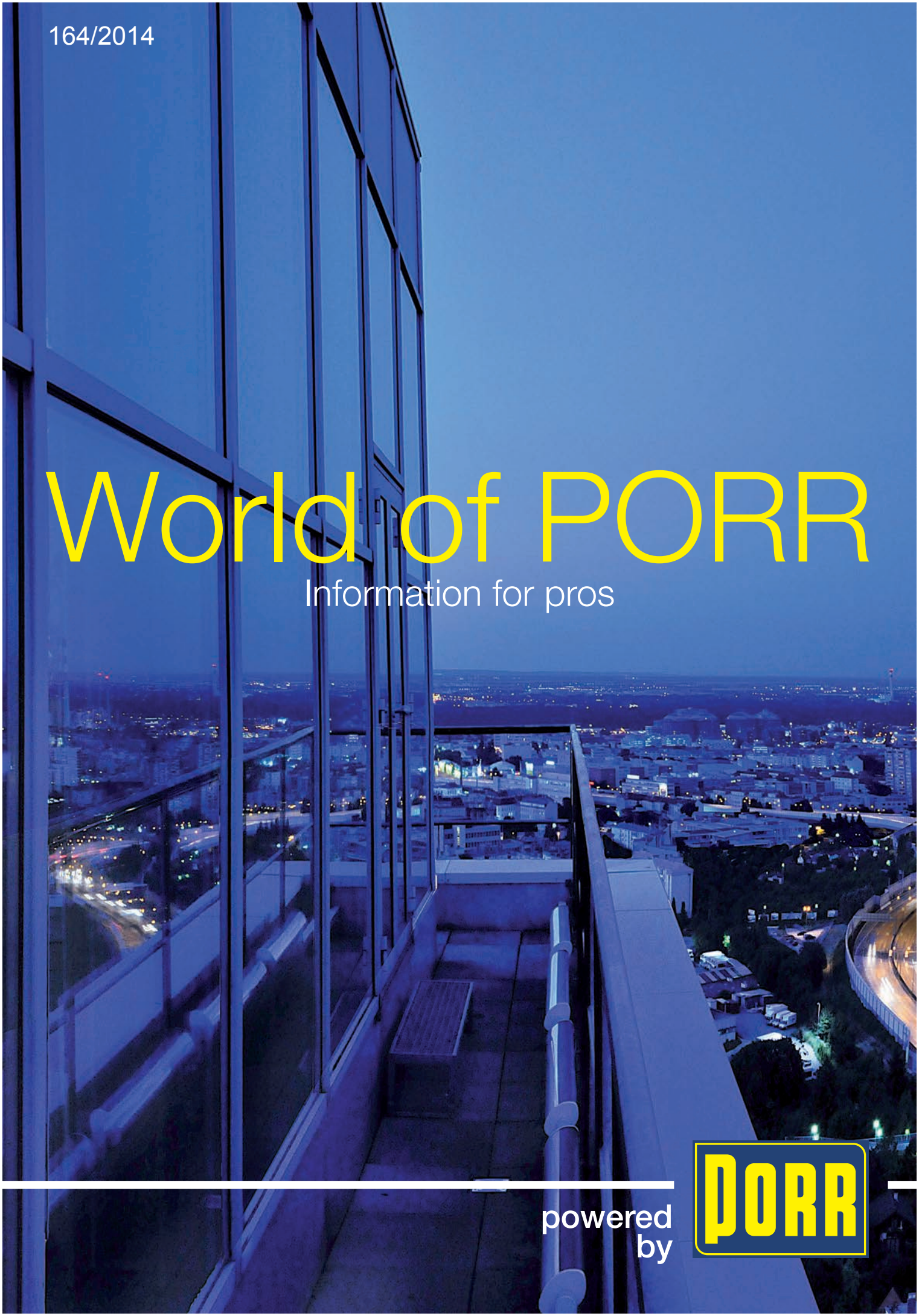
164/2014

World of PORR

Information for pros



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CEO Karl-Heinz Strauss

CEO Karl-Heinz Strauss
Image: PORR

Dear Readers,
esteemed Business Partners!

PORR was able to present an extremely pleasing annual result in 2013. The Group boosted its production output by 19 % to EUR 3,439m, while pre-tax profits soared to EUR 60.5m, an almost threefold improvement. Our core excellence in infrastructure played a prominent part in this impressive growth, besides strong development on our domestic markets (Austria, Germany, Switzerland, Poland and the Czech Republic).

PORR's strategic decision to concentrate on the stable and attractive domestic markets with their outstanding planning security and unbeatable creditworthiness, while purposefully and selectively expanding into international markets in the infrastructure sector, assumed a pivotal role in this excellent development. Orders on hand rose to a new historic peak of EUR 4,591m.

Readers of our specialist journal World of PORR are familiar with many of the projects contained in our order books. Besides presenting finished projects, we have a tradition of providing exciting insights into our ongoing construction ventures, while our brief updates keep interested readers up to date with ongoing building progress. In this edition, we have selected two structural engineering projects of particular importance for PORR that are currently undergoing completion, the Styria Media Center in Graz and construction site 5 at EURO PLAZA in Vienna. The Styria Media Center will add a further architectural landmark to the Styrian state capital. Now in its 10th phase of expansion, the EURO PLAZA in Vienna continues to write the unparalleled success story of this state-of-the-art office campus in the capital city of Austria.

I am particularly keen to draw your attention to our German projects. The BMW Berlin Branch venture and Twin Yards in Munich are building blocks in an expansion into our domestic market in Germany and pay conclusive testimony to the outstanding performance that our company delivers in two of the biggest and most important urban conglomerations.

You will be pleased to find that this issue also contains the usual reports on ongoing civil engineering projects, delivered in our accustomed quality. This time round we are placing a focus on flood control and will therefore present the projects in Schärding and Melk, among others.

For now, I wish you an interesting read, and look forward to greeting you once more in the next edition.

Kind regards,

Ing. Karl-Heinz Strauss, MBA
CEO

Construction of Flood Defences for Melk including Redesigning of the Main square and Renewal of the B1

Gerald Bieder

Introduction

The town of Melk is situated in Lower Austria on the right bank of the Danube at river-km 2,035.00. Towering above the old town, the imposing Benedictine Monastery is Melk's most distinguishing landmark. With around 400,000 visitors a year, Melk is the most popular tourist destination in Lower Austria.

In response to the catastrophic floods of 2002 and the resulting damage, the City of Melk approached the responsible authorities to seek assistance with the planning of flood control measures. Following approval by the Federal Ministry of Transport, the Water Engineering Department (WA3) of the Lower Austrian Government engaged Retter & Partner ZT GmbH to carry out the planning for the necessary flood control measures for Melk.

Melk Abbey – underground sealing works
Image: PORR

Parallel to this, the City of Melk launched an architects' competition for the redesigning of the main square in the old town. The contract was awarded to Karl Langer Architects, who were also commissioned by the Lower Austrian Government to design the flood control measures.

Tender and Scope of Contract

In addition to the construction work for the flood control system and the redesigning of the main square, the Municipality of Melk also invited tenders for the following constructional measures:

- laying of district heating pipelines in the affected construction area
- renewal and reconstruction of damaged pipes
- renewal of the B1 main road along the flood defences
- constructional measures for the creation of the Wachau World Heritage Site

On 26 February 2013, TEERAG-ASDAG AG (T-A) was awarded the contract for the overall project, with a construction period set at 75 weeks. The contract was divided into the following six packages according to the tasks involved:

Package 1 – Construction of district heating
This part of the contract consisted of the excavation and construction work for the laying of 550 m of supply and return pipelines.

Package 2 – Sewer adaptation / pressure pipeline, Winden
This package consisted of the demolition and reconstruction of approx. 450 m of sewer pipes of dimensions from DN 300 to DN 1000 in the development area within the city, and the new construction of approx. 650 m of pressure pipelines of the dimension OD 125 and made out of PE pipes.

Package 3 – Renewal of the B1 main road
The B1 main road running parallel to the banks of the Danube underwent extensive renovation in the polder area following construction of the flood protection system and its substructures. To achieve this, the hard core of gravel beneath the existing asphalt layer was removed and replaced by a frost protection and base course.

Renewal of the main road following construction of the flood protection wall
Image: PORR

Package 4 – Redesigning of the main square

In addition to completely renewing the lighting cables, managing parking space, tourist signs and acoustics and constructing seven underground power distributors, the redesigning of the main square involved converting space into a shared-space zone. Traffic is separated from the pedestrian zones by varying surface designs. The pedestrian areas are covered with natural stone paving composed of medium-grain granite and the traffic lanes are laid with fine-stone paving in segments. Great attention was paid to the choice of colours. The natural stone paving is composed of 90% yellow and 10% grey stones, whereas the fine stone paving sections are 50% yellow and 50% grey.

Natural stone paving
Image: PORR

The overall architectural concept is rounded off by a colourfully designed viewing platform made of pre-fabricated concrete components and various other pre-fabricated concrete elements used to create seating, bicycle stands and refreshment stands.

Package 5 – Flood protection measures

The flood protection package involved the most extensive work in the whole construction project. The flood protection wall consists of an approximately 1 m high in-situ concrete wall base measuring 0.65 m in width, with foundations constructed out of jet-grouting columns to distribute pressure and inclined GEWI piles measuring 57 mm in diameter to absorb tractive forces. In addition to building the foundations, a plunge wall was constructed out of jet-grouting panels to guide seepage in controlled underflows to drains and sewers.

Exposed underground sealing with GEWI piles
Image: PORR

The architects ensured the colour of the in-situ concrete wall matched the colour of the Monastery's façade. To achieve the desired colour tone, 3% yellow and 1% black colour pigments were added to the concrete. Additionally, an aggregate of crushed granite with a grain size ranging from 4 mm to 22 mm was used, which will take on a reddish hue due to rusting caused by its high iron content.

Completed flood protection wall
Image: PORR

Top priority was also assigned to the surface design of the in-situ concrete wall. The side walls were ground, the top wall bush hammered and the corner pieces sand-blasted.

Bush hammering the top wall
Image: PORR

Column foot plates were installed in the prepared wall base, onto which the mobile element system can be assembled in the event of a flood, which should ensure protection against the flood of the century.

The polder drainage system on the landside behind the flood protection wall consists of a seepage drainage system, including complementary channels for the collection of surface water and sewage running into the drains and sewers, and feed pipes leading to two newly constructed pumping stations. Owing to the tough geological conditions, construction of these two pumping stations proved to be challenging. To avoid endangering the adjacent buildings that are under preservation, the roughly two metres of outcropping rock had to be removed using a vibration-free driving device owing to the rock's high compressive resistance.

Pre-drilling for the installation of driving machines
Image: PORR

The goal of the flood protection measures was also to direct the Weierbach watercourse running beneath the old town to the head of the HW 100 reservoir in a pressure-tight channel. For this, the existing vaulted brick channels were demolished and replaced by a pressure-tight casing made out of GRP pipes with the dimension DN 200 and pressure rating PN 02.

Demolition of the old Weierbach watercourse and construction of the new casing
Image: PORR

Package 6 – World Heritage Site / Prandtauer Platform
The project's stylistic centre-piece, the "Prandtauer Platform", forms part of the World Heritage Site package. Elliptical in shape and with a curved underside, it projects approximately seven metres out over the River Melk. For this structure, too, the same colour and surface concrete design requirements apply.

Floods of May/June 2013

Following three months of construction work, progress was abruptly interrupted by an unexpected natural event. After long-lasting heavy rain, particularly in western Austria and southern Germany, the level of the Danube and its tributaries rose dramatically on 31.05.2013. Flood level forecasts made by the responsible authorities at the relevant points along the river had to be revised upwards on an hourly basis.

Within a very short time, the early warning stage applicable to the construction site had been reached according to the flood alarm plan in place. Evacuation of the construction site was begun immediately and activities to protect the components already constructed were set in motion. Due to the tireless and ongoing efforts of site employees until Monday, 03.06.2013, all equipment and building materials were brought to safety and all hazardous areas secured before the Danube burst its banks.

Flooded construction area
Image: PORR

According to the statistics reported in the continual media coverage, this flood was likely to happen only once in a hundred years.

After three days of completely damming off the construction site, the clean-up and reinstallation work on site was able to commence on 06.06.2013, once the water level had receded. It was subsequently established that the damage consisted mainly of soiling of reinforcements that had already been laid. Since the groundwater level did not return to normal until weeks after, the construction project was extended by a period of approximately five weeks.

The old town was also affected by the floods
Image: PORR

Challenges

Contractors were confronted with several challenges during the project's execution, whereby the greatest challenge was presented by the large number of units operating in the construction area and the obstruction to

progress this caused, all while maintaining main route traffic.

On the one hand, progress had to be adapted to the huge influx of tourists in the coming spring, but on the other hand progress was hindered by the partially high density of buildings in the old town and the resulting lack of space, which meant the necessary materials could only be brought on-site in small quantities.

Project data

Jet grouting underground sealing	3,000 m²
GEWI piles	2,700 m
Trench excavation	7,000 m³
Channel construction	2,400 m
Concrete	2,500 m³
Reinforcement	250 t
Paving	5,000 m²
Asphalt	3,000 t

Final Remark

In conclusion, all that remains is for us to thank everyone involved for their cooperation and contribution to the smooth running of the project. The Lower Austria branch of TEERAG-ASDAG AG has once again been able to put its expertise and competence to the test during a highly complex civil engineering project.

Tram/Regionalbahn Innsbruck – Extension of Line 3 (Leipzigerplatz / Amraserstraße)

Alexander Weißenbichler

Introduction

Due to the steady population growth in the city of Innsbruck, optimising and expanding the public transport network plays an ever-increasing role. With approximately 44.9 million passengers last year, the Innsbrucker Verkehrsbetriebe und Stubaitalbahn GmbH (IVB) already serves far more passengers than predicted for 2020 (40.5 million). Particular priority has been assigned to expanding the tram network, owing to the large volume of passengers it handles and its low environmental impact. In response, the IVB, in cooperation with the City of Innsbruck and State of Tyrol, has launched the ″Tram/Regionalbahn″ project, which involves expanding the tram network in the whole city.

Overview of the Tram/Regionalbahn project
Image: IVB

Contract

IVB und Innsbrucker Kommunalbetriebe AG (IKB) awarded the contract for the site management and track construction work at Leipzigerplatz/Amraserstraße, the ninth of 30 construction lots, to the Tyrol branch of TEERAG-ASDAG AG (T-A) in March 2013. Tasks included the complete renewal and adaptation of the underground power supply infrastructure for IKB and Telekom, the removal and reconstruction of tracks and stations, and the restoration of roads, including footpaths and cycle paths over the entire 500 m stretch at Leipzigerplatz / Amraserstraße.

View of construction site in August 2013
Image: PORR

Traffic situation

Since the Amraserstraße is one of the main routes through the city of Innsbruck, it was a major challenge for the T-A team to maintain traffic throughout the entire construction period. Firstly, it was necessary to adapt the whole construction process to the traffic management process, which involved eight traffic phases. In addition, due to the school holidays and resulting capacity requirements, it was only possible for the IVB to set up a replacement bus service from the beginning of August to the beginning of September, which led to extremely tight scheduling.

Preliminary work

Before construction work itself could begin, an electrical installations survey was conducted, which revealed that the construction site already contained some 16 km of installed power and telecom cables. The number of safety measures that had to be installed greatly delayed excavation work. Ultimately, the four existing stations, all traffic islands and green spaces, approx. 900 m of tracks and 14,000 m² of road surface were cleared.

Cable construction

The track and road construction work involved installing a total of 9,300 m of protective cable tubing for IKB, Telekom and UPC, 680 m fibre optic cable, 800 m street drains and 40 m of service connections for gas line operators. Street drains were fitted at depths of up to 4.70 m underground.

Track construction

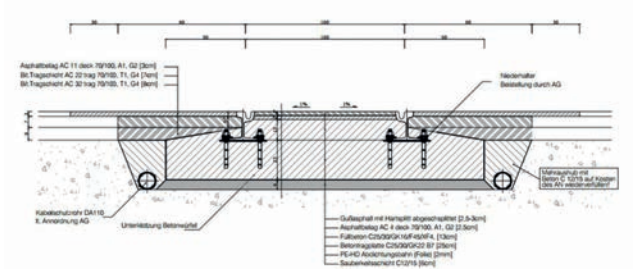
During the initial phases of construction, the affected tram line was diverted onto a bypass track by means of special 'climber points'. A total of 1,385 m of tracks with a gauge of 1,000 mm were laid, 106 m of which were laid on the Friedensbrücke. The track system also included four

intersections and twelve points.

Climber points for diversion of tramway
Image: PORR

Construction of the new tracks involved the following procedures:

- Preparation of a subbase and lateral formwork for the track supporting layer
- Installation and welding of a PE sheet to provide electrical insulation
- Hoisting of track panels measuring up to 18 m in length and weighing up to 9 tonnes, and positioning them onto concrete blocks (23 x 24 x 25 cm)
- Welding and grinding of the track joints using the active gas welding process on straight sections and the electric welding process at intersections and points
- Alignment and adjustment of the tracks by measurement
- Attachment of track tensioners every 2.5 m
- Sinking and connection of the track drainage system and wiring for the point and signal controls
- Concreting of the track supporting layer

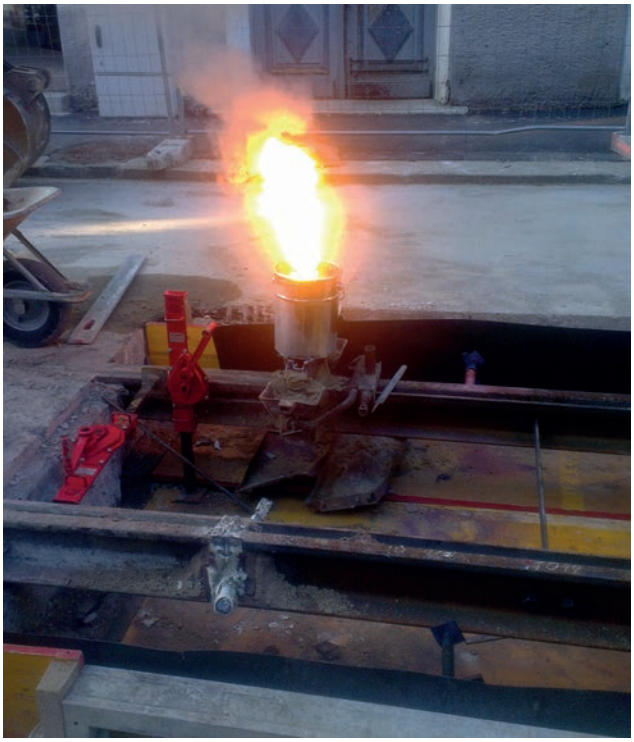


Cross-section of track system (plan extract)
Image: PORR

Preparation of subbase – track bed
Image: PORR

Installation of PE sheet and concrete blocks
Image: PORR

Hoisting the track panels
Image: PORR



Welding the track joints
Image: PORR

Track intersection at the Leipzigerplatz Amraserstraße/Defreggerstraße junction
Image: PORR

Concreting the track supporting layer
Image: PORR

It was not possible to construct the track supporting layer on the bridgework because of a lack of mounting space. Therefore, a total of 492 threaded rods were drilled into the bridge structure and secured with grouting. The tracks were then attached to the rods using special track binders and grouting, and pressed watertightly onto the bridge seal.

To compensate for movements in the bridgework, a 40 mm thick layer of grouting was inserted between the tracks and the bridge seal. For areas near the bridge's supporting structure, the client specified track expansion joints which are capable of compensating for movements of up to 10 cm. So as to rule out any bonding action between the asphalt and tracks and avoid cracks caused by track expansion, the tracks were temporarily wrapped in sheeting before asphalting took place.

Attachment and protection of tracks on the bridge
Image: PORR

The new tram stations were designed so that at later stages in the "Tram/Regionalbahn" project, double-length trams with an overall length of up to 60 m will be able to enter them without blocking traffic. In total, 410 m of tram station area was constructed, including 13 shelters. Platform edges had to be positioned with the utmost precision. To ensure easy access, the distance between entry points and trams has to be kept to a minimum, without carriages touching the platform edges as they swing out in curves.

Tram station areas with shelters
Image: PORR

The former high-voltage overhead lines were constructed

by attaching the cross lines to the façades of surrounding buildings. The IVB wanted to change this and so it became T-A's task to set up 29 concrete masts measuring up to 9 m in length and 50 cm in diameter. To accommodate the large tensile forces created by the sheer weight of the overhead lines, the foundations had to have a width of 1.60 m and be partially laid at a depth of 3.70 m.

Concrete mast and new overhead lines
Image: PORR

Road construction and landscaping

With construction of the tracks and street drains together with 43 drain holes complete, and all the cables installed for IKB and Telekom, 3,500 m of curbstones were laid for 770 m of pavement and bike paths and 32 traffic islands and green spaces.

To enhance the landscape, an area of 1,350 m² was prepared with topsoil which was sown with a special blend of grass seed. In addition, the department of parks and green spaces of the city of Innsbruck planted 54 trees.

Due to the high volume of traffic that will be using the 14,000 m² of new road surface, the IVB specified that the structure should consist of an 8 cm thick base course, a 7 cm thick asphalt-binding layer and a 3 cm thick asphalt cover and wearing course.

In the station areas, to accommodate the high mechanical stresses caused particularly by bus traffic, a 'semi-rigid' road surface was chosen to seal cavities. Composed of a very porous cement mix, it exhibits both the tensile strength of asphalt and the compressive strength and stability of concrete.

Semi-rigid surface in station area
Image: PORR

Final remark

Thanks to the excellent cooperation from clients, cable operators, planners, construction supervisors, authorities and local residents, TEERAG-ASDAG AG was able to meet all penalty-bearing deadlines and complete construction work to everybody's full satisfaction.

With this project, T-A was able to demonstrate its organisational and human resource expertise gained from its many years of experience in the construction of infrastructure and, particularly, in large city civil engineering projects, and show that it was able to handle a large inner-city contract under challenging conditions in the shortest possible construction period due to its well-trained and experienced personnel and meticulous preparation work.

Tram after works completion
Image: PORR

Project data

Start of construction	2 April 2013
Completion	19 November 2013
Completion of finishing works	4 April 2014
Length of construction site	500 m
Total track length	1,385 m
Track installations	12 points and 4 intersections

Stations	410 m
Track supporting layer	600 m³
Cable ducts	10,000 m
Earthworks	12,000 m³
Frost buffer	6,900 m³
Surface area of road and platforms	14,000 m²
Cement mix	5,500 t
Curbstones	3,500 m
Semi-rigid road surface	1,750 m²

twin yards, Munich

Construction of a modern office complex in the garden city of Schwabing, Munich

Achim Mantel

twin yards – visualization
Image: TOP Office Munich GmbH

Project developer

At the beginning of April 2013, TOP Office Munich GmbH, a joint venture between Münchener Grundbesitz Verwaltungs GmbH (MGV) and STRAUSS & PARTNER Development GmbH (S&P), succeeded in acquiring the last available plot in the garden city of Schwabing along the A9, the main approach road to Munich from the north.

The Client

STRAUSS & PARTNER DEVELOPMENT is a leading building promoter and project developer which covers the office, commercial, residential, health and special-purpose property market segments in Central Europe. STRAUSS & PARTNER stands for competence, from development and financing, through to construction, marketing and property management, and offers all services from a single source.

MGV cooperates closely with SAM Plantech General Planners and Architects as well as with renowned technical designers and has contributed to the smooth running of construction projects for many years. Through many years of experience in developing and executing construction projects, MGV has a vast interdisciplinary knowledge base that encompasses all areas of the real estate industry.

Development phase

Coinciding with the acquisition of the property, S & P brought in the Munich building construction branch of Porr Deutschland GmbH. During the development phase, in close collaboration with PORR, the project was optimised visually, technically and, not least, economically over a nine month period.

The façade's design, which was the outcome of an urban development architectural competition, presented the major challenge to all involved.

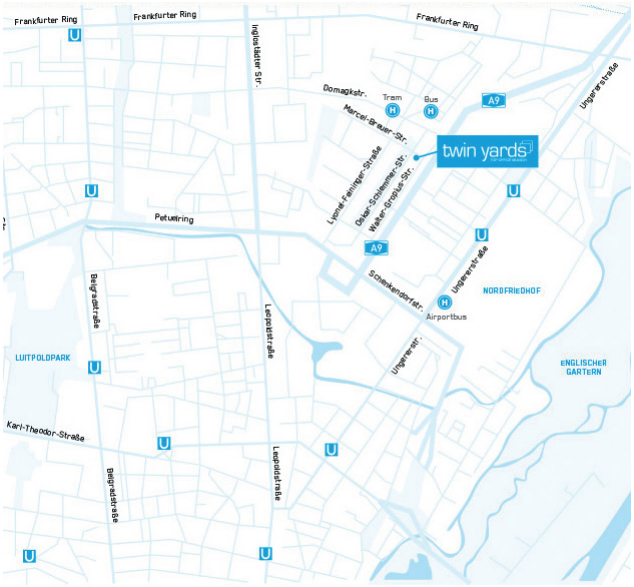
The aim was to maintain both the visual appearance and the high quality required to sell the property, while taking into account the available budget.

In extremely close cooperation with SAM Plantech GmbH, the subsidiary ALU-Sommer and the cost accounting department of the Munich branch, the facade was optimised by almost EUR 2.5 million during this phase.

Location and office building

The garden city of Schwabing has rapidly become one of the most sought after business locations in Munich, not least because of its outstanding accessibility.

Within just five minutes' walk, there are two metro stations with direct links to the city centre and Munich Airport. Parkstadt Schwabing has a direct connection to the main A9 the to as well as Munich of artery "Ring Middle" motorway lying directly adjacent to the construction site.



Location – twin yards
Image: 2dm GmbH, Munich

Schwabing already boasts several well-known companies, some of which are international. The extensive open spaces on the site have been designed to a very high quality. A local shopping centre for daily necessities is located in the vicinity and numerous restaurants, cafés and other facilities are also close by.

Last but not least, the twin yards location offers an excellent publicity opportunity since the building is highly visible from the motorway.

twin yards – aerial photo
Image: 2dm GmbH, Munich

The twin yards brand

The twin yards brand evolved from the building's external appearance. Unique to this office location, the building boasts two courtyards. The first courtyard, adjoining the southern neighbouring plot, has been designed to take on a representative function. The centrally positioned second courtyard will contain a bright relaxation area filled with plants for both tenants and owners to enjoy. Several roof gardens constitute a further distinguishing feature.

The aim is to receive the DNGB Silver and LEED Gold certifications, which will highlight both the sustainable and value-creating design. Porr Germany is committed to optimising the construction and operation of the building while considering environmental aspects.

Approaches to achieve this include the latest air conditioning technology, innovative building materials, rainwater utilisation, solar technology and much more.

Visualization of internal courtyard
Image: 2dm GmbH, Munich

The twin yards building

The twin yards building offers an overground gross floor area of approx. 13,500 m² and an underground GFA of approx. 6,000 m².

There will be seven floors, each with a GFA of 2,660 m².

Three stairways and three lifts will ensure ease of access within the building.
The smallest rental unit on offer has a generous GFA of approx. 290 m², ideal for startup companies, whose operational and marketing activities can benefit from the structures available on site.

The total rentable office space amounts to approx. 13,485 m².
Owing to a highly flexible design, up to 34 rental units can be formed, using a 1.35 m grid system as the basis for planning. The offices have a depth of between 4.95 m and 6.13 m.

The ceiling height is 3.50 m on the ground floor and 3 m on other floors. The two underground parking levels offer parking for a total of 168 vehicles.

Construction of the building shell will require approx. 13,500 m³ of concrete and 1,900 t of structural steel.

Basic installations

The building will receive a mechanical ventilation system which makes use of heat recovery.

For the office areas, two air changes per hour will be provided. The highly-frequented conference and casino areas will receive a six-fold air change.

A near-surface building element activation system will be installed in the reinforced concrete slabs for year-round thermal comfort (heating and cooling) in the office and conference areas.

Cross-section of the building
Image: 2dm GmbH, Munich

In addition, acoustically active heating and cooling panels will be installed in the open plan and conference areas and

in the team offices.

The spacious and welcoming foyer will be thermally controlled by underfloor heating.
All windows will open individually and be fitted with triple glazing.

A highly effective exterior sun protection system in the upper third of the building using daylight reflection and a manually operated interior glare protection system are additional comfort-providing features.

Tenant options

Due to the previously mentioned flexible design, almost every special request which does not compromise the building structure can be catered for. Variations, such as partition walls with a high glass content, special flooring or tiles for toilet facilities and special lighting can be sampled by future tenants during the shell construction phase. Also, additional service rooms and other special rooms can be added at any time before shell construction has been completed.

The construction phase

Construction started on 4 December 2013 with site decontamination. To achieve this, the construction area was divided into nine fields and systematically analysed by geotechnical experts. By the beginning of 2014, the preliminary excavation work had been largely completed so that construction of the foundation pit and lining and dewatering could take place.

Within just two months, a tied-back sheet pile structure had been installed, consisting of 185 sheet piles measuring up to 12.60 m in length, and 81 four-strand anchors of up to 14 m in length.

Since a special solution was requested for the drainage of the tertiary sands, Porr Deutschland GmbH opted for a design with 63 microfiltration vacuum wells. This concept has a clear advantage over conventional gravity wells, which function only over short ranges.

At the same time, excavation was undertaken so that by the beginning of March 2014, the site equipment, including three tower cranes, could be set up.

During the shell construction phase, a high proportion of pre-fabricated columns and cavity wall elements will be used so that sealing of the building shell can be expected to take place at the end of 2014.

Visualization of external view
Image: 2dm GmbH, Munich

Handover of the building is scheduled for 28 September 2015.

You can find additional information on the project under www.twin-yards.de

The construction site is also now viewable via a specially installed WEB CAM: baucam.nextframe.de/twinyards

A23 southeast city bypass

Measures to secure retaining walls at the Favoriten roundabout

Richard Gutsche

General information

This article reports on the geotechnical measures undertaken to secure retaining walls measuring up to 11.5 m in height along the A23, Vienna's southeast bypass, and the extremely challenging conditions under which work took place, in terms of scheduling, logistics and technical restraints.

The safeguard measures were deemed necessary after a detailed examination of the approximately 40-year-old retaining walls revealed a sometimes substantial lack of stability. A detailed account will be given of the underlying conditions governing implementation of the safeguard measures and also a report on the construction measures undertaken.

Introduction

Entrusted with operating Austria's first-class road network, ASFINAG (Motorways and Highways Financing PLC) is responsible for the adequate provision and efficient running of motorways and highways in Austria, and for providing maximum safety for users.

In March 2012, a retaining wall of more than 10 m in height collapsed onto the carriageway of the A13 Brenner Motorway in Schönberg without any visible forewarning, burying a lorry and killing the driver.

In response to this incident, ASFINAG immediately examined 49 similarly constructed retaining walls for any visible damage in a first step, and in a further step made a realistic assessment, based on estimated loads and earth pressure, of the possibility of future damage or failure.

In this context, the following article will review the situation and reconstruction work on the A23 southeast city bypass, which with 200,000 vehicles a day is Austria's busiest motorway. The assessment findings revealed that the retaining walls on both sides of the Laaerberg Tunnel, measuring up to 11.5 m in height, contained sections several hundreds of metres long with sometimes substantial load bearing capacity deficits.

The structural fabric was well documented. Additional exploratory drilling showed low subsurface shear stresses. Since the retaining walls had been constructed with a highly optimised design in 1973, the structural evidence for internal stability could not be met in accordance with modern-day standards. The retaining walls were therefore classified as critical, which is why appropriate reconstruction measures were immediately introduced and implemented.

Fig. 1: Site overview – retaining walls at the Favoriten roundabout
Image: PORR

Reconstruction measures undertaken at retaining walls M1001 – M1004

For all four retaining walls, each connecting directly to the Laaerberg Tunnel portals on both carriageways of the A23, emergency log braces were put in place and friction-locked to the wall and concrete carriageway surface using steel brackets (see Fig. 2).

To achieve this, traffic was rerouted along reduced lane widths, and appropriate boundaries were set up between the traffic and works.

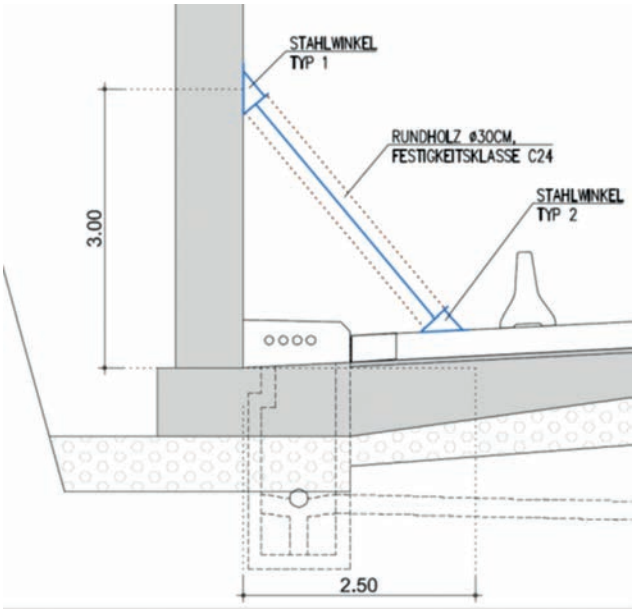


Fig. 2: Standard section of wall bracing
Image: PORR

The retaining walls were constantly measured to check for any deformation before and during the entire construction

process.

Each of the four retaining walls is composed of between 26 and 43 blocks of varying widths. In the higher sections, the walls are fitted with a heel on the earth side (see Fig. 3) approximately half way up. The lower sections, reaching a height of approx. 5 m, are constructed without a heel.

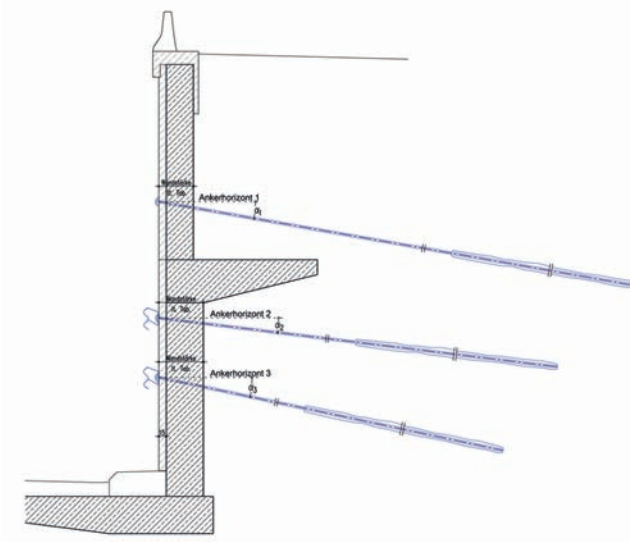


Fig. 3: Standard section of retaining wall with a heel, 3 anchor heights
Image: PORR

As a final and permanent safeguard measure, rear anchors were constructed against the ground to reinforce the retaining walls. After immediate securing of a section with 225 anchors, the Porr Bau GmbH / Civil Engineering Department and Felbermayr Foundation Engineering consortium was awarded the contract for the additional security measures.

In essence, this work consisted of constructing a further 600 or so permanent anchors. In order to make rapid progress, up to five drilling machines were deployed simultaneously. In addition, it was necessary to construct the drilling platforms and make appropriate adaptations to machinery in order to reach the defined anchor points on the up to 12 m high walls.

Fig. 4: Klemm KR806/3 drilling unit on lorry convoy
Image: PORR

Fig. 5: Adapted drilling unit with drill carriage at a height of approx. 8.50 m
Image: PORR

To avoid any additional vibration and damage, the retaining walls had to undergo core drilling prior to boring the anchor holes.

All anchors are constructed as permanent anchors with double corrosion protection. In addition, the anchor heads are formed so that shrink tests can be performed at a later date.

In the area of the free length sections, which largely ran in a layer of drainage material, a cased borehole was drilled to protect the drainage system before the grouting was introduced. In addition, a permanently positioned steel pipe was installed in the area to ensure the long-term functioning of the existing drainage system and drainage measures and to avoid any future water pressure building on the wall.

After the anchors had been installed and the appropriate injection measures undertaken, the anchors were pretensioned and provided with corrosion resistant anchor heads with stainless steel covers. Finally, guide rails were added to protect the anchor heads, ensuring that no damage to the heads would occur from passing lorries.

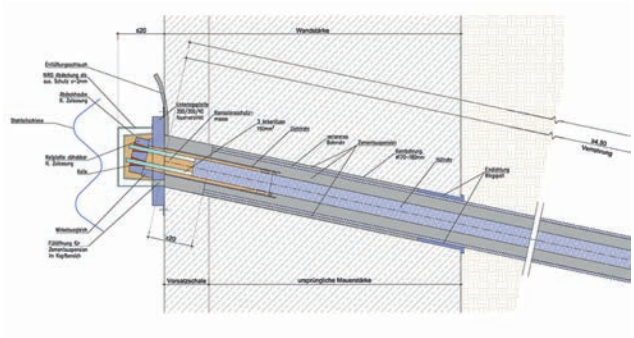


Fig. 6: Finished anchor including head formation and guide rail
Image: PORR

Particular challenges during construction

Tight construction period

In an extremely tight construction period, using up to five drilling machines, not only were 600 permanent anchors (lengths up to 18 m) installed at heights of up to 11 m and pressed in during several injections steps, but also numerous ancillary works were carried out, such as core

drilling through the reinforced concrete wall, maintaining traffic flow and protecting road surfaces from dirt of any kind, extending the log bracing and support constructions, mounting anchor heads and guide rails, road marking etc.

Restricted working hours
Work had to be carried out at night between 21:00 and 05:00 (at weekends to 09:00), seven days a week.

Intensive use of equipment and manpower
Due to the simultaneous use of up to five drilling machines, a variety of ancillary works, numerous injection measures during anchor production and in particular the height of the drilling points, an enormous deployment of human resources and equipment was required. Also, in addition to special adaptations for drill carriages and various drill platforms, up to ten telescopic and crossbar platforms were required.

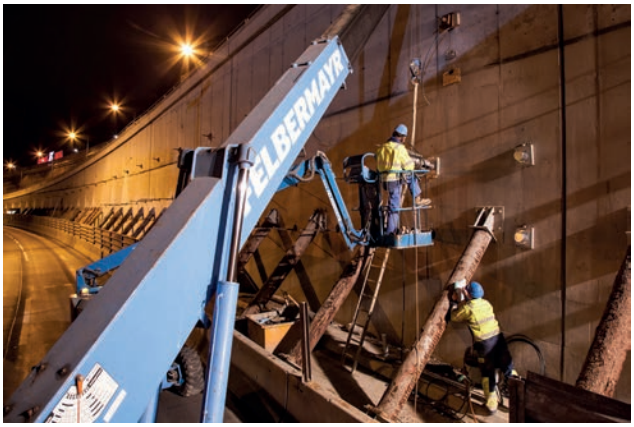


Fig. 7: Pretensioning of a permanent stranded anchor with corresponding lifting devices for the tensioning jack and workers
Image: PORR

Traffic
During the above-mentioned working hours, one lane in each direction had to be kept clear and adequately secure. During the day (i.e. from 05:00 to 21:00), three lanes were kept free.

Winter conditions
Work was carried out from 27.12.2013 to 9.3.2014.

Summary

Examination of the retaining walls at the Favoriten roundabout and structural calculations revealed an urgent need for renovation.

The Porr Bau GmbH/Civil Engineering Department and Felbermayr Foundation Engineering consortium carried out the appropriate anchoring and renovation work in record time.

At this point, on behalf of the consortium, we would like to thank all project participants for their exceptionally fair and close cooperation.

Special thanks go to the project and construction management and the workers from the two companies involved for their exemplary commitment.

Construction project – Austrian Federal Railways (ÖBB) training centre in Salzburg-Gnigl

First class trainee positions for young apprentices

Benjamin Buttinger

In October 2012, the Salzburg branch of Porr Bau GmbH was commissioned by ÖBB Infrastruktur AG to construct the new ÖBB training centre in Salzburg-Gnigl.

The general contractor contract involved executing all construction work, including the electrical installation and fitting of technical building systems, right up to turnkey delivery.

Southwest view
Image: Andrew Phelps

The project

The new ÖBB training centre houses all the rooms necessary for future training that were previously spread over several buildings.

The building is composed of three parts – a ground floor section, an upper floor section and an adjoining assembly hall.

On a total of approx. 2,000 m² of usable floor space, the new training centre provides considerably more space than previously on offer and in the future will be able to admit up to 105 apprentices.

On the ground floor, there is a multi-purpose assembly hall with welding stations, forge and storage.

Inside view of assembly hall
Image: Andrew Phelps

Also on the ground floor are new workplaces for turning and milling, a teaching area, an office and meeting room and bathrooms.

Inside view of teaching area / office and meeting room
Image: Andrew Phelps

Inside view of the three course rooms, separable by means of mobile partition walls.
Image: Andrew Phelps

On the first floor can be found the general course rooms, men's changing rooms and communal areas for trainers and apprentices.

The second floor houses the electrical laboratory, a state-of-the-art computer room, the course room for hydraulics and pneumatics and the ladies' changing rooms.

Construction phase

Construction started at the end of November 2012 and lasted approximately ten months.

Foundations

Due to the poor ground conditions (lacustrine clay), the base slab was constructed on ductile piles. A total of 2,200 m of piling was sunk to depths of up to 20 m.

Reinforced concrete construction

In the workshop area, the base slab was constructed out of a monolithic slab impregnated and interspersed with a hard aggregate.

In order to lend a workshop character to the stairways and course rooms, the lift shaft and most of the walls were constructed in fair-faced concrete.

Inside view of stairway
Image: Andrew Phelps

Floors

In the course rooms and stairways, the concrete floor was left visible and only impregnated to prevent moisture absorption.

The wet rooms required a more waterproof covering.

Facades

The design of the building's outer shell provides a distinct contrast to the very simple design and strong functional cohesion of the inner building structures.

The contrast is achieved by simple means through the use of carefully placed openings, various shades of colour and different types of surface structure.

The ground floor, with its dark brown coarsely plastered facade, forms a solid base on which the gleaming white plastered upper levels seem to float. The handsome upper floors owe their lightness to the arrangement of windows and sunscreens in long horizontal lines.

The white plastered walls of the assembly hall have a coarser structure to suit the function of this part of the building.

ÖBB training centre as own energy provider

As part of the new training centre development, ÖBB decided to implement a CO2-neutral heating system. The building's heating and hot water is supplied by a roof-top solar plant with a gross collector area of around 150 m². Solar energy is transmitted to the base slab and upper storey floors, via plastic pipes inserted into these concrete components, and then stored there. These storage components as well as a 5,000 l buffer tank ensure a comfortable indoor climate even during long periods without sunshine. Distribution of the heat stored in the concrete components is regulated by sensors in an ongoing storage management process. This system is supported by a highly efficient ventilation system enjoying a heat recovery rate of 82 percent. In the summer, the concrete core can also be cooled with ÖBB's own utility water. After a payback period of 12 years, ÖBB will be making a saving of around 22,000 euros a year, in view of its current energy costs for heating and hot water.

Project data

Client	ÖBB Infrastruktur AG
Start of construction	November 2012
Completion	October 2013
Usable floor space	2,000 m²
Gross room volume	12,350 m³
Volume of concrete	1,600 m³
Area of facade	1,700 m²
Bored piles	2,200 m

Final remark

The ÖBB training centre was handed over to the client on schedule on 18.10.2013.

Am Westpark, Munich

Residential scheme with child day care facilities and retail outlets

Ingo Schuischel

At the start of 2012, the German motoring association Allgemeiner Deutscher Automobilclub e.V. (ADAC) vacated its former administrative offices at Am Westpark 8 in Munich to occupy a new headquarters building. Eurytos GmbH & Co. Westpark KG, a member company of the Eurytos Group, had already acquired the approx. 2.9 hectare site in 2008 with the aim of building a new, attractive residential quarter complete with child day care centres and retail outlets.

Plan view of Am Westpark development
Image: Eurytos Unternehmensgruppe / konzept 3D

Procurement of planning permission

The vacated site in the north-east of Munich's Sendling-Westpark municipal district (cadastral district of Untersendling) directly adjoins the eastern edge of the Westpark, built for the International Garden Show in 1983.

The first step in implementing the scheme was to create the building legislation for the future residential development of the site. The prime location directly by the Westpark called for a top-class urban solution. This prompted the site owner – on the basis of the outline scheme details approved by Munich City Council – to stage an urban and landscape design ideas competition. The jury recommended the proposals submitted by Jatsch Laux Architekten in partnership with landscape architects ver.de landschaftsarchitektur as the basis for the continuing design development. The development plan was adopted as a by-law by the City Council in summer 2012.

Project

The new residential quarter comprises nine above-ground buildings, with a maximum of seven upper storeys, which are linked at basement level by a unified parking area.

Overall, the site will accommodate 378 variously sized (1- to 5-room) rental apartments with a total living area of over 30,000 m².

View of Am Westpark street front
Image: Eurytos Unternehmensgruppe/ konzept 3D

The permeable arrangement of freestanding blocks in the southern and western site sections allows the entire development to benefit from the amenity offered by the Westpark setting. With their spacious patios, balconies and loggias, the apartments – even those in the second and third row of blocks, where possible – are oriented towards the neighbouring park. Spread over two floors, the child day care centres offer various group rooms and generous outdoor areas with their own playgrounds to cater for children of all age groups (from crèche care to after-school and homework supervision).

View of Am Westpark from south
Image: Eurytos Unternehmensgruppe/ konzept 3D

In February 2012, Porr Deutschland GmbH's Munich branch, in a consortium, was appointed by Eurytos Wohn- und Gewerbebau GmbH & Co. KG as management contractor for turnkey construction of the scheme. This is already the third development project entrusted to Porr Deutschland GmbH by the Eurytos Group. With a two-thirds stake in the contract, Porr Deutschland GmbH is acting as technical lead manager for the project. The first

two development phases are due for completion on 30.06.2014, the third to fifth phases each a month later. Overall completion is scheduled for 31.10.2014.

However, before commencement of the new-build works, the former ADAC headquarters had to be demolished and the basement pit prepared for the new structures. These works, which started in February 2012, were also covered by the contract.

Demolition of existing building

The first phase of demolition involved on-site clearance works and the strip-out of the existing building interior. As of May 2012, after removal of all reusable materials and hazardous substances from the building, it was possible to proceed as scheduled with the mechanical demolition of the structure and envelope.

Demolition of existing Am Westpark building 1
Image: PORR

Given that parts of the existing basement car park had four below-ground decks and only a single level is needed for the new development, a considerable amount of work went into filling the basement void with some 70,000 m³ of material in order to raise the site to the correct level for the new foundations. During the peak times, up to 12 heavy construction machines plus recycling plant were in operation on site to ensure the prompt completion of the necessary preparations for the scheduled start of the new-build works in September 2012. Given the proximity of existing apartment buildings to the site, various measures were specified and consistently implemented to protect the neighbouring residents during the demolition period. These included the provision of adequate water-spray equipment to minimize dust emissions and its optimum positioning, with additional allowance for the prevailing wind direction. Moreover, the state-of-the-art construction plant deployed on site ensured minimum noise disturbance, and the working hours and breaks were scheduled so as to best suit the interests of the local population.

The final demolition and excavation works in the southern site area were completed in early December 2012.

Site establishment concept

Given the depth of the site and varying weights of the prefabricated units for the individual buildings, crane selection was an important consideration in the contract planning process. Accordingly, the precise weight of the many different precast balcony types (up to 10 tonnes in some cases) was determined in advance. This then formed the basis for specifying the required crane types and their exact positioning on the site.

Am Westpark Phase 1
Image: PORR

Building structure and fit-out

The buildings essentially comprise a reinforced-concrete structure with non-loadbearing masonry walls within the apartments. To meet the outdoor noise control requirements while enhancing floor plan efficiency, the external walls were also planned and built in reinforced concrete. The energy requirements placed on the building envelope were met by means of an external thermal insulation composite system (ETICS).

Am Westpark structural works 2
Image: PORR

Construction work started in September 2012 in the northern section of the site. Of key importance here was the rapid construction of the pits needed for the double parking stackers located in this part of the development. As the water table tends to be low in September, the project team wanted to seize the opportunity to excavate these pits without the dewatering installations that may

have been necessary later in the year. The careful co-ordination of operations and continuous monitoring of the water table allowed prompt completion of the parking stacker pits without the need for any elaborate groundwater control measures. The development is served by a centralized water supply and heating system. Given that the associated supply pipes from the central plantroom to the individual buildings on the site run below the new ground slab, these also had to be installed before casting the relevant ground slab bays.

Am Westpark structural works 1
Image: PORR

Structurally, the first development phase – with 104 apartments, the child day care centres and commercial units on the bottom three storeys – mainly comprises in-situ concrete structures. Phases two to five feature a hybrid solution with in-situ concrete walls, precast double walls and precast half-slabs. The works were sequenced such that, on each level, the in-situ concrete lift shaft and external walls were constructed first and the precast double wall partitions installed after a short time lag. The logistical challenge consisted in transporting some 32,000 m³ of in-situ concrete, 4,700 tonnes of steel reinforcement, approx. 22,000 m² of precast double walls, 38,000 m² of precast half-slabs and 460 precast balcony and stair units to the appropriate work location, mainly via a single haul road. Moreover, the first of some 2,100 windows were also delivered and installed while the structural works were still in progress.

To guarantee a minimum air change rate, the apartments are served by a central mechanical supply and extract ventilation system. Occupants can choose between two ventilation levels. High-quality oak parquet flooring is laid in all 378 apartments. The spacious sanitary areas are fitted with large-format tiles and stylish, contemporary sanitary appliances.

The approx. 10,000 m² basement car park, directly accessible from each of the blocks, is provided with a light-coloured floor coating and LED lighting that give it a user-friendly, bright and welcoming appearance.

External works

The landscaping concept for the new development is inspired by the spatial qualities of the neighbouring Westpark, with its multi-faceted circulation routes and subtle planting arrangements. The new residential quarter is criss-crossed by an intriguing sequence of paths and squares that link up existing routes with the park and adjoining areas. In stark contrast to the impenetrable barrier formed by the previous ADAC complex, the site provides thoroughfares to the Westpark for all Faberstraße residents.

The entire site is embellished by curvilinear grassed "islands" and tree stands that visually echo the vibrant landscaping of the Westpark right through to the interior of the residential quarter. Apart from serving foot traffic within the quarter, the winding network of colour-asphalt paths also provides access for the fire and rescue services or, in case of removals, for furniture vans. Normal car traffic is not, however, permitted on the site.

A public plaza with benches and a ring of trees will mark the main entrance to the quarter. Upon completion of the plaza and retail outlets, all residents in the neighbourhood will thus enjoy the use of a new urban meeting place together with shopping facilities to meet everyday needs.

The external works also include several playgrounds, with a total area exceeding 1,000 m², that are provided with seating and a range of apparatus for children up to the age of five.

Am Westpark facade 1
Image: PORR

Final remark

Thanks to the remarkable professionalism and commitment of the entire project team, backed up by an intensive collaboration with the client, Porr Deutschland GmbH and its consortium partner are due to hand over the first development phase to the client on time on 30.06.2014. Phases 2 to 5 will then be ready for letting at successive monthly intervals.

Project data

Client	Eurytos Wohn- und Gewerbebau GmbH & Co.KG
Contractor	Am Westpark Consortium
Building design	Laux Architekten GmbH and Maier Neuberger Projekte GmbH
Landscape design	ver.de landschaftsarchitektur GbR
Start on site (demolition)	6 February 2012
Start on site (new-build)	14 September 2012
Completion	31 October 2014
Living area	30,000 m²
Site area	29,000 m²

Styria Media Center, Graz

PORR builds a further architectural showpiece in Graz

Jakob Derler, Otto Hofmann, Gerhard Holpfer

Project

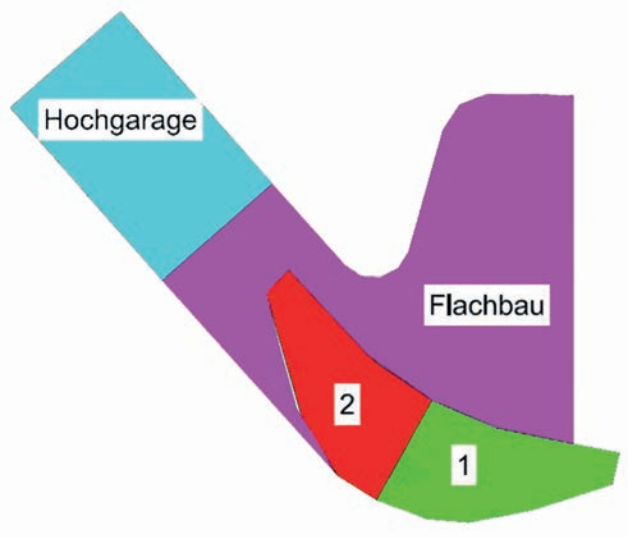
On the left-hand side of one of the approach roads leading into the Austrian city of Graz from the east sits the "Black Panther" building, head office of the Pachleitner Group and completed four years ago by Porr Bau GmbH (Styria branch) and its consortium partners. On Conrad-von-Hötzendorf-Straße, some distance to the north in the direction of the city centre, PORR is now building another high-profile scheme, which is to become the new headquarters of the Styria Media Group AG. The building was designed by ArchitekturConsult ZT GmbH under the supervision of architects Hermann Eisenköck and Herfried Peyker.

Visualization
Image: ArchitekturConsult ZT GmbH

The 14-storey, approx. 60 m tall tower scheme is being realized under a design-and-build contract by an internal partnership between Porr Bau GmbH's Styria branch and its Vienna-based Major Building Projects department. Apart from fielding the project and site management team, the company made every effort to integrate and capitalize on the internal Group resources and its own know-how. The following units and companies played a key role in implementing the scheme:

- Porr Design und Engineering GmbH: Contract and construction planning, building services site management
- Porr Bau GmbH / Infrastructure, Found. Eng. Dpt.: Bored piling, well construction
- Schwarzl Transport GmbH: Earthwork transport and disposal
- Schotter- und Betonwerk Karl Schwarzl Betriebsges.m.b.H: Concrete supply
- ALU-SOMMER GmbH: Glass facade
- TEERAG-ASDAG AG / Waterproofing Dpt.: Bituminous waterproofing
- TEERAG-ASDAG AG / Styria branch: Drainage and infiltration systems

Covering 5,387 m² of a 21,659 m² site opposite the Messe Graz exhibition centre, the 14-storey Styria Media Center is poised to become a new urban landmark. The scheme essentially comprises three separate volumes: the main building with podium (from basement to first upper floor), the tower (from second to 14th upper floor) and the two-storey car park building to the north-west.



General building layout
Image: PORR

The ground floor of the Styria Media Center will accommodate a nursery school, bank branch and restaurant facility. The nerve centre of the new building – the newsroom of the Kleine Zeitung newspaper and Antenne Steiermark radio – will be located on the first upper level. The approx. 3,200 m² office will house the workplaces of some 240 journalists and editors. The first floor is surmounted by the curved volume of the tower, with a further 13 storeys. The third to 13th upper levels have identical floorplates, though with different office layouts created by the space partitioning. The sky lobby on the 14th floor is reserved for events.

The overall complex offers some 18,000 m² office space which will accommodate up to 1,200 workplaces. Apart from the 5,400 m² building footprint, the site will also feature an approx. 9,000 m² public park, including a 1,000 m² playground for the nursery school and around 1,300 m² of private grounds.

Building structure

The structural works, which started in March 2013 with the

excavations for the main building and the movement of approx. 20,000 m³ of earth, took one year to complete. The next stage involved installation in the ground of 84 bored piles with a diameter of 90 cm and a total length of some 950 m. This process was accompanied by a systematic search for war relics: luckily, despite the presence of several suspicious objects, no explosive devices were found.

The pile caps were subsequently cast into the ground slab of the main building, with its practically full-area single basement level. This involved placing some 2,500 m³ of concrete in several bays for varying slab thicknesses up to 90 cm, with a reinforcement density of approx. 104 kg/m³.

Although the highest water table level at this location was estimated to lie around 1 m below the ground slab, the entire basement, with its plantroom, storage and archive spaces, was additionally protected by a 4,500 m² bentonite tanking system.

Basement pit with ground slab and, in background, bentonite tanking system
Image: PORR

The ground floor level, which is to house a nursery school, bank branch, restaurant/foyer space and housekeeping area, has a structural ceiling height of 4.54 m. In the low-rise section, the loads are essentially carried by 62, mainly circular reinforced-concrete columns in conjunction with perimeter downstands. Reinforced-concrete walls, for which a fair-faced finish was additionally specified, are the key structural elements in the core area. These walls also necessitated a polygonal formwork arrangement to meet the architectural requirement for a curved wall configuration on plan.

A similar structural concept was adopted for the first upper storey, containing the newsroom and editorial area. The podium and car park building are topped by a planted flat roof, parts of which serve as a terrace.

Two weeks were needed for each of the standard tower storeys. For operational reasons, each level had to be constructed in two phases, using two cranes and table forms for the floor slabs. While pumped concrete delivery was still possible on the lower levels, two crane skips, each with 2 m³ capacity, were needed for concrete placement from the ninth storey upwards.

Two construction phases for each standard storey
Image: PORR

Building cantilever on Conrad-von-Hötzendorf-Straße front
Image: PORR

An additional fast-erecting crane was used for construction of the podium and subsequently, between mid-August and the end of December 2013, for the car park building.

Overall, the building required a formwork area exceeding 80,000 m², with nearly 17,000 m³ of concrete and some 1,736 tonnes of steel reinforcement (mainly rebars) incorporated.

The stair flights were built from fair-faced precast concrete units.

The concrete walls in the core area posed a number of challenges: apart from the high-spec (Class 3 fair-faced) finish required for the exposed surfaces, these works – performed between June 2013 and March 2014 – were subject to wide-ranging weather conditions. The concreting operations, particularly the concrete vibration, were additionally complicated by the large ceiling heights on the lower levels, the high amount of reinforcement required by the structural design, and the numerous wall openings needed for the building services and electrotechnical installations. The storage and cleaning of the Dokaplex formwork panels, which were coated with Doka-Optix release agent, also proved more labour-intensive than for

the construction of standard concrete walls. Moreover, special protection was required for the completed walls to prevent damage, e.g. to the square-edged reveals, during the fit-out phase.

Section of fair-faced concrete wall
Image: PORR

Fit-out

Facades

The short construction timeframe necessitated an overlapping of the fit-out operations with the structural works. For example, the fact that the installation of the tower windows trailed the structural frame by only around three storeys allowed an early start on the interior finishings. As a result, the facade window strips were in place only four weeks after completion of the building structure.

Concurrent construction of structural frame and curtain walling
Image: http://smc.netzcam.net

Different facade systems were specified for the podium levels, tower (high-rise) and car park building. The selection of high-quality curtain walling, especially in terms of thermal control, was a top priority given that LEED Gold certification is targeted for the scheme.

Full-height stick-system curtain walls featuring up to 4 m high glass units were installed on the podium levels. Solar-control glass was incorporated on the first and second upper levels due to the lack of any external sunshading on these fronts.

The tower facade features full-perimeter strip windows with enamelled spandrel glazing and integrated external venetian blinds. The tower elevations are punctuated in the rhythm of the 140 cm window grid by vertical elements, so-called "lesenes", which create the impression of a unitized curtain wall.

Curtain wall installation with mast climbers
Image: PORR

Perforated profiled metal sheeting was used to clad the car park building. Due to the strict requirements in terms of net free ventilation area (63%), this was made from special sections. This solution eliminated the need for both a fire-alarm and a mechanical exhaust system.

Building interior

All office storeys, from the third to the 13th, have the same standard floorplate. The space partitioning is co-ordinated with the facade grid and allows maximum layout flexibility in case of later alterations. Carpeting laid on screed was selected as the floor covering. Due to the high priority given to room acoustics, fully perforated plasterboard panels were specified for the suspended ceilings. Also, in order to maximize the transparency of the interior spaces, most of the partitioning between offices and corridor takes the form of glass screens.

Sample office shortly before completion
Image: PORR

As mentioned above, the approx. 3,200 m² newsroom is located on the first upper level. The particularly stringent acoustic requirements for this space necessitate the installation of a perforated plasterboard acoustic ceiling,

which will double up as a chilled ceiling, in conjunction with special acoustic carpeting. Moreover, to accommodate the vast quantity of electrical and media installations, the entire area will be fitted with raised access flooring. Also situated on the first floor are the Antenne Steiermark radio studios and the Kleine Zeitung TV studio, for which customized acoustic concepts are being developed.

Future newsroom
Image: PORR

Building services

The city of Graz authorities granted permission for two extract wells plus associated infiltration systems. In winter, these supply the heat pumps with enough energy to cover the full heating load while, in summer, they offer some 900 kW of cooling capacity for the building. The remaining cooling capacity is provided by refrigeration plant / heat pumps.

Most building areas are heated by radiators and cooled by fan-coil units. Certain areas that are subject to special requirements are fitted with heated/chilled ceilings, floor heating, active chilled beams and ventilation systems. The stringent acoustic requirements in the TV and radio studios necessitated the installation of chilled canopies. The refrigeration system serving the "Antenne" and "Kleine Zeitung" tenancies will offer 100% redundant capacity.

A restaurant facility will be provided on the ground floor.

A further ground-floor unit will be fitted out as a bank branch and a data centre installed at basement level.

A photovoltaic system with a peak output of 14 kWP will be mounted on the car park building roof. The generated electricity will be fed into the building network. To rule out the risk of any operational disruption, both an emergency power system (650 kVA) and an uninterruptible power supply are provided for specific areas defined by the client, e.g. newsroom, TV/radio studios and workstations.

The entire building is served by sprinklers, a full-coverage fire-alarm installation and stair pressurization systems, in accordance with Austrian guideline TRVB 127.

On account of its size, the newsroom is equipped with its own smoke and heat exhaust ventilation system (SHEVS). The car park building is naturally ventilated.

Concluding remarks

Currently the biggest building construction scheme in the Province of Styria, the facility is due to become the Styria Media Group's new home as of 2015. Thanks to the wholehearted commitment of the entire project team and on-site operatives, the works are proceeding apace. Consequently, as things stand, there is nothing to prevent the punctual handover of the keys on 19 December 2014.

Berlin-Mitte: Inselstraße 9-10

Construction of 86 private apartments with underground parking and gardens

Michael Fischer

General information

Are you looking for idyllic surroundings in the heart of the city? Inselstraße provides both – quiet living and yet only minutes from the city centre.

The 3,550 m² plot is situated in an attractive location near the Märkisches Museum metro station. The Heinrich-Heine-Straße metro station and Jannowitzbrücke train station are also within easy walking distance.

In December 2012, the Berlin branch of PORR Germany GmbH was commissioned with the turnkey construction of two apartment blocks, each with commercial premises on the ground floor and an underground garage.

The construction project was undertaken as part of a property development scheme. The general contractor agreement included not only the construction process but also the site planning, building design, planning permission procedure, including obtaining acoustic and thermal insulation certification, and the designing of the external grounds.

Building art replaced by new building

Building art
Image: PORR

Art of building
Image: PORR

Project data

Client	Münchner Grund Immobilien Bauträger AG (subsidiary of UBM Realitätenentwicklung AG)
Contractor	Porr Deutschland GmbH, ZNL Berlin, Building Construction Department
Start of construction	December 2011
End of construction	September 2013
Gross Floor Area (GFA)	15,445.37 m²
Residential units	86
Commercial units	2
Underground parking spaces	71
Concrete	12,560 m³
Reinforcement	1,450 t
Facade area	4,000 m²

Project description

The two buildings are interlinked on the ground floor and first floor, but in terms of energy supply and waste disposal remain fully independent. The district heating main pipeline supplying Berlin-Mitte runs between the two buildings and therefore had to be carefully protected from any damage during the construction period.

Both main entrances on Inselstraße take you into an imposing foyer which leads to all the apartments and inner court-yard. The communal garden area and private courtyard gardens form the core of the complex.

Foyer
Image: PORR

Bicycle storage room
Image: PORR

To comply with barrier-free construction requirements, stepless side entrances were also built to access the apartments.

Modern 2- to 5-room apartments with high-quality fittings offer scope for all tastes and individual wishes. The 3 m high ceilings provide plenty of light and space. The apartments come with either their own garden, balcony, loggia or roof terrace.

From the underground garage, level-access lifts lead to all floors.

In the basement, in addition to the bicycle and pushchair storage rooms, each apartment has its own cellar compartment.

The designing and planning permission phases took into account measures to ensure sustainability and an optimal use of resources. These measures were optimised and implemented in the construction planning phase in accordance with the requirements of the German Energy Savings Regulation EnEV 2009, KfW-Effizienzhaus 70.

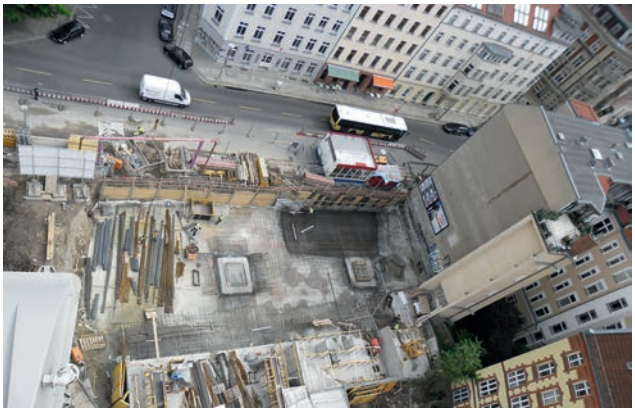
Construction process

Construction of the building complex presented two challenges in particular:

Construction of foundations

The first challenge was presented by the fact that the foundations had to be constructed adjacent to an existing property on one side and next to a recently completed development on the other side.

Foundation pit for Building 10
Image: PORR



Base slab of underground garage for Building 10
Image: PORR

Each building received a single-floor underground garage with a total of 35/36 car spaces and an interior entrance ramp along the basement wall and foundations of the neighbouring plots in accordance with the relevant foundation construction criteria and in compliance with the .specification (Wanne Weiße) ″tank concrete waterproof″

Base slab for Building 9
Image: PORR

Base slab of underground garage for Building 9
Image: PORR

Construction of the foundations required the following preliminary measures:
removal of contaminants, ground improvements, dewatering works and partial pit lining along the Inselstraße frontage side.

During the process, approx. 5,000 m³ of earth with varying degrees of contamination were excavated and disposed of.

Roughly 200 m³ of existing foundation had to be demolished and also disposed of.

The positive outcome of the operation was evident on comparing the documented state of affairs before and after the preliminary measures had been taken.

Foundation pit
Image: PORR

Special requests
The second significant challenge was presented by dealing with the special agreements and requests from future purchasers.

These requests turned out to involve not only tiles and flooring, sanitary fittings and inner door designs, but also changes in headroom heights above doors and entire apartment layouts.

Specially requested fittings
Image: PORR

Headroom height alteration
Image: PORR

Internal layout
Image: PORR

The challenge was to coordinate these special requests

with the particular construction phase in progress.

Technical building systems

The choice of technical building systems was also influenced by the latest innovations in modern living and energy efficiency:

- District heating – low temperature heating
- Centralised water heating
- Energy-saving underfloor heating with separate thermostat control
- Solar heating installation on roof to support service water supply
- Radio-controlled electronic metering
- Demand-based decentralised ventilation system in each apartment
- Separate ventilation system in bathrooms and toilets

Supply pipes with floor-level inflow
Image: PORR

Solar heating installation
Image: PORR

Living space design

The generous room dimensions allow for transparent, individual interior design options.

An abundance of light ensures a warm, bright atmosphere in all living areas.

The high-quality sanitary installations combined with the specially chosen flooring in the kitchen, bathroom and toilet bring a "feel good" factor and add a personal touch, contributing to overall customer satisfaction.

Dining room
Image: PORR

Bay window
Image: PORR

Apartment with roof terrace
Image: PORR

Facade from courtyard
Image: PORR

Facade

On the street and courtyard side, the outer walls were provided with an exterior insulation finishing system (EIFS) in accordance with the requirements to meet the guidelines of the EnEV 2009 Regulation.

The facade design follows a traditional Berlin construction method whereby large, almost ceiling-high windows or groups of windows are fitted into the facade.

With the remaining wall surfaces, a multi-dimensional appearance was created through the use of structural elements and arrangement of various insulation thicknesses.

The layout of the balconies, loggias and roof terraces contribute to the overall appearance of the architecture in the district and add to Berlin-Mitte's reputation as the cultural and art district of Berlin.

Partial view of facade
Image: PORR

Courtyard design

The inner courtyard, originally empty and barren with just one tree grown over decades, is now to become the focal point, playground and "green lung" of the complex.

Inner courtyard – empty and barren
Image: PORR

Following the open space design plan, this was achieved by remodelling the ground, adding railings and support walls, using colour design in the paving and adapting playground equipment to the surroundings, all to the full satisfaction of purchasers, architects and the City of Berlin.

The "Inselstraße" project has once again shown that by using internal resources and consulting collaboratively with all concerned, such a demanding task can be realised to the satisfaction of everyone involved.

View of courtyard
Image: PORR

View of courtyard after remodelling
Image: PORR

EURO PLAZA Development, Phase 5

Blocks H, I and J completed in just 14 months

Helmut Piller

Project description

In August 2012, Porr Bau GmbH was appointed general contractor in the construction of Phase 5 in the EURO PLAZA office park, which stands on the Wienerberg near Vienna-Meidling station in the city's 12th district.

Built in the record time of 14 months, Phase 5 has extended Vienna's most up-to-date office development by a further three office buildings. This was already the ninth property at this location that PORR has completed as general contractor since 2001.

EURO PLAZA Master Plan
Image: AnnA BlaU

Construction phase 5
Image: AnnA BlaU

The high quality of execution and the site's prime location due to excellent transport links have generated considerable interest in the rental units at the office park. Phase 5 has added a further 35,000 m² to the lettable gross commercial floor area at the EURO PLAZA site. Like EURO PLAZA 4, the new buildings are set to obtain a gold ÖGNI (Austrian Green Building Council) certificate, the most stringent international label for sustainable buildings in Austria.

Phase 5 occupies a square plot with a side length of around 100 m, framed by three streets and a car park to the south. The offices of HN+P Architekt Heinz Neumann + Partner designed the two L-shaped blocks and a smaller building as reinforced-concrete frame structures. This concept maximized layout efficiency and flexibility, which are key features in attracting tenants.

The ground-floor levels are intended for multi-purpose uses, e.g. as office units, shops, restaurants, storerooms and service facilities. The five upper storeys in each building are to house variously sized and configured offices. The two basement levels provide 328 parking bays plus storage and service space.

Car park
Image: Toni Rappersberger

Car park
Image: Toni Rappersberger

Project data

Project type	Office park
Client	Kapsch Immobilien GmbH represented by Strauss & Partner Development GmbH
Investor	Kapsch Immobilien GmbH
Architecture	HN+P, Architekt Heinz Neumann + Partner

Structural design	ZT Gritsch and ZT Mencik
Building services	HTG Ortner GmbH (HVAC & sanitary), KBC Kapsch BusinessCom (low-voltage current), Elektro Schwarzmann GmbH (mains connections), Otis GmbH (elevator)
Site supervision	Proché & Partner Ziviltechniker KEG
Construction period	August 2012-October 2013 (completion of building shell and developer's fit-out plus parts of tenant fit-out)
Contractor	Porr Bau GmbH (internal partnership between Major Building Projects Department & Vienna Building Construction Branch (New Build Dpt. 1)
Gross commercial floor area	35,000 m²
3 buildings	Ground floor, 5 upper floors
Garage	Two-level underground garage with 328 car spaces
Site area	Approx. 10,000 m²
Grounds	Approx. 10,000 m²
Excavated soil	100,000 m³
Concrete	40,000 m³
Reinforcement	3,000 t

Construction schedule

Construction started on 2 August 2012. The construction period roughly breaks down as follows:

- Excavation: August 2012-November 2012 (3 months)
- Shell: November 2012-May 2013 (6 months)
- Fit-out: March 2013-October 2013 (8 months)

This simplified programme highlights the tight construction deadlines, with the first tenant scheduled to move in just 14 months after the start of excavation work. The heavy snowfall in the winter of 2012/2013 caused further headaches for the PORR project team. But all sections were completed on time, despite these adverse factors.

The cornerstone ceremony took place on 5 November 2012 in the presence of Vienna's Deputy Mayoress Mag. Renate Brauner and PORR CEO Karl-Heinz Strauss. Click here for video: https://www.youtube.com/watch?v=IVE2It5MYYY&feature=youtu.be

Up to 250 people worked on the construction site over the course of building, while as many as 350 were involved in the fit-out.

Excavation

The approx. 10,000 m² plot was excavated to a depth of around 10.5 m below ground level, requiring removal and disposal of some 100,000 m³ of soil in less than three months. Patches of rock, inadequately recorded during the construction site selection procedure, proved further complications.

Shoring up the pit

Suitable methods were adopted to stabilise the pit as excavation works proceeded. It was unnecessary to anticipate groundwater infiltration, as the water table in this area is low. A 60° embankment was constructed along the sides of the pit in the southern section of the construction site, where there was sufficient space. A retaining wall with discontinuous bored piling, held in place by a row of anchors, stabilised the pit on the other three sides of the construction site. Shotcrete infill was injected between the individual piles to improve structural strength. The single row of anchors was removed as soon as the building acquired sufficient structural stability.

Shell

Some 40,000 m³ of concrete and 3,000 tonnes of reinforcement were needed to construct the shell. In line with the client's specifications, a waterproof concrete basement solution was adopted for the two below-ground levels. In this structural waterproofing system, the concrete itself acts as the waterproof barrier and must hence satisfy high demands in terms of concrete quality and degree of reinforcement.

The ground floor and five upper storeys were designed and constructed as reinforced-concrete frame structures. In consequence, there were no other supporting elements to provide rigidity apart from the stairwells and the parapets included in the structural calculations. The parapet beams serve to minimise floor slab deflection around the edges, while providing reinforcement for the installation of a transom-mullion facade. The structural columns are arranged at intervals of 7.6 m. To increase load-carrying capacity, the floor slabs were strengthened around the columns using stud rails incorporated in the upper reinforcement layer and by applying higher-quality concrete within a radius of 1.5 m around the column centres. Static and dynamic load transfer poses the greatest technical challenge when it comes to frame constructions. Therefore, all elements intended to transfer load (columns, walls) were positioned flush in vertical alignment, without any offsets. Earthquake reinforcement was fitted additionally to the centres of the stairwells from the second basement level to the second upper floor (40 mm dia. rebars).

The structural concept offers major benefits in terms of future lettability: there is ample scope to accommodate tenant wishes due to the absence of 'obstructing' walls that limit layout freedom. Freely installable plasterboard partitions are used to design space in tenant fit-outs. The only constraint is posed by ceiling bulkheads, incorporated as part of the developer's fittings to speed up the fit-out process. These offer the tenant a choice of two different corridor positions. The fifth upper storey is designed as a

recessed penthouse level.

Initial excavation and pit support by means of cast-in-situ piles
Image: Toni Rappersberger

Initial base slab sections and earth excavation
Image: Toni Rappersberger

Concrete and reinforced concrete work on basement level 2
Image: Toni Rappersberger

Concrete and reinforced concrete work on basement level 1
Image: Toni Rappersberger

Snow and ice clearance due to onset of winter
Image: Toni Rappersberger

Challenging conditions due to construction in winter
Image: Toni Rappersberger

Concrete and reinforced concrete work on upper floors
Image: Toni Rappersberger

Facade assembly and mounting apertures by scaffolding platforms
Image: Toni Rappersberger

Rapid progress on final floors
Image: Toni Rappersberger

Completion of roof landscape
Image: Toni Rappersberger

Steel support assembly and formation of inverted roof
Image: Toni Rappersberger

Planting on roofs and completion work
Image: Toni Rappersberger

Start of garden construction
Image: Toni Rappersberger

Tenants‘ improvements on other structures
Image: Toni Rappersberger

Completion of garden and planting work
Image: Toni Rappersberger

Initiation of terraces in rented area
Image: Toni Rappersberger

Advertisement signs for settled tenants (Philips and 3M)
Image: Toni Rappersberger

Initiation of irrigation and maintenance
Image: Toni Rappersberger

The technical systems within the building are housed on the rooftop areas. Just one stairwell in each of the three buildings leads to this area, out of bounds for the building occupants and accessed for maintenance purposes only. Two other technical rooms are located on the first basement level.

Roof structures BT J
Image: Toni Rappersberger

Supply lines and connections on roof BT J
Image: Toni Rappersberger

Ventilation facilities on roof BT J
Image: Toni Rappersberger

Maintenance walkway over building services lines on roof BT J
Image: Toni Rappersberger

Ventilation facilities behind soundproof walls on roof BT J
Image: Toni Rappersberger

Top view of roof BT J; BT I; BT H including soundproof housing
Image: Toni Rappersberger

Planting on flat roofs outside soundproof walls
Image: Toni Rappersberger

Crossover to mezzanine floor; angled sheet metal edging; planted roof and soundproof wall
Image: Toni Rappersberger

The guests at the topping-out ceremony in June 2013 included PORR CEO Karl-Heinz Strauss. "The rapid progress we have made in completing Phase 5 is a testament to the tremendous effort and commitment of the entire project team", he explained. "Also, we are in a position to draw on our longstanding experience in the structural engineering sector, which enables us to combine top-class workmanship with prompt delivery."

Topping-out ceremony
Image: Toni Rappersberger

Presentation of the topping-out fee, (from left to right) Wolfgang Benedekt (foreman), Mag. Elisabeth Kapsch (MD Kapsch Immobilien)
Image: Toni Rappersberger

From left to right: Dr. Kari Kapsch (MD Kapsch Immobilien), Wolfgang Benedekt (EURO PLAZA 5 foreman), Mag. Elisabeth Kapsch (MD Kapsch Immobilien), Karl-Heinz Strauss (CEO PORR AG)
Image: Toni Rappersberger

From left to right: Dr. Kari Kapsch (MD Kapsch Immobilien), Councillor Gabriele Votava, architect Heinz Neumann, Mag. Elisabeth Kapsch (MD Kapsch Immobilien), Karl-Heinz Strauss (CEO PORR AG)
Image: Toni Rappersberger

Fit-out

The ground-floor zones in the office park are designed for multi-purpose uses, e.g. as office units, shops, restaurants or storage space. Catering to a variety of unit sizes and all contemporary office configurations (including cellular, group and open-plan), the upper storeys can be tailored to suit the tenants' requirements. Architect Heinz Neumann opted for large glass fronts to lend the interior a bright, transparent feel. The architecture excels in its marriage of

functional efficiency and aesthetic appeal. Spacious entrance areas open onto immaculately furnished offices with everything – from state-of-the-art air-conditioning to the very latest in information technology – needed for a relaxing and professional working environment.

Philips fit-out
Image: Toni Rappersberger

Completion

The project was completed in phases between autumn 2013 and summer 2014. The first tenant to occupy its new offices at the start of November 2013 was the reputable healthcare, lifestyle and technology company Philips. It was followed by 3M and various big-name companies from the high-tech and pharmaceutical sectors. Some 65% of the accommodation is already let.

Completed building
Image: Toni Rappersberger

Completed building
Image: Toni Rappersberger

Flood defences for Schärding's historic core

Uwe Tuma

Introduction

Since its beginnings (the first records of a settlement at this location date from 806 AD), the town of Schärding has been periodically hit by medium to heavy flooding. The floods of 1954, 2002 and 2013, for instance, caused particular devastation. The high water marks displayed on the facade of the Wassertor gate that links the Burggraben with the Innländе riverside promenade bear witness to the frequency and severity of flooding over past centuries.

The Inn bursts its banks almost every year. Until relatively recently, however, minor high water events posed no serious threat to the town's built-up areas.
But the rapid transformation in residential and lifestyle habits, also development of the local economy over recent decades, means that the havoc wrought by a single major flood event can now – unlike in the past – threaten the livelihood of the urban population.

The more frequent incidence of flooding and consequent damage over recent years have convinced the relevant government agencies of the need to protect the town's listed historic fabric by constructing engineered flood defences along the Inn.

High water marks at Wassertor gate
Image: PORR

In 1998, the Upper Austrian Provincial Government and the Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW) commissioned a feasibility study to analyse the present situation and to propose realistic, technically attainable solutions to protect the town of Schärding against further floods.

After completion of this study in January 2003 and an EU-wide call for tenders, a contract was awarded in 2006 to develop a scheme for approval under water laws.

This scheme provides for the protection of built-up areas in the historic core against a one-in-30-years flood of the Inn, with a 20 cm freeboard.

It was neither technically nor economically feasible to provide protection against a once in a century flood.

Historic Wassertor gate
Image: PORR

Overall project

The flood control package for Schärding's historic centre extends over a total length of 960 m and was split into two construction sections.

A consortium including PORR's Upper Austria branch (see article in World of PORR 159/2011) had already completed the Polder 2 section between October 2010 and June 2011.

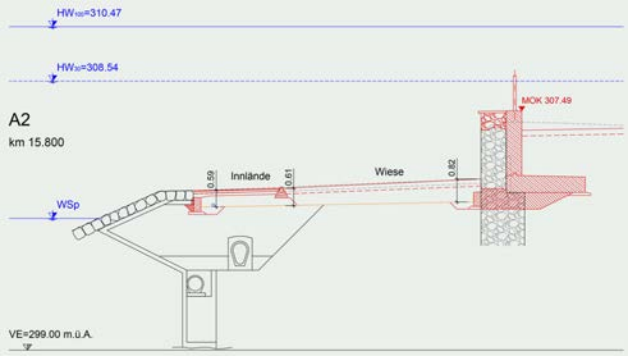
Porr Bau GmbH was contracted by Schärding town council to construct the Polder 1 phase on 26 August 2013. The scheduled date for completion was August 2014.

Within this project, a fundamental distinction is to be made between the direct riverside (foreland) flood control systems and the hinterland drainage installations. (A more detailed explanation is included later on in this article.)

All of the buildings and town walls are listed monuments, which posed key engineering challenges and necessitated compliance with special provisions for the conservation of the historic townscape.

Operational principle

The Passau/Ingling hydropower plant on the Inn was built in the 1960s. A concrete cut-off wall was built along the riverbank embankment, stretching from the rock foundation up to the Innlände promenade, to accommodate the consequent rise in water levels.



Standard template through Innlände
Image: PORR

Hence the main focus in the new project was to adapt the structural and waterproofing capacities of the existing walls and building elements to withstand the loads arising over the course of any future flooding.

The flood control concept detailed the installation of a waterproof sheet membrane over the Innlände promenade and its average width of 7 m between the existing cut-off wall and the current masonry fabric we had previously adapted suitably. The purpose of the membrane is to prevent water infiltration below the shallow foundations of the existing walls in the event of a flood.

Further, movable shutters were fitted to all building openings below the high-water mark.

Flood control

Reinforced concrete supports

Most of the new cantilever retaining walls installed to shore up the existing fabric were built in the garden areas behind the town walls.

The height of these reinforced-concrete walls was adapted in line with the historic masonry to ensure they remain invisible from the Inn promenade. Anchor plates were incorporated in the reinforced-concrete walls to provide adequate protection against a one-in-30-years flood and to permit an elevation in barrier height using movable aluminium panels to accommodate freak flooding.

Excavation works for the floodwall behind the town walls
Image: PORR

Anchor plates fixed in position prior to concreting
Image: PORR

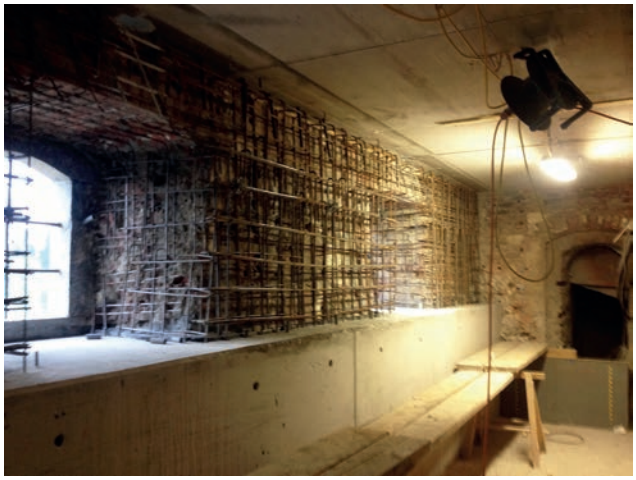
Formwork erection for foreland flood walls (Polder 2)
Image: PORR

Masonry refurbishment

Injection grouting was applied as a means of waterproofing the areas where buildings directly front the Innlände promenade.

Fine cement was injected into the composite clay brick/granite masonry of the historic buildings. In some cases, the Austrian Federal Office for the Care of Monuments (Bundesdenkmalamt) required the necessary holes (30/30 cm grid) to be drilled in the building interior so as not to detract from the appearance of the external facade.

In places, injection grouting was not considered an effective solution due to the structural condition of the buildings. The alternative adopted here involved the construction of internal reinforced-concrete walls. These walls were cast using single-sided formwork. This necessitated the creation of openings in the ground floor ceiling in order to apply the concrete. Self-compacting concrete (SCC) was specified as a means of maximising the quality of the hardened concrete.



Concrete reinforcement on the building interior
Image: PORR

Fair-faced self-compacting concrete wall
Image: PORR

Special geotechnical engineering
Despite the small project size, the ground conditions and spatial constraints necessitated a variety of special geotechnical engineering services:

- sheet pile walling for the cut-off wall in the Kurpark (spa park) and construction of the Leonhard-Kaiser Weg pump station
- injection grouting to install the cut-off barrier against groundwater infiltration below the historic town walls
- shotcreting works and anchorages in areas where adjacent buildings prevent the construction of reinforced-concrete walls
- ductile cast-iron piles as foundations for reinforced-concrete cantilever retaining walls

Injection grouted cut-off barrier below the town walls
Image: PORR

Ductile cast-iron piles as foundation for the floodwalls
Image: PORR

Removal of granite walls and simultaneous construction of shotcrete wall
Image: PORR

Membrane laid with drainage mat in Polder 1
Image: PORR

Waterproof sheet membrane (foreland)
A horizontal waterproof sheet membrane was installed along the Innlände to prevent water infiltration below the floodwalls. This necessitated complete removal of the promenade surfacing to a depth of around 70 cm.

Concrete beams were then constructed on the land and watersides as a means of providing a watertight membrane connection. The masonry behind the beam was additionally injected with cement mortar to prevent direct water infiltration at the landside junction.

Prior to preparing the membrane bed, the existing sewer/drainage manholes and lamp post foundations required adaptation or complete renewal to enable proper connection of the membranes using stainless-steel clamping bars. The 2 mm thick PE membrane was then laid on the prepared bed.

Sand bed to lay the waterproof membrane in Polder 2
Image: PORR

Hinterland drainage
The construction of four pump stations was necessary to ensure safe discharge of surface water into the Inn, even during high water. While it was possible to construct one pumping station from precast-concrete units, an in-situ concrete solution was needed for the other three on account of their size.

PORR proposed the use of a MEGA slide rail shoring system to permit excavation down to the necessary depth of over 5 m without compromising the vibration-sensitive buildings located nearby. The client was enthusiastic in welcoming this supporting system for excavation due to the constraints of on-site space, as it presented a far more compact solution than would have been needed for a shotcreting option.

Installation of SBH earthwork supports at the Wieningerstraße pump station
Image: PORR

Excavated pit at the Wieningerstraße pump station
Image: PORR

Reinstated historic town walls
Image: PORR

All pump stations operate based on the same principle. Under normal conditions, discharge through the pumping station is by means of standard gravity drainage. When flooding occurs, the rainwater is drained into the pump chamber, from where it is pumped via the gravity pipe and discharged into the Inn. This necessitated upgrading of all outlet pipes for use as pressure pipes.

Restoration of historic town walls – architectural conservation
Although all of the preliminary design work was completed in close consultation with the architectural conservation authority, a number of changes proved necessary over the course of completion.

Some parts of the old town walls were in such a poor state that their demolition and replacement with reinforced-concrete walls proved unavoidable. To preserve the external appearance, however, an approx. 40 cm thick granite facing was applied to the new reinforced-concrete walls. Particular care was taken to ensure an ideal match between faced surfaces and the masonry structure and pattern, also the stone and joint colour, and the adjoining original wall sections. The Austrian Federal Office for the Care of Monuments oversaw restoration of the historic town walls.

Walls chosen for application of granite facing
Image: PORR

Concluding remarks

Against the backdrop of spatial constraints, sensitivity of surrounding buildings and constant changes in circumstances, this project called for profound expertise, flexibility and the efficient collaboration between all team members, including the client, designers, architectural conservation authority and, above all, PORR as the contractor.

It presented our company with yet another opportunity to showcase its enormous versatility. All works were performed by the Upper Austria branch itself or by group companies. IAT played an important role in this by installing the membranes, also the Foundation Engineering Department at PORR that performed the special geotechnical engineering services, and the Concrete Repair Department, which handled injection grouting and the reconstruction of natural stonework. The client commissioned ALU-SOMMER GmbH to supply and install the movable panels designed to elevate the walls and to seal the door and window openings.

Project data

Client	Municipality of Schärding
Polder 2 construction period	October 2010 – June 2011
Polder 1 construction period	September 2013 – August 2014
Length of reinforced-concrete retaining walls	295 m
Concrete volume (including concrete fill)	1,950 m³
Reinforcement	185 t
Waterproof sheet membrane	3,800 m²
Masonry refurbishment	34,500 ltr (cement suspension)
Natural stonework	475 m²

New BMW branch in Berlin-Charlottenburg

Premium car brand occupies flagship premises in German capital

Stefan Oberzaucher

May 2012 saw PORR awarded the general contract to construct BMW's new branch in Berlin. The project was handled by an internal partnership between Porr Bau GmbH's Major Building Projects department and Porr Deutschland GmbH's Berlin site.

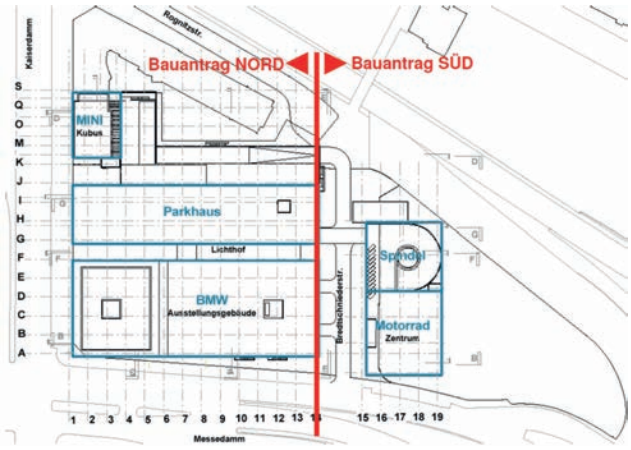
Project data

Client	BMW AG
Contractor	Porr Deutschland GmbH, Berlin branch
Lead designer	Lanz Architekt + Generalplaner
Start on site	June 2012
Completion	March 2014
Site area	16,500 m²
Gross floor area	46,000 m²
Sales area	11,000 m²
Concrete	26,000 m³
Reinforcement	4,500 t

Project description

The BMW Group's new main branch stands in Berlin's Charlottenburg district at the junction of Kaiserdamm and Messedamm. Ready access both by public transport (U-Bahn underground and S-Bahn rapid-transit system) and by private vehicle via the A100 city motorway makes this an ideal location for a car showroom.

The overall scheme comprises several separate blocks and functional areas designed to showcase the BMW Group's various brands. For the purposes of gaining planning permission, two separate applications were submitted for the north and south sections of the development.



Location plan
Image: Lanz Architekt + Generalplaner

The two basement levels, spanning the full area of the north site section, house the workshops.

This part of the development features three distinct volumes: the MINI cube, car park block and BMW showroom building. The south component comprises the Motorrad (motorcycle) centre and spiral access ramp, which is linked to the car park building by three bridges.

The new branch also includes various amenities appropriate to a new car showroom, e.g. a car wash, on-site filling station and painting booth.

The approx. 350 employees accommodated at the new site enjoy the use of generous social spaces, a staff restaurant and a bistro located between the MINI cube and BMW showroom building.

Building structure

As the basement excavation had already been completed by the time of contract signature, it was possible to commence the structural works without delay.

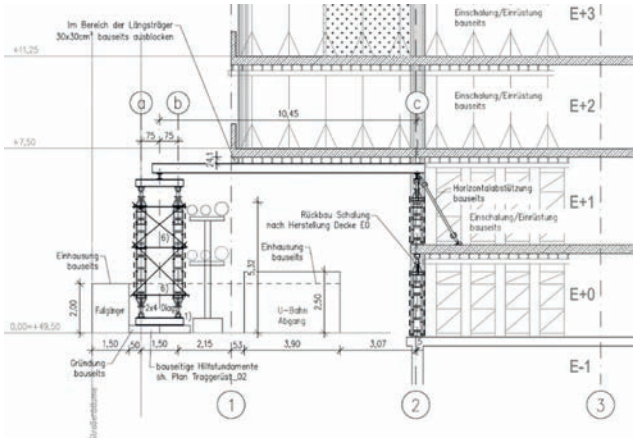
Start on site
Image: PORR

A reinforced-concrete structural system was adopted, with 35 cm thick, point-supported, two-way flat slabs. The columns, on a 11.25 m x 11.25 m main grid, are supported by pad foundations while the walls have strip footings. Te ground slab has no structural function and was cast after the vertical building elements.

Ground slab
Image: PORR

The individual blocks are stiffened by shear cores housing the stairways.

On the Kaiserdamm front, the buildings oversail an existing U-Bahn entrance. The necessary 7 m cantilever was constructed using support scaffolding with a span of 10.45 m. All loads from the projecting element are transferred via a 50 cm thick in-situ concrete slab above the third upper storey.



Oversail at U-Bahn entrance
Image: Ziegert Sailer Ingenieure GmbH

Oversail at U-Bahn entrance after completion
Image: PORR

Despite the unusually harsh winter of 2012/2013, the structural works were completed on schedule by the end of April 2013, in good time for the topping-out ceremony on 8.5.2013.

Topping-out ceremony
Image: PORR

Building services installations

The facility is heated and cooled by means of a concrete-core activation system, incorporated in the middle of the slabs, and floor heating installation. Cooling is only provided in the showrooms and some of the administrative areas. The necessary thermal energy is supplied by utility company Vattenfall AG, whose district heating pipeline runs through the complex. Split air conditioners are used to cool interior plant rooms with high heat loads.

Concrete-core activation
Image: PORR

Various building environmental control systems are installed to provide the necessary supply and extract ventilation as well as to comply with the fire venting requirements in certain areas. These systems are housed in rooftop and basement plant rooms.

The facility is served by a full-coverage sprinkler system meeting the guidelines of property insurer FM Global. Moreover, all stairwells are fitted with dry risers for the distribution of firefighting water.

The vertical circulation systems include four passenger lifts, a 5-tonne-capacity hydraulic car lift and a combined passenger/goods lift.
The MINI cube also incorporates a lift platform for presentation purposes.

The buildings are connected to the medium-voltage grid. The transformer station plus medium- and low-voltage installations are housed in the basement at the Bredtschneiderstraße / Messedamm corner of the development.

The emergency power supply for the sprinkler pump and fire venting systems is provided by a 900 kVA diesel standby generator set.

Facade systems

Key data
Stick-system curtain walling with projected top-hung windows: 3,800 m²
Profiled glass facade: 3,800 m²
Horizontal aluminium-louvre cladding: 4,500 m²

PORR subsidiary ALU-SOMMER GmbH was contracted to install all facade assemblies bar the external thermal insulation composite system (ETICS).

The visual impact of sales outlets for the BMW Group's MINI, BMW and Motorrad brands is governed by corporate identity guidelines.

The black exterior of the MINI block was assembled using a stick-system curtain wall system. The insulated, black frame of broad metal members, wrapped like web around the building, is leavened to some extent by colour frames that intensify the shopfront effect. A subtle transition to the neighbouring Gründerzeit architecture is achieved by means of a "punched-window" ETICS facade, also with anthracite finish.

MINI cube
Image: PORR

A plain greyish-white colour scheme was adopted for the BMW and Motorrad blocks, which are enclosed by stick-system curtain walling on the ground and first floors. A profiled-glass facade was installed on the second and third levels. Both buildings feature horizontal aluminium-louvre cladding between the second and fourth levels. The band of louvres sheathing the BMW, Motorrad and car park buildings lends a compactness and unity to the complex, and ensures that it engages sensitively with the neighbouring urban fabric.

BMW showroom building
Image: PORR

Atrium between showroom and car park buildings
Image: PORR

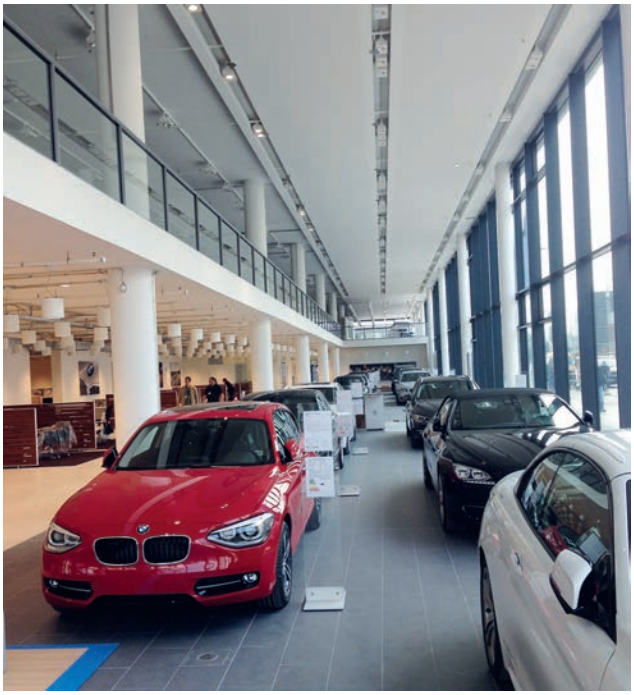
Completion/inauguration

Fire safety acceptance was granted by the building control authorities on 24.3.2014 and the facility duly handed over to its occupants. With all employees having relocated to the new premises, the new building was officially inaugurated by Berlin's Governing Mayor Klaus Wowereit on 8.4.2014 under intense media coverage.

Inauguration ceremony
Image: PORR

BMW showroom area
Image: PORR

Open stairway in BMW showroom area
Image: PORR



BMW showroom area
Image: PORR

Completed building
Image: Linus Lintner

Completed building
Image: Linus Lintner

Narzissen Bad Aussee

Brine baths & vitality centre in Salzkammergut region

Stefan Hödl

Background

Situated at the heart of Austria, the town of Bad Aussee boasts a decades-long tradition as a spa and vitality resort whose reputation extends far beyond the Province of Styria. However, as the former vitality baths in the centre of the town had reached the end of its service life some time ago and had been closed down, a replacement building was needed.

The envisaged facility was required to meet high ecological, economic, functional and technical standards. A site-finding exercise resulted in the choice of an elevated setting on the Lerchenreith Plateau amid the unique mountainscape of the Ausseerland area.

This spot is well-known throughout the region for its unspoilt natural beauty. In response to the public announcement of the scheme, a citizens' initiative was immediately launched to block its implementation. However, various architectural adaptations and other design changes, some made as late as the construction phase, allowed an agreement to be reached with the project's opponents in time for the topping-out ceremony.

External view
Image: PORR

Competition

Given the project's exposed and sensitive location on the Lerchenreith Plateau, the number-one priority was to develop an architectural and urban design concept that engages harmoniously with the context while taking due account of the site's topographical features and high visibility.

Working in tandem with construction firms, the architects entering the competition were required to support their design proposals with a detailed cost estimate consistent with the prescribed cost frame.

Key criteria governing the design concepts included:

- Interpretation of vernacular architecture and Alpine landscape
- Fragmented, village-like organization of development, transformation of Alpine silhouette
- Trimming down, simplification and optimization of massing
- Satisfactory balance between new-build volumes and natural setting
- Exploitation of natural topography
- Brine grotto as distinct centrepiece of healthcare offerings
- Focus on remedial power of salt as regional resource, thereby creating a unique selling point for new Narzissen Bad Aussee

In the spring of 2012, PORR Bau GmbH and architectural practice Schulz-Architektur were named winners of the project competition with a scheme under the working title "Bad Aussee vitality baths with accompanying hotel and apartment complex". The jury had been convinced by the quality of the overall concept as well as by PORR's proven expertise in the field of thermal baths construction.

Design

Porr Bau GmbH was initially appointed to handle the design work for the following three phases:

- Outline proposals
- Detailed proposals
- Planning application proposals, including submission and management of statutory planning process

PORR continuously adjusted and revised its cost estimate in line with the design development by the architect. The scale of the deviations from the cost target gradually diminished as the scheme took increasingly concrete shape.
The client's go-ahead was required for the results of each design phase prior to the commencement of work on the next stage.

Location plan
Image: PORR

The design scheme covered the following structures:

- Narzissenbad: Swimming pool, thermal baths, sauna, therapy suite, fitness area and restaurant
- Resort hotel: Three hotel blocks to be operated in conjunction with the baths facility
- Residential component: four to five additional apartment blocks
- Golf chalets: small holiday chalets (proposals dropped in reworked scheme)

The purpose of the design mandate was to submit a planning application and obtain planning permission. A legally effective planning approval for the entire development (baths facility, hotel blocks, apartments and golf chalets) promptly followed in August 2012.

GMP contract

The end of August 2012 saw Porr Bau GmbH awarded a design-and-build contract on the basis of a guaranteed maximum price (GMP) arrangement. PORR was initially commissioned to construct only the baths facility. A contract for the three hotel blocks that were also part of the tender for the overall development may be additionally awarded as of mid-2014.

The guaranteed maximum price covered the following components:

- Lump sum for all construction works performed by PORR as classified under LB-H (Building Construction Specification) system: LG01-LG19 (general builder's work), LG 26 (asphalting), LG 32 (structural steelwork) and LG 36 (carpentry)
- Payments for subcontractor works: client and contractor to collaborate in subletting of works for purpose of price optimization

The subcontracts were negotiated on the basis of an open-book arrangement.
GMP contracts are such that, if the final sum exceeds the guaranteed maximum price, as defined above, then the client is obliged to pay only the price originally agreed, provided no variation orders or addenda were issued. Should the final sum fall short of the guaranteed maximum price, then the following bonus provisions apply:

- The difference between the guaranteed maximum price and the final sum are to be shared equally between the client and contractor.

Hence, through expert cost management, Porr Bau GmbH successfully garnered a bonus for both contract parties.

Night view
Image: Schulz-Architektur

Project description

The architectural concept is largely based on an attempt to model the building silhouette on the surrounding mountainscape. The angular contours of the Narzissen Bad, with its eye-catching tower, are inspired by the outlines of a nearby peak, the Loser in the Totes Gebirge range. The transparently designed building takes full advantage of the breathtaking location to offer magnificent views of the unique mountain setting. The use of indigenous materials was a key priority in designing both building envelope and interior. This served as a means of enhancing the references to nature and accentuating the synergies between building and landscape. One very striking feature of the exterior is the shingle facade, which, in tandem with the generous glazing, adds particular vibrancy.

Foyer
Image: Schulz-Architektur

Restaurant
Image: Schulz-Architektur

Sauna
Image: Schulz-Architektur

Sauna bar
Image: Schulz-Architektur

Sauna catering area
Image: Schulz-Architektur

Reception
Image: Schulz-Architektur

Therapy area
Image: Schulz-Architektur

Through the use of indigenous woods, stone linings and other locally sourced materials, the interior furnishings further emphasize the happy marriage of modern and naturally inspired architecture.

The baths facility spans four levels:

- Level 01 – basement: Sauna suite, plantrooms and storage spaces
- Level 02 – ground floor: Foyer, pools and admin
- Level 03 – first upper floor: Spa and therapy areas
- Level 04 – second upper floor: Fitness area, services installations and rooftop terrace

The 180-space car park is located in the northern part of the site, the individual bays being arranged in terraces as dictated by the local topography. Here, all hard surfaces, specifically the circulation routes, bays and footpaths, were paved in asphalt. The forecourt to the Narzissen Bad Aussee doubles up as a bus turning circle with an official stop of the local public transport network.

A ground infiltration system is provided for disposal of the surface run-off from the paved areas. The rainwater from the parking areas is collected in grassed channels, from where it soaks into the ground. The remaining water drains into a retention basin lying to the north-east, from where it is gradually discharged into the outfall.

Construction works

Access road

Work on site commenced in September 2012. The first step was to build an access road to the previously unserviced site. This road runs over a greenfield area and crosses the Schindergraben, a small stream with an ecologically significant riparian zone. Where it meets the road, the stream was culverted. As an ecological mitigation measure, twice the area cleared of shrubs and woody plants had to be replanted near the Schindergraben. The local water authority demanded the appointment of an ecological supervisor to oversee these works, which were duly certified as being compliant with statutory requirements.

The roadworks for the approx. 200 m access route were performed by TEERAG-ASDAG AG. Much of the road was built using material from the basement excavations on site. Fill for the road embankment was placed to a height of up to 5 m. The works were always limited to one half of the route so as to guarantee site access throughout the earthworks phase.

Fill placement for access road
Image: PORR

Utility lines

Prior to development, the site was completely without electricity, water and sewage infrastructure. Nor was there, initially, any provision for heavy-vehicle access. Special measures were needed with regard to an existing Eternit water pipe, mainly serving Bad Aussee's new hospital, which ran across the site. Prior to the start of work, protective steel plates were installed over the pipe to ensure safe access to and from the site for construction traffic. Due to the early onset of winter, the planned relocation had to be postponed until April 2013. Most of the structural works thus had to be carried out without any running site water.

The fact that no excavations were allowed near the water pipe also delayed the laying of an electricity line to the site. This necessitated the installation of a diesel generator to provide power for the works. Apart from the normal site power demand, electricity was also needed for a tower and a fast-erecting crane. In order to minimize site set-up costs, PORR opted for the use of a guided boring system to install power lines to the site as soon as possible together with early operation of the transformer station planned for the finished facility.

Structural works

A reinforced-concrete frame system was adopted for the building structure. The building is braced against horizontal wind and earthquake loads by the stair core and continuous shear walls. The in-situ concrete columns are "pin-ended", i.e. they serve to transfer vertical loads only. The building structure is some 20 m tall. The structural floors are built as reinforced-concrete flat slabs, with a

standard thickness ranging between around 27 and 40 cm. The entire structure is founded on shallow footings, with all ground slabs rigidly connected. The ground slabs are partially strengthened by haunching below the structural elements. The thickness of the ground slabs is approx. 30 cm, increasing to around 60 cm at the haunches.

Despite the inclement weather, the structural works continued throughout the winter period. Precast double walls and stair flights were used to streamline construction. For the bulk of the works, however, the structural requirements and complex geometries dictated the adoption of in-situ concrete solutions.

Tower assembly

Construction of the tower feature was particularly challenging. The first step – the concreting operations – at the same time marked the end of the structural works. The longitudinal and transverse inclination of some of the beams and wall sections placed additional demands on the scaffolding and formwork. By the time the structural members of the tower were being cast, the fit-out works for the rest of the building were already in full progress. Consequently, the still-open sections of the facade had to be temporarily covered-over with tarpaulin to protect the interior fittings and finishings from the elements.

Only after completion of the concreting was it possible to take the as-built measurements as a basis for the subsequent steelwork and aluminium/glass curtain walling. Given that the subcontractors had already prepared the basic production information, only minor adaptations were needed in line with the built structure.

The structural works for the tower are straddled by a steelwork frame that stands "on all fours". This was developed on the basis of the architect's 3D modelling and co-ordinated with the structural design so as to ensure that, once the curtain walling is in place, the tower surfaces and edges are properly aligned with the rest of the building.

The steelwork and curtain walls were installed after a factory-fabrication process spanning several weeks.

The steel lattice-girder space frame was clad partly with larch shingles and partly with aluminium composite panels.

Despite the close consultations between architect and subcontractors on the 3D design, it was only possible to specify the final connection details on site.

Erection of tower
Image: PORR

Erection of tower
Image: PORR

Erection of tower
Image: PORR

Erection of tower
Image: PORR

Installation of crystal
Image: PORR

Brine floating pool
A further project highlight was the installation, in the pool hall, of a salt-crystal-like enclosure to house a brine floating pool with a salt concentration exceeding 10%, along with a brine steam bath and ante-space with showers.

The supporting frame of the "crystal" is built from steel circular hollow sections. A glassfibre-reinforced plastics (GRP) product was used for the imitation-rock interior lining over the brine pool. As the artificial rock panels had to be fixed at approx. 30 cm centres, a system of wood battens and counter-battens was fitted to the steelwork assembly. The battens were also used as a base for fastening the LED-strip backlighting for the crystal. The overall lighting installation comprises some 1,500 m of lighting strips with a choice of three colours.

The interior lining to the steam bath and shower areas takes the form of GRP panels, with a tile covering on the walls and a coated finish for the ceiling.

The entire interior lining in the crystal, which is exposed to a highly saline environment, was vapour-proofed. The steelwork was also finished with a special anti-corrosion coating.

On the exterior, the crystal is clad with variously sized, backlit, satin-finished glass panels. These were secured by three-dimensionally adjustable, stainless-steel point fixings specially welded to the steelwork. Prior to ordering the glass, special templates were prepared by cladding the whole crystal in pressed particleboard. Due to the different sizes and shapes of the glass panels, each of these had to be custom-manufactured. Open joints, approx. 10 mm wide, were deliberately left between the panels to allow the escape of moisture. Variable-height tiled skirtings were installed at the floor junctions around the full perimeter of the crystal.

Installation of crystal
Image: PORR

Installation of crystal
Image: PORR

Installation of crystal
Image: PORR

Installation of crystal
Image: PORR

Pool hall with crystal
Image: Schulz-Architektur

Fit-out works
The fit-out works commenced on schedule in the spring of 2013 after completion of the timber roof construction over the bathing area. In all, some 75 subcontractors were involved in the Narzissen Bad Aussee project.

Pool hall roof construction
Image: PORR

Value creation from Group resources
The PORR Group companies IAT (Innovative Abdichtungstechnik) G.m.b.H. and TEERAG-ASDAG AG were respectively contracted to carry out the roof membrane installation and external works.

Waterproofing specialist IAT installed approx. 1,150 m² of polymer membrane and approx. 1,650 m² of bitumen felt roofing. Some polymer membranes served as an underlay for green roof areas, others for a roof terrace. Bitumen felt was used for the hipped roof over the pool hall and second-floor ventilation plantroom. A two-ply felt system was adopted, with a mineral granule-surfaced product used for the exposed top layer.

Civil engineering experts TEERAG-ASDAG constructed the foul water and rainwater sewers, the aforementioned access road, the asphalted car park and circulation routes, and all the paved lounging areas and paths needed for the facility. At the architect's request, the concrete units used for the approx. 1,050 m² paving by the main entrance and outdoor pools were tinted with a colour to match the indoor tiling.

Inauguration
On 16 December 2013, after a construction period of only 15 months, the Narzissen Bad Aussee baths facility was successfully handed over to a satisfied client.

The official inauguration ceremony, held on the very same day, was attended by Styria's Deputy Provincial Governor Hermann Schützenhöfer and over 300 other guests. They were guided through the evening by Austrian TV presenter Werner Ranacher as MC, with music provided by Bad Aussee's municipal band and a group from the local music school. The event's grand finale, the traditional "Dirndlspringen" inauguration ritual, saw a group of Dirndl-clad girls jump into the main pool.

The Narzissen Bad Aussee brine baths and vitality centre with spa and wellness offerings was then opened to the public on 19 December 2013.

Built at a cost of EUR 20 million, the facility has created 50 new jobs in the region. The town of Bad Aussee plans to unveil a new range of offerings that capitalize on its historic credentials as a spa and vitality resort and hopes to attract some 90,000 visitors each year.

The response, even within the first few weeks, turned out to be more than satisfying: in a record-breaking launch, the new attraction pulled in some 10,000 visitors within the first month. Should this run continue, the visitor numbers projected for the first year will be exceeded by far.

Project data

Client	Vitalbad Errichtungs GmbH
Client's representative	WEGRAZ
Project management/Austria Bad Aussee	Wendl ZT GmbH
Contractor (D&B)	Porr Bau GmbH, Styria branch/Building Construction
Scope of works	Design-and-build contract
Contract sum	Approx. € 16 million
Architecture	SCHULZ-ARCHITEKTUR ZT GmbH
Project type	Pool/thermal baths facility, therapy suite
Country/location	Austria/Bad Aussee
Start on site	September 2012
Inauguration	16 December 2013
Gross floor area (GFA)	6,641 m²
Gross cubic content	27,724 m³
Total pool area	Approx.526 m²
Sauna suite area	595 m²
Bathing area	1,345 m²
Wellness & therapy area	1,074 m²
Terrace/balcony area	1,104 m²
Concrete volume	Approx. 4,600 m³
Steel reinforcement	Approx. 433 t
Formwork area	Approx. 17,900 m²
Excavation/landscape modelling	Approx. 26,000 m³

Extension to ESO Headquarters in Garching bei München, Germany

Markus Rabel

Background

The European Southern Observatory (ESO) is Europe's foremost astronomical research organization and the world's most scientifically productive observatory for ground-based astronomy.

Formed in 1962, ESO is now supported by 15 countries, including Austria. The organization employs a workforce of around 740 at its headquarters in Garching bei München, Germany, and three sites in Chile.

Project description

Architectural practice Auer + Weber + Assoziierte was commissioned to design the headquarters extension. The brief called for a scheme which, through its spatial arrangement and architectural language, respects both the green belt south of the Garching research campus and the extroverted character of the adjoining main building.

Visualization of overall scheme
Image: Architectural practice Auer+Weber

With a design based on a series of curved segments, the new-build extension sets out to emulate the formal geometry of the existing curvilinear building and enter a symbiosis with the landscape setting. The main building continues to house the principal entrance, reception and public spaces while the new block primarily accommodates office and seminar spaces, as well as an auditorium.

The scheme breaks down into three main components: the first of these is the three-storey Office Building, comprising the three sections A, B and C along with four inner courtyards. The second component is the Technical Building, again with ground floor and two upper levels. The third section is the link bridge between the extension and the existing building.

Together, the new Office Building and Technical Building have added a usable area of 18,700 m² to the ESO Headquarters, which has doubled in size as a result.

The inclusion of inner courtyards is in keeping with the overall architectural concept, which makes extensive use of natural light sources.

Timber stick-system curtain walling in inner courtyard
Image: ALU-SOMMER

Timber stick-system curtain walling in inner courtyard
Image: ALU-SOMMER

The cylindrical Technical Building, with an area of 2,900 m², will soon be the place where ESO's most advanced instruments are developed, built, tested and refined. It will also house one of the world's largest computer-based archives of astronomical data.

Construction sequence

The structural works for the ESO Headquarters extension

commenced in January 2012.

The building's notable features include its unique shape and the high degree of transparency achieved by the facade. The entire envelope for this project was designed, fabricated and installed by ALU-SOMMER between 2012 and 2013.

The building features three different facade systems:

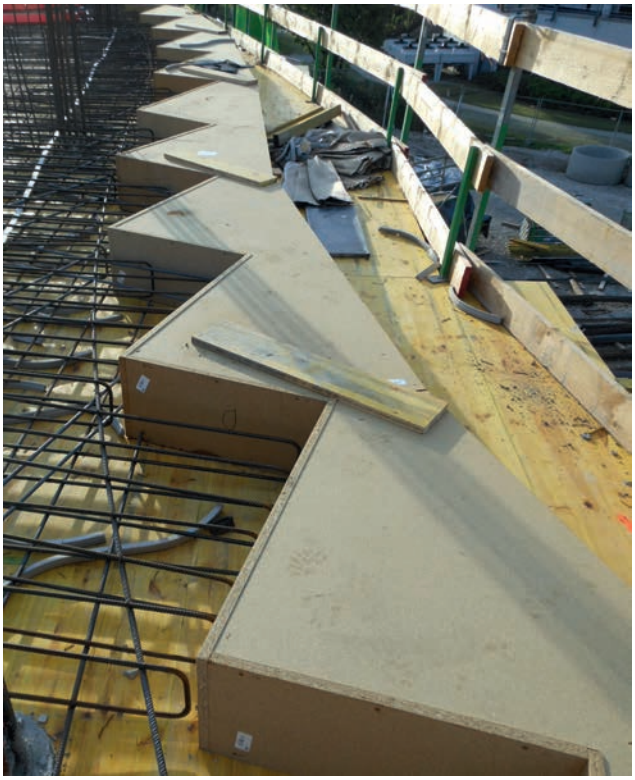
- Zigzag unitized curtain walling (main facade)
- Aluminium stick-system curtain walling (Technical Building and bridges)
- Timber stick-system curtain walling (inner courtyards)

A special steel/glass assembly was used to construct the skylight roofs.

Zigzag unitized curtain wall system with sheet-metal cladding
The zigzagging main facade is an architectural eye-catcher. Accordingly, during the detailing and erection process, it was imperative to meet the architect's visual and geometric specifications to the letter.

In accordance with ALU-SOMMER's proposals, the individual panels were fabricated as 7.5 m tall, double-storey units. Although this solution somewhat complicated the logistics and installation operations, it allowed significant economies to be achieved in terms of material and fabrication costs.

Part of zigzag facade (22.11.2012)
Image: ALU-SOMMER



Outline of structural slab edge
Image: ALU-SOMMER

Completed building
Image: ESO

The curtain walling was required to meet exceptionally high insulation and proofing requirements, specifically an overall U value of 1.4 W/m²K and a sound-reduction index of 45 dB.

The entire curtain wall system, including all sections and seals, was developed, designed and realized by the engineers at ALU-SOMMER.

Top priority was given to the windproofing and driving rain resistance of the assembly. Thanks to the team's tireless efforts, all requirements were met to the utmost satisfaction of the client and architect.

Special reusable frames were developed and fabricated from steel hollow sections for the handling and transportation of the oversize units, two at a time. After unloading on site by forklift, the frames were set upright

and temporarily fixed to the building structure. The 7.5 m tall units were then individually raised into position by a specially adapted telescopic handler and fixed to steel brackets premounted on the structural frame.

Installation of zigzag curtain walling (22.11.2012)
Image: ALU-SOMMER

Installation of zigzag curtain walling (22.11.2012)
Image: ALU-SOMMER

Stick-system curtain walling
In a similar way as for the main facade, the aluminium stick-system curtain walling was specially designed for factory preassembly into larger units. Thanks to the high degree of prefabrication at the plant, only a short time was needed for on-site installation.

The individual units were likewise fabricated with lengths of 7.5 m spanning two storeys.

Installation of stick-system unit with telescopic handler (18.12.2012)
Image: ALU-SOMMER

Stick-system curtain walling installed as preassembled units in inner courtyard (18.12.2012)
Image: ALU-SOMMER

Completed building
Image: ESO

The curtain walling works were completed in the late autumn of 2013 to the full satisfaction of all project team members. With only routine cleaning work left to be done, the path was clear for successful handover of the work package to PORR's employer (the general contractor) and of the entire project to the client in December 2013.

Project data

Client	ESO (European Southern Observatory), Garching bei München
Employer	BAM Deutschland AG, Frankfurt/Main
Architect	Auer + Weber + Assoziierte, Munich
Contract sum	Approx. EUR 5.1 m
Contract period	Commencement of design in July 2012 Handover of works in December 2013
Scope of works	3,300 m² special unitized curtain walling (zigzag facade) 2,000 m² stick-system curtain walling (aluminium, timber) Roofs, pedestrian/industrial doors and sheet-metal cladding

Construction of S2 expressway in Warsaw

Konotopa-Puławska package, including (S79) spur route to Warsaw Chopin (Okęcie International) Airport and inner-city Marynarska road

Marcin Ardziński

S2 expressway, westward view by day
Image: PORR

Reinforcement of structures WD-19A and WD-19B
Image: PORR

S2 expressway, westward view by night
Image: PORR

Tall column for structure WD-20 in cutting
Image: PORR

Project description

A consortium comprising TEERAG-ASDAG Polska Sp.z o.o. (PORR (POLSKA) S.A. as of June 2013), TEERAG-ASDAG AG and INTOP Tarnobrzeg Sp. z o.o. – headed by TEERAG-ASDAG (later PORR) – was contracted by the General Directorate for National Roads and Motorways (GDDKiA)/Warsaw Head Office to construct the Konotopa-Puławska section of the S2 expressway in Warsaw, including the S79 spur route to Warsaw Chopin (Okęcie International) Airport and inner-city Marynarska road, between September of 2009 and 2013. The contract value ran to some PLN 920 m (approx. EUR 221 m).

The completed S2 and S79 expressways form part of a larger ring road scheme through the city of Warsaw to link up the eastern and western sections of the A2 motorway (Poznań – Łódź – Warsaw – Biała Podlaska). Built as an expressway within the municipal boundaries, the route is designed to serve both inner-city and through traffic.

The consortium built the section of the S2 southern ring road (known locally as "POW") between the Puławska and Airport junctions. The S79 spur between the Airport junction and inner-city Marynarska road forms part of the north-south (N-S) route through the city. The intersection of the POW and N-S routes (Airport junction) and the new airport terminal junction on the N-S spur offer direct access to Warsaw Chopin (Okęcie International) Airport.

The S2 and S79 are dual-carriageway roads with two (S79) or three (S2) lanes in each direction. They are widened by one or two extra lanes at the junctions to improve safety for vehicles joining and leaving the expressway. In line with the technical requirements for expressways, all junctions are grade-separated. To maximize the safety of the transport infrastructure, tunnels and overpasses are provided at the intersections with crossing roads and railway lines. In view of the plans for a continuation of Warsaw's southern ring road, both the

Puławska and Airport junctions were designed to accommodate a possible extension (from the Puławska junction to the east and from the Airport junction to the south).

Construction of planted precast-concrete noise barriers
Image: PORR

Project data I

Highway class	S (expressway)
Number of junctions	4
Traffic speed	80/100 kph
Number of carriageways	2
Number of lanes on the main carriageway sections	2 x 2 or 2 x 3
Lane width	3.50 m
Total highway length	12.63 km (including 3.9 km for S2 and 5.7 km for S79)
Number of engineering structures (bridges/under passes/tunnels)	34
Width of hard shoulder	2.5 m per carriageway
Width of central reserve	4 m
Traffic category	KR6
Axle load	115 kN
The site width was 100-115 m for the S2 and 80-150 m for the S79 (except at the junctions).	

Formwork to bridge kerbs/perimeter strips for WD-20
Image: PORR

Ground improvement by cement stabilization in cutting – with railway overpass in background
Image: PORR

Scope of works

The works on the S2 route between the Konotopa and Puławska junctions plus the S79 spur between the Airport and Marynarska junctions comprised:

Construction of two expressway sections with suitable pavement for traffic category KR6:

- S79 section from Airport junction to Marynarska junction
- S2 section from Airport junction to Puławska junction

Construction of new roads or alteration of existing roads needed for integration of new expressway into road network:

- Crossing roads
- Approach roads
- Slip roads

Construction of expressway junctions:

- Airport junction
- Puławska junction

- Marynarska junction
- Warsaw Chopin Airport terminal junction

Construction of engineering structures, e.g.:

- Bridges
- Road and rail tunnels
- Overpasses (for main and slip roads, above and below expressway route)
- Pedestrian bridges and pedestrian tunnels

Construction of road drainage system

Construction of road lighting

Demolition works and connections needed for access to site

Alterations to and protective measures for existing utility lines, e.g.:

- Sewers
- Water
- Gas
- Energy
- Telecommunications
- District heating etc.

Alterations to road/railway overhead lines

Installation of signage and road traffic safety systems:

- Lighting systems
- Markings
- Traffic signs
- Concrete safety barriers and steel safety fences

Environmental installations:

- Noise barriers
- Tree and shrub vegetation strip on either side of expressway
- Surface water pretreatment systems
- Safe wildlife crossings

Casting of loadbearing structure for WD-20
Image: PORR

Cement stabilization of subgrade in cutting
Image: PORR

Airport junction

The most complex and labour-intensive part of the project was the creation of a safe junction between the S2 (POW) and S79 (N-S) expressways.

The following engineering structures were needed for the Airport junction:

- Cutting along S2 expressway
- Small cutting on slip road WL1
- Road tunnel TD-24 on slip road WL3
- Road tunnel TD-27 on slip road WL5
- Road overpass WD-19A on carriageway parallel to N-S route
- Road overpass WD-19B on S79 route
- Road overpass WD-19C on S79 route
- Road overpass WD-20 on slip road WL5
- Railway overpass WK-21 at km 15+354 of Warsaw-Radom-Kielce railway line
- Railway overpass WK-22 on railway line no. 50 (branch line for Siekierki combined heat and power station)
- Railway overpass WK-23 at km 2+360 on remodelled section (km 2+109 to km 2+650) of branch line Warsaw-Okęcie-Kabaty metro rail yard
- Sections of main S2 and S79 routes plus junction slip roads, i.e. WL1, WL2, WL3, WL4, WL5, WL6, WL7 and WL8

The walls of the cutting, the tunnels and the piers for the railway overpasses were constructed as 1 m thick diaphragm walls. Over 61,000 m³ of diaphragm wall concrete, more than 66,000 m³ of structural concrete and almost 9,000 tonnes of reinforcement and structural steel were incorporated in the engineering structures. The works also entailed excavating over 140,000 m³ and backfilling over 100,000 m³ of material. The walls of the cutting were faced with granite panels and the tunnel sections lined with Promat fire-resistant board. The remaining areas of exposed concrete were finished with an anti-corrosion coating.

The focus of the roadbuilding works was on the construction of two dual-carriageways with two (S79) or

three (S2) lanes in each direction, plus hard shoulders and slip roads to ensure collision-free access in the required direction of travel. The expressways are built with a hydraulically (cementitious) bound base on a naturally broken rock subgrade. Asphalt concrete with a high shear modulus (AC PmB 0/16) was used for the bituminous binder course and tack coat, and stone mastic asphalt (SMA 0/8) for the surface course. Overall, nearly 60,000 tonnes of mineral/asphalt mixes were laid at the Airport junction. All pavements are flanked by natural stone (granite) and concrete kerbing and other concrete barriers.

Various traffic safety installations were fitted at the interchange, including energy-absorbent impact attenuators (U-15a), steel safety fences, concrete safety barriers and traffic signs.

The interchange was also provided with a drainage system (retention basins ZB-24 and ZB-26, including pumping stations) for the proper collection of surface water run-off from the carriageways and its discharge via intermediate sewer to an outfall ditch (R46).

Challenges posed by construction of Airport junction

A major complicating factor in the construction of the Airport junction was the convergence of road, rail and metro routes at the site. The situation was made even more difficult by the height restrictions placed on construction due to the nearby flight paths into Warsaw Chopin Airport.

S2 – view towards cutting
Image: PORR

Cutting with structures WD-19B and WD-19C
Image: PORR

The biggest engineering challenge was to co-ordinate construction of the cutting at the interchange with the necessary maintenance of rail services. Given that full closure of the affected railway lines was not feasible (also, for part of the time, due to the 2012 European Football Championship hosted by Poland and Ukraine), the following sequence had to be adopted for construction of the overpasses:

- Switchover of rail traffic from Siekierki CHP station branch line to main track of railway line no. 8 (Warsaw-Radom-Kielce)
- Construction of diaphragm walls (abutments) and soldier pile walls (ancillary supports) for structure WK-22 (railway overpass)
- Launching of steel bridge assembly for structure WK-22
- Construction of track, including necessary foundations and installations
- Obtaining of approval for operation of structure WK-22
- Switchover of rail traffic from main railway line no. 8 (Warsaw-Radom-Kielce) to track of structure WK-22
- Construction of diaphragm walls (abutments) and soldier pile walls (ancillary supports) for structure WK-21
- Launching of steel bridge assembly for structure WK-21
- Construction of track, including overhead lines, necessary foundations and installations
- Obtaining of approval for operation of structure WK-21
- Completion of all excavations below railway structures
- Placement of drainage layers and ground slab for cutting, including concrete laid to falls
- Installation of longitudinal drainage, including backfilling
- Construction of road embankment, cement stabilization as ground improvement, stonework and laying of road courses
- Laying of paving units

Despite delayed handover of the design documents and the need to maintain the operation of rail traffic, the works at the Airport junction were duly completed by the contractually agreed date.

Cutting at S2 Lotnisko junction by night
Image: PORR

View of S2 in direction of Konotopa junction (A2/S8)
Image: PORR

Completion

The works required by the construction authority were completed by PORR (POLSKA) S.A. on 15 September 2013. On 18 September 2013, the authority's district inspector gave the go-ahead to open the entire S2 and S79 route to traffic. On 19 September 2013, a commission comprising the General Directorate for National Roads and Motorways (GDDKiA)/Warsaw Head Office, contract engineer TPF Planege S.A., the police and PORR (POLSKA) S.A. signed the documents for the introduction of the definitive traffic management system. Shortly after, the first vehicles set off along the newly built S2 and S79 expressways.

Project data II

Companies	PORR (POLSKA) S.A. TEERAG-ASDAG AG INTOP Tarnobrzeg Sp. z o.o.
Investor	General Directorate for National Roads and Motorways (GDDKiA)/Warsaw Head Office
Designer	DHV Polska Sp. z o.o.
Contract engineer	TPF PLANEGE SA / TPF Sp. z o.o.
Project type	Highway, bridge, railway and ancillary construction
Country / location	Poland, Warsaw, Dawidy
Construction period	September 2009 – September 2013
Earthworks (excavations/ embankments)	1,356,000 m³
Sub-grade (stabilization and mechanically stabilized broken rock)	1,565,000 m²
Concrete of various grades (including diaphragm walling)	197,000 m³
Reinforcement and structural steel	22,000 t
Contract sum	PLN 920 m (net)

S2 team
Image: PORR

Inauguration of Kraków Main Station

Entrance
Image: PORR

Hall 1
Image: PORR

Hall 4
Image: PORR

Furniture
Image: PORR

Project

Kraków main railway station reopened on 14 February 2014. With this exciting scheme in the heart of the Polish city, PORR (POLSKA) S.A., as general contractor, has added a further high-profile reference project to its portfolio.

To tackle the challenge, Poland's national rail operator Polskie Koleje Państwowe Spółka Akcyjna (PKP S.A.) needed a reliable and highly experienced railway engineering contractor capable of meeting the high expectations and completing the project within the shortest possible construction window. The original plan to open the station in time for the EURO 2012 European Football Championship had to be abandoned due to problems with the previous property owner.

A public tendering procedure led to the appointment of PORR (POLSKA) S.A. as general contractor. The contract embraced both the design and execution of the works for the main station and a mezzanine level above the ticket hall to house shops and waiting rooms.

The tight deadlines and high expectations of the client were not the only demanding aspects of the project: the biggest challenge was, through meticulous planning of the individual refurbishment phases, to safeguard the proper operation and serviceability of the station – one of the biggest in Poland – and maintain use of the access routes and circulation spaces during the works while still meeting the construction schedule. Thanks to the experience and commitment of all involved companies and, not least, the in-depth know-how of its own engineers, PORR (POLSKA) S.A. succeeded in flexibly reconciling these diverse requirements.

Inauguration

The inauguration ceremony for Kraków main station, which is one of the country's largest and most modern transport

hubs and located completely underground, was hosted by Ms Katarzyna Mazurkiewicz (PKP S.A.). The invited guests were given a warm welcome by PKP S.A. CEO Jakub Karnowski. The event kicked off with speeches by the Polish Minister of Infrastructure and Development, Ms Elzbieta Bieńkowska, and the Mayor of the City of Kraków, Mr Jacek Majchrowski.

"This station is only one of the many investments to have been made in Poland in recent years," emphasised Deputy Prime Minister Bieńkowska in her address. "It is a striking symbol of how our country is changing."

She reminded the guests of how some PLN 1 billion of domestic and EU funding had gone into the development and refurbishment of station facilities throughout Poland between 2012 and 2014. In 2014 alone, a full 18 new or revitalised rail facilities are due to come into service.

PKP S.A. CEO Jakub Karnowski pointed out that Kraków station is not only one of the largest and most up-to-date facilities of its kind in Poland, but also the only station in the country to have been built completely underground below the platforms.

The official speeches were followed by a multimedia presentation on the project.

The inauguration press conference was attended by Piotr Ciżkowicz (PKP S.A. Board Member), Andrzej Rogiński (PORR (POLSKA) S.A. Board Member), Ryszard Frankowicz (Agencja Architektoniczna Centrum), Dr. Ing. Bogusław Molecki (Wrocław University of Technology) and Dr. Ing. Arch. Daniel Załuski (Gdańsk University of Technology). The invited guests and press members were also given the opportunity to inspect the reopened station.

Historical background

The original Kraków station building was designed in the Neo-Gothic style by Wrocław architect Peter Rosenbaum and was erected between 1844 and 1847. Since then, the station has undergone successive alterations, including upgrading as a transport interchange. From the passengers' perspective, however, the key transformation began in 2010 with the relocation of all station amenities below the station platforms and track.

The new station

The finished station facility links up local and mainline rail services with Kraków's underground fast-tram system, car park, bus station and, via a rail connection, Kraków-Balice Airport. For passengers and visitors, the new facility offers enhanced travel comfort, greater security within the station precinct and shorter times for changing between transport modes. The new underground station spans three levels – the ticket hall, a mezzanine with waiting rooms and a shopping area. The total usable area runs to around 15,000 m².

Apart from creating a modern and comfortable station environment for travellers, the developer's concept also set out to provide a wide range of leisure offerings. The amenities include a choice of 50 shops and restaurants, three waiting rooms, 28 ticket windows and a left-luggage locker area. Overall, there are 25 access points to the five platforms together with ten lifts and 15 escalators. All station areas cater for disabled access.

The station's centrepiece and calling card is the two-metre-high cast-iron globe, dating from 1996, that originally stood at platform level.

As Kraków's Mayor, Jacek Majchrowski, emphasised, the new main station is the final, crowning element in the city's transport infrastructure and the most important addition to the hub in 40 years. Earlier developments at the station site included the underground section of the fast tram system and the regional bus station.

"Whenever you arrive in a new place, the first impression sets the tone for the whole visit," Jacek Majchrowski explains. "And anyone arriving at Kraków by train will be enthralled."

The project was co-financed by the European Union.

Groundbreaking ceremony for Schärding station

The official groundbreaking ceremony for the station remodelling project in the Upper Austrian town of Schärding took place on 20 March under blue skies and glorious sunshine. DI Hubert Hager, head of the responsible division of the ÖBB (Austrian Federal Railways), opened by welcoming the guests and numerous press members in attendance. He then joined Deputy Provincial Governor Ing. Reinhold Entholzer and Mayor Franz Angerer in breaking the ground to mark the official project launch.

The EUR 10.4 million contract with a completion time of three years was awarded to the ÖBB Umbau Bahnhof Schärding consortium under the lead management of Porr Bau GmbH's Railway Engineering department. The first key project phase commenced almost immediately on 29 March with the eight-day closure of the Wels–Passau line.

In addition to improvements to the track formation over the entire station area, the Sauwaldstraße and Otterbacher Straße bridges will also be dismantled and rebuilt. A new passenger tunnel complete with lifts will provide barrier-free access to the platforms. Long overdue noise control measures will also be implemented and two culverts will be fully renovated. The future improvements to the rail services will be supported by ample Park & Ride provision on either side of the track.

Mayor Franz Angerer, Head of ÖBB-Infrastruktur AG, Hubert Hager and Upper Austria Transport Councillor Reinhold Entholzer
Image: PORR

Triumphant start to the New Year

Major new contracts for TEERAG ASDAG AG, Lower Austria branch, in flood control sector

Under a resolution passed by the Austrian Federal Government, measures to protect all municipalities in Lower Austria against severe flooding are to be implemented by 2019, four years earlier than originally planned. The decision came in response to the spring 2013 flood catastrophe. TEERAG ASDAG AG, Lower Austria branch, was awarded two of the planned projects at the start of the year.

Both contracts – flood defences on the River Danube at Dürnstein (net contract sum: EUR 8.3 million) and on the River Kamp at Zöbing (net contract value: EUR 3.6 million) – were secured on the basis of innovative, purpose-developed proposals.

Completed project: Rossatz flood defences
Image: PORR

Completed project: Spitz an der Donau flood defences
Image: PORR

Start on site for third main package of Koralm Tunnel project

The symbolic start of the drive for the third main package (KAT 3) of the Koralm Tunnel project took place at the western Lavanttal portal on 17 January

The symbolic start of work on the south tube of the future 32.9 km Koralm Tunnel was celebrated at a ceremony held on Friday 17 January. The active participants, with pick in hand, included Federal Minister Doris Bures, Carinthian Provincial Governor Peter Kaiser, Styrian Provincial Governor Franz Voves, Desirée Oen from the Cabinet of European Transport Commissioner Siim Kallas, ÖBB-Holding AG CEO Christian Kern and PORR CEO Karl-Heinz Strauss. The works, due for completion in 2020, are estimated to cost some EUR 300 million. Two tunnel boring machines are already in operation at the Styrian end of the tunnel. The ceremony thus marked the start of the drive from the opposite end in Carinthia's Lavanttal valley. The breakthrough in the southern tube is targeted for 2016.

"The Koralm Tunnel is the key project on the new 133 km Koralmbahn rail link," explains ÖBB-Holding AG CEO Christian Kern. "At the end of a pan-European tendering and intensive vetting process, PORR was singled out as the best tenderer for the KAT 3 work package. The start of the tunnel drive represents a further important step in the creation of a modern rail corridor in southern Austria, where our total investment by 2025 will just about top the EUR 11 billion mark."

PORR CEO Karl-Heinz Strauss is convinced of the importance of the project for the whole region: "The Koralm Tunnel is an important step in making our transport infrastructure fit for the future. On top of that, the project has been proposed for inclusion in the Trans-European (CORE) network, which also underlines the pivotal role played by our country at the heart of Europe. I am proud that PORR's decades of experience have been instrumental in helping Austria achieve this milestone."

KAT 3 package in detail

Tunnelling operations for the twin tubes from the Lavanttal valley portal heading towards the Styrian side of the mountain range have been in progress since mid-January. For construction of the southern tube, the existing 8.2 km long pilot tunnel will be enlarged to the full profile. The New Austrian Tunnelling Method (NATM) will then be used for the full-profile excavation of an additional 2.7 km of tunnel. Most of the 12.6 km northern tube will be driven by a tunnel boring machine. The works are due to be completed in the summer of 2020, with the contract sum running to around EUR 300 million. The breakthrough in the southern tube is scheduled for 2016. The drive for the southern tube from the Styrian side is progressing at a rate of 40 m per day and has now reached a length of over 9.6 km.

Preparation of site set-up area at St. Paul im Lavanttal

The site set-up area at St. Paul im Lavanttal is currently being prepared for the work ahead. The coming weeks and months will see the installation of the extensive production equipment needed for the two tunnel tubes. In addition to office accommodation, workshops, storage areas, belt conveyors and a rail connection, facilities will be provided, among other things, for concrete and tubbing production. Tubbings are precast reinforced-concrete segments used to line mechanically driven tunnels. On the Carinthian side too, use of a tunnel boring machine is planned as from the second half of 2015. By then, all the necessary infrastructure needs to be in place and fully operational. Upon completion of the tunnel, the site set-up area will house the new Intercity railway station in the Lavanttal valley.

Image: LPD/Fritz

Topping-out ceremony at Klinikum Baden

Image: PORR

The topping-out ceremony at the new Klinikum Baden orthopaedic and rheumatology clinic took place on 29.04.2014 in the presence of PORR CEO Karl-Heinz Strauss and Porr Bau GmbH Executive Board Member Josef Pein.

The design-and-build contract for the clinic had been awarded on the basis of a two-stage negotiated tendering procedure, conducted in 2011, for services that included the preparation of design proposals and an operational organisation concept. Following award of the contract in 2012, PORR collaborated with the architect and other specialist consultants in an integrated design development process covering the outline, detailed and planning application proposal phases. This collaboration allowed the immediate integration of suggested optimisations into the designs which, in turn, helped to boost the cost-effectiveness of the on-site works.

Of particular importance was the technical experience gathered by PORR from the reference projects carried out in collaboration with sustainability consultant IG Lebenszyklus Hochbau for St. Pölten University of Applied Sciences and the AK (Chamber of Labour) Linz. The scheme embraces an inpatient rehabilitation facility with some 150 beds for musculo-skeletal treatment, an outpatient dental clinic and a service centre.

Following the granting of planning permission at the end of June 2013, the PORR-led consortium completed the building shell on time and to a high specification in March 2014.

In his speech, the representative of Lower Austria regional health insurer NÖGKK, as client, thanked the project team for their successful collaboration. The completed facility, with a gross floor area of approx. 21,000 m², will be handed over in May 2015.

PORR wins contract to build Obervermunt II power plant

(Vienna, 3 February 2014) PORR is part of a consortium that has been contracted to build the Obervermunt II power plant in the Austrian Province of Vorarlberg. The total contract sum runs to EUR 120 million, in which the Group has a 30% share. The project is scheduled for completion in December 2017.

With an output of 360 MW in turbine and pumping mode, the Obervermunt II pumped-storage hydropower station is set to become the second largest plant of power company Vorarlberger Illwerke AG. Located underground between the Silvretta and Vermunt reservoirs in the Montafon valley, it is designed as a parallel plant for the existing Obervermunt facility.

Work at the Alpine site, some 1,700 m above sea level, will continue in winter. During this time, a passenger and materials ropeway will be required for all deliveries. An extensive system of tunnels and galleries is needed to construct the plant. A cavern will also be built to accommodate the powerhouse. The material excavated during the works will be processed for use as concrete aggregate.

PORR CEO Karl-Heinz Strauss is delighted at having secured the contract: "The award of this technically and logistically challenging project once again underlines PORR’s impeccable reputation in the field of power plant construction."

PORR ensures sustainable use of Voitsberg power plant components

Investor group purchases power plant components as dismantling work proceeds apace

(Vienna, 19 March 2014) Following an international call for bids, PORR, the Austrian market leader in sustainable environmental engineering, accepted the offer from a Romanian investor group for the recycling of components from Block III of the former Voitsberg brown coal power station. PORR acquired the site, complete with its power plant, in December 2012 as part of an asset deal with the receiver in the A-TEC Industries AG insolvency proceedings. Blocks I and II were professionally dismantled in collaboration with consortium partner SCHOLZ Austria GmbH. The recovered components and steel parts were duly recycled.

In the coming months, the Romanian buyer will dismantle and reclaim the key power station components from Block III, including the turbine set, generator, boilers, boiler water feed system, pumps, electrostatic precipitators, DeNOX and gas purification systems for reuse.

Given the excellent condition of Block III, PORR and SCHOLZ were delighted to find a buyer committed to recycling the system components. PORR CEO Karl-Heinz Strauss sees this as a vindication of the company's efforts to find a sustainable solution for the power station: "I am pleased that we managed to find a buyer that will put the Block III components to good use. This solution epitomises our commitment to resource efficiency and environmental protection, and further cements PORR’s reputation for delivering on its promises."

Berlin: Living 108 project – foundation stone laying ceremony on 26.11.2013

In 2013, Porr Deutschland GmbH's Berlin branch was awarded a turnkey contract for the construction of 128 high-grade private apartments, including a basement car park and three commercial units, by Cologne-based Peach Property Group AG. Peach Property Group AG is a leading developer of luxury residential properties in Europe's German-speaking countries.

On 26.11.2013, Peach Property Group AG laid the foundation stone for its fourth Berlin project, in immediate proximity to the new German Federal Intelligence Service (BND) headquarters. The Living 108 scheme directly adjoins the successfully completed Living 106 building. The traditional foundation stone laying ceremony was attended by all project parties and numerous guests. The welcoming address was delivered by the architect Annette Axthelm, Udo Sauter, the then Berlin Branch Manager of management contractor Porr Deutschland GmbH, and Bernd Hasse, CEO of Peach Property Group (Deutschland) AG.

From left to right: Udo Sauter (CEO Porr Deutschland GmbH), Annette Axthelm (architect), Bernd Hasse (CEO Peach Property Group Deutschland AG)
Image: PORR

As Bernd Hasse explained to the guests, "With buyers already found for over 65 % of the units – with 45 % notarised sales and 20 % reservations – and completion scheduled for early 2015, the project is running absolutely to plan." Occupying the Chausseestrasse 108/109 site in Berlin's "Mitte" district, the Living 108 ensemble comprises 128 high-grade private apartments offering a total of 7,188 m² of living space and three commercial units with a total area of 291 m². The scheme was designed by the Potsdam-based practice Axthelm Architekten. KAIRONOS Invest AG is involved on the equity side. Peach Property Group AG currently anticipates a revenue volume exceeding EUR 35 million for Living 108. The prices for the two-to-four-room apartments, between 38 m² and 121 m² in size, range from EUR 197,500 to EUR 703,000. The private apartments, penthouses with roof terrace and urban living suites are designed to serve a wide variety of needs. The urban living suites are intended as serviced accommodation for letting in furnished condition – a concept that has proved particularly attractive for private investors. Residents will enjoy the use of their own community space with fitness area, a common roof terrace commanding a panoramic view of Berlin and a 54-space basement car park.

Further details:
www.livingsuites.de

PORR Suisse AG clinches design-and-build contract for seven apartment buildings on Winzerhalde in exclusive Zurich-Höngg district

PORR Suisse AG has been contracted by investment foundation Zürich Anlagestiftung (Zurich Insurance Group), represented by Zurich IMRE AG Investment Management & Real Estate, to collaborate with Zurich-based architectural practice Theo Hotz Partner AG on what will be their second joint project.

The housing scheme excels with its sophisticated architecture and exclusive hillside location by the River Limmat. Redevelopment of the site will entail the replacement of four existing residential facilities, dating from 1962, by seven new buildings.

The project essentially embraces the following:

- Demolition and disposal of existing building fabric
- Construction of 67 new apartments to the Swiss MINERGIE P-ECO energy efficiency standard
- A 63-space underground car park with civil defence shelters
- Remodelling and soft landscaping to external areas.

The project has a gross floor area (GFA) of over 12,300 m².

Consistent with the principles of sustainability and the MINERGIE P-ECO label, it is planned to use river water to generate most of the energy needed by the development.The contract is worth some CHF 26 million. The technical design/production information stage started in April 2014. Demolition work at the site is due to commence in July 2014. Handover of the first apartments is scheduled for March 2016.

Image: Theo Hotz Partner AG, Zurich

Vienna International Airport

PORR entrusted with Pier West alterations and refurbishment

Image: PORR

In April 2014 the Major Building Projects department at PORR Bau GmbH has been commissioned to carry out alteration and refurbishment works to the Pier West area at Vienna International Airport.

As PORR aficionados may remember, the company was responsible for constructing this building in the 1990s. This original scheme, encompassing 12,000 m² of passenger-handling facilities and 3,000 m² of shops and lounge areas, was completed within only 12 months.

Secure passenger access to the aircraft was provided via 12 air bridges also installed at the time. Now, nearly 20 years on, the time has come for a general overhaul. PORR was awarded the general contract on the strength of its long track record of successful airport projects.

The newly opened Check-In-3 hall at the airport has imposed new requirements on the Pier West building. The new scheme will help to improve passenger circulation routes and provide a new system of security checks for employees and special passengers.

The main focus of the works, however, is on enhancing passenger comfort, on creating a stylish and contemporary environment, and on increasing the available retail space. Upgrades will also be performed on the fire safety and security installations in all public areas.

PORR pursues "intelligent growth" in Polish railway construction sector

Projects worth nearly EUR 100 million in progress

(Vienna, 17 February 2014) With two major projects currently under construction (Lines 18 and 132), PORR is strengthening its position in the Polish railway engineering sector. While last year already saw PORR modernise over 150 km of the Polish rail network, the Group expects similar contract volumes for 2014 and the years beyond due to the generous investment budget of network operator PKP PLK. PORR and PKP PLK recently signed a contract for the modernisation of Line 272 from Kluczbork to Ostrzeszów (60 km). Worth EUR 49 million, the contract is PORR's biggest rail project in Poland to date, with design and construction likely to take some 19 months.

Austria's market leader is a full service provider in the field of railway construction. As well as track improvements, PORR will also install or refurbish the signalling systems, overhead lines, platforms, crossings and other rail facilities.

On Line 132, which runs from Wrocław via Opole to Upper Silesia, PORR is upgrading a 35 km double-track section, including 44 sets of points and all overhead lines. The approx. EUR 43.5 million contract also covers the construction of 10 new platforms, the modernisation of 22 level crossings and the refurbishment of numerous bridges and culverts.

The works to Line 18 between Bydgoszcz and Toruń, in progress since August 2012, are now nearing completion. All interim deadlines set by the client have so far been met and the main works (including reopening to traffic) were finished three months ahead of the contractual completion date (April 2014). Overall, some 93 km of track and 54 sets of points were refurbished. The contract totals up to around EUR 39 million.

With a strong foothold in both the building construction and infrastructure sectors, PORR views Poland as one of its home markets. CEO Karl-Heinz Strauss believes that the "intelligent growth" strategy has paid off: "Railway construction is one of PORR's core competencies and a field in which patented innovations such as the Slab Track Austria system have made us a technology leader. With our pioneering solutions, in-depth expertise and impeccable service quality, we are fully committed to becoming one of the top providers in Poland's rail sector."

Topping-out ceremony for Styria Media Center in Graz

At the topping-out ceremony, held in the future newsroom on 20.3.2014 following a one-year construction period, the Styria Media Group AG Executive Board took the opportunity to thank the project team and the 110 or so workers. The project for the media company's new home remains on time and on budget. The keys to the 60 metre-tall building are due to be handed over in December 2014.

Styria CFO Malte von Trotha presents PORR site manager Walter Sommer with the topping-out payment.
Image: PORR

Some 85,000 man-hours, 18,000 m³ of concrete, 1,800 tonnes of steel and 13 completed storeys: the topping-out ceremony in the shell of the new Styria Media Center in Graz (Conrad-von-Hötzendorfstraße) offered the perfect opportunity to thank the project team and site operatives for all their hard work and commitment. "Although we have not quite topped out yet," said PORR Branch Manager and opening speaker Peter Schaller, "we wanted to hold the ceremony while all the workers were still on site."

Relocation in 2015

Excavation at the site had started a good year earlier. Only little work now remains before the building shell, with its 60-metre tall office tower and 18,000 m² of office space, is complete. Currently the biggest building construction scheme in the province of Styria, the facility is due to become the Styria Media Group's new home as of 2015. The building, situated in the Jakomini district of Graz, will house 1,200 state-of-the-art workplaces.

"Prime strategic location"

Markus Mair, Chairman of the Executive Board of Styria Media Group AG, described the topping-out ceremony as a "beautiful moment". As he sees it, an enormous amount has been achieved since the go-ahead was finally given in the wake of extended deliberations as to whether and what to build. The new Styria Media Center is the "gateway to Graz city centre", occupying a prime strategic location from where the core markets – including Slovenia and Croatia – are easy to reach and can even be seen from the top storeys. Mair thanked the workers and the architect team from ArchConsult for creating a "gorgeous building" and the Grazer Wechselseitige for its project management services.

Topping-out payment as "compensation for pain and suffering"

Styria Media Group CFO Malte von Trotha presented the topping-out payment to the construction crew, represented by PORR site manager and general foreman Walter Sommer. As von Trotha emphasised, the fact that this happened to be Sommer's last project before his retirement was a particular honour for Styria. The site supervisor team also received a topping-out payment or, as the CFO joked, "some sort of compensation for the pain and suffering caused by all the changes we made".

A happy gathering

The official part of the ceremony closed with the topping-out toast spoken by an apprentice, who took a long pull from a wine glass only to shatter it on the floor, in line with tradition, for good luck. This received enthusiastic applause from the gathering, which also included Klaus Schweighofer (Styria Executive Board Member), Nicola Kasakoff (Styria), Josef Praschinger, Othmar Ederer and Patrick Pongratz (Grazer Wechselseitige), Hermann Eisenköck and Martin Priehse (ArchConsult), as well as Hubertus Kröll and Oduala Olugbenga (PORR).

(Author: Styria Media Group AG)

PORR builds Südgürtel link road in Liebenau

Roadbuilding contract in Graz

(Vienna, 13.12.2013) PORR and its consortium partners have been commissioned by the Styrian provincial authorities to build the 2 km Südgürtel link road between the Puntigamerbrücke bridge and Liebenauer Gürtel in Graz. The project kicked off in January 2014 and is scheduled for completion in summer 2017 after a 42-month construction period. The net contract sum stands at around EUR 70 million.

The Südgürtel project in the Liebenau district of Graz involves the construction of twin tubes to carry a 1,440 m underground link road. This will be connected to the existing road network by two roundabouts and by internal slip roads that run parallel to the underground carriageways.

"We are delighted to have secured this contract," says PORR AG CEO Karl-Heinz Strauss. "It is an acknowledgement by the Province of Styria of our roadbuilding and engineering know-how. By building the Südgürtel link road, PORR will make a major contribution to improving the traffic situation in the southern part of Graz."

New design-and-build contract for PORR Suisse AG

(Zurich, 09.01.2014) The New Apostolic Church of Switzerland contracted Porr Suisse AG to build a new church complex (consecrated church and residential building) at Zofingen in the Canton of Aargau.

The net contract sum for turnkey construction of the new facility, to be built between 2014 and 2016, totals CHF 14.55 million.

The centrepiece of the development is a four-storey church building with consecrated areas of worship as well as seminar and education rooms. The entire building exterior features sandblasted, fair-faced concrete.

A matching five-storey residential block, designed to the Swiss Minergie energy efficiency standard, will contain 25 apartments plus hobby rooms and studios.
A 47-space basement car park will be built below the two structures and central landscaped area.

The scheme has a total gross floor area (GFA) of around 5,560 m².

Image: PORR

PORR clinches three work packages for Vienna underground network worth a total of EUR 68 million

Vienna's public transport operator Wiener Linien once again draws on the Austrian construction group's infrastructure know-how

(January 2014) Brushing off strong competition, PORR put in the best tender for the three final work packages of the Vienna underground project, worth a total of EUR 68 million. The three-part contract ("Favoritenstraße points system", "Neulaa" and "Oberlaa") covers measures needed for the southward extension of the U1 line.

The works include construction of a points system with signal box, the new Neulaa und Oberlaa stations, two depot halls, a roof inspection facility for two long trains, a service building together with various bridge structures and pedestrian underpasses.

As PORR CEO Karl-Heinz Strauss sees it, the award of this contract has vindicated the Group's strategy of positioning itself more clearly as an infrastructure specialist: "The three work packages offer PORR yet another opportunity to demonstrate its supreme technical expertise in underground railway construction. After completion of the major Green Line contract for the Metro Doha in Qatar, our success as best bidder for three key underground packages in Austria, our domestic market, is particularly gratifying."

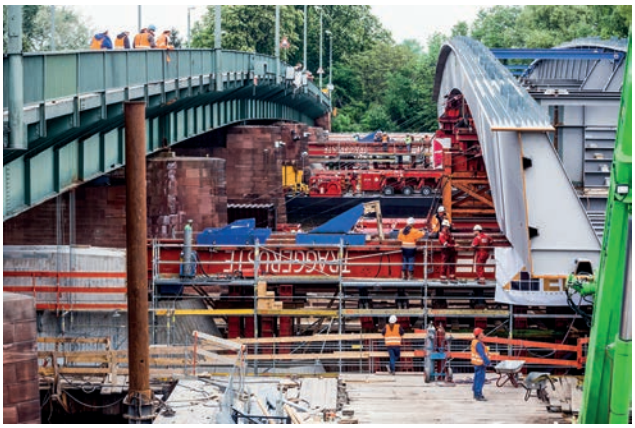
New bridge in Offenbach floated into temporary position

The PORR-built Carl-Ulrich-Brücke will link the cities of Frankfurt and Offenbach

Dating from the 1950s, the Carl-Ulrich-Brücke bridge connects Offenbach's Nordend district with the industrial zone of Frankfurt/Main and is thus a crucial traffic artery between the two cities. The scheme to replace the existing bridge with a new structure was prompted by the need to maintain traffic safety, improve traffic management and cater for future traffic volumes. To keep the route open to traffic, the new superstructure has been built on provisional supports at a temporary location parallel to the existing structure. During a four-week closure period, the existing bridge will be demolished and the new bridge manoeuvred sideways into its final position.

New bridge in Offenbach floated into temporary position
Image: PORR

New bridge in Offenbach floated into temporary position
Image: PORR



New bridge in Offenbach floated into temporary position
Image: PORR

New bridge in Offenbach floated into temporary position
Image: PORR

The composite steel superstructure, comprising a parabolically haunched, single-cell box girder, will sit on solid reinforced-concrete piers. The continuous girder will extend over three spans with widths of 60.86 m, 112.04 m and 60.86 m, i.e. a total length of 233.76 m. The commencement of work on the foundations for the two river piers and temporary abutments in autumn 2013 was preceded by extensive operations to clear the site and neighbouring riverbank areas of unexploded ordnance from the Second World War. The steelwork pre-assembly site on the Offenbach bank was simultaneously made ready. This paved the way for the start of erection work on the 150 m long central bridge section in January 2014. Thanks to the strict observance of a tight schedule and the tremendous commitment of the entire PORR project team and all subcontractors, the 150 m long central bridge section was successfully floated into its temporary position on 28 April 2014. The spectacular operation, which necessitated closure of the River Main for all water traffic, attracted immense public interest.

Metro Doha – Green Line – an update

Some nine months after the official project launch, the normal teething problems for a project of this size have been resolved and work is now proceeding to schedule. Our Qatar branch currently employs some 230 white-collar and 700 blue-collar workers. By the end of the year, these figures will have risen to 350 and 2,000 respectively.

Image: PORR

Image: PORR

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Occupational safety plays a pivotal role on this project. Accordingly, the HSE (Health and Safety Executive) team alone now comprises 40 work safety engineers, who, apart from conducting daily training courses, continuously plan and oversee the safety of on-site operations. These precautions have enabled us to top the mark of one million man-hours without a single reportable accident (i.e. an accident with over 24 hours' lost time) – a highly respectable achievement that we aim to improve still further. Top priority is also given to the quality of the accommodation and working conditions on site. The high standards specified by the contract in this regard are being strictly observed by the consortium and our subcontractors.

Despite the very hard limestone encountered at some locations, excavation work at the stations is proceeding apace. So far, some 400,000 m³ of rock has been cut or blasted out. However, the geotechnical conditions – which include numerous weathering zones, fissures and intercalations – necessitate permanent stabilization of the pit slopes and, in some places, even tied-back diaphragm walls. The excavation base will soon be reached and concreting will commence at the most time-critical station, Al Messila, where four of our six tunnel boring machines (TBMs) will be in operation. The first two TBMs have already been handed over at the Herrenknecht plant in Schwanau in south-western Germany and are now on their two-month sea voyage to Doha. Tunnelling is scheduled to start at the end of August.

PORR notches up another success in road and tunnel refurbishment

ASFINAG awards contract for comprehensive overhaul of Bruck/Mur tunnel series to TEERAG-ASDAG

(May 2014) Joining forces with a partner firm, PORR subsidiary TEERAG-ASDAG has been contracted by ASFINAG, Austria's government-owned motorway construction and management company, to handle the TK Bruck BL3.2 refurbishment project. In recent years, the PORR Group has developed key expertise in the rehabilitation of Austria's road, bridge and tunnel infrastructure.

The TK Bruck BL3.2 contract for the S6 Semmering expressway covers the full refurbishment of both carriageways over a length of 5.5 km between the Bruck/Mur junction and Oberaich.

The most important part of the contract involves refurbishing a 3.6 km tunnel section, but it also includes repairs to the carriageways, bridges and retaining walls, also alterations to the noise barriers along the route.

The works will commence in June 2014 and are scheduled for completion some 26 months later in summer 2016. The contract volume amounts to approximately EUR 49 million.

As CEO Karl-Heinz Strauss sees it, PORR's infrastructure strategy has been fully confirmed: "This new contract for wholesale refurbishment of the Bruck tunnels has given PORR yet another opportunity to underline its tunnel-building credentials. The refurbishment sector in particular is set to gain increasing importance over coming years. Here, PORR will be in a position to capitalise on expertise acquired in a host of tunnel projects in recent years. Our current tunnel contracts include projects in the Austrian Provinces of Styria and Carinthia (Koralm KAT 3), in Germany (Stuttgart 21 station and rail project) as well as in Qatar (Metro Doha Green Line)."

Steigenberger Hotel Am Kanzleramt opens its doors

Image: PORR

Hotel am Kanzleramt, the new addition in the Steigenberger chain, opened on schedule on 1 May 2014. Situated approximately 20 m from Berlin Central Station, it is just a few minutes' walk from the German Federal Chancellery building.

Built over a 20-month period that included construction planning, the four-star-superior hotel boasts a gross floor area of around 26,000 m², 339 rooms including 22 suites, an approx. 700 m² spa area on the eighth floor, restaurant, bistro, bar and events and conference facilities covering some 1,500 m².

The project was realised by Strauss & Co. Development GmbH.

The general contractor services, including construction planning, were provided by the Berlin branch of PORR Deutschland GmbH, as the developer's dependable partner of many years.

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