 m wide projects over the B81, the Bleiburger Bundesstraße, and provides beautiful views of Drau River as it flows past the museum. The museum itself exhibits Liaunig's collection of contemporary art and includes some 3,000 works of art. After six years of operation, Herbert Liaunig decided to extend the museum with its usable space of 5,000 m² by an additional 2,500 m² in a 2nd construction phase. The reason for this was the ever growing collection.

Image 1: Existing building 1st construction phase – main exhibition wing
Image: Liaunig Museum

Start of construction on the extension – architectural concept

Porr Bau Gmbh, Carinthia branch was commissioned with work on the extension as the leading firm in a joint-venture. Construction started in April 2014. A triangular room for temporary exhibitions with an adjoining atrium, a depot as well as presentation rooms for glass and silver exhibits were to be added to the four distinct existing structures. The architectural concept characterised by exposed concrete, steel and glass is carried into the extension and represents a reference to Linauig's industry career.

The only structure that was to remain visible in the architectural concept created by querkraft was the existing museum's main wing with its length of 160 m. All the other structures – also the extended parts – were to be constructed underground. For this purpose, it was necessary to establish a construction pit by excavating some 30,000 m³ of soil and to temporarily store the accruing material at the site and to remove parts of it. In addition, a construction road branching off from the B81 had to be established in such a way that it didn't affect the trees on location. After these preparatory works had been completed, work on the reinforced concrete construction began.

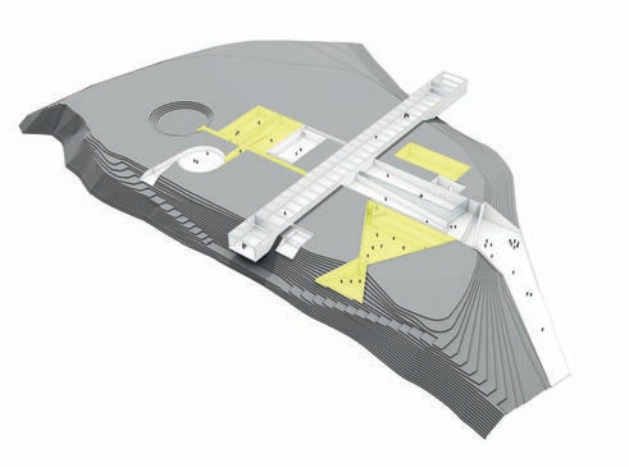


Image 2: Extension structure – incorporation
Image: querkraft Architects

The extension structures are marked in yellow on the model. They are primarily characterised by the triangular exhibition room used for temporary exhibitions. The objective was to connect these structures to the existing ones via corridors / breakthroughs.

Special challenges: Temporary exhibition room

Designed as an exposed concrete structure, the temporary exhibition room with its 7 m high walls and complex girder ceiling system posed an extraordinary challenge. In order to guarantee the requested quality of exposed concrete as well as to test the chosen concrete grade, two model walls were erected after sample concrete blocks had been built. In collaboration with the concrete supplier and the project team, it was decided to concrete all walls with self-compacting concrete. Among others, this was supposed to minimise deficiencies on the exposed concrete surface resulting from improper compacting / hasty pouring of concrete. Due to this choice of concrete grade and the unusually high sections to be concreted, demands towards the form work system rose.

TOP 50 girder form work with Dokaplex form work sheathing was chosen as the form work system. This allowed for the trouble-free absorption of the maximum

permissible fresh concrete pressure of 90 kN/m² on the one hand, and for the implementation of the architect's desired form work looks on the other. In order to comply with the tight schedule, it was decided that one wall construction cycle would last three days. 250 m² of form work were provided for this purpose. In order to complete the sections as fast and efficiently as possible, one working cycle was fixed at 9.60 m.

The connection of a 40 cm thick wall to the existing structure complicated things further. This wall had to be entirely dowelled to the existing structure and concreted over 7 m while formed on one side only. This wall also served as a support construction for a 14 m long and 2.80 m high wall breakthrough which needed to be made as it formed the new access to the temporary exhibition room from the existing foyer. It was the architectural intention to execute this breakthrough with sharp edges and straight lines to convey the impression that it is an original part of the museum and not an addition.

Image 3: One-sided forming – temporary exhibition room
Image: PORR AG

Image 3 shows the connection of the one-sided wall to the existing structure as well as the openings that needed to be cut out of the existing structure to form the new access to the extension structure.

Despite atypical, very bad weather conditions during the summer months, all walls of the exhibition room as well as those forming the house technology room could be erected within two months. Meeting this milestone in the construction schedule was of immense importance with regard to the complexity of the subsequent construction of the girder ceiling system.

Image 4: Girder ceiling
Image: PORR AG

System form work could not be used for the girder ceiling due to the fact that the sharp-edged connection and end points of the girders facing one another / the two wing walls could not be implemented using conventional Framax drop-beam form work. For this reason, a manually manufactured form work solution was developed in collaboration with the foreman. Here, too, a Dokaplex covering was used as form work sheathing, whereby the individual form work sheathing supporting and bracing elements were made from construction timber. This allowed for maximum flexibility during forming and striking and thus, significantly contributed to complying with the stipulated intermediate deadlines.

Image 5: Girder construction – concreting section 3
Image: PORR AG

The girder ceiling system was constructed in seven concreting sections, whereby the girder supports and the ceiling were constructed subsequently to one another.

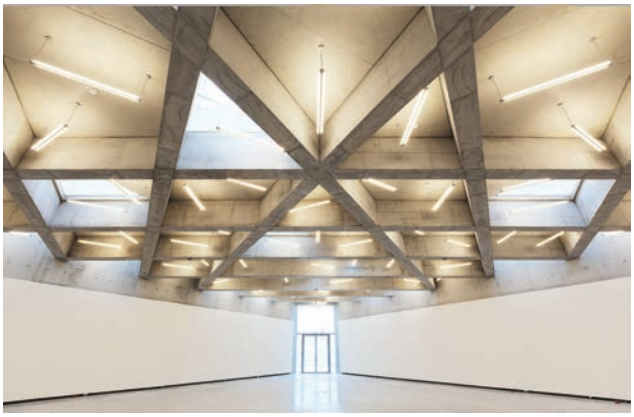


Image 6: Completed temporary exhibition room with view towards the exit leading to the atrium and the triangular roof light dome
Image: Liaunig Museum

After completion of the finishing work such as lighting installation and installation of the roof light domes, the room itself looks like a work of art.

Glass and silver collection structure, depot

The glass and silver collection section in which two rooms of equal size are separated by a "hovering" wing wall ramp, is a structure not lacking in complexity. This structure was executed at the same time as the temporary exhibition room, yet the wall form work differed in terms of anchor separation and the looks of the form work sheathing. Thus, it was not possible to utilise the wall form work quantities which significantly impeded the construction progress. The exhibition rooms' upper boundary is formed by a hollow core slab with a span of 12.50 m. In addition, corridors connecting the rooms to the existing main exhibition wing and the sculpture depot had to be established.

Image 7: Glass and silver collection room with corridor leading to the existing structures
Image: PORR AG

After this structure had been successfully erected, a 400 m² depot adjoining the existing storage room and the display depot was constructed.

Finishing work

In addition to the whole exposed concrete rooms, the joint-venture was also commissioned with the construction of the sanded concrete surfaces as well as the installation of portals, 28 triangular special roof light domes and large-scale gypsum cardboard facing form work for the presentation of paintings.

Outdoor facilities

In accordance with the client's and landscape architect's vision the outdoor facilities needed to be designed in such a way to house a sculpture garden in the area of the glass and silver collection. Five specially surveyed hill formations were formed using the excavated material still stored at the construction site. In order to make the new structures disappear underground, they were sealed by means of a green roof and covered in top soil and substrate. Only the triangular roof light domes as well as the two light-bands makes one suspect that new exhibition rooms for a private art collection are located underground.

Final remark

A special aspect of this construction site certainly was the cooperative execution and the interest in finding new solutions together in project teams. The fact that the client was satisfied and words of praise during the celebratory opening in April 2015 prove the excellent collaboration.

The museum, which was awarded the Austrian Museum Award in 2011 and was named a registered building in 2012, surely represents an architectural and museal highlight in Carinthia and the whole of Austria.

Project data

Client	HL Museumsverwaltung GmbH
Contractor	Porr Bau GmbH in a joint-venture
PORR	Technical management, construction manager and foreman
Architect	querkraft architekten zt gmbh
Local building supervision	Klingbacher ZT
Superstructure planning	Wolfesberger ZT
Type and scope of contract	Structural work and finishings (without house technology)
Project location	Neuhaus/Suha bei Lavamünd – Province of Carinthia
Construction time	23 April 2014 to 15 December 2014

Key data/quantities

Concrete	approx. 4,000 m³
Steel	approx. 300 t
Exposed concrete wall	approx. 3,500 m²
Excavated material	approx. 30,000 m³
Extension space	2,500 m²

Construction Scheme "Sapphire-Libeskind"

Celebrity architect Daniel Libeskind's first residential and commercial building in Berlin

Christoph Zieger

General information

Celebrity architect Daniel Libeskind's intention in this project was to show his love for the city of Berlin. The result is based on the concept of a spectacular corner building which is supposed to form the border of Berlin's customary block structure in the city's Mitte district.

Porr Deutschland GmbH, Berlin branch, was commissioned with the turnkey execution of the "Sapphire" construction scheme in September 2014. Apart from the execution of the construction project, the entire execution planning of the HOAI (The Fee Structure for Architects and Engineers) service phase 5 is also part of the general contractor agreement.

Visualisation
Image: pure rendering gmbH

Visualisation
Image: pure rendering gmbH

Project data

Client	Chausseestraße 43 Entwicklungs GmbH
Contractor	Porr Deutschland GmbH, Berlin branch, Building Construction Department
Type of project	Residential and commercial building
Start of construction work	October 2014
End of construction	March 2016
Gross floor area (GFA)	approx. 8,000 m²
Flats	72
Commercial units	4
Parking spaces in the underground car park	32

Location

The construction scheme's site is located on the corner property Chausseestraße 43/Schwartzkopffstraße 1, directly opposite from the building of the German Intelligence Agency (BND) currently under construction.

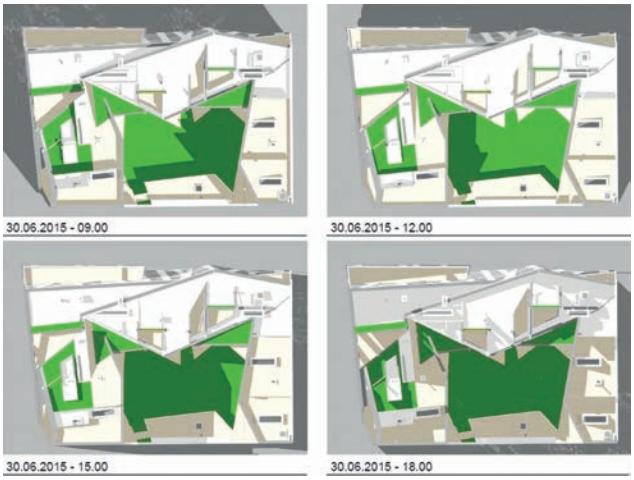
Project description

The project includes of 72 individual flats (1st to 6th floor), four commercial units on the ground floor and a basement floor with 32 underground parking spaces and cellar units.

The flats are grouped around an intensively landscaped inner courtyard on the first floor.

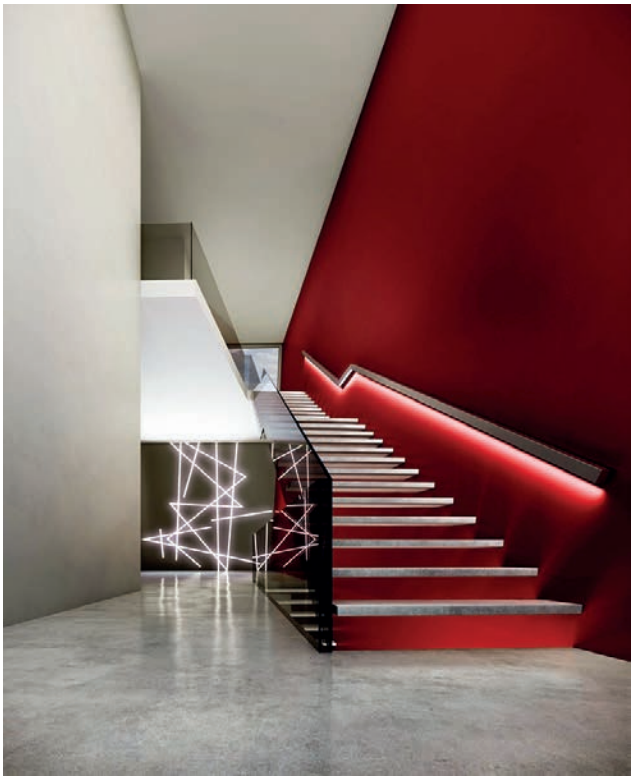
A usable community area with playgrounds and fitness rooms will be established in the inner courtyard. The walkways and green areas are intended to function as extensions of the building's architectural lines allowing a viewer to immediately spot the continuation of the architectural concept in the green areas.

Visualisation of inner courtyard
Image: xoio



Shade calculation inner courtyard
Image: PORR AG

The project has been divided into three building elements. Each building element will feature a unique, high-quality foyer with integrated lift and staircase.



Visualisation of foyer
Image: pure rendering gmbH

Modern, open 2 to 3 room flats with upscale equipment and a room height of 2.80 m offer future residents plenty of free space. All the buildings' flats feature a loggia, a balcony or a terrace or, when located on the first floor, a piece of garden facing the courtyard.

The penthouses equipped with roof terrace, integrated gallery and their own fireplace will be installed on the 6th floor. Ceiling heights of up to 7.50 m are achieved here. In order to guarantee beautiful views of Berlin for all residents, there will be a community terrace on the roof.

Visualisation of penthouse
Image: pure rendering gmbH

Visualisation of penthouse
Image: pure rendering gmbH

Visualisation of penthouse
Image: pure rendering gmbH

All flats are equipped with real wood floors. Doors feature block frames installed flush with the wall executed with a circumferential shadow gap.

Flats furthermore feature floor heating and controlled domestic ventilation representing the standard when it comes to the flats' technical equipment.

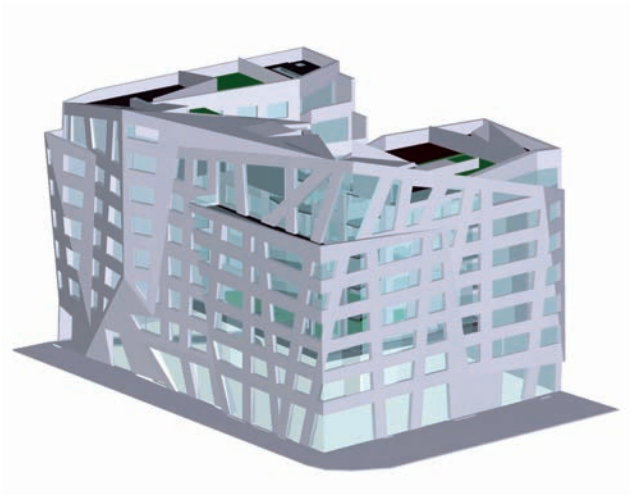
The premium bath rooms feature integrated covered lighting in the ceiling and tiles designed by Daniel Libeskind.

Planning

In order to capitalise on PORR's internal know-how, PORR Design & Engineering was commissioned with the LP 5 planning of execution (architecture, superstructure and house technology).

BIM software is used to plan a digital model of the building – from the concept to completion – on the basis of standardised processes. This planning process includes 3D geometry with standardised parameters, 4D linkage for purposes of construction process planning (time) as well as 5D linkage for purposes of performance and cost monitoring.

The created 3D model forms the basis for all those involved in the project – from the architect to the structural engineer to those responsible for building technology, construction project preparation and calculation to the client and those taking care of facility management.



3D-Modell
Image: PORR AG

Execution of construction work

During execution, an economical and practical solution had to be found for the sloped walls and those walls not positioned at a right angle to one another. The objective was to have the foreman on site execute the planned sloped walls and not having a surveyor work on site every day or every hour.

In the end, we managed to find a satisfying solution through utilising our in-house expertise: The walls were executed using digital spirit levels and digital bevels. This method proved very successful in the execution of construction work and still does for it allows keeping the interface to the surveyor as small as possible.

Positioning sloped exterior walls' form work
Image: PORR AG

Load transfer from the formwork to the scaffolding
Image: PORR AG

Alignment and control of the sloped form work
Image: PORR AG

Another core area during execution was selecting a suitable sub-structure or scaffolding system to support the form work of the sloped exterior walls. It was PORR's intention to develop a system that would additionally replace the façade scaffold.

Together with those involved in the project and the form work manufacturer, we managed to develop a form work scaffolding system that met all requirements

in the form of heavy duty scaffold towers provided by the form work supplier. The work platforms were established at the height of each floor slab using form work girders and floorboards. These served as platforms for all work to be performed on the exterior façade and made sure that the forces generated during form work installation could be absorbed professionally and safely.

Heavy-duty scaffold towers
Image: PORR AG

Heavy-duty scaffold towers
Image: PORR AG

Working level on the form work scaffolding
Image: PORR AG

Façade material

For the façade, architect Daniel Libeskind developed tiles reflecting the architectural intention of the entire construction scheme in collaboration with one of the oldest Italian tile manufacturer.

The unique tiles measuring 60 cm by 120 cm are 13 mm thick and – thanks to a special ceramics-titanium material – extremely sturdy. In addition, the tiles were coated with a bio-active layer. This layer allows for a self-cleaning effect and converts the abundant carbon dioxide into oxygen.

In order to secure the construction period and the quality, the material was pre-manufactured by the producer by order of our sub-contractor. The tiles are being delivered to Berlin cut to size, and pre-drilled. They constitute an oversized puzzle allowing for almost no tolerances with regard to the sub-structure.

Façade

The main façade extends from Chausseestraße to Schwartzkopffstraße. It was executed as a classic curtain

façade.

Set-up

Inside out	
1. Layer	Interior plaster
2. Layer	20 cm reinforced concrete
3. Layer	18 cm mineral wool
4. Layer	3 cm rear ventilation
5. Layer	3 m guiding rails (sub-structure)
6. Layer	1.3 cm tiles

The different slope angles on site created great difficulties when installing the tiles. The sub-structure is an agraffe system and features consoles that are being attached to the shell. Continuous guiding rails are mounted onto these consoles and serve as suspension points for the tiles.

In order to attach the tiles to the guiding rails, four cone-shaped undercut anchors with the corresponding counter piece to the guiding rail are being mounted to the tiles. In order to attach the anchors to the tiles, 6 mm wide and 5 mm deep holes are drilled into the tiles' back. The anchors are placed in these holes and mounted with the agraffes (counter pieces to the guiding rail).

Thanks to the chosen form work scaffolding, construction processes demand installing the façade (tiles) form top to bottom. This could only be managed through turning the guiding rail system around by 180 degrees. After technical clarification with the manufacturer, permission for this execution method could be obtained.

In order to ensure the execution quality of the façade work and to achieve high-quality and professional results, a model façade was manufactured at the construction site. At a size of 3.50 m x 7.50 m, the model shows a section of the real façade. Its construction illustrated the façade's individual detailed aspects' complexity and execution features that need to be paid attention to in particular later on during execution.

Façade
Image: PORR AG

Façade
Image: PORR AG

Façade
Image: PORR AG

Façade
Image: PORR AG

Façade
Image: PORR AG

Utilising PORR's know-how, we will construct a future-oriented, unique building in Berlin which will open a gate to the city's centre in a glorious fashion.

A12 Inntal Motorway – Reconstruction of Völs/Innsbruck-Kranebitten Interchange

Measures to improve the traffic situation

Michael Falkensteiner

Introduction

The Völs/Innsbruck-Kranebitten interchange (km 82.7 to km 83.3) is both the western-most connection of the A12, the Inntal Motorway, to the provincial capital of Innsbruck and the supra-regional access route to the market town of Völs with its numerous businesses and to the large shopping centre CYTA. This situation led to recurring traffic congestion problems due to high volumes of traffic in the subordinate traffic network (B171b and L306), in bend leading to traffic jams on the main carriageway of the A12, the Inntal Motorway, in the direction of Bregenz. Furthermore, the connection of the exit and access ramps of the carriageway leading to Bregenz with the B171b in the shape of a T-junction marked a frequent accident spot.

Project

The project's goal was to increase traffic safety for all road users and, at the same time, significantly lower traffic congestion. To be precise, the existing roundabout – south junction – was extended to a diameter of 45 m. Due to ongoing construction in the CYTA area, the centre of the roundabout was moved towards the west in order to keep the edge of the roundabout access road coming from CYTA. The north junction was also reconstructed into a roundabout with a diameter of 45 m. In order to increase traffic quality, a bypass extending over the entire length of the B171b between the two roundabouts was connected to the two roundabouts. In bend, the ramps 100 and 400 were also adapted to the new traffic routing and extended. The surface drainage system was also adapted / newly constructed. Filter seepage systems were installed at the ramps 100 and 400 to ensure proper surface water seepage. In the course of construction work, a bicycle and foot path was furthermore established along the L306 and B171b.

Apart from the road reconstruction efforts, the following civil engineering work was necessary:

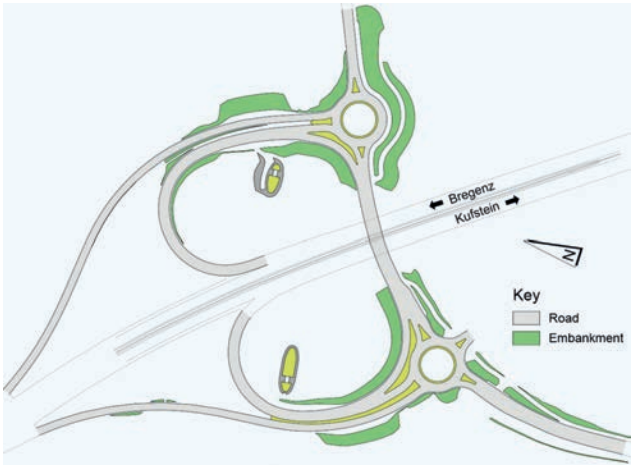
- Overpass structure A12 Inntal Motorway "B5 crossroads structure Kranebitten"
- Superstructure extension and reconstruction of the abutments, renewal of sealing and driving surface laying, renewal of fedge beams and expansion joints, renewal of bridge equipment, concrete rehabilitation and the like
- Widening of the Giessenbach Bridge at the southern access to the CYTA business area
- Adaptation of the driving surface (adaptation of edge beams) at the northern access to the CYTA business area
- Adaptation / renewal of the support wall in the area of Schuler as well as installation of a reinforced earth wall in the area of M-Preis wholesalers and Schuler to form the embankment for the new bicycle and foot path running running along the road
- Construction of a passage made from corrugated sheet metal for the new bicycle and foot path

Traffic situation

The average annual daily traffic volume on the mentioned section of the A12 in the area of the Völs-Kranebitten interchange amounts to approx. 65,000 motor vehicles/day, 10% of which is heavy traffic. The ramps face a volume of approx. 6,500 motor vehicles/day, also with a 10% portion of heavy traffic. Therefore, reconstruction work had to be performed under the following aggravated circumstances:

- The ramps of the Kranebitten interchange, the B171b state road and the L306 needed to remain open for traffic during the entire construction period. Long-term traffic closures as well as closures during daytime were not possible.
- Work had to be performed in phases and sections.
- Extensive traffic volume at the Völs-Kranebitten interchange
- Access and exit junctions to the CYTA business area needed to remain open for traffic during the entire construction period. Short-term closures were only permitted after coordination and during the night from 10:00 p.m. to 5.00 a.m. and only in special cases.
- Work on the junctions of the Völs-Kranebitten interchange's ramps connecting to the B171b and on the north and south roundabouts as well as the construction of the accesses and exits of the Völs-Kranebitten interchange's ramps connecting to the A12 was performed in sections and generally in such a way that traffic was kept moving. Permits for necessary closures for the construction of sections needed to be obtained in advance and such work could only be performed at night from 10:00 p.m. to 5:00 a.m.
- Rehabilitation and renewal work on the superstructure of the B5 bridge structure, too, could only be performed at night between 10:00 p.m. and 5:00 a.m.
- Due to the close proximity to residential areas, special attention was paid to compliance with the permissible noise emissions limits . Another objective was keeping the contamination of driving surfaces and dust build-up and corresponding

emissions at a minimum.
- Since the building site is located in the safety zone of Innsbruck Airport, regulations and guidelines with regard to the Aviation Act and the Water Rights Act (height limits for construction machinery and the like) were to be adhered to. Continuous exchange of information as well as pro-active coordination with the airport authority's persons in charge were daily business.



General site plan
Image: PORR AG

Order

After a public call for tenders, TEERAG-ASDAG AG, Tyrol branch, was awarded the contract for the reconstruction of the interchange in April 2014 by ASFINAG Baumanagement GmbH. Proportional co-financing of the building scheme by the Office of the Tyrolean Government, the Market Town of Völs and the business enterprise CYTA was settled during the project development phase. The engineering office Haller assumed the creation of the overall road construction concept as well as execution planning. Construction started in late May of 2014. The building project, including all recultivation, roadway and remaining work could be concluded in late November of 2014.

Ramp extension / rehabilitation

The essential building measures taken to achieve an improvement of the traffic situation without traffic jamming back onto the A12, the Inntal Motorway, included the adaptation of the ramp lanes 100 to 400 to the new, intended driving situation as well as their extension. The following reconstruction work was performed:

Ramp 100

As it had been before, the exit remained a single lane one all the way to the B5 crossroads structure. Directly behind the superstructure, it was extended to two lanes. After branching off from the A12, the ramp, as it had before, describes a right hand bend in south-easterly direction and extends in a straight line to the northern roundabout. Whereas the ramp's left lane connects to the new roundabout, the right lane bypasses the northern roundabout and leads to the B5 crossroads structure.

Road construction at ramp 100
Image: PORR AG

Ramp 200

Ramp 200 branches off the northern roundabout as a single lane, continues in a straight line and is, by means of a left hand bend with a radius of 200 m, connected to that section of ramp 200 that is not effected by construction. In the rest of the area up to the traffic island toe, the bituminous structure is being rehabilitated. The A12 access area (right bend lane) was not part of the construction scheme.

Ramp 300

Ramp 300 describes a right hand bend from the traffic island toe RFB Kufstein and subsequently becomes a left hand bend with a radius of 144 m. In this area, the bituminous driving surface was rehabilitated on a length of approx. 200 m. In the area of its junction with the southern roundabout, the bend's radius is reduced to 135 m. The exit area (braking lane) branching off from the A12 was not part of construction work.

Kerbstone laying in the area of ramps 200 / 300
Image: PORR AG

Ramp 400
Ramp 400 branches off from the southern roundabout by means of a right bend with a radius of 140 m. After some 30 m, it connects to the new bypass at the north side. After that, the ramp is extended to two lanes. Subsequently, the axis continues towards the A12 access area in the shape of a bend with a radius of 50 m. Before it reaches the traffic island toe, ramp 400 is being reduced to a single lane road by means of moving the right edge of the carriageway. The A12 access area (right bend lane) was not part of the construction scheme.

Work on the additional ramp lanes, the rehabilitation of the existing ramp lanes and reconstruction / adaptation work in the area of the roundabouts had to be performed in phases in such a way that traffic could be kept moving. Inspection bays were installed in front of the roundabout intersections as well as immediately behind the exits from the roundabouts.

Road construction – northern and southern roundabouts

The ramps were joined with the downstream road network by means of the two primary road construction measures in the shape of the northern and southern roundabouts. Both roundabouts were executed as single lane roundabouts with an outside diameter of 45 m. Their normal cross-section consists of a 5.50 m wide lane and an outside and inside hard shoulder, 0.50 m and 1 m wide, respectively. The roundabout's road surface is therefore 7 m wide. Comprehensive embankment work was required to construct these roundabout structures.

In order to keep traffic moving constantly, the entire excavation, road cutting, de-watering, road bed, asphalt and paving work had to be completed in eight complicated construction phases. For this purpose, traffic was guided over several temporary lanes as well as over lanes that had already been completed. In the course of construction execution which was performed in stages, this posed great challenges in terms of both traffic guidance and construction logistics.

Northern roundabout – prior to completion
Image: PORR AG

Rehabilitation of B5 crossroads structure above the motorway

The existing bridge spanning the A12 was built in the years 1974 and 1975. It is a pre-tensioned three-bay t-beam bridge with a width between supports of 71 m (17 m + 37 m + 17 m) and a width of 15.50 m. The supports are clamped into the superstructure. The abutments are detached plate structures, its wings are of the suspended type. The superstructure is supported by means of roller bearings. Some time ago, the original expansion joints have been exchanged in favour of a "Maurer System" profile construction. In the course of the overall construction scheme, the bridge was completely rehabilitated. The essential rehabilitation and reconstruction measures included the following:

- Demolition and new construction of the northern edge beam (outside of the bend)
- Minor widening of the superstructure at the northern side (on a length of some 10 to 15 m at the abutment on the Innsbruck side)
- Demolition and new construction of the southern edge beam; minor widening of the superstructure as well as making provisions for a 3 m wide bicycle path
- Complete renewal of the superstructure sealing (dual layer bitumen, continuously adhered) and the asphalt layer
- Reconstruction of the existing bridge drainage system
- Reconstruction of the abutments to make them accessible for purposes of inspection and maintenance (setting back the chamber wall)
- Replacement of the expansion joints (single lamella profile construction with a minimum total elongation value of e=40 mm)
- The existing drag plates were demolished and replaced by a backfilling made from single-grain concrete in the course of reconstruction.
- Renewal of the restraint system between the bicycle path and the driving surface in the shape of an H1 asymmetrical, stand-alone pre-manufactured concrete safety barrier; an H1 steel guardrail was dowelled to the edge beam
- New construction of the maintenance staircases as well as the cable lines below the widened cantilever arm
- Concrete rehabilitation measures in the superstructure, support and abutment areas
- Renewal of the bridge parapet type F, h = 1.20 m (laterally bolted) as well as the 2 m high splash guard

In essence, the bridge was rehabilitated one side at a time (referring to the B171b and the L306 sides, respectively) while traffic was kept moving on a 3 m wide lane each for every direction.

B5 crossroads structure – reinforcement work, superstructure widening at south side
Image: PORR AG

Water protection system – filter basin

Water protection systems for the purification of road surface run-off water that cannot be cleansed by means of the embankment area or the filter troughs in the ground were installed on the inside of ramps 100 and 400. These systems can be accessed via the inspection bays located at the ramps. The surface of these access roads was covered in a water-bound gravel layer. The water protection systems consist of a sedimentation tank and a downstream purification tank. Water flows into the sedimentation tank via an inlet structure. The sedimentation tank was separated from the filter basin by means of a separating structure.

Water protection system – southern filter basin
Image: PORR AG

Water protection system – northern filter basin
Image: PORR AG

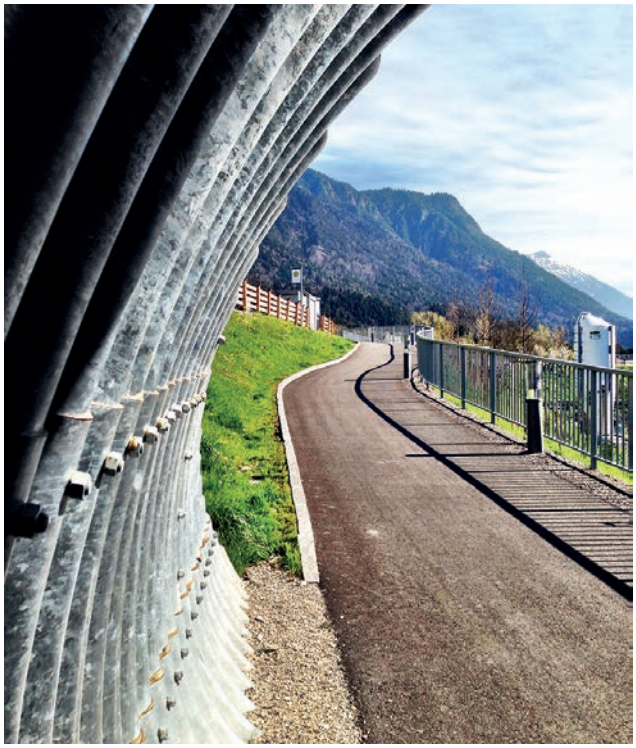
Foot and bicycle paths / corrugated steel sheet passage

In the course of construction work on the Völs-Kranebitten interchange, the gap in the local bicycle and foot path network was closed, too. Coming from the north, this network extends all the way to the southern abutment of the Inn River bridge and coming from the south to the access area leading to the CYTA 2 shopping world. For the safety of bicycle riders, the combined foot and bicycle path was executed without crossroads and its width is 3 m along the entire length. Guide walls with attached handrails were installed along the foot and bicycle path for purposes shielding it against the B 171b running in parallel.

Between the existing southern roundabout and the existing "connection to CYTA 2" bridge, the new foot and bicycle path underpasses the access road in a grade-separated fashion. This required the incorporation of a passage made from corrugated steel sheets. The profile for the corrugated sheet metal passage (MP200, VR8, wall thickness 4 mm) was selected to ensure the foot and bicycle path's required width of 3 m and clear height of 2.5. Its spread is 4.62 m and it is 3.64 m high. The corrugated sheet metal passage is some 27.60 m long and was covered to a depth of 0.60 m to 1 m. The space between the road side and the executed circular cross-sectional shape of the passage's walls was formed as a shoulder. The crown and adjoining embankments were executed with riprap and secured.

Corrugated steel sheet passage – bicycle path
Image: PORR AG

Bicycle path in the area of the northern roundabout
Image: PORR AG



Corrugated steel sheet passage – bicycle path
Image: PORR AG

Landscaping

The motorway embankments affected by construction were heavily vegetated. This vegetation served as a visual and dust protection and as a habitat for animals. Special heed was therefore paid to reducing clearing efforts to a minimum and to confine the building site as much as possible in order to prevent root stocks capable of putting down roots from having to be uprooted / to preserve as many plants as possible. This ensured that, despite of required felling and clearing, the vegetation can grow back and soon cover the whole area again. Primarily using domestic plants (two-year saplings, standard trees) were used to re-vegetate the area. However, due to the levels of continuous stress the surface area is subjected to, this could only be achieved in the area between the road side / shoulder (minus the required safety distance) and the embankments' bottom edge and in consideration of the required visibility zones at the motorway accesses and exits. The safety zones had to be kept free of trees and were therefore planted using a meadow mix appropriate for the location. Three years of care are included in all plantations (e.g. fertilisation, tree anchoring, mowing, mulching, surface drainage).

Furthermore, compensation / replacement areas needed to be found for the executed, lasting felling amounting to some 25,000 m² according to the Environmental Protection Ruling. These are located to the south west of the A12, were vegetated with coppice in a comprehensive fashion and subsequently grassed using a permanent meadow mix.

Landscaping – vegetated embankment surface
Image: PORR AG

Landscaping – vegetated embankment surface
Image: PORR AG

New traffic situation

The reconstruction of the existing roundabout and the construction of a new roundabout including bypass lanes will ease the build-up of dangerous and time-consuming jams at the interchange. This enables road users to access and exit the shopping world's area in stress-free manner. Furthermore, the Inn Valley bicycle trail was extended in the direction of CYTA in the course of construction. Public transport, too, benefited from the construction of the new "CYTA North" bus stop in the immediate proximity of the motorway in the southern roundabout's area. The declared goal of the project's operators, namely " to increase safety for all road users and to decrease jams at the interchange" could be achieved to the satisfaction of all those involved. In an exemplary fashion, ASFINAG, the Province of Tyrol and the Market Town of Völs managed to implement a multi-modal traffic concept taking into account drivers and pedestrians, public transport and bicycle riders alike.

Northern roundabout (final completion)
Image: PORR AG

Southern roundabout – prior to completion – viewing direction: south
Image: PORR AG

Lanes between northern and southern roundabouts
Image: PORR AG

Southern roundabout – viewing direction: south
Image: PORR AG

Final remark

Thanks to excellent collaborations between all those involved in the project – from the client to local building supervision to planners – work proceeded to the great satisfaction of all those involved. After work was completed and the construction site was cleared, the project could be handed over according to schedule in late November 2014. The greatest challenge TEERAG-ASDAG AG and all those involved in the project faced was keeping traffic moving during in and around the large construction site area. In terms of construction progress, this necessitated a complex execution of construction work in several phases and using several temporary installations. Confined spatial conditions, the location of the construction site in Innsbruck Airport's approach path as well as the rainy summer of 2014 further complicated road construction. With this project, TEERAG-ASDAG AG, an essential part of the PORR group, once again proved its experience and expertise in the areas of infra-structure and road construction, just as it had done in the course of many other large road rehabilitation projects in recent years.

Project data

Client	ASFINAG Baumanagement GmbH
Contractor	TEERAG-ASDAG AG, Tyrol branch
Start of construction	May 2014
Final completion	November 2014
Cleared area	22,000 m²
Asphalt surface	21,100 m²
Excavated material, earth moved	19,000 m³
Embankment ballast	20,000 m³
Frost wall UTS	15,500 m³
Ready-mix	10,600 t
Reinforced earth wall (face side)	350 m²
Compensation area new plantation	25,000 m²
Rehabilitated bridge surface B5	500 m²
Concrete	770 m³
Construction steel	50 t

A12 Inntal Motorway – Refurbishment of Tunnel and Gallery Structures at Haiming/Silz

Stefan Plankensteiner

Introduction

The Inntal Motorway A12 is a 153 km long motorway extending from Austria's border at Kufstein to the interchange at Zams in the Oberinn Valley (connection to the S16, the Arlberg Highway). In the mid-1980s, the motorway between Telfs and Imst was opened for traffic. Between Mötz and Haiming, the A12 runs directly below the jagged rocks of the Tschirgant Massif. Above this section, giant rocks and rock material (landslides) can be released at any time. This is why comprehensive protective measures have been taken when the motorway was constructed. Protective walls, landslide catch basins, rock slide nets as well as tunnel and gallery structures (open building method) were installed. After almost 30 years in service and operation and especially due to the effects of frost de-icing agents used by winter service on the structures' wall and support areas, their full fitness for purpose, their durability and bearing capacity could not be assured any longer. The four tunnel and gallery structures (dual tubes) with the names MÖ7, MÖ8, MÖ9 and MÖ10 (year of construction 1985 – 1986) between km 116.90 and 120.35 were comprehensively rehabilitated.

Order

ASFINAG Baumanagement GmbH commissioned TEERAG-ASDAG AG's Tyrol branch with the refurbishment of the four tunnel and gallery structures in March 2014. The engineering office Passegger-Autengruber (IBPA) ZT-GmbH assumed the execution planning for the refurbishment work.

Refurbished structures

Structure MÖ7 ("Simmering Gallery")

At a length of 861 m (96 blocks), this structure is the longest protective structure to be rehabilitated. The special feature of this structure is its open cross section in the central area of the dual tube stretching some 684 m which is supported by central supports at a centre to centre distance of 3 m.

Structure MÖ8 ("Schlenzenmure" tunnel)
Structure MÖ9 ("Steinbruchmure" tunnel)

These structures were constructed as closed coverage types (three-part basket arch) with centre wall. They are 240 m (24 blocks) and 180 m (18 blocks) long, respectively.

Structure MÖ10 ("Kirchenriese" tunnel)

The tunnel structure was constructed as a closed coverage type with centre wall. The cross-section in the direction of Zams (north tube) was executed as a three-part basket arch (three lanes) and as a dual basket arch in the direction of Innsbruck. The tunnel is 175 m (18 blocks) long.

Refurbishment work

In the course of the regular structural examinations, it was found that the state of the concrete and reinforcements in the area of walls and support surfaces was unsatisfactory as a result of decades of multiple adverse influences such as frost, frost de-icing agents, mechanical and chemical attack, moisture / water, carbonisation as well as chloride. In order to ensure the structures' future fitness for purpose, durability and load bearing capacity, their refurbishment was therefore mandatory. According to the rehabilitation concept, the following work steps / rehabilitation measures were performed:

- Removal of approx. 6 cm of concrete by means of hydraulic jetting, beginning at the top edge of the elevated hard shoulder

– to 2 m on all structures including the centre rows of supports (structure MÖ7) and the downhill gallery tunnel walls as well as the downhill rows of supports (structure MÖ7)
– to 5 m on the uphill wall area of the Simmering Gallery

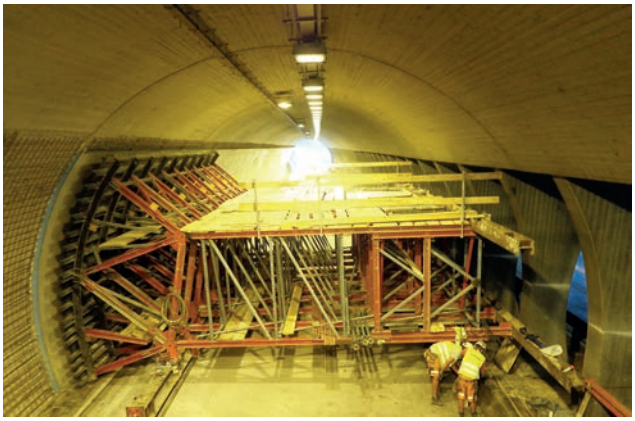
Concrete removal by means of hydraulic jetting – downhill wall surface
Image: PORR AG

Concrete removal by means of hydraulic jetting robot – centre wall
Image: PORR AG

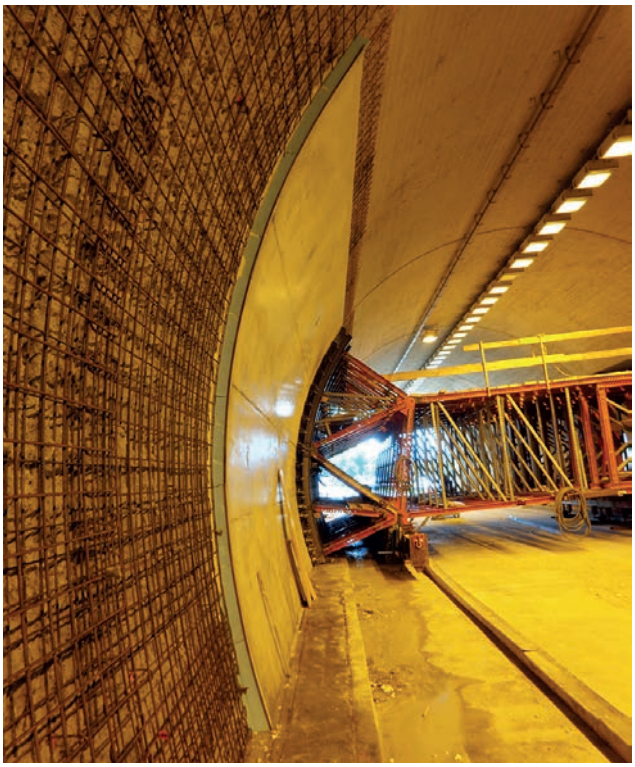
Concrete removal by means of hydraulic jetting robot – uphill wall surface to +5.0 m (Simmering Gallery)
Image: PORR AG

Concrete removal by means of hydraulic jetting robot – centre wall surface to +5.0 m (Simmering Gallery)
Image: PORR AG

- Small-scale concrete refurbishment and crack repair work in areas more than 2 m above the top edge of the elevated hard shoulder on all structures
- Replacement of reinforcements and construction of facing form work on average 10 to 15 cm thick from in-situ concrete C25/30/B7/GK16 in the area of all surfaces from which concrete had been removed using form work carriages (including external vibrators)



Form work carriage for the construction of the uphill facing form work in the Simmering Gallery
Image: PORR AG



Form work carriage for the construction of the uphill facing form work in the Simmering Gallery
Image: PORR AG

Form work carriage for the construction of the facing form work on both sides (tunnel areas)
Image: PORR AG

- Preparation of the new concrete surface by means of hydraulic jetting to requirement class UG 2 (mean roughness depth > 0.3 mm) for subsequent coating
- Preparation of the old concrete surface by means of hydraulic jetting to requirement class UG 3 (mean roughness depth > 0.3 mm) for subsequent coating
- Continuous cleaning of the gallery tunnel ceilings

The following additional measures were subsequently performed in the areas of the uphill and south side gallery tunnel walls as well as on the south side and centre rows of supports (structure MÖ7):

- Continuous application of a primer
- Application of a continuous filling on new concrete surfaces
- Application of a continuous compensation filling (scratch or shrink hole filling)
- Application of a continuous dual layer of paint to the tunnel surfaces as well as continuous top coat

Mechanical coating work in the "Kirchenriese" tunnel (MÖ10)
Image: PORR AG

Coating work in the Simmering Gallery (north tube)
Image: PORR AG

Construction procedure

Refurbishment work on the tunnel structures MÖ8, MÖ9 and MÖ10 was executed in two construction phases at total closure of one tunnel tube. Three construction phases were required for the rehabilitation of the 861 m long Simmering Gallery MÖ7. Apart from the total closure of the south tube followed by the north tube, the 287 centre supports bent at the side facing the road were refurbished in a third construction phase. Work started on 31 March 2014. The project was completed in November 2015.

Completion of the refurbishment and coating work (tunnel area)
Image: PORR AG

Completion of the refurbishment and coating work in the Simmering Gallery (MÖ7)
Image: PORR AG

Additional work

In addition to concrete refurbishment work on the insides of the tunnel-gallery structures MÖ7 – M10, the following services were performed:

- Sealing work in the area of the 76 segment joints on the gallery surfaces of the structure MÖ7
- Replacement of 1,300 m² of wooden elements (new wood concrete cartridges) at the southern protection wall in parallel to gallery MÖ7
- Renewal of the road restraint systems made from steel guide rails as well as installation of new pre-manufactured concrete elements
- Renewal of all inspection panels at the drainage shafts
- Replacement of all shaft covers in the road area with screw-on covers and frames
- Removal of some 4,000 m³ of material that had accrued in the north-running catchment troughs / the ground

Furthermore, new video and traffic technology installations as well as kerb stone lighting on the elevated shoulder were installed in the tunnel-gallery structures in the course of this construction project.

An additional building measure in the immediate motorway area (direction east) included the renewal of the expansion joints on the MM2 bridge, the Silzer Inn River Bridge, km 115,045 in both directions.

Final remark

Thanks to excellent collaborations between all those involved in the project – and especially thanks to the dedication and enthusiasm of all employees – work proceeded to the great satisfaction of all those involved. Work was completed and the site cleared in November 2014.

The rehabilitated downhill columns in the Simmering Gallery
Image: CHEMBAU GmbH

Bent centre columns in the Simmering Gallery
Image: CHEMBAU GmbH

Bent centre columns in the Simmering Gallery
Image: CHEMBAU GmbH

Project data

Client	ASFINAG Baumanagement GmbH
Contractor	TEERAG-ASDAG AG, Tyrol branch
Start of construction	April 2014
Final completion	November 2014
Total tunnel/gallery length	1,456 m (861 m + 240 m +180 m +175 m)
Concrete removal by means of hydraulic jetting to 6 cm	12,650 m²
11 cm facing form work (supports)	2,850 m²
11 cm facing form work (supports)	9,800 m²
Reinforcement steel (mats)	90 t
Tunnel coating thereof wall/column area	23,000 m² 16,000 m² / 7,000 m²

S6 Semmering Highway – Complete Rehabilitation of the Bruck Tunnel Chain

Ernst Landgraf

Introduction

The Bruck an der Mur traffic junction is one of the most important traffic hubs in Styria. It connects Graz with Vienna and Salzburg through the highways S35 and S6. The junction is also the only detour route for the A9, the Phyrn Motorway and thus, an alternative route for the Gleinalm Tunnel.

Due to its generally bad state, ASFINAG needed to completely rehabilitate the S6 in both directions from km 78.35 to km 83.88 (overall length: 5.53 km).

This included the rehabilitation of roads, bridges, tunnels as well as noise barriers and the new construction of operation buildings and water protection systems.

In addition, the entire electrical and mechanical systems in this area are being renewed in the course of rehabilitation work. We will execute the constructional work and a partner will take care of the electro-technical installations.

Bruck tunnel chain
Image: PORR AG

Order

TEERAG-ASDAG AG (T-A), Styria branch, in the form of a consortium with a partner for the electro-technical parts, was awarded the contract amounting to more than EUR 48.9 million by ASFINAG Bau Management GmbH in May 2014.

T-A Styria branch's specialisation on certain ranges of services in individual construction areas led to joint execution by the locations Frohnleiten, Knittelfeld, Mürzzuschlag and Scheifling.

The execution period was June 2014 to August 2016.

Project description

The total rehabilitation of the two two-lane carriageways will take place in the area between the Bruck/Mur junction and Oberaich, encompasses a total length of 5.5 km and will be executed in two construction phases.

Construction phase 01 (June 2014 to May 2015) included work on the Seebenstein carriageway. Construction phase 02 (June 2015 to August 2016) concerns work on the St. Michael carriageway.

Work is performed during a total closure of the respective carriageway. Traffic will be guided onto the carriageway not being worked on at the time in the form of two-way traffic.

The greatest challenge of this construction section is the coordination of the individual, occasionally overlapping subsections. TEERAG-ASDAG employs up to 100 skilled workers for the execution of construction work.

Road construction

On a total area of 123,000 m², the asphalt layers are mostly removed to expose the unbound binder course and newly asphalted with two or three layers. The overall thickness of the new asphalt layer will therefore range from 12.5 cm to 18 cm. In total, some 60,000 tons of asphalt are being used.

In the tunnel area, the unbound binder course is being renewed, too. This requires the installation of a total of 36,000 tons of binder course material.

In addition, road drainage as well as optical fibre installations will be adapted in certain areas.

Road surface removal
Image: PORR AG

Finished road surface
Image: PORR AG

Bridge rehabilitation "viaduct"
Image: PORR AG

Removal in the tunnel
Image: PORR AG

Bridge rehabilitation, Mur River bridge
Image: PORR AG

Bridge rehabilitation / civil engineering work

Overall, eight bridge structures measuring 33,000 m² in total will be rehabilitated. The longest of the bridges is the "Mur River bridge" with a length of 450 m.

Basically all edge beams and cantilever slabs will be removed and newly constructed. In the superstructure area, sealing and drainage systems will be completely renewed. The bridge insulating work will be performed by TEERAG-ASDAG's sealing department. In sub-areas the superstructure must be reinforced by means of grooving and additional reinforcements due to the enlargement of the retaining stage. In addition, the expansion joints and bearing constructions on the three large bridges will be replaced.

When it comes to this subsection, the rehabilitation of the Mur River bridge's 50 columns represents the greatest challenge for it must be performed using 4,400 m² of jetcrete above the Mur River.

Mur River bridge edge beams
Image: PORR AG

Due to their generally bad state, the retaining walls "anchor wall east portal Ruprechter Tunnel" and "retaining wall Kaltbach" with a total length of 50 m will be comprehensively rehabilitated. The 50 m long and 5 m high "retaining wall Bruck east" will be newly constructed.

23,000 m³ of concrete, 25,000 tons of jetcrete, 700 tons of steel and 32,800 m² of bridge sealing material are required for the execution of bridge rehabilitation and civil engineering work.

Noise protection

In the area of the construction section, some 7,600 m² of noise barriers are being removed and newly installed. The new walls are being executed as "slanted" walls up to 4 m high.

Aluminium cartridges are used as wall systems which will be brightened up with glass elements in certain areas on the bridge structures.

Noise barriers bridge
Image: PORR AG

Noise barrier details
Image: PORR AG

Tunnel rehabilitation

Tunnel rehabilitation work is being performed on the "Bruck" tunnel with its overall length of 2,500 m (both tubes) and "St. Ruprechter" tunnel with a total length of 1,250 m (both tubes). Apart from the aforementioned road refurbishment, the following rehabilitation measures will be executed in these tunnels:

- Removal of the wall surfaces to a height of 4 m by means of hydraulic jetting
- and application of new, 4 cm thick jetcrete facing with subsequent coating.
- The tunnels' drainage systems, slit drainage gutters and supports will be entirely renewed.

Two new, accessible cross cuts with a length of 20 m each needed to be driven by underground means at the "Bruck" tunnel. PORR's tunnel construction department assumed this task.

Support widening
Image: PORR AG

Cross cut 1
Image: PORR AG

Cross cut 2
Image: PORR AG

Building construction

In order to satisfy the current technical requirements toward road and tunnel equipment, a new operation building is being newly erected. Additionally, an existing operation building will be removed and newly constructed,

too.

Central operation building
Image: PORR AG

Water protection systems

This project also included the establishment of three water protection systems. These systems are also responsible for the drainage of waste water from the Tanzenberg Tunnel located outside of the construction section's area. This is why the client requested the filter area to encompass some 1,200 m².

Water protection system
Image: PORR AG

Final remark

Despite the most difficult framework conditions, TEERAG-ASDAG, Styria branch, managed to implement this project to the full satisfaction of all those involved. From what we know today, nothing speaks against this project's successful implementation all the way until the end of construction.

With this project, TEERAG-ASDAG AG once again proves its overall expertise.

Project data

Order volume	EUR 48.6 million
Start of construction work	June 2014
End of construction	August 2016
Length of project	5.53 km
Tunnel lengths	1.90 km
Road surface	123,000 m²
Anti-frost layer material	36,000 t
Concrete volume	23,000 m³
Reinforcing steel	700 t
Bridge sealing material	32,800 m²
Noise barriers	15,500 m²

New Construction of the Hochmosel Bridge

A technical masterpiece in one of the best known wine growing regions of Germany

Olaf Krumbein

Introduction

With a length of more than 1,700 m, the Hochmosel bridge in Rhineland-Palatinate probably represents Germany's largest and most challenging bridge construction project at the moment. The new B50 federal highway is part of an international road axis that is supposed to connect the Benelux countries with the Rhine-Main area. It closes the gap in the arterial road network between the A 60 at Wittlich in the direction of Mainz. The bridge is the centre piece of this newly constructed section of some 25 km length.

View from the Eifel hillside
Image: PORR AG

The structure crosses the Mosel River between the famous wine towns of Bernkastel-Kues and Traben-Trarbach and spans the Mosel Valley at a height of 158 m. Even the Cologne Cathedral would fit underneath.

Clear heights, special piers and large spans make the bridge look light and transparent. The famous wine-growing region and vibrant tourism in this region were especially considered during the planning process.

Hochmosel bridge visualisation
Image: V-KON.media

Contract award

In November 2010, the consortium Hochmoselübergang ("Hochmosel crossover") in which PORR Germany, central branch Berlin, is in charge of commercial management and, in technical matters, of concrete construction, was awarded the contract for the construction of the Hochmosel bridge by the state enterprise Mobilität Trier ("mobility Trier").

Construction started on the Hunsrück side in August 2011 with the construction of the abutment and the sites for later pre-assembly of the steel structure behind. Thus, the first headstone for the erection of the Hochmosel bridge was laid.

Foundations/piers

The bridge is supported by only ten piers which are built one after the other, from the Hunsrück abutment in the Mosel direction and then, on the opposite side of the Mosel River, towards the Eifel abutment. They are distributed over 1,700 m and stand 105 to 209 m apart. Compared to its length, the structure is supported by remarkably few piers.

Their foundations are large-scale foundation plates with integrated bore piles with diameters of 1.80 m and 2.00 m, respectively, and lengths between 10 and 47 m.

Bore pile foundation construction
Image: Brückner

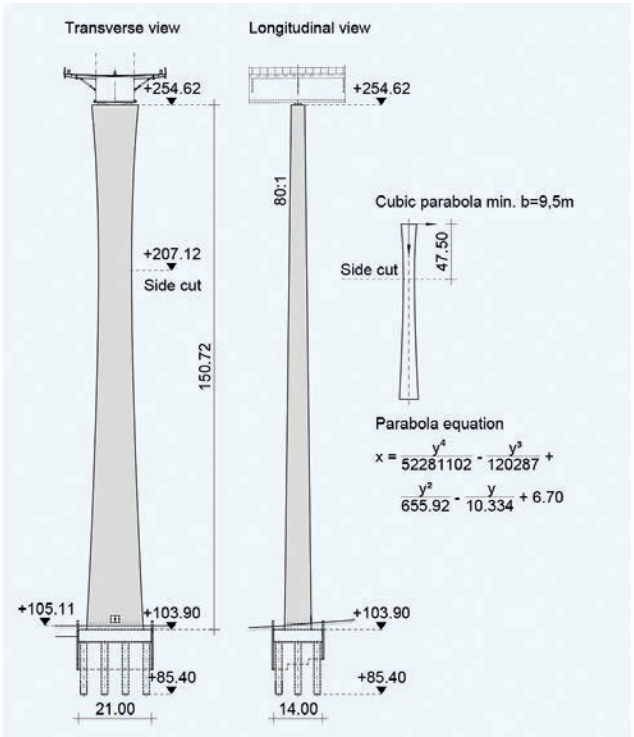
Slope stabilisation and temporary construction pit supporting system
Image: PORR AG

View of piers 5 to 10
Image: Brückner

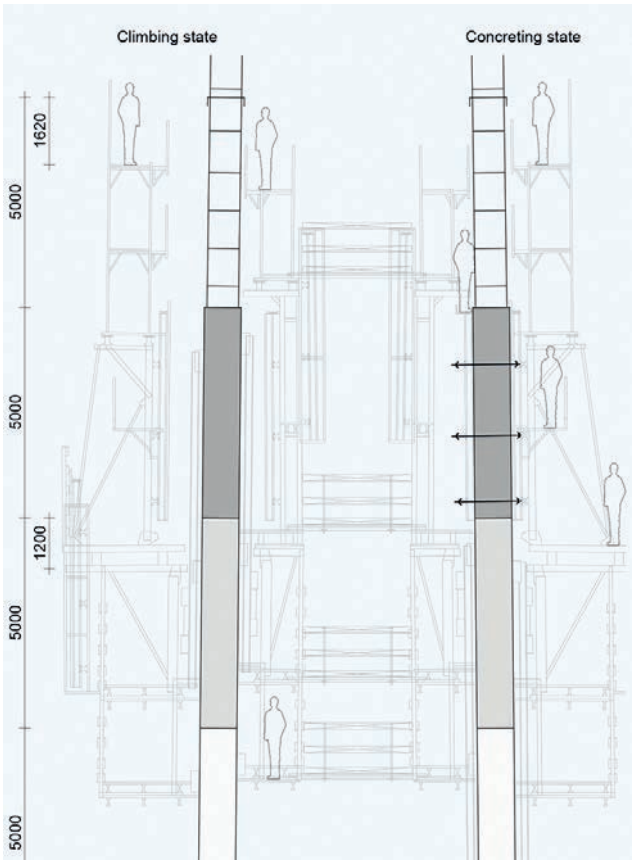
Whereas the construction pits could mostly be installed in a sloping position on the Hunsrück side of the Mosel River, extensive supporting work with sheet-piling and bore pile walls as well as anchor and jetcrete work was required in the immediate proximity of the Mosel River and on the Eifel side before the pile caps could be installed.

The ten piers consist of a single-cell rectangular cross-section made from reinforced concrete with wall thicknesses between 30 and 60 cm.

The piers which are up to 150 m high feature a special cross-section – a conical shape in longitudinal direction and a strong side cut in transverse direction. Despite its height, the Hochmosel bridge has been designed in a way that avoids obstructing the view on the Mosel Valley through the bridge, thus limiting its effects on the scenery.



Pier view
Image: PORR AG



Pier cross-section with automatic climbing form work
Image: PORR AG

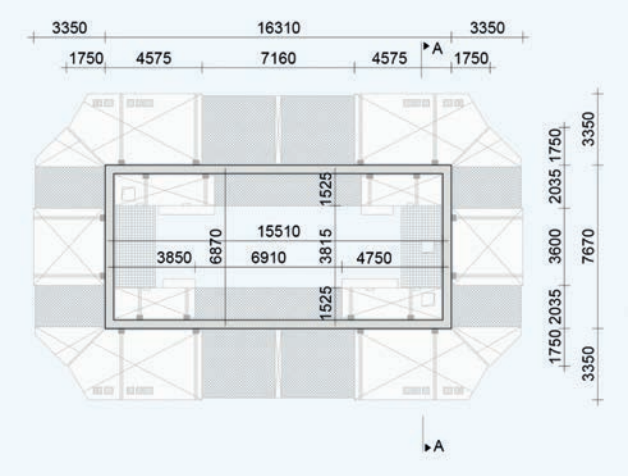
Automatic climbing form work with high levels of work safety

The geometrically challenging reinforced concrete piers are constructed by PORR specialist craftsmen using two automatic climbing form work systems. The automatic climbing units used here consist of 20 climbing consoles and four working levels with a total height of 13 m each.

The uppermost working level is used for reinforcing and concreting. Erected on the main level is the 5-m-high girder form work which can be positioned and moved off the concrete by means of winches. Two finishing platforms complement the climbing pier factory. They provide space

for the operation of the hydraulic units, concrete sealing and are used for disassembling the climbing anchors on the piers.

The modular system climbs up along with the structure without requiring a crane. As early as in the planning phase, all building states were taken into account and so was work safety on the permanently – with every form work step – changing geometry. The form work and platform concepts were balanced in such a way that, by using telescoping levels, safe working without having to install and disassemble console and platform units is possible at all times. Highest levels of precision during the installation of all anchoring and installation parts, permanent monitoring of the quality of the supplied concrete and the regular inspection of position and height by the surveyor guarantees that the form work climbs safely and precisely to the pile head.



Top view automatic climbing form work mail level E0 – telescoping levels in grey
Image: PORR AG

View of the automatic climbing form work
Image: Brückner

View of the automatic climbing form work
Image: PORR AG

View of automatic form work
Image: Brückner

Crane concept

Before the piers could be erected, the foundations and abutments were built using fast erecting cranes.

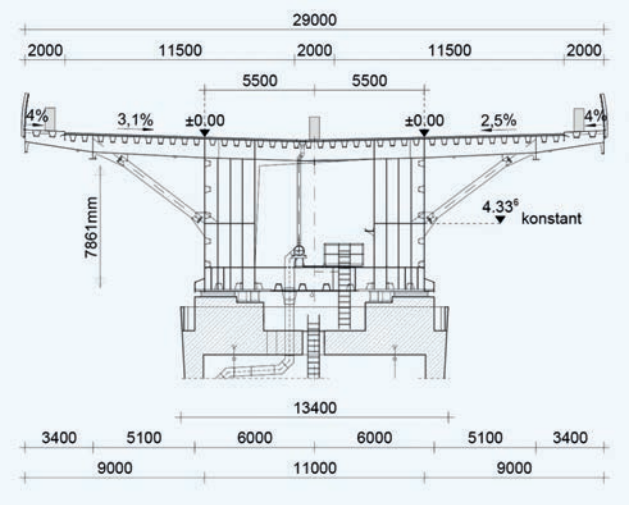
Type 6031.12 cranes which climb up in unison with the piers and are anchored to the latter up to three times are used for the delivery of the climbing form work in order to achieve hook clearances of up to 163 m above ground level.

Gantry cranes are used for the installation of the superstructure.

Superstructure

The single-part superstructure is being executed as a steel beam bridge spanning 11 fields with orthotropic deck.

The construction height changes depending on the width between supports. It reaches its highest point at a height of 7.78 at axis 4.



Superstructure cross-section
Image: PORR AG

The superstructure's steel construction is being machined in the works in Hannover and Lauterbourg and pre-manufactured in segments which are then transported to the construction site by means of heavy haulage.

Delivery of factory-produced components
Image: PORR AG

At a 300-m-long pre-assembly site behind the eastern abutment especially established for this purpose, 10 to 12 of these segments at a time are assembled to a bridge section of 15 to 25 m in length.

82 so-called sections are being welded together to construct the Hochmosel bridge.

In stages, the completed and coated steel construction is being inserted via the Mosel Valley from the pre-assembly site via slide bearings and using hydraulic presses (timed shifting).

Tilting and assembly into superstructure sections
Image: PORR AG

The tasks "bridge section installation", "corrosion protection application" and "shift construction" are repeated 13 times until the opposite abutment is reached and the bridge can be set down on its final bearings.

In order to reduce the loads from the projecting superstructure during shifting, the lateral cantilever plates were removed from the cross-section for the first 80 m and just the box-section slab was built. In addition, an 80-m-high auxiliary pylone was erected.

The deformations and loads are controlled by the latter making the use of additional auxiliary supports unnecessary, even in case of the largest widths between supports of up to 209 m. This construction technique preserves the Mosel Valley, known for wine-growing and tourism.

Superstructure shifting in front of pier 10
Image: LBM

Special features

Especially because of the shape, height, foundation parameters and mass distribution, much attention was given to the examination of load conditions involving turbulence-induced shear vibration. For this design-relevant load condition, pier models were tested in the wind tunnel, studies on reduction were conducted, measures for the avoidance of turbulence-induced shear vibration were developed and implemented in the field.

Wind deflectors for the prevention of turbulence-induced shear vibration
Image: Brückner

Final remark

PORR group's construction work has reached a status of 60 % in May 2015 and five out of ten piers with a height of up to 120 m were completed in high quality. One can practically watch as two more piers grow higher and higher almost each week. At this point, I would like to express a special thank you for the hitherto good collaboration and participation to all those involved in the project: the client, the specialist planners, the steel and concrete constructors, the authorities and the commissioned sub-contractors. According to current plans, the first vehicles will pass the Hochmosel bridge in autumn 2018, and further connect the regions and bring the their people closer together.

Project data

Bridge surface	49,300 m²
Bridge height	158 m
Largest width between supports	209 m
Total volumes	
Steel construction	32,000 t
Concrete volume	40,000 m³
Reinforced steel	5,500 t

Munich, Maximilianstraße 6 – 8

Specialist civil engineering work under an ensemble of registered buildings

Wolfgang Wiesnet

General information

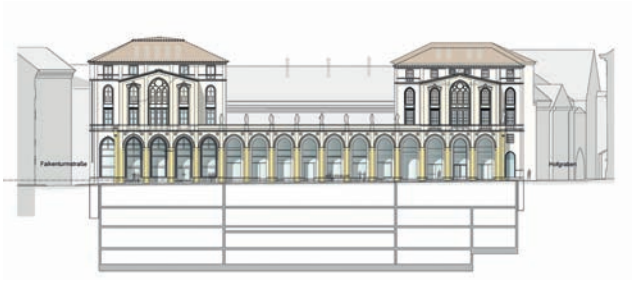
Built at the behest of King Maximilian II between 1853 and 1875, Maximilianstraße in Munich is a registered, closed urban concept.

Photo of existing buildings along Maximilianstraße
Image: PORR AG

Located at Maximilianstraße 6-8, the construction scheme at hand is a building ensemble in a prime location which will be fundamentally modified and extended. The building itself is registered as a single monument.

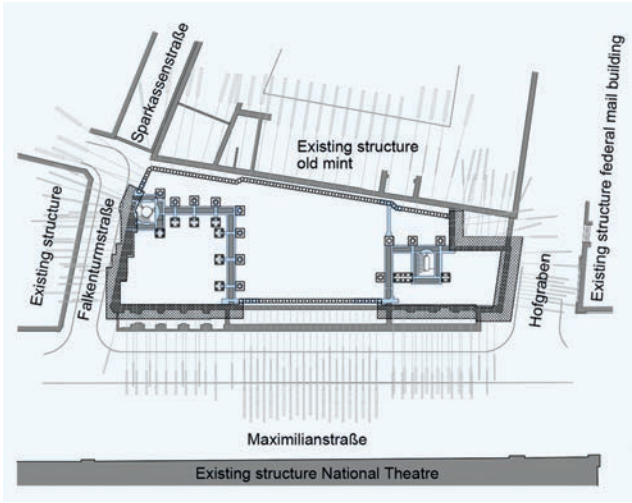
Extensive technical and economical feasibility studies looking at many alternatives such as the creation of only partial basements and the consideration of various number of basement storeys finally resulted in the following task for specialist civil engineering:

- Three new and thus, a total of four basement storeys are constructed. The new foundation level is 12 m deeper than the existing basement level and 15 m below Maximilianstraße.
- The foundations are to cover the entire property area, if possible. Both buildings need to be underpinned in the centre of the construction pit to a height of some 12 m.
- The regulations of historical monument preservation stipulate that the two buildings' outer walls, all the arcades and one ceiling in building 6 must be preserved in their entirety and that no cracks must occur.

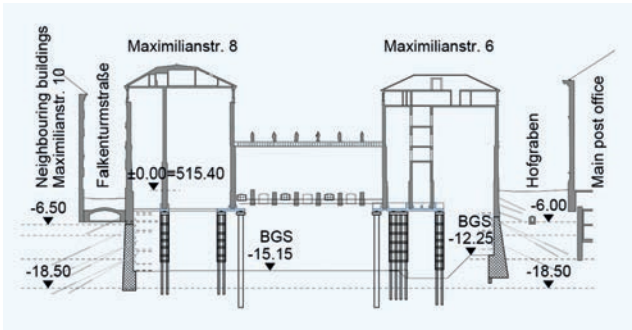


Planned basement construction
Image: Brunner/IGG / Execution plans

As the only specialist civil engineering company, STUMP-SPEZIALTIEFBAU, as part of the PORR group, could both process all the required subsections in-house and adhere to the deadlines put down by the client. In January 2014, STUMP-SPEZIALTIEFBAU was awarded the contract for preliminary work and in subsequence, the overall order for the construction pit and earth-moving work.



Plan of construction pit supporting system with building underpinning
Image: Brunner/IGG / Execution plans



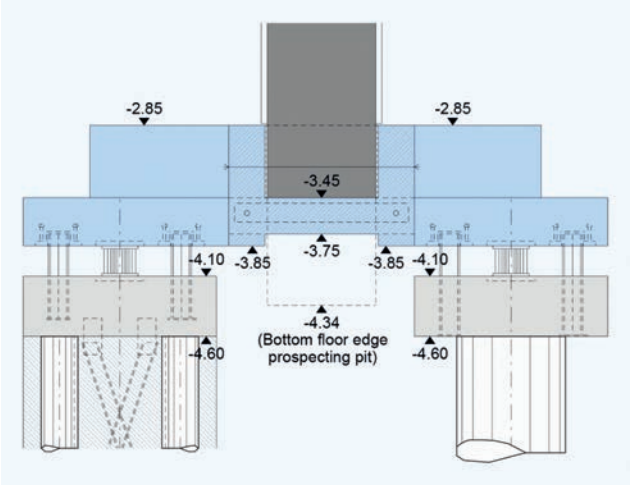
Longitudinal section of construction pit
Image: Brunner/IGG / Execution plans

Ancillary conditions

Submitting a "regular" type of modification ready for approval under the existing ancillary conditions was

tantamount to a master stroke, both in legal terms and in terms of planning. The "total" modification of the registered building that became possible brought along numerous additional obligations:

- Maximum movement of the overall structure of no more than 2 mm
- No crack formation whatsoever
- Removal and re-installation of the historical city walls dating back to the 13th century
- Prior to and during the construction project, ground-level monuments were surveyed in-situ or protected. Furthermore, foundation walls and the old bailey walls of the historical old part were excavated and archaeologically surveyed.



Detail wall underpinning with pile heads
Image: Brunner/IGG

Among others, critical points that needed to be solved included:

- Allocation of the very cramped construction pit equipment site, e.g. for purposes of placing and operating two jet grouting devices
- Accessibility of the site facilities with mobile cranes under consideration of road and tramway traffic and their catenary systems
- Construction pit logistics (especially excavation) via a small and subordinate side street

After supporting the building on the underpinning construction, the actual support loads could be determined, evaluated and, if necessary, adjusted continuously.

Construction pit logistics via a small side street
Image: PORR AG

Construction procedure

1) After the historical city walls had been cut up and transported off, the actual construction work on location could begin.

2) While demolition work in the upper storeys was advancing, the existing walls were braced in the basement storeys. This yielded a significant time advantage for the overall project. The nails could only be installed thanks to a special proposal by STUMP-SPEZIELTIEFBAU.

All 150 bracing points needed to be established in the existing walls by means of core drilling in a way that wouldn't affect the building too much. The core drilling lengths ranged from 1.2 m to 5.5 m; on average, the core drilling length was approx. 2.6 m.

3) After some 1,300 running metres of bracing had been installed in the existing walls and the entire demolition / gutting to the foundations had been completed, the archaeologists once again began working. While anchoring work and the archaeological surveying were in process, building construction installed the entire building underpinning construction (consisting of cored and grouted steel birders, cased in reinforced concrete).

4) The following tasks were simultaneously begun from the installed working level – some 1 m above the bottom edge of the foundations – in the comparatively cramped indoor areas:

- Jet grouting (lengths of up to approx 16 m)
- Interior supports for the pile grillage underpinnings consisting of groups of reinforced DN 300 mm piles of up to 17 m in length

Interior jet grouting
Image: PORR AG

Interior jet grouting
Image: PORR AG

5) At the same time as excavation work to the first anchoring level was performed, the pile grillage supports (1 mm pre-tensioned) were placed on the press supports. The foundations still embedded in the foundation soil underneath the pile grillage needed to be demolished. Jet grouting / milling work was started.

Underpinning of the building onto DN 300 mm pile groups
Image: PORR AG

6) Anchoring work was performed continuously with 2 double head drilling systems and an additional small drill rig for the corners and narrow points. Starting at the second anchor position, the proximity of ground water required a pressure-tight execution and end sealing of the anchor heads.

7) Prior to the second anchor position and prior to putting the dewatering system into service, the GEWI piles used for buoyancy control were installed.

8) After that, the following tasks were completed in succession: Excavation, installation of additional anchor positions, start of dewatering incl. detensioning of the second ground water storey and straightening of the jet grouted retaining walls.

Volumes

- approx. 1,300 running metres of soil nails
- approx. 700 rising metres of BP DN 300 in groups of 4 as support construction
- approx. 2,400 m³ of statical jet grout
- approx. 8,000 running metres of permanent soil anchors with 4 and 5 strands (some 400 units)
- approx. 700 rising metres of buoyancy control system GEWI 63.5
- approx. 12,000 m³ of excavated material, plus
- approx. 7,000 m³ of disposed construction rubble
- approx. 1,500 m³ of excavated material were being removed by means of crane buckets

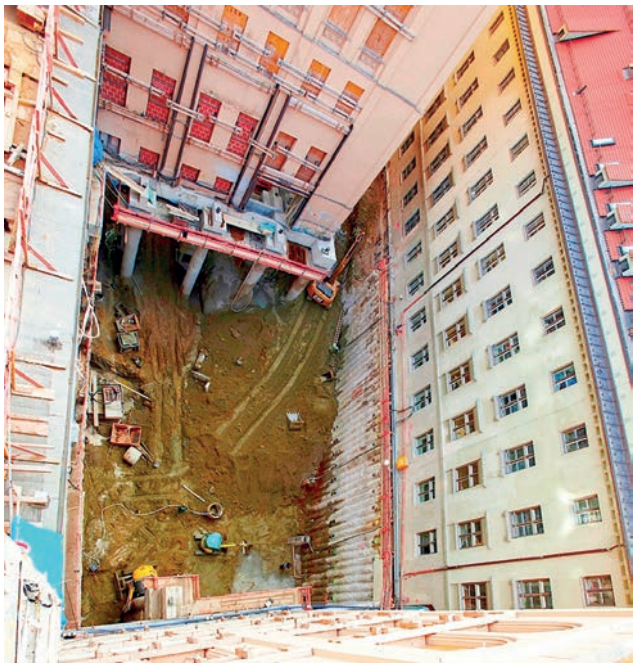
Project data

Client	BRUNNER + CO, Baugesellschaft mbH & Co München
Construction pit planning	IGG, Ingenieurgemeinschaft Grundbau, Augsburg
Area	4 new basement storeys plus installation level 2,100 m² in Munich's top location opposite the state opera
Start of construction work	February 2014
Completion	February 2015

Conclusion

In Munich, STUMP-SPEZIALTIEFBAU could once again prove its expertise and experience and fully satisfy the client with quality, punctual completion and efficiency, as it had done in a number of previous projects.

This joint effort with regard to the implementation of such a highly complex and highly risky project was only possible with the perfect and closely interlinked teamwork of planners and the structural work, earth work and specialist civil engineers. This allowed, for instance, for the approval of modification proposals within an few hours and their implementation on the very same day.



Top view
Image: PORR AG

Exposed jet grouted walls in the building
Image: PORR AG

Installation of blinding concrete at a height of 15 m
Image: PORR AG

Residential and office building Prager Carrée in Dresden

Maik Tanneberger

On 5 July 2014, Revitalis AG awarded Porr Deutschland GmbH, Berlin branch, the contract for the erection of the residential and office building Prager Carrée as a general contractor including planning and house technology.

The development site

Revitalis AG, with its project company Revitalis Dritte Grundstücksgesellschaft mbH & Co. KG, has purchased the development site MK5 in Dresden's Old Town in June 2013. Already there was a construction pit which had been excavated in 1999 in the course of development measures in the area of Dresden's main station and the tunnels making the southern Prager Straße accessible. The property is surrounded on all sides by tunnel structures whose outer walls – except for the western side – also represent the respective construction pit walls. The east-west tunnel whose northern double carriageway is located on the project plot runs in parallel to the southern property line.

Construction pit
Image: PORR AG

Building on the MK5 site will occupy the last unused site in the southern section of Prager Straße, thus closing the last gap on the heavily frequented axis between the main railway station / the central bus station (ZOB) and Dresden Altmarkt. With some 8,500 pedestrians daily, Prager Straße is the most frequented shopping street in Eastern Germany.

Project description

The ground floor, parts of the first floor and the first underground storey along Prager Straße and Wiener Platz will be used as retail spaces. Some 241 rental flats will be built in the other areas and upper storeys.

The two-storey underground car park will feature a total of 327 parking spaces. Apart from the underground car park and retail spaces, the two basement storeys measuring a gross floor area of approx. 7,300 m² each will harbour the house technology rooms and tenants' cellars.

Bottom slab
Image: PORR AG

Floor slab 2 basement storey
Image: PORR AG

A total of eleven house entrances along Prager Straße and Wiener Platz with one staircase and lift each are located on the ground floor with its gross floor area of 4,900 m². The mezzanines at Breslauer Straße and Planstraße D, are planned to house flats with tenants' gardens positioned towards the interior. 42 residential units each will be located on storeys 1 to 5 with a gross floor area of 17,000 m². The 6th storey measuring some 2,600 m² in gross floor area is executed as a stacked storey. The 21 residential units located on this storey will feature generous roof terraces positioned towards the interior and towards Wiener Platz in the south. All the other flats in the building feature at least a balcony or terrace with garden plot.

Laying of the corner stone

Following the motto "bye, bye Viennese Hole" (the name comes from the adjacent Wiener Platz), the corner stone for the residential project was laid on Monday, 8 September 2014.

In perfect "Anglo-Saxon", the client, Revitalis AG, invited more than 100 guests to the cornerstone laying ceremony. Among the invited guests were the city's Construction Mayor Jörn Marx, the comedian Uwe Steimke, representatives from the city's administration and the city council.

Laying of the corner stone; from left to right: Comedian Uwe Steimke; Mayor Jörn Marx; architect Jan-Oliver Meding and Thomas Cromm from Revitalis AG
Image: PORR AG

Building shell
Image: PORR AG

Visualisation areal image
Image: MPP Meding Plan + Projekt GmbH; Gärtner+Christ

Execution of construction work

Porr Deutschland GmbH has been commissioned with the execution planning, statics, house technology and turn-key ready construction. The 19-year-old construction pit was overgrown with varied vegetation which had to be removed before construction could begin. The northern and southern tunnel bypasses surround the construction pit. These were partly founded on piles which protruded into our development site.

Using a mat foundation system, we provided a uniform transfer of the loads into the grown soil. Additionally, two existing subterranean culvert pipelines serving flood protection purposes needed to be protected in such a way that their function would not be impeded by the floor slab above. For this purpose, a load-transferring cap was concreted that transfers the loads around the pipelines and into the building ground.

The 2nd basement storey was entirely constructed in monolithic design. The high ground water level made it necessary to construct both basement storeys as water-tight constructions. The exterior walls on the 1st basement storey were executed using double filigree walls.

In order to meet the demands of the commercial areas on the ground floor and the 1st storey, all walls in this area are to be executed with reinforced concrete beams transferring the loads safely into the building ground.

Only once the residential areas were reached, the exterior and separation walls could be made from lime and sandstone masonry. The system used was a Quadro system with a brick compressive strength of 2.0. In the flats, the ceilings were constructed using filigree slabs and top concrete.

At the moment, form work, reinforcement, concreting and masonry work are advancing at full swing. Thus, nothing stands in the way of the building's scheduled completion in June 2016.

Visualisation: View from the balcony
Image: MPP Meding Plan + Projekt GmbH; Gärtner+Christ

Visualisation: View Prager Straße
Image: MPP Meding Plan + Projekt GmbH; Gärtner+Christ

Visualisation: View Prager Carree
Image: MPP Meding Plan + Projekt GmbH; Gärtner+Christ

Project data

Client	Revitalis Dritte Grundstücksgesellschaft mbH & Co. KG
Contractor	Porr Deutschland GmbH, Berlin branch
Start of construction work	Juli 2014
End of construction	Juni 2016
Gross floor area	44,005 m²
Storeys	2nd basement storey, 1st basement storey, ground floor, 1st to 6th upper storey
Staircases	12
Lifts	12
Residential units	241
Car parking spaces	327

Hall of Residence Messecarree Nord, Building Section B

Erection of a state-of-the-art flat complex near the campus of Vienna's University of Economics and Business

Helmut Piller

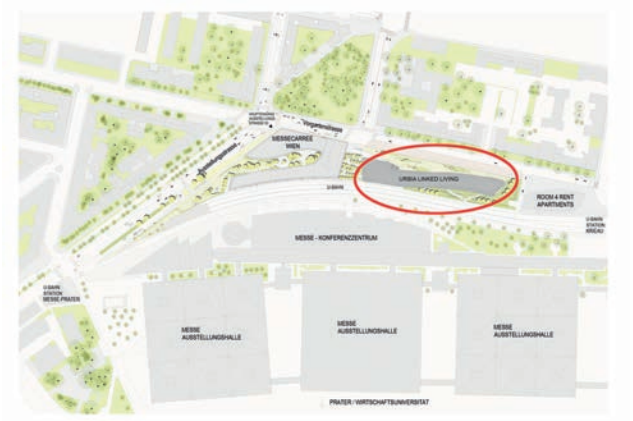
Visualisation
Image: Urbia linked Living

Project description

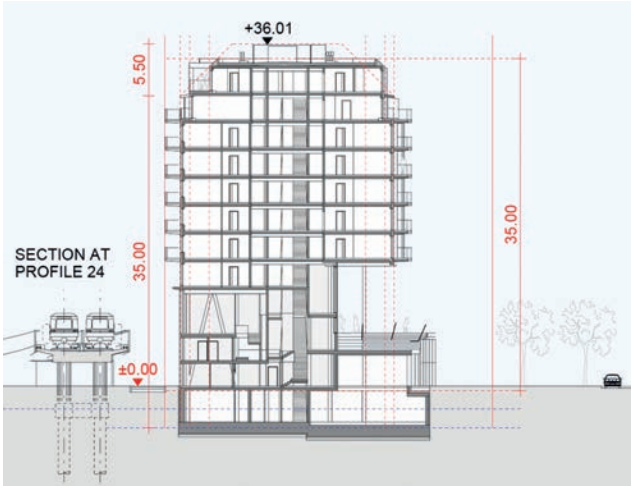
in March 2014, Porr Bau GmbH was awarded the contract for the erection of the hall of residence Messecarree Nord/building section B as a full service general contractor. The hall of residence is located in the immediate vicinity of the Vienna Trade Fair Centre in the city's 2nd district as well as underground line 2's Krieau station.

Building site B serves as a connection element between the lower building site A and the higher building site C. The visual axis to Messeturm tower and the open spaces determine both the structures' location and height. On a length of more than 150 m, the building's curved shape creates a thrilling overall impression with a multi-faceted façade and varied light and shadow effects.

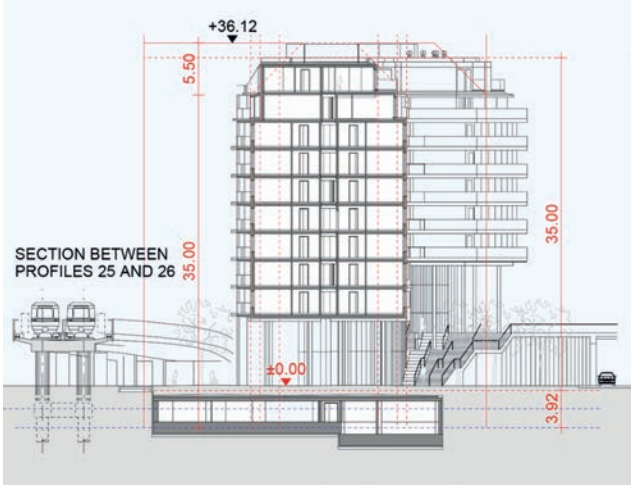
The building's inside is fully adapted to modern student life: It includes some 600 rooms and numerous common rooms, community kitchens and utility rooms. The semi-basement storeys of ground floor and first floor house the access areas, public rooms, offices, a "Learning Lounge", a gym, restaurants as well as waste disposal rooms. The semi-basement storeys are being interrupted by a generous open area and are spanned by the residential storeys (2nd to 10th storey) above. Supports are used to strut the building. The basement storey houses an underground car park providing some 60 car parking spaces as well as house technology and storage rooms.



Site plan
Image: Urbia linked Living



Section
Image: PORR AG



Section
Image: PORR AG

Semi-basement storeys (ground floor and first floor)
On Vorgartenstraße, students access the hall of residence via three entrances arranged along the entire length of the building. Both ends of the building feature one entrance as does the middle of the building. The latter is accompanied by a staircase core with lift on the inside.

The main entrance is located in the north-western semi-basement area, directly next to the outside staircase leading to the plaza level. The main entrance leads to the building's internal reception area which has been designed as a dual-storey "Welcome Lounge" inviting one to linger and take a seat as well as serving as a meeting place and the building's social focus. From here, the gallery located above as well as spaciously designed internal connections via staircases and/or entries and passages give students access to both the rooms and the most important auxiliary functions in the northern semi-basement. These include the "Scout Office", the "Learning Lounge" and commercial areas.

An wide stairway running parallel to the outside staircase leads to the first floor and the plaza level. Both the inside and outside staircases have been designed in such a way that they look like a single staircase running straight through the glass façade. This connects the building's exterior area to its inside in a particularly striking way. Through its width and the double-height seat steps, this staircase, apart from its access function, also serves as a meeting place and will thus significantly enliven the building's entrance area.

The central entrance is also located in the northern part of the semi-basement, directly next to the building's underpass. Apart from providing access to the rooms, the southern entrance also gives residents access to the dual-storey gym.

In contrast to the main entrance and the building's common areas connected to it, the central and southern entrances lead directly to the upper storeys which means that both entrances are quieter and more private as a whole.

Entrance area – Lobby
Image: Söhne & Partner

Façade
The residential storeys' façade is executed using a thermal insulation composite system.
In order to provide good natural lighting and splendid views, all windows have been very generously dimensioned. In accordance with the spatial conditions, the windows facing the balconies are room-high. Rooms without balconies also feature exceptional spatial qualities thanks to windows with a parapet height of 60 cm.

Between the static shear walls, the semi-basement storeys' façade is being built using a post and rail system. In the shear wall area, a ventilated façade is being installed.

Both the 9th storey and the attic storey are executed as staggered storeys. The roof areas thus created are used as terraces interrupted by roof bays arranged along a third of the building's length.

Manually operated exterior blinds and inside sun protection systems on the northern side provide sun protection for the rooms' tenants.

Learning Lounge
Image: Söhne & Partner

Regular storeys
The staircases with one lift each lead to the rooms arranged along a central corridor in a double-hipped fashion. In the north-eastern head of the building, the room order is interrupted by the centrally located scissor staircase as well as the double-height Learning Lounges. The central corridor forks, thus surrounding these components. This central corridor's three branches all end in front of windows meaning that every end is illuminated with daylight.

Execution of construction work

Excavation
In order to reduce building settlement to a minimum, the sandy gravel soil was compacted in stages by means of vibro-compaction.

The construction pit retaining structure was executed using steel sheet piles which were reinforced with 33 m-long pre-manufactured parts.

cross members. Draw and drainage wells were used to control the ground water level.

Temporary construction pit system
Image: PORR AG

Construction pit
Image: PORR AG

Construction pit reinforcement and ground water control
Image: PORR AG

Shell

Following client specifications, the "brown tub" method was used for the basement storey.
The building was constructed in conventional reinforced concrete style. The ceilings were partly executed as element ceilings whereby the edge areas needed to be built using in-situ concrete in order to allow for adequate static anchoring of the balconies made from

The house technology ducts made from pre-manufactured parts (Instabloc) represent a special feature. Provided planning has been carried out in a predictive way, these allow for a significant mitigation of interface problems as the individual elements already contain the entire house technology installations and only need to be connected to one another storey by storey.

Also worth mentioning is the considerable thickness of the reinforced concrete on the basement floor providing protection against vibration caused by the adjacent underground lines.

Concrete/reinforced concrete work
Image: PORR AG

Roof
Image: PORR AG

Roof
Image: PORR AG

Southern view – underground railway side
Image: PORR AG

Finishing work

When it comes to the technical part of the execution, finishing work is in tune with the current state of technology. However, the scope of finishing work is special: Our contract as a full service general contractor also includes the rooms' entire furniture. Finishing work in the commercial areas poses additional challenges. The fact that some tenants move in at later dates requires both quick plan adaptation and flexible execution.

Model room – single room
Image: Urbia linked Living

Model room – flat
Image: Urbia linked Living

Model room – flat
Image: Urbia linked Living

Project data

Client	Turbo Ö2 Liegenschaftsverwaltungs GmbH
Architects	Architekten Tillner & Willinger ZT GmbH
Statics	Vasko + Partner Ingenieure Ziviltechniker für Bauwesen und Verfahrenstechnik GmbH
Gross floor area	34,000 m²
Size of building site	6,500 m²
Excavated earth	26,000 m³
Concrete	22,000 m³
Reinforcements	2,800 t
Start of construction	Spring 2014
Completion	Autumn 2015

Final remark

At the moment, finishing work on the building is advancing at full swing. Hand-over is scheduled for late September 2015. Due to the dedication and professionalism of all those involved, we are confident to be able to fulfil the high expectations in the high PORR quality customers are accustomed to and to hand over the building according to schedule.

Visualisation northern view
Image: Urbia linked Living

Visualisation southern view – balconies made from pre-manufactured parts with E30 glass balustrades
Image: Urbia linked Living

Construction Scheme Motel One – Vienna State Opera

Revitalisation of two existing inner-city properties

Anita Kafka

General information

In Vienna's 1st district, between Karlsplatz and Elisabethstraße, in the former Wheli-Palais (house 5) and the listed residential and commercial building Friedrichstraße designed by architect Hans Prutscher (house 3), a new hotel with 400 rooms belonging to the Motel One chain was built in two existing properties.

As a general contractor, Porr Bau GmbH performed the demolition and shell construction work, the façade rehabilitation, the interior work and installed the house technology facilities. In the course of construction, the existing buildings were united and adapted for the use as a hotel.

Finished Hans Prutscher building
Image: PORR AG

Finished Hans Prutscher building
Image: PORR AG

Finished Hans Prutscher building
Image: PORR AG

Finished Hans Prutscher building
Image: PORR AG

Project data

Location	Elisabethstraße 3 / Friedrichstraße 4 and Elisabethstraße 5 / Operngasse 5 in 1010 Vienna

Client	Immovate Alpha Bauträger GmbH
Operator	Motel One
Execution of construction work	Porr Bau GmbH / Revitalisation
Construction period	7 January 2013 – 11 November 2014
Gross floor area	17,904.88 m²
Usable floor space	13,592.02 m²
Number of rooms	400

Project description

Erected around the year 1870 in the course of ring road development efforts, the Wehli-Palais drawn by architect Ludwig Zettl in Elisabethstraße was designed in the style of the time called neo-historicism. Its rich façade decorations accentuate the individual storeys through increments in the arrangement, from a richly decorated Belle Etage to subtler window decorations on the 4th floor.

The building adjacent to the Wheli-Palais (house 3) features a façade drawing from Art Nouveau styles. Its delicate arrangement is being structured by sporadic floral elements and curved lines. Here, the architect expresses his passion for the spatial shaping of a façade and enriches it by incorporating bays.

Execution of construction work House 3: Residential and commercial building designed by Hans Prutscher dating back to 1913

Demolition

The demolition of the cinema that had existed since the building's construction and the restaurant below and the extension of the exterior walls allowed for an increase in the hotel's number of rooms.

Demolition of the reinforced concrete beams of the former cinema floor and creation of a continuous courtyard façade
Image: PORR AG

Demolition of the reinforced concrete beams of the former cinema floor and creation of a continuous courtyard façade
Image: PORR AG

Lighting

Providing the amount of natural light stipulated by the authorities in the rooms located in the former restaurant's area on the basement storey posed a special challenge. For this purpose, a metallised light deflection system was installed on the upper storeys of the inner courtyard. In

addition, a water basin reflecting daylight was built.

Light deflection system on the upper storeys
Image: PORR AG

Static elements
In order to re-establish the load bearing capacity of the historical, laterally extending Seidel ceiling, the ceiling panels were retrofitted around the openings with reinforced concrete in an h-shaped fashion and connected to the existing ceiling after the ceiling penetration for the new hotel room ducts had been executed.

Reinforced concrete beam replacement in the historical Seidel ceiling
Image: PORR AG

Reinforced concrete beam replacement in the historical Seidel ceiling
Image: PORR AG

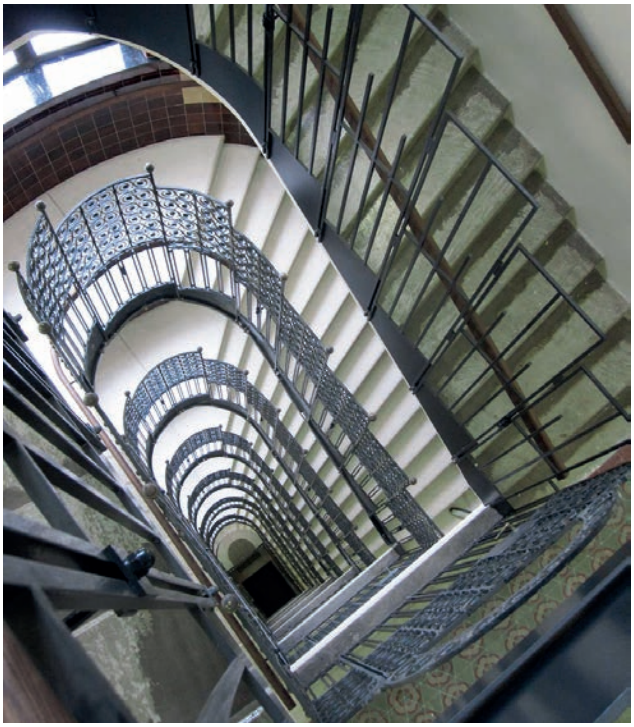
Staircases
During demolition work, employees from Vienna's University of Technology carried out load tests on the existing listed natural stone staircases through load application by means of water containers in order to test their suitability as escape staircases. In the course of these tests, a natural stone staircase in house 5 that had been cleared for demolition was made available to the University of Technology to conduct an in-situ test under load until fracture and to evaluate the measured data in the framework of scientific research.

The natural stone staircase cleared for demolition is being stressed until fracture occurs
Image: PORR AG

The natural stone staircase cleared for demolition is being stressed until fracture occurs
Image: PORR AG

The listed staircases in house 3 were carefully revitalised involving restoration experts, converted to escape staircases and equipped with a pressure aeration device integrated into the historical context in a maximally subtle way via the roof.

The ceramic tiles that were missing or had broken off as well as the mosaic cement tiles, the decorative elements on the staircase grids and the roof lights' missing glass covers were reconstructed in close collaboration with the historic preservation agency and the accompanying restoration experts and in full accordance with the historical example on location. The well-preserved crafted items were also carefully restored.



The listed staircase
Image: PORR AG

Restored historical staircase at Elisabethstraße 3
Image: PORR AG

Roof construction
Whereas the roof system and the roofing of the street-side wings are listed as historical monuments, the roofs of the longitudinal wings connecting them could be removed and replaced with a new, space-creating roof with incorporated dormers. The listed historical roof structures on the street sides were rehabilitated and the sheet metal covering renewed in the course of façade rehabilitation.

New roof construction atop the courtyard wings
Image: PORR AG

Execution of construction work House 5: The former Wehli-Palais

While the listed building designed by Hans Prutscher houses only hotel rooms, office and retail space, all the house technology rooms and rooms used for the hotel's administration are located in the Wilhelminian style house on Elisabethstraße 5. Apart from the house technology facilities and staff rooms, these premises on the basement floor also include public toilets.

The ground floor is home to the foyer, the reception, a bar, a buffet and a breakfast area with buffet kitchen. Thanks to lowering the ceiling in this area between ground floor and basement floor, an intermediate ceiling could be installed in the high ground floor rooms and the breakfast buffet area could be extended.

On warm summer days, this area can also be extended into the inner courtyard.

Restoration work in the former Wehli-Palais' inner courtyard
Image: PORR AG

Restoration work in the former Wehli-Palais' inner courtyard
Image: PORR AG

Restoration work in the former Wehli-Palais' inner courtyard
Image: PORR AG

Restoration work in the former Wehli-Palais' inner courtyard
Image: PORR AG

Archaeological excavations

In the course of construction, the inner courtyard's soil was dug off under the supervision of Vienna's archaeological department to allow for the installation of the collector corridor on the basement floor. The excavation work for the lift shafts and sump pits unearthed remains of the numerous victims of the first plague epidemic of 1350 which were reburied by the archaeologists and staff working for Vienna's archaeological department involving

months of painstaking work.

Archaeological excavations on the basement floor
Image: PORR AG

Access core construction
The reception on the ground floor leads one directly to the lifts which allow one to access the rooms in both buildings. To build this access core, house 5's entire historical wing between inner courtyard and adjacent Prutscher-building was removed across all storeys and rebuilt at the same time as the main staircase and lift shafts using reinforced concrete and pre-manufactured parts.

Gutting of the former Wehli-Palais for the new access core
Image: Porr AG

Static elements
In order to restore the load-bearing and stiffening function of the ceiling that had already been negatively affected by the installation of the new house technology ducts and in order to meet the earthquake standards in effect, the ceiling panels in this area were replenished with reinforced concrete and connected with the existing wood beam ceiling.

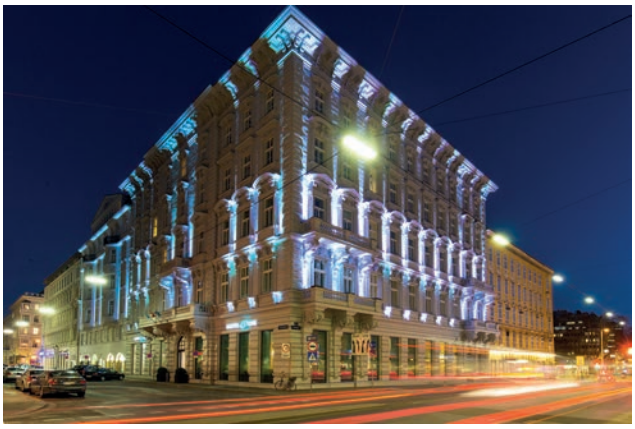
Form work of the ceiling replacements on the historical wood beam ceiling
Image: PORR AG

Form work of the ceiling replacements on the historical wood beam ceiling
Image: PORR AG

Roof finishing
The removal of the existing roof structure allowed for the construction of two new storeys. While the 5th storey hides behind the former palais' cornice and while an existing access balcony for lighting purposes provides a little exterior area for the residents of this storey's hotel rooms, the attic storey was encased with an expanded metal covering which once again picks up the historical roof pitch and thus perfectly blends in with the surrounding, historically grown cityscape.

The former Wehli-Palais' new attic storeys
Image: Porr AG

Interior finishing and house technology work
Interior finishing and house technology work was started at the same time as structural work. The intermediate walls once installed to separate the office, cinema and restaurant premises were demolished and the roomy areas resulting from this were integrated into the building's new use as a hotel using drywall. Once the painting work and final interior equipment installation work had been completed, a design hotel embodying typically Viennese charms could open its doors just in time for the Viennese ring road's 150-year anniversary.



Completed hotel
Image: PORR AG

Completed hotel
Image: PORR AG

Completed hotel
Image: PORR AG

The newly constructed bar of Motel One
Image: PORR AG

Metro Doha – Green Line

Status update

Manfred Lamping

Contract award

In June 2013, the joint venture PORR-SBG-HBK consisting of Porr Bau GmbH, Saudi Bin Laden Group Riyad and HBK Contracting Company W.L.L. was commissioned with the construction of Green Line M32.

The contract was awarded by Qatar Rail. The order volume amounts to 8.989 billion QAR (approx. 1.858 billion Euros as per June 2013).

Doha's Metro is an integral part of Qatar's raildevelopment programme. Consisting of four lines, the underground network will cover Doha's metropolitan area and establish connections to the city's central area as well as to various commercial and residential zones located in the city. In Doha's centre, the Metro will run under ground, while it will mostly run at street level or on elevated tracks in the suburban zones.

Especially for the football world cup in 2022, the Metro will establish connections to the individual stadiums.

Project overview

The Green Line order includes the construction of some 2 x 16.5 km of tunnel, six stations and one external switch hall.

Furthermore, four emergency exit shafts up to 40 m deep, 32 cross-cuts and two additional combined emergency exit/MEP shafts are being installed. When it comes to size, the latter are more like stations than shafts.

Construction time for the tunnels is 42 months and 61 months will pass until the stations are handed over.

Some 500 employees and 3,000 workers are currently working at the construction site.

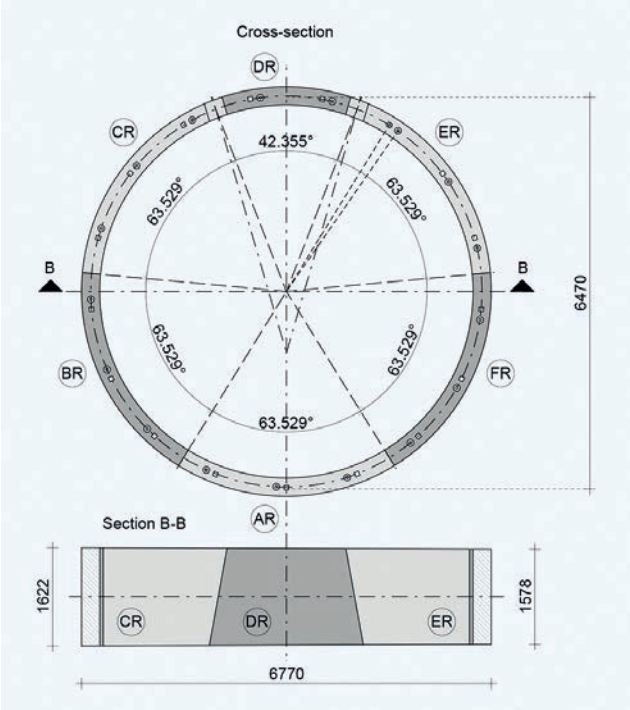
Network Phase 01 2015
Image: QATAR RAIL 2015

Execution of construction work

Six tunnel boring machines are operated simultaneously in the course of this project. The TBMs were installed in the 2nd half of 2014 and started up one after the other until January 2015. Four TMBs started at Al Messila station, two machines eastwards in the direction of the city centre to Musheireb station while the other two started boring westwards towards Education City. Both Musheireb and Education City were being built by third parties. This means that close collaborations are required and time frames need to be met precisely.

From Al Bidda to Musheireb, the Green Line will run parallel to the Red Line at a small distance. Musheireb station will serve as the central interchange station between Green Line, Red Line and Golden Line.

Two more machines started in the direction of Education City from the Trough.



Segment ring
Image: PORR AG

On their way from Al Messila to Education City, machines 1 and 2 will cover 6,124 m and pass three stations.

Working their way from Al Messila to Musheireb, machines 3 and 4 will cover 4,068 m and pass one switch box and three stations – among others, Al Bidda station built by Red Line.

Only machines 5 and 6 running from the Trough to Education City and covering 6,279 m will pass no station. Instead, these two machines will cross two emergency exit/MEP shafts.

All machines are supplied from a central segment production plant which is located on the MLPA some 20 km outside of Doha. Approx. 72 segment rings are installed every day in parallel operation. In total, some 21,000 rings with 5+1 segments each are manufactured.

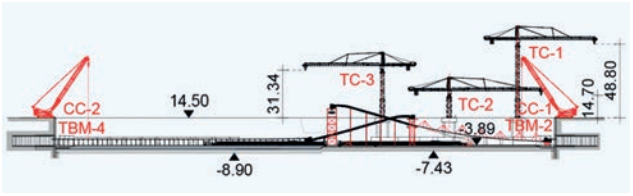
Work at the segment production plant is carried out in continuous mode in order to secure heading supply.

So called multi service vehicles are used to transport the segments to the TBM in the tunnel. These MSVs run on wheels and can transport one complete ring each to the TBM.

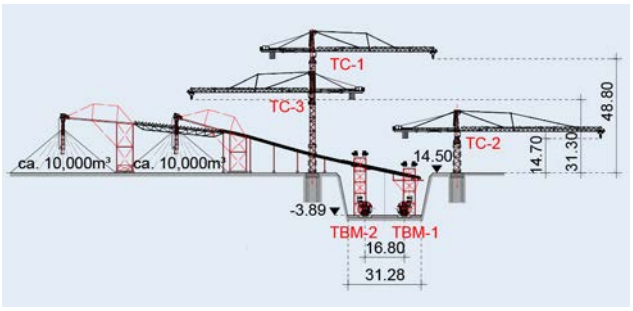
In turn, some 4,500 m³ of excavated material must be removed from Al Messila and Trough every day. The excavated material is transported to the MLPA and finally deposited there.

These transports involve complex logistics which is taken care of by a designated project department.

Work on the stations is executed at the same time as heading work. Therefore, work on the stations must be conceptualised in a way that allows the TBMs to push through while the stations remain fully operational. Al Messila station assumes a particularly important role in this process. Al Messila features a station and a switch hall and simultaneously serves as the logistics centre for the supply of four TBMs and the removal of the material excavated by them. The conveyor belt system required for the latter alone is extraordinarily large.



Plan longitudinal section Al Messila
Image: PORR AG



Plan cross section Al Messila
Image: PORR AG

Al Messila station conveyor belt system (during erection)
Image: PORR AG

Al Messila station conveyor belt system (during erection)
Image: PORR AG

Al Messila station conveyor belt system (during erection)
Image: PORR AG

Occupational safety

A separate department is responsible for monitoring work safety. The HSE (Health and Safety Executive) team alone currently consists of 40 work safety engineers who permanently plan and monitor the safety of the work steps and conduct briefings on a daily basis. Among others, this measure has made it possible to record a maximum of six million work hours without a single notifiable (absence from work of more than 24 hours) accident. This is an result to be proud of and one that should be extended further. Great importance is also attached to the quality of the worker housing and working conditions at the construction site. The contract documents already stipulated high standards in this regard which are strictly adhered to by the consortium and our sub-contractors.

Outlook

From December 2015 to April 2016, the TBMs will reach their target points, one after the other. After that, the stations can be completed and the rest of the work in the tunnels can be carried out.

Albula Tunnel II

PORR takes lead on Swiss tunnel project

Vienna, 23. February 2015 – A new tunnel in the Swiss Canton of Graubünden, to be built in the next four years, should secure a long-term, winter-proof route between Upper Engadine and the Chur/Landquart region. Rhätische Bahn AG has awarded the tender to build the Albula Tunnel II to a consortium of PORR SUISSE (lead and technical management), Walo Bertschinger AG (commercial management) and Società Italiana per Condotte d'acqua S.p.A. (technical co-management).

The tender value of this technically demanding project is around CHF 125 million. Construction started in April 2015, after which tunnelling should be completed by December 2017, with completion of the entire project projected for August 2019. The total length of the tunnel is 5,860 m.

The current Albula Tunnel I is over 100 years old and overhauling it would be too costly in light of the ongoing rail service. This is why Rhätische Bahn AG opted for a new construction. There will be twelve cross-connections between the two tunnels. Albula Tunnel I will then be converted into a safety tunnel.

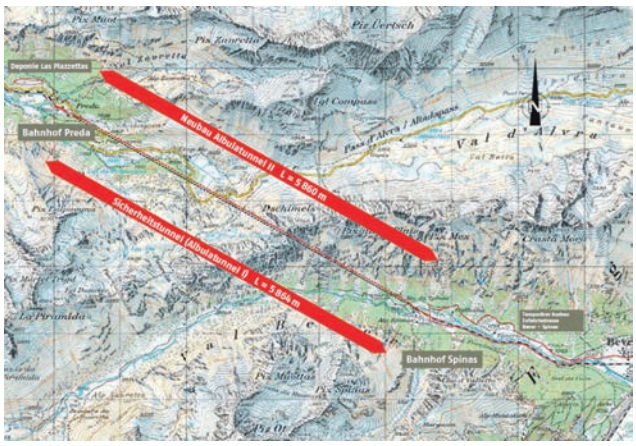


Image: Rhätische Bahn AG

"Albula Tunnel II will be built at 1,800 m above sea level and is technically demanding because of the geology of the area. We are delighted that the Rhaetian Railway has decided to rely on the comprehensive expertise of PORR SUISSE and its consortium partners", said Karl-Heinz Strauss, CEO of PORR AG. "This tender shows that PORR's group-wide knowhow in tunnelling and rail construction is also acknowledged in Switzerland. Albula Tunnel II opens up a third key business division for PORR SUISSE, alongside building construction and civil engineering on our home market of Switzerland", concluded Strauss.

Romania – PORR erects a waste sorting plant and a mechanical-biological waste treatment plant with adjacent landfill

The project, situated in the center of Romania, about 15 km north of the city of Alba Iulia, was signed on 21st January 2015 by the representatives of the Client and the representatives of the Joint-Venture PORR Construct SRL – Porr Bau GmbH – Entsorga Italia SpA.

The construction project includes the design and build of a waste sorting plant with a capacity of 42,000 t per year, a mechanical-biological waste treatment plant with an annual capacity of 85,000 t, as well as the construction of a new landfill with a volume of approximately 550,000 m³.

The construction design activity begins in February 2015 and the completion of the works is planned for April 2016.

The project is financed from the European Regional Development Fund and by the Romanian state.

PORR Germany builds railway overbridge in Magdeburg

At the beginning of the year PORR Germany was commissioned to build the new railway overbridge Ernst-Reuter-Allee in Magdeburg. DB Projektbau GmbH, DB Netze AG, the provincial capital of Magdeburg, MVB Magdeburger Verkehrsbetriebe GmbH & Co.KG, SWM Städtische Werke Magdeburg GmbH and AGM Abwassergesellschaft Magdeburg GmbH are the clients. Construction will start in spring 2015 and completion is scheduled for August 2019. The order volume amounts to some EUR 57.9 million.

Located directly in front of Magdeburg main station, the project will turn the area into a new "central hub" of the city. A total of five overpass structures are supposed to decongest car traffic, the tramway route and the flows of pedestrians, thus eliminating the existing bottleneck. Among others, keeping tramway and individual traffic running during most of the construction period will pose a great challenge. Due to its level of complexity, this project demands extensive expertise in the areas of civil engineering, infrastructure and specialist civil engineering.

"In the last few years, PORR Germany has made itself a name as a specialist for infrastructure projects. The confidence put in us by DB Projektbau and the City of Magdeburg proves once again that we are on the right path with our infrastructural know-how – also in Germany. A project such as this one which will significantly shape the city of Magdeburg for years to come represents a highly exciting task – not least for our construction management and our execution excellence", Karl-Heinz Strauss, CEO of PORR AG happily comments on the new order and adds: "And I know that PORR Germany's team is optimally positioned for this project."

PORR Polska – Ceremonious opening of Ogrdody Elblag Shopping Centre

After some 25 months of construction, PORR (POLSKA) S.A., a subsidiary of PORR AG in its function as general contractor has completed the expansion and modernisation of the "Ogrody Elbląg“ ("Elbląg Gardens“) shopping centre in Northern Poland according to schedule and to the client CBRE Global Investors Poland's full satisfaction. Late March saw the official opening. The total construction volume amounts to EUR 40 million.

Visualisation "Ogrody Elblag"
Image: CBRE Global Investors

The original shopping centre was built in 2002 in Elbląg. Today, after the completed modernisation and extension, Ogrody is the largest and most modern shopping centre in the region, featuring some 40,000 m² of floor space. Two storeys house a shopping arcade with more than 130 shops and a large supermarket. The entertainment offerings for visitors were updated, too – among others, with a new cinema complex. The open parking area was replaced by a 3-storey car park with some 1,000 parking spaces.

In the course of the opening celebrations, Martin Sabelko, Managing Director CEE with the client CBRE Global Investors, thanked PORR (POLSKA) S.A. for the professional execution as well as successful collaborations during the structure's realisation phase. "We have deliberately chosen a partner with experience in the execution of such large structures. Upon awarding the contract, PORR guaranteed highest levels of quality and adherence to schedules – and they have kept their promises. We are very satisfied with the result."

Among others, PORR (POLSKA) S.A. has built Galeria Słoneczna ("Sun gallery") in Radom, carried out the ex-pansion of the Magnolia Park business centre in Wrocław, built the group headquarters "Agora" as well as the Hotel InterContinental in Warsaw and executed the project Stary Browar (Old Brewery) in Poznań.

"I congratulate all colleagues from PORR (POLSKA) on this thrilling project", Karl-Heinz Strauss, CEO of PORR AG stressed. "It shows once again that a good track record is the best prerequisite for new and attractive construction projects. An internationally successful investor such as CBRE Global Investors only works with the best. The fact that they have chosen PORR proves we are on the right path."

PORR SUISSE is awarded GC-contract for project Feinspinnerei in Windisch

With the order for the construction of the "Feinspinnerei" in Windisch, PORR SUISSE AG not only managed to further strengthen its position along the axis Zurich – Bern but also to win another leading project developer as a client. The project in the Kunz area in Windisch is one of numerous projects executed by HIAG Immobilien Schweiz AG, a company specialising in the re-use of existing works structures.

HIAG itself was originally developed out of a successful timber industry company and realised some special projects regarding the construction of lofts in old factories in recent years. The residential space thus created helps revitalise derelict areas and condensing residential space "inwards". Living in lofts is still very trendy.

Planned on the basis of the Swiss Minergie Standards, the project convinces with many unique features: Extra-high rooms, one-of-a-kind ground plans and finishing standards that surprise with many comfortable details. Additionally, all flats are equipped with generous outside space promising tranquillity, relaxation and glorious sunshine. No matter if it's families, singles or couples: The project „Feinspinnerei“ is supposed to meet all requirements and surprises with its diversity.

Thanks to its special shape, „Feinspinnerei“ gently follows the bend described by the Reuss Canal and consists of a compact body with 29 flats all positioned towards the water. The project comprises 4,618 m² of floor area and amounts to CHF 10.2 million.

Construction will start in October 2015 and take some 20 months.

PORR Polska: Topping-Out Ceremony at the FERIO WAWER Shopping Centre in Warsaw

Image: RE project development Sp. z o.o

The 13th of June 2015 saw the topping-out ceremony of project Ferio Wawer in Warsaw. A listed factory that dates back to 1900 is being rehabilitated and converted into the first shopping centre in the Wawer district. The halls that had not been used since the 1990s were becoming more and more derelict.

Prior to the First World War, the factory had produced beds for the army and hospitals – mostly for export to Russia. In the years between the two great wars, it produced cauldrons, among other things. What was then Poland's largest manufacturer of such items used the factory for the production of electrical appliances in 1938. The company was socialised after the Second World War. In the 90s, the company was eventually sold to ABB who shut the factory down.
Its new owner RE Project Development decided to convert it into a trade and business centre. The project was developed by the renowned Warsaw-based architectural office Kuryłowicz & Associates.

"The halls have a special place in our hearts. All changes we are about to make will be coordinated with the Department for the Protection of Historical Monuments“, Mariusz Skrzyński, Director of PORR in Warsaw pointed out. "We preserved the hall's walls and its steel construction but we had to reinforce the latter. On the roofs, we added girders and, further below, a reinforced concrete ring. The support walls were reinforced, too. The specialised company Renox executed the conservation of the brickwork“, he continued.

Between the existing halls, a second shopping centre is built and connected. In addition, a new building with a basement and three upper floors was erected. In its entirety, the facility will provide 12,300 m² of lettable area. The listed halls and the new building will house shops, restaurants and service companies as well as a car park for some 170 cars.

Shoppers will be able to purchase their first items at Ferio Wawer as early as this November.

Image: PORR AG

Image: PORR AG

Image: ©RE project development Sp. z o.o

PORR Bahnbau is awarded contract at freigh train bypass St. Pölten

The railway construction department further extends the Slab Track Austria System. Under its leadership, a total of 7,394.80 m of railway section will be in installed using the "system ÖBB-PORR elastically supported slab".

By order of ÖBB (The Austrian Federal Railways), construction work on the slab tracks in Pummersdorf Tunnel, contract section GUM 6.2 gap closing St. Pölten – Loosdorf started on 2 March 2015.

Currently, the western railway section Vienna – St. Pölten runs through the municipal area of St. Pölten. In the future, the freight train bypass through Pummersdorf Tunnel will allow the redirection of heavy traffic and relieve St. Pölten's main station from through and freight traffic.

As a part of ÖBB's order amounting to EUR 9.8 million, the following roadbed and track work is being performed:

- Slab track construction with trafficable cover plates
- Mass-spring system
- Installation of an extinguishing water line

The tracks in Pummersdorf Tunnel are being executed as dual-track slab tracks with 3,697.40 m per track.

System ÖBB-PORR in Wienerwald Tunnel, constructed in 2010/2011. Trains on this part of the western railway section reach speeds of up to 250 km/h.
Image: PORR AG

Gap closing St. Pölten – Loosdorf
Image: ÖBB

Slab Track Austria, also known as Feste Fahrbahn (FF), system ÖBB-PORR elastically supported slab is the primary track system used by the Austrian Federal Railways since 1995.

So far, PORR has installed slab track in the course of the following projects on the Vienna – St. Pölten section:

Lainz Tunnel 2010	18,075 m
Wienerwald Tunnel 2010/2011	26,406 m
Tullnerfeld, contract section 10.3 2010/2011	12,285 m
Perschlingtal, contract section 7 2009/2010	12,285 m
Wagram Interchange 2003	2,870 m

Learn more about Slab Track Austria at:
www.slabtrackaustria.com

Start of construction on Austria's largest fish migrating aid

Porr Bau Gmbh, Upper Austria branch, was awarded the contract for the construction of the 14.2 km fish migrating aid on the right shore of the Danube River between Ottensheim-Wilhering and Brandstatt/Pupping by Verbund Austrian Hydro GmbH.

Clearing work had already started in February and the ceremonious ground-breaking ceremony was celebrated on 10 April 2015. The completion of the fish migrating aid is scheduled for autumn 2016 and will allow the domestic fish to circumnavigate the Danube power plant of Ottensheim/Wilhering.

With the construction, some 30 – 40 hectare of natural water course habitat will be upgraded and/or newly created and the passability for fish and other aquatic creatures will be restored.

The goal of construction is establishing passability on this Danube section as well as the creation of special structural measures at the beginning of the backwater in the shape of gravel banks, islands and branches.

Schematic plan showing the fish migrating aid
Image: VERBUND

At the ground-breaking ceremony (from left to right): Project Leader David Oberlerchner (VERBUND), Otto Höller (Via Donau), Mayor Gabriel Schuman (Alkoven), Mayor Mario Mühlböck (Wilhering), Karl Heinz Gruber (VERBUND), Deputy Governor Franz Hiesl, State Parliamentarian Ulrike Schwarz, Mayor Ulrike Böker (Ottensheim), Michael Amerer (VERBUND), Josef Schwarz (PORR)
Image: VERBUND

PORR – Foundation specialist for corporate headquarters

After PORR Grundbau had executed the foundations for the corporate headquarters of both ÖBB and Erste Bank at Vienna's Main Station plot in the past two years, it managed to land two additional, high-prestige contracts in the area of specialist civil engineering at the beginning of the year.

SIGNA Holding awarded PORR's foundation engineering department the contract for the complete establishment of the construction pits and the foundations of the future Austria Campus, the new corporate headquarters of Bank Austria at the area of the former Vienna North Station.

Apart from extensive slurry wall and sheet-pile wall sealing work on the five construction pits, PORR's special proposal which was eventually ordered includes elaborate anchoring, dewatering and geothermal work.

Thanks to the technical know-how obtained through the planning and execution of all these construction schemes, PORR furthermore received an order for a deep, cut-and-cover temporary building pit supporting system for the new corporate headquarters of Austrian POST AG at Vienna's Rochus Market.

The two construction schemes represent an order value of some EUR 12 million.

Future Austria Campus
Image: SIGNA

Future Austria Campus
Image: SIGNA

Area of former Vienna North Station
Image: PORR AG

Demolition of Grünhübl bridge

An innovative demolition concept for the arched bridge (cable pull method)

In early February 2015, Grünhübl bridge's arch with a height of 55 m in Judenburg was brought down according to the removal concept agreed upon with ASFINAG by means of the cable pull method in a controlled and planned fashion. Due to environmental considerations and the statutory provisions that were to be adhered to as well as due to economical considerations, no blasting means whatsoever were used. With its environmentally friendly demolition concept, PORR Umwelttechnik could clearly outperform its competition in the tender process. The demolition concept primarily scored points with its utilisation of a combination of cable pull and statically calculated, targeted cuts into the concrete which made the reinforced concrete arch collapse with utmost precision and according to plan onto the Mur River's shore area and the cushioning ballast that had been placed there.

Image: PORR AG

During this project's execution, PORR Umwelttechnik's project team could excel with its richness of ideas and dedication, its professional project management as well as with unique and efficient concepts. Thus, it strengthened PORR's position as the industry leader in the area of special demolition projects in Austria.

Image: PORR AG

Ground-Breaking ceremony for the new IMP institute building

On 13 March 2015, the Vienna Biocenter location (city development area Neu Marx in Vienna's 3rd district) saw the ground-breaking ceremony for the future building of the Research Institute of Molecular Pathology (IMP). Thus, the new construction funded by Boehringer Ingelheim enters its realisation phase.

Despite the cold weather, Michel Pairet, Senior Corporate Vice President of Research and Non-Clinical Development (Boehringer Ingelheim), Philipp von Lattorff, Director-General of Boehringer Ingelheim Regional Center Vienna, Renate Brauner, Deputy Mayor of the City of Vienna, Horst Reiner, Managing Director of the Viennese office (ATP Architekten Ingenieure) as well as Hans Wenkenbach, COO of PORR, performed the ground breaking ceremony together with Harald Isemann, Financial Officer of the IMP and Jan-Michael Peters, Scientific Director of the IMP.

From left to right: Michel Pairet, Jan-Michael Peters, Hans Wenkenbach, Horst Reiner, Renate Brauner, Philipp von Lattorff, Harald Isemann
Image: IMP/pov

The new construction to be built by Porr Bau GmbH, Building Construction branch Vienna / Neubau district as well as Ortner serving as the company responsible for house technology worth some EUR 29 million will feature approx. 15,000 m² of gross floor area and offer space for some 250 researchers. Apart from flexible laboratories featuring top-level equipment and highest technical standards, the IMP's new building will feature a large lecture hall and a cafeteria and harmoniously blend into the existing ensemble of the Vienna Biocenter. Construction work is scheduled for completion in October 2016 and the first users are supposed to move into the new building in late 2016.

PORR constructs highest noise barriers in Austria to date

Scholz Rohstoffhandel processes junk and scrap metal in the Tankhafen area in Linz's industrial region.

The noise the handling of the material causes repeatedly resulted in complaints from the residents living on the opposite side of the Danube. Authorities demanded the improvement of the existing noise protection system to solve this problem.

The existing, 5-m-high noise barriers were removed and the parts were stored for subsequent re-use.

As a filling, the pre-manufactured concrete parts were then once again installed in the newly erected superstructure consisting of DN 800 steel tubes and HEA450 steel girders and heightened to a total height of 13 m using highly absorbent aluminium noise protection elements. The overall length of the barriers along the existing industrial railway tracks is 66 m.

The removal of the existing wall started on 2 February 2015. The new noise barriers including foundations were completed in just three and a half weeks.

Image: PORR AG

Image: PORR AG

PORR a.s. – Topping-out ceremony for MARINA ISLAND IIA

On Thursday, 16. April 2015, in Prague, the tapping of the cornerstone in the new luxurious residential project MARINA ISLAND took place.

This project follows the intention of the investor to improve still predominantly industrial and port character of the city part Prag – Holešovice. PORR a.s. is the proud general contractor, the developers are Lighthouse Group, with which PORR has realised a lot of interesting and challenging constructions already, and Daramis Group.

The project with the total number 341 of flats includes five blocks of flats. Two blocks have twelve floors, three blocks have nine floors. The project includes three different standards. Townhouses on the ground floor, penthouses on the top floors and in the rest of the floors there are houses with the comfort standard. The superior flats include their own closed garage spaces and pools on the terraces. The whole project is protected against flood up to the millennial water and builds upon the flood levees of the City of Prag.

The realisation of the whole project worth 858 million is divided into two phases. The first phase worth 385 million includes two blocks of flats, the appropriate part of the basements und the majority of the infrastructure. The implementation of the first phase has been started in November 2014 and will be finished in February 2017. The second phase worth 473 million will finish the rest of the project, its beginning we suppose in April 2015 and end in January 2018.

Image: Marina Island a.s.

Image: Marina Island a.s.

PORR Construct S.R.L. signs Design & Build Contract of the first project phase of project Metroffice in Bucarest

The project “Metroffice” – is located in the North area of Bucharest and one of the biggest and most important Construction Projects in the city. The project is the beginning of a long-term transformation of the existing Iride Business Park into a modern urban district called “Iride City”.

The scope of the project is creating a sustainable building complex providing office space and generating different adjacent services. The main objective is to create space with maximum flexibility, in order to satisfy any need for prospective tenants. Another objective required by the design brief is to create buildings being environmentally sustainable and energy-efficient in order to reach the goal to be LEED-Silver certified.

The first stage of the project is the office building A, having the shape of two Z’s with maximum dimensions of 58.20 m x 42.00 m. The height regime of Stage I is 2B+GF+M+4F. The basement area is approximately 12,900 m² and the superstructure is 21,300 m².

The contract is “Design & Build” and major activities are: pit support system, earthworks, reinforced concrete structure, facade, interior finishing works, all mechanical and electrical installations and exterior works.

Construction work started in September 2014 and completion is scheduled for Mid-2016.

Image: Immofinaz Group

PORR Deutschland constructs NOVE office building

On the last vacant lot in Munich's Arnulfpark, the project company Horus Development GmbH, consisting of Art-Invest Real Estate in joint venture with SALVIS Consulting will erect the NOVE office building.

After almost a year of negotiations, Porr Deutschland GmbH, Building Construction branch Munich, has managed to be awarded the contract as a general contractor in form of an alternative contract type with GMP on 11 February 2015. Both the branch's expertise proven in previous projects involving GMP contract types as well as the presentation of almost 40 special proposals led to their success.

With regard to this project, Porr Deutschland GmbH performs the entire general contractor services including planning of performance phase 5 (execution planning).

PORR Design & Engineering in Vienna takes care of most of the calculation, tender and planning services when it comes to MEP.

Image: PORR AG

The façade was the only part outsourced to a third tenderer.

PORR leads overall construction with involvement of the on-site façade partner in the form of a roof-consortium.

The new building is supposed to assume a unique position in Munich's office real estate market. In order to meet this demand, the architecture office Antonio Citterio Patricia Viel & Partners from Milan was commissioned with project planning, the planning of the interior as well as lighting planning after winning a competition between seven invited participants.

Some 27,500 m² of overground and some 18,500 m² of underground floor area will be built on the 7,300 m² building grounds at Luise-Ullrich-Straße and Lilli-Palmer-Straße. The floor area is distributed over six regular storeys, a 23-m-high atrium and a high-rise structure with nine storeys at Luise-Ullrich-Straße as well as a three-storey underground car park with some 430 parking spaces.

The overall height of the high-rise building up to the 8th storey is approx. 34.60 m; the flat building will measure some 27 m up to the 5th storey together with the stacked storey. As a rule, the centre-to-centre grid is 1.35 m.

The ground floor's public area consists of the mentioned atrium with a height of some 23 m, a restaurant and two inner courtyards that will be available to both tenants and visitors. The majority of the building will be comprised of office space meeting high standards in terms of both technical equipment and surface quality. Heating and cooling ceilings provide warmth and cooling and, being louvre strip waffle slab ceilings, highest levels of flexibility at a clear height of some 2.90 m.

Image: PORR AG

Apart from the parking spaces, the utility rooms and storage areas are located on the lower floors.

In terms of city development, NOVE is modelled after an Italian Palazzo. In the centre, two inner courtyards invite tenants and their guests to take a break in a sheltered open-air area. Four equivalent entrances allow for "house inside a house" solutions. Thus, the new construction caters to both major tenants requiring several 1,000 m² of office space as well as to smaller users. In total, the ensemble provides space for more than 1,300 jobs.

NOVE has been designed as a "Green Building". LEED Gold certification is intended. This required state-of-the-art, sustainable building methods. Naturally, the new

construction also meets the requirements towards energy-efficient building operation. It is located in close proximity of the Donnersperger-Brücke high-speed railway station in Arnulfpark. The main station is within walking distance and an access to Mittlerer Ring ring road is located at the next junction. The airport is a 45 minutes' drive away.

In total, some 247,000 m² of gross floor area have been constructed on Arnulfpark's 185,000 m² gross building land in recent years. Out of these, 172,000 m² are business space, 68,000 m² residential space and 5,000 m² were allocated to cultural institutions. NOVE will represent the conclusion of this district's development.

PORR Polska wins two new tenders

Totalling around EUR 37 million

Vienna, 02 April 2015 – PORR Polska's building construction expertise has been proven twice over: following a further award process, the interrupted works on Renaissance Hotel at Chopin Airport in Warsaw were awarded to PORR Polska. At the same time PORR Polska was given the general contractor tender for building a residential and business complex with the necessary site development in Wrocław.

"These two tenders underline the strong reputation which PORR enjoys on its home market of Poland. The quality of our work, our precision in project management and calculation paired with the trustworthiness of our PORR Polska team is universally acclaimed", Karl-Heinz Strauss, CEO of PORR AG, on the success of the Polish team.

PORR to realise 16th hotel project in Poland

PORR Polska is building its 16th hotel at Chopin Airport in Warsaw. The 5* Renaissance Hotel will be the first in the CEE to be managed under this brand. Spanning eight floors, there will be a total of 225 rooms for up to 400 guests, multiple conferencing facilities, a spa, pool and fitness centre, and a restaurant. There will also be a three-storey underground garage. The tender volume is around EUR 26.7 million. Construction started in April and should be completed in 15 months.

Tumskie Ogrody: a residential and business complex for Wrocław

In Wrocław, Poland's fourth largest city, PORR Polska is constructing a sophisticated mixed-use property for Investor mLocum S.A. – the second phase of Tumskie Ogrody. 199 apartments and eight business premises will be built on almost 20,000 m² usable space. A two-storey garage will offer over 150 parking spaces. Construction is set to start in mid March and completion is planned for November 2016. The tender volume is around EUR 10 million.

PORR lands infrastructure project in Slovakia

Total construction volume: EUR 19.75 million

Vienna, 15 April 2015: In early April, the federal Slovakian Motorway Administration NDS awarded the best tenderer PORR with the construction of the Triblavina junction on the D1 motorway. Work will start in May 2015. The scheduled construction period is 24 months. The total construction volume amounts to EUR 19.75 million.

"The Slovakian one is an important project market for PORR. For more than five years, our Slovakian subsidiary Porr s.r.o. has been successfully implementing major infrastructure projects – alas, until now, only with local partners. The erection of the Triblavina motorway junction is the first one, for which we were commissioned as the sole contractor by a public client in Slovakia", Karl-Heinz Strauss, CEO of PORR AG happily exclaims. "For us, this is a great mark of confidence in our extensive know-how and a big chance to further strengthen our position on the Slovakian infrastructure market."

The new motorway junction will be built in Senec country, some 20 km north-east of Bratislava. The project includes the new construction of the "Triblavina crossroads" as well as the construction of additional lanes on the existing D1 motorway along the section Bratislava – Senec. For this purpose, an underpass will cross below the motorway and traffic will be directed onto the lanes that are to be newly constructed. Apart from that, two large roundabouts and two roads connecting to the junction including minor bridges and noise barriers will be constructed.

PORR Germany rehabilitates the Villa Calé in Berlin-Zehlendorf

The Embassy of Qatar will open its future guest house in the German-Qatari year of culture 2017

Berlin, 14 April 2015 – The Qatari embassy in Germany has awarded PORR Deutschland GmbH the official order to rehabilitate the listed Villa Calé in Berlin-Zehlendorf. The Villa that was built for the publisher Franz Calé between 1904 and 1907 is being restored according to the specifications of listed buildings. The diplomatic representation of Qatar plans to welcome its guests there from 2017, the German-Qatari year of culture. It is also intended to be opened for Berlin residents to visit.

The Embassy of Qatar had purchased the Villa Calé at Schützallee and Riemeisterstraße in Zehlendorf in 1997. At first, the neo-classicist building was supposed to be used as the embassy's seat. However, the embassy itself is located in a building newly constructed in traditional Qatari style in Hagenstraße at Berlin-Grunewald since 2004. The villa once designed by the architectural office Bastian & Kabelitz is now supposed to be turned into a guest house. The signing of the contract marked the start of the long-anticipated project for the rehabilitation of the cultural monument. In the course of the rehabilitation efforts, the façade is to be restored to its original state, the room arrangement is to be left mostly unchanged and converted to meet its new type of use.

His Highness Abdulrahman bin Mohammed Al-Khulaifi, the Qatari ambassador in Germany expressed: "The nation of Qatar is highly interested in the German culture and we will use the German-Qatari year of culture 2017 as an opportunity to restore the villa in style and open it to our guests but also to the residents of Berlin. We are happy to live up to our promise and return a piece of cultural heritage to the citizens of Berlin."

Image: PORR AG

Udo Sauter, Managing Director of Porr Deutschland GmbH on the signing of the contract: "It is a rare and very special task to restore one of the most beautiful villas in Berlin to its former glory. We gladly accept the challenge to carefully rehabilitate the Villa Calé in close collaboration with the State Conservation Agency in order to preserve this magnificent building for future generations."

As previously announced, the preparatory construction measures will start as early as spring 2015 in close collaboration with the State Conservation Agency. Once the building permission has been granted, construction should commence in the fourth quarter of 2015. Completion is scheduled for late 2016.

The plan is to design the premises encompassing 1,200 m² of gross floor area for representative events and conferences and there will be personal guest rooms and rooms for the house staff. The ground floor is intended as a semi-public space and invites Berlin residents to visit.

On-Schedule Completion of the Residential Care Home Rudolfsheim Fünfhaus

On 10 June 2015, exactly two years after the start of construction had been officially announced, Porr Bau GmbH (new building construction department 2 and building construction department) handed the Residential Care Home Rudolfsheim Fünfhaus over to the client Gemeinnützige Siedlungs und Bau AG (GESIBA) and, subsequently, to the future operator, the Vienna Association of Hospitals (Wiener Krankenanstaltenverbund) fully completed and in a turn-key condition.

On the property of the former Empress Elisabeth Hospital (Kaiserin Elisabethspital) in Vienna's 15th district, a new home for 328 elderly people in need of care was built on an almost square ground plan nearly encompassing one hectare.

One of 12 ward control stations
Image: PORR AG

The residential care home is divided into 12 wards with a total of 284 rooms, a little local area as well as public kindergarten designed for five groups of children.

The cube circumscribing this residential care home is comprised of a basement storey, a ground floor and three upper floors. Apart from two little roof terraces, four generous inner courtyards which received a pretty decoration by the landscape architects, provide a quiet play, relaxation and therapy area separated from road noise.

Prater courtyard (dedicated to the kindergarten)
Image: PORR AG

Wachau courtyard (with separated therapy areas)
Image: PORR AG

The core of the concept are the large community areas grouped around the courtyards. Among other things, these access areas can be used as places to eat, quiet and retreat areas, play zones, walking courses etc. Walks can be shaped as loops restricted to one ward or incorporating several wards and offer multi-faceted views of the garden courtyards and the city scape.

One of 12 ward control stations
Image: PORR AG

Access / evacuation zone
Image: PORR AG

Apart from the technical equipment and the requirements with regard to hygiene, the short construction time emerged as this project's greatest challenge.

After structural work had been completed after some nine months of construction time, just nine months were left for finishes. In the project's core time, approx. EUR 4 million worth of material were installed every month by some 350 workers in a six-day week in order to meet the near-impossible construction deadline with the selection of strong partners.

32,000 m² of gross floor area were to be completed in just 19 months of construction to allow for multiple inspection bodies to start with the technical certification of the facilities relevant to safety and hygiene. Once this phase had been completed, the contractually stipulated trial operation could begin in late February and was successfully completed by the end of April.

Only then were the operator's requirements deemed fulfilled and the application for the hearing by Vienna's magistrate department 40 for the granting of the operating approval could be submitted.

After the authority hearing had been passed successfully on 2 June 2015, nothing stood in the way of the formal hand-over of the building on 3 June 2015, effective 10 June 2015.

Formal hand-over on 3 June 2015
Image: Markus Heinrich (GESIBA)

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