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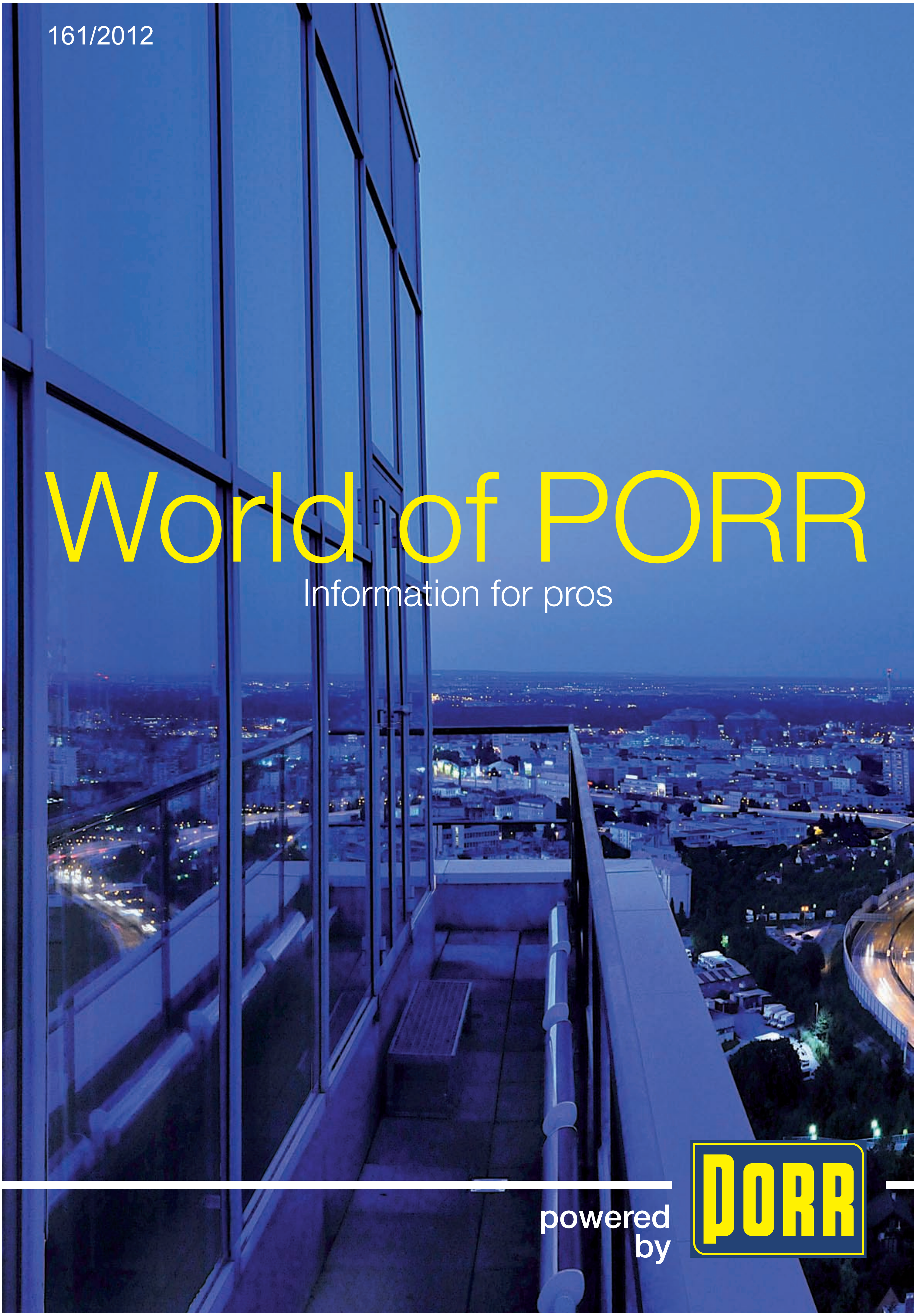

World of PORR

Information for pros

powered by PORR

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CEO Karl-Heinz Strauss

CEO Karl-Heinz Strauss
Image: PORR

Ladies and gentlemen,
Dear business partners,

Thank you for your interest in the latest edition of our trade journal “World of PORR”. I am happy to invite you to read about PORR’s performance in an issue that once again lives up to the journal’s tradition of high quality. The “World of PORR” has been coming out for more than 50 years now, and today is not only directed at business partners, clients and trade professionals, but also used in a large number of teaching establishments throughout Austria.

We seek to satisfy this great interest with a wide range of topics in every issue. This has been particularly easy for us in the present issue, because there are a large number of very different projects being implemented at the moment. For the same reason we have also decided against picking a central theme as we normally do and given an overview of projects from all building sectors.

In building construction we are showcasing certain housing projects, especially in the Vienna area. In recent years PORR has paid particular attention to housing. The question of how energy efficiency, resource conservation and homeliness can be most effectively combined is answered by PORR with innovative solutions which focus on incorporating the needs of the residents.

In the civil engineering sector the wide range of presented projects includes a wind farm, the Machlanddamm high water protection scheme, a viaduct in Salzburg, and road and rail construction projects. You will also find updates on numerous other projects we have presented in past issues.

If you would like to see a special theme as the focus of one of the coming issues, please let us know. It is your feedback that enables “World of PORR” to respond even more specifically to the wishes of its valued readership. You will find the contact details as always on the last page of the publishing information.

2012 is coming to an end and an exciting 2013 is already close upon us. I would like to take this opportunity of wishing you and your families a tranquil conclusion to the year, much health and good fortune and a Happy New Year.

Karl-Heinz Strauss
CEO and Chairman of the Board

Donau-City Tower 1

Special foundation works for new Vienna landmark

Josef-Dieter Deix

The first of three landmark high-rise developments planned for the north of Vienna will soon form a spectacular gateway to Donau-City.

Poised to overtake Austria's present frontrunner, the Millenium Tower (202 m incl. roof construction), the Donau-City Tower 1 will set new standards with its record height of 220 m.

New Donau-City skyline
Image: beyer.co.at

The Foundation Engineering department of Porr Bau GmbH was contracted to perform the entire excavation and deep foundation works for Donau-City Tower 1.

The contract comprised the following:

- Construction of 60 cm thick, tied-back diaphragm walling as basement retaining structure for approx. 9 m deep pit with approximate area of 10,000 m^2
- All earthworks required for preparation of graded formation
- Deep foundation works comprising approx. 15,000 m^2 diaphragm walling constructed as approx. 170 barrettes, 60 cm thick, 3.60 m wide and 20-35 m deep
- Quaternary and Tertiary groundwater control, as needed for basement excavation and construction of deep foundation elements
- Construction of approx. 1,500 m bored piling as deep foundation elements

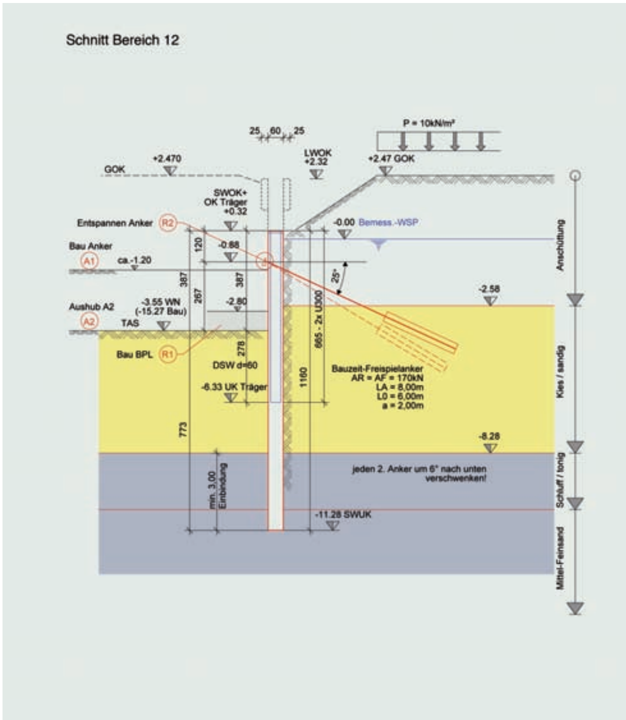
Geology

Both the difficult subsoil conditions of the riverside site and the time constraints imposed by the client posed a test to the ingenuity of the project team.

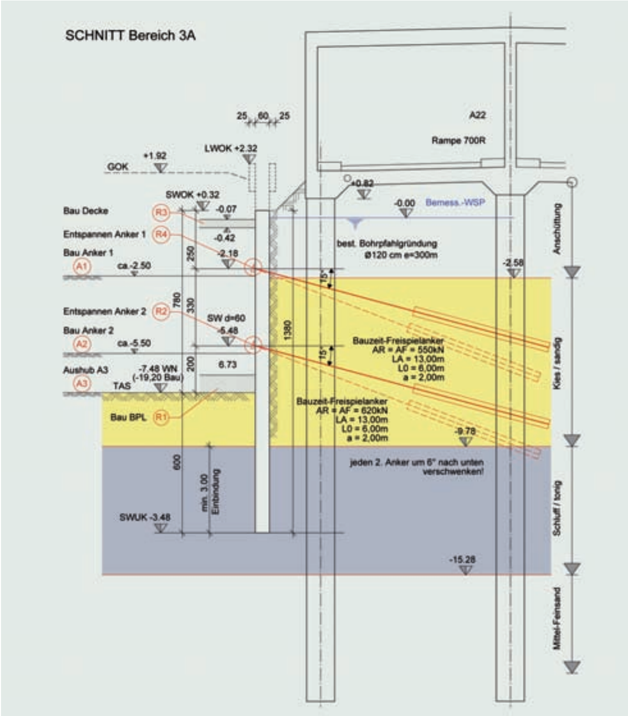
The tricky geotechnical parameters governing the foundation works stemmed from the diversity of fragmented strata in the filled area of the "Kaiserwasser" (former course of the Danube) and the banded structures in the Tertiary strata.

Basement retaining structure

Under the construction contract, responsibility for the detailed design of the excavation support system was allocated to the contractor. The client's brief broadly specified the use of tied-back reinforced-concrete diaphragm walling, to be embedded in the first impermeable horizon. The diaphragm wall was designed both as a watertight basement retaining structure to prevent the infiltration of Quaternary groundwater and, following project completion, as a means of restraining uplift in the shallower, non-heave-resistant parts of the development.



Cross-section of basement retaining structure: slurry wall
Image: PORR



Reinforced-concrete diaphragm wall
Image: PORR

The tendered design was retained for the deep foundation area adjoining the A22 motorway and exit ramp. However, to reduce construction time, the anchorage installations were fine-tuned so as to minimize the technically demanding and time-consuming works below groundwater level.

For the remaining, shallower areas (approx. 6 m excavation depth), the system was changed. Here, the reinforced-concrete diaphragm walling originally specified for the retaining structure was replaced by a slurry wall (i.e. single-phase diaphragm wall) system incorporating structural steel members. Given the inadequate compressive strengths offered by standard slurry formulations, the one used here needed special adaptation in line with the structural requirements of the site. After fulfilling the supporting function of a retaining wall during the construction period, the tied-back steel members provided resistance against uplift for the finished works by means of welded-on corbelling.

Earthworks and excavations

The tight construction window demanded an elaborate logistics concept for the earthworks. Parts of the site were excavated down to groundwater level while the basement support works were still in progress. As soon as the retaining structure was in place, the basement perimeter was excavated down to anchor level to allow immediate commencement of the anchorage works. The focus then switched to the Tower's deep foundations and implementation of the alternative construction proposals developed by PORR, which, as outlined below, allowed the necessary elements to be installed from ground slab level. In close collaboration with the Earthwork department, some 45,000 m^3 of spoil was excavated and carted off, at an average rate of 1,500 m^3 per working day, prior to grading.

Deep foundations

The deep foundation system for the building complex can be roughly divided into two parts: one for the high-rise block and one for the remaining development. Efficient load transmission and settlement minimization were the decisive factors for the high-rise component. For the remaining areas of the development – where the dead loads offered inadequate protection against uplift – the necessary heave resistance was provided by the joint action of the deep foundations and basement retaining structure.

A key feature of the procedure for constructing the deep foundation elements was the location of the working platform, just above the level of the ground slab lower face. This platform lay some 7 m below the Quaternary water table or hydrostatic level of the Tertiary groundwater. The constraints imposed by the difficult groundwater conditions – which were compounded by the predominance of fine-grained strata, with alternating cohesive and non-cohesive soils – posed a tough challenge for the site management, particularly in respect of the diaphragm walling works. Any failure of the Tertiary groundwater control system would have had serious consequences, such as the washing in of fine particles into the open diaphragm wall trenches, failure of the foundation bed (hydraulic heave) and ultimately the endangerment of adjoining infrastructure and developments (underground railway, motorway, office buildings).

Bored piles

The perimeter areas of the high-rise component were founded on 90 cm dia. piles up to 18 m in depth. The augered cast-in-place piling method was adopted as an alternative to the originally specified cased borehole method. The choice of boring method was dictated by the subsoil conditions and location of the drilling platform at the level of the ground slab lower face.

Augered cast-in-place pile
Image: PORR

Diaphragm walls

The deep foundations for the high-rise block formed the centrepiece of the structural works. The loads from the 220 m tower were accommodated by discrete lengths of diaphragm wall called "barrettes". These 60 cm thick elements with a side length of 3.60 m were installed down to a maximum foundation depth some 40 m below the level of the subsequently cast, 4 m thick ground slab. In all, roughly 180 barrettes with a total area of around 16,500 m^2 were incorporated. To meet the tight deadlines specified by the client, special measures were adopted for the deep foundation works.

Diaphragm wall construction
Image: PORR

Socket bar solution

To achieve structural continuity with the ground slab, the barrettes were designed with 1.5 m long starter bars between which the 24 m long, 40 mm dia. rebars of the ground slab had to be threaded. As a result, the steelfixing for the barrettes was subject to practically zero tolerances. Furthermore, mechanical excavation of the remaining material between the starter bars was virtually impossible without bending these. Equally unfeasible was the subsequent straightening of the (30 mm dia.) starter bars on site. The use of mechanical equipment for cutting-back at the top face of the diaphragm wall between the starter bars was also severely restricted.

The above problems were solved by the use of threaded socket bars: projecting reinforcement was avoided by fitting the longitudinal rebars with threaded sockets cast flush with the top face of the barrettes.

Not only did this allow free movement of the diaphragm walling equipment, it also minimized the lengths of empty trench required for the adopted guide wall system (see next paragraph) – thereby guaranteeing a highly accurate standard of steelfixing. Mechanical scabbling of the top face of the barrettes obviated the need for time-consuming and cost-intensive hacking works. Following preparation of the upper surface as specified, the sockets, protected by void formers, were exposed by means of ultra-high-pressure water jetting. Finally, the 1.5 m long starter bars were manually screwed into place.

Diaphragm wall cage with threaded sockets
Image: PORR

Guide wall construction

The guide wall was constructed in two parts. The main component took the form of an approx. 0.6 m high guide wall "grid" that achieved rigidity through its spatial extension. As this grid was positioned below ground slab level, it was possible to leave it in place after completion of the diaphragm wall. To raise the level of the suspension and thus increase the hydrostatic pressure exerted by the stabilizing fluid to improve the internal stability of the trench, a funnel-shaped extension was fixed on top of the guide wall base unit. This attachment also served to retain the surplus concrete necessitated by the system. Upon completion of a barrette, the extension was removed and accurately repositioned on the guide wall base unit for the next element. Prompt removal of the extension piece before the concrete had properly stiffened allowed this to be cut back with relatively little effort, thus saving time and expense.

Guide wall extension
Image: PORR

Fast-tracking
The rounded gravel strata encountered when installing sections of the basement retaining structure necessitated pre-grouting works that had not been allowed for in the original construction programme. To make up for the resulting delays in the construction schedule, various measures were adopted to speed up the works. Given that the spatial constraints ruled out the deployment of additional equipment, a round-the-clock work regime was the only option. Operations originally planned as sequential (e.g. cutting-back and high-pressure jetting) were, as far as possible, executed in parallel and at weekends. The concerted effort ultimately ensured on-time completion of the special foundation works, despite the three-week delay caused by the subsoil conditions.

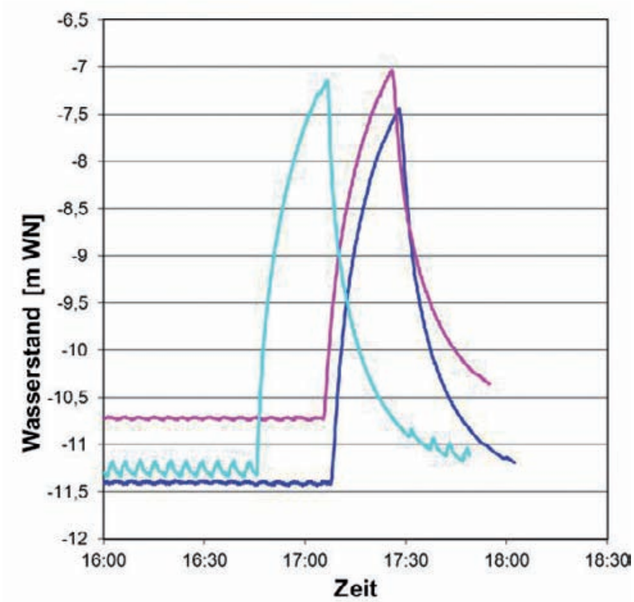
24-hour operations
Image: PORR

Groundwater control
In addition to the retaining structure, various dewatering works were also needed for the basement excavation: the so-called "Quaternary" groundwater control measures entailed one-time pumping-out of the pit and management of the residual water flows while the "Tertiary" system offered protection against uplift and failure of the pit base (hydraulic heave).

The Quaternary dewatering setup included a total of four wells with a maximum pumping rate of 16 ltr/s.

The Tertiary system was designed with a total of 23 deep wells and pumping level (6" inner casing). After installation and start-up, the system was found to be unable to achieve the targeted groundwater lowering level in certain parts of the site. This was mainly due to the close alternation of thin aquifers and impermeable strata. The boring of four additional large wells (DN 900 mm, 400 mm inner casing) was thus needed to achieve the required lowering levels.

The risks inherent in special foundation works of this kind were clearly demonstrated by a shutdown test: after the groundwater lowering targets had been met, 11 wells were switched off and the resulting rise in the water level observed (4 m after only 20 minutes). This clearly highlighted the critical conditions acting on the excavation base.



Pump shutdown test
Image: PORR

Failure of the Tertiary groundwater control system would have inevitably resulted in ground failure, with serious financial losses as the upshot. This risk was mitigated through the provision of additional standbys, backup equipment, emergency generator sets etc.

Concluding remarks
The complex excavation works for the Donau-City Tower 1 scheme yet again underlined the crucial role played by the marriage of design and construction expertise – backed up by innovative ideas and open-minded project consultants – in delivering cost and time-effective solutions. This approach is epitomized by the single-source services of PORR's Foundation Engineering department.

Handover of basement excavation
Image: PORR

The successful completion of the contract, which met with the client's utmost satisfaction, was the product of a constant process of adaptation and optimization brought about by the joint efforts of an experienced (foundation) engineering team.

Vienna Central Station

Record-breaking project demands concerted effort

Gudrun Just, Georg Pleva

Since November 2009, construction has been in progress on the site of the former Südbahnhof (Southern Station) in Vienna's Tenth District for a state-of-the-art interchange to accommodate local and long-distance transport services. Once in full operation as of December 2014, the new Vienna Central Station will boost the city's status as a trans-European rail hub for national and international passenger and freight traffic. The extensive works specified under Package 01 (Transport Interchange and Infrastructure East between Laxenburgerstraße and Gudrunstraße bridges near crossing with A23 "Südosttangente" motorway) have been contracted to a consortium consisting of PORR and other companies. Completion of the immense workload is subject to an extremely tight construction window.

Austria's biggest infrastructure project

The new Vienna Central Station scheme is a record-breaking venture which involves replacement of the former Südbahnhof (Southern Station) and Ostbahnhof (Eastern Station) – both terminus stations with platforms perpendicular to each other – by a contemporary through station with platforms set diagonally to the previous arrangement. Once in full operation as of December 2014, the five island platforms and 12 tracks will, for the first time in Vienna's history, cater for through traffic. Vienna Central Station will then serve as a high-performance hub at which the north/south and east/west rail networks converge. Since Austria's biggest station infrastructure project started on site, construction work has proceeded apace and to plan.

After closure of the Südbahnhof and Ostbahnhof stations in January 2010, the existing station building and track installations were completely demolished. This operation proceeded concurrently with the establishment of the mass logistics areas and site facilities needed to build the new main station. Up to 700 operatives and over 100 construction machines are now busy working on what is, at present, Austria's largest infrastructure site. The structural work for the new station building was preceded by extensive excavation needed to level and widen the site prior to laying the foundations for the new Transport Interchange.

Cheerless view of old track installations at heart of development site
Image: PORR

Apart from the structural and fit-out works for the Transport Interchange, Package 01 also includes extensive alterations in the "Infrastructure East" area between Arsenalstraße and Gudrunstraße. The facilities constructed here include road underpasses, railway underpasses, noise barriers, retaining walls, trench walls and bridge structures (Ghegastraße and Gudrunstraße) along with piers for two further bridges – the Südbahnhofbrücke and the Arsenalsteg pedestrian/cycle link. Alongside the Transport Interchange proper, the Vienna Central Station project encompasses passenger train care depots (supply/disposal, external cleaning), a car-on-train installation, a multi-purpose supply and depot facility for trains, new installation of and alterations to open track for the Südbahn services between Meidling station and the new Transport Interchange, including the construction of a railway overpass, new installation of and alterations to open track for the Ostbahn services between the new Transport Interchange and the A23 motorway bridge, including an underpass, various holding tracks for freight trains plus a freight train through track between Landgutgasse and Gudrunstraße.

View from west to east: district cooling station under construction in foreground
Image: PORR

The station building: showpiece of the new Vienna Central Station

The fit-out works for the new Transport Interchange commenced in July 2011. The station building itself was designed in accordance with eco-friendly and barrier-free principles. The compact building volumes, with their clear directional emphasis, incorporate low-maintenance wall and floor materials. The combination of generously dimensioned glazing, bright, spacious passageways and glass flooring creates a welcoming atmosphere. The key circulation routes are optimized by means of clearly designed signage systems and a total of 19 escalators and 15 passenger lifts that connect the five station levels. The new direct link between the station building and Vienna's U1 metro line via an underground passageway is certain to prove a major boon for travellers and commuters needing easy access to the city's public transport system.

First and second basement level of station building – all-weather working
Image: PORR

Night-time working
Image: PORR

Transport Interchange fit-out

The elevated platform level houses five island platforms and 12 separate tracks. All platforms are accessible by lifts, escalators and stairways, and are provided with glazed waiting shelters. The centrepiece of the new station building is the approx. 100 m long, 25 m wide northern concourse on Level E0: as the main circulation hub for arriving and departing passengers, this entrance hall will be served by a full-surface floor heating system (combined heating and cooling using geothermal energy), in conjunction with an air curtain and revolving door assembly. The first basement level will mainly house the retail and catering units of the future shopping mall, a loading area for deliveries and disposal, two plant rooms, sprinkler tanks and normal station amenities such as public toilets, luggage lockers and lost-property office. The retail outlets here open off a 10 m wide mall, lit by means of a 7 m wide light well plus additional floor glazing. The second basement level will accommodate a car park with over 620 spaces. This is linked to the above floors by two escalators and five lifts, which directly serve the platform level. The third basement storey, which is exclusively reserved for mechanical and electrical (M&E) services distribution, links up the rail terminal plant rooms via shafts. Covered taxi ranks along with kiss & ride, disabled and cycle parking spaces will be installed around the new station facility. A new bus station with a total of five platforms, ten stands and three additional bus parking spaces will be incorporated below the Laxenburgerstraße bridge. This will be adjoined by a new-build 1,600 m² cycle park with capacity for up to 1,000 bicycles.

Vienna Central Station will be put into partial operation this December with the relocation of the Ostbahn routes to the new Transport Interchange. Four platformed tracks and one through track will then come into service. The overall railway infrastructure project will be concluded by December 2014 with completion of the new station building and the final track installation works.

View from east to west: station building (Transport Interchange)
Image: PORR

Works to raft foundation and M&E service corridors on third basement level
Image: PORR

A particular challenge: formwork & fair-faced concrete finishes

To optimize execution of the extensive in-situ concreting required under Package 01, the contractor consortium opted for a high-performance formwork system developed by Doka. The need for simultaneous casting of many of the structural components of the station project resulted in an on-site formwork equipment value of just over EUR 17 million. The high number of contractually agreed penalty deadlines limited flexibility in the deployment of resources: as a result, any optimizations vis-à-vis the tender programme invariably necessitated bringing forward the relevant works. Structural elements 143 and 144 (bus station), for instance, were cast ahead of time such that, after striking, the associated formwork could be reused for the structural works in the central Section 4 area. In this regard, the bipartite organizational division of the project (into Transport Interchange and Infrastructure East) paid dividends, not only by catering for separate design teams, but also due to the varying nature of the elements to be constructed.

The Infrastructure East sub-package features a string of individual structures such as underpasses (Ghegastraße, Gudrunstraße etc.), bridges (Südbahnhofbrücke, Arsenalsteg with special piers) and transformer stations. By contrast, the Transport Interchange, though made up of several components (Section 1: access ramp; Sections 2 & 3: loading area and basement car park, Section 4: central terminal with platforms; Sections 5 & 6: concourse), still constitutes a unified complex at a single location. During tender preparation, the existing design drawings were used to develop a detailed formwork solution. However, due to the lack of information regarding the complexity of the structural design and the extensive ancillary works that subsequently proved necessary (propping left in place for up to seven span lengths of the cast structural floors), the formwork concept had to be completely revised during the construction period. This prevented full exploitation of the previously optimized system with table forms for the works to the slab and beam floor (Section 4, basement levels 1 & 2) – which had provided for separate casting of the downstand beams and the intermediate slab areas. Instead, the table forms had to be positioned at the level of the lower downstand face over the entire area of the slab to be cast. Then, after construction of the downstand beams, additional shuttering made from loose material had to be assembled one metre above the table forms. The continuous rows of temporary propping to the downstand beams in north-south direction subsequently posed a massive obstruction to the formwork striking operations. Moreover, the top formwork layer, which was left suspended from the floor slabs after relocation of the table forms, had to be dismantled by hand using scissor lifts and mobile scaffolding.

Given that a (special GBS-grade) fair-faced finish was required for 10% of the formed surfaces, the specified air-entrained and synthetic-fibre-reinforced concretes were subject to particularly stringent requirements in terms of porosity and colour uniformity. The problem was compounded by the specification of an extremely smooth face-contact material with a negative impact on porosity. The casting and curing of the many fair-faced concrete areas during the climatically unfavourable wintertime and midsummer months thus demanded the utmost care.

Focus on special foundation works

Argentinierstraße, Ghegastraße, Momsenstraße and Gudrunstraße underpasses, and the pier foundations for the Südbahnhofbrücke bridge, Arsenalsteg pedestrian link and Transport Interchange required around 30,000 metres of bored cast-in-place piles with diameters of 90 or 120 cm. The tight building programme for the Transport Interchange also necessitated stabilization of a 20 m high slope using sprayed concrete, self-drilling injection and partially bonded anchors, prior to constructing the basement levels. Given that the only line connecting the Südbahn and Ostbahn networks ran above this heavily stabilized slope and had to remain in service at all times, the track installation required monitoring throughout the contract period by means of anchor load cells and deformation measurements. The many large borings, up to 36 m deep, were carried out primarily for the purpose of constructing the foundations. Yet some of them doubled up as a means of extracting geothermal energy to run the Transport Interchange's heating and cooling system. For this purpose, geothermal pipes were laid in the bored pile reinforcement cages. These reinforcement cages were then incorporated in the ground and the piles cast in place. The system will now provide the Transport Interchange with heating and cooling energy for the duration of its service life and thereby promote the efficient and ecologically sustainable operation of the new Vienna Central Station.

Project data

Client	ÖBB Infrastruktur AG
Contract type and scope	shell construction and fit-out for Transport Interchange and Infrastructure East
Project location	The development site is bounded by Wiedner Gürtel, Arsenalstraße, Gudrunstraße and Sonnwendgasse.
Project consortium	apart from acting as project manager, PORR is also responsible for the commercial and third-team technical management
Contract award date	09.11.2009
Construction period	November 2009 to December 2014 (structural works), July 2011 to December 2014 (Transport Interchange fit-out), 2015 (ancillary works)
Completion date	December 2015

Transport Interchange and Infrastructure East shell

Construction period	09.11.2009 to 31.12.2015
Excavation	1,020,000 m³

Fill	830,000 m³
Bored piles	38,000 m
Concrete	285,000 m³
Formwork	370,000 m²
Steel reinforcement	38,000 t
Penalty deadlines	116

Transport Interchange fit-out (station building, concourse areas, shopping mall & parking)

Construction period	04.07.2011 to 14.12.2014
Partial operational start-up	December 2012
Penalty deadlines	28

Boiler Station – Simmering Power Plant

Gerhard Gail

Project description – project status

On 13.3.2012 Porr Bau GmbH was awarded the contract for the turn-key construction of a pump station (steel construction) with adjoining E building (pre-cast concrete component) and three solid concrete boiler foundations, including substructures for the boiler station.

In addition to commissioning our construction and general contracting services, the client, WIEN ENERGIE, delegated further services such as pipe-laying, steel construction of boilers and E works to other so-called "lot contractors".
The interaction between the individual works presents a particular challenge and an optimal coordination within the overall management concept will be crucial in meeting the construction deadlines and project requirements.

Porr Bau GmbH began construction work on 29.5.2012, following several months of planning.

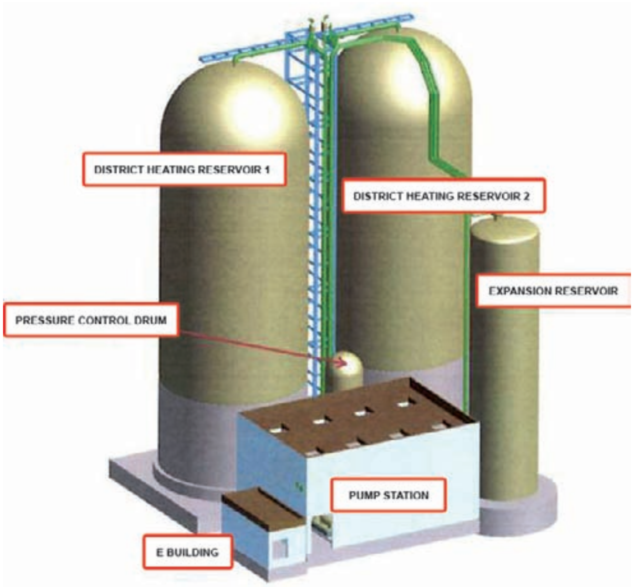


Image: PORR

Project data

Company	Porr Bau GmbH
Client	WIEN ENERGIE
Project type	Construction an General Contracting Services
Country / Location	Austria/Vienna
Start of construction	29.5.2012
End of construction	Nov. 2013

Boiler foundations

Construction work began with soil excavation which required UXO-free certification prior to operations.

Following the removal of excavated soil, specialist foundation engineering began on the bored piles, which were cast in-situ (ductless boring), measuring up to 16.5 m long and with a DN of 90 (91 pieces).

After completion of the piles at the end of June 2012, the solid concrete boiler foundations were cast (each consisting of approx. 1,000 m³ of concrete). The boilers were positioned on the concrete foundations, into which the anchor elements for the steel supports of the boilers could be subsequently placed by other lot contractors designated for the steel construction of the boilers.

Pump station and E building

In addition, PORR is constructing a pump station with adjoining E building which is to be delivered to the client on a turn-key basis.

For the foundations, 30 ductile piles (compressed) were inserted using the impact boring method. The pump station was implemented as a steel construction with pre-set trapezoidal sheet metal façade. The roof was planted and provided with eight light domes, four of which are designed as smoke extractors.

The E building was constructed out of pre-cast concrete components. Despite considerable heat loss from the equipment, sufficient climate control will be ensured by an air-conditioning system with split and external devices. The same applies to the pump station, where the dimensions and requirements make it possible for climate control to occur through a largely natural ventilation (air intake and extraction) process.

Collectors

From these two buildings, approx. 75 m of collectors (pre-cast elements and in-situ concrete) were produced as a watertight provision.

External grounds

Independently from the above-mentioned construction activities, the concrete foundations for the outgoing district heating supply line are being constructed at the Simmering power plant.

After completion of the main works, plans have been made for the external grounds to be tarmacked and provided with various drainage channels in May 2013.

By November 2013, we anticipate that all services will have been carried out to the full satisfaction of WIEN

ENERGIE and that the site can be handed over in the specified condition.

Facts regarding district heating storage provided by WIEN ENERGIE

Advantages of heat storage

Heat storage enables a time delay between heat production and heat use. This minimises the use of peak-load boilers during very high electricity and heat demand periods. The facility optimises the use of co-generation plants, thermal waste management plants and decentralised providers of renewable energy. CO2 emissions are reduced and peak-period district cooling is equalised in the summer months.

The altitude difference in Vienna's 1,153 km long district heating network is as high as 150 m; for this reason Vienna's hot water for space and water heating is transported at high pressure and at temperatures of between 95 and 150˚ Celsius.

Every year the storage plant will be charged and discharged during approx. 2,200 hours. The quantity of heat stored and therefore extracted amounts to approx. 145,000 megawatt hours, which corresponds to an average yearly heat requirement of 20,000 households.

Facts and figures for Simmering Heat Storage Plant

Water storage quantity	11,000 m³
Height of both pressure storage cylinders	45 m
Pressure	10 bar at storage cylinder base, 6 bar at top
Storage capacity	850 mWh
Quantity of concrete for foundations	2,000 m³
Construction period	from May 2012 to end of 2013
Heating	for 20,000 households per year
CO2 reduction / year	approx. 11,000 t
Investment	EUR 20 million

Start of construction – earthworks and pile construction in June 2012
Image: PORR

Current state of operations – concrete foundation works and steel construction completed
Image: PORR

Machland Dam

Structure of the century in record construction completion time

Mario Ecker, Franz Hrebik (Project unit 8)

Formation / Background

The Machland has always been hit by major floods since the beginning of time. Following the flood waters of 1991, the communities in the Machland region once again voiced their demands for flood control measures. In a letter dated 15 October 1991, Dr. Fischler, the Minister of Agriculture at the time, announced that a feasibility study for the Machland Dam would be carried out. The completed study was presented in July of 1994 in Mitterkirchen and the Environmental Impact Assessment for the protection project was initiated in February 2000.

The 2002 flood waters became the largest flood water disaster in the history of Upper Austria (especially in the communities of Schwertberg, Naarn, Perg and Mitterkirchen). The flood water reached previously unknown levels in Schwertberg. Volumes of water that only occur every one thousand years in the statistics flooded wide parts of the municipality and many businesses. The damages for Upper Austria were estimated at EUR 895 million (WIFO) and EUR 1.1 billion (Region of Upper Austria). The flood with its catastrophic consequences then necessitated the planning to be completely revised. This was started in 2003 and an application for a 36.4 km long Machland Dam including an 8.4 km flood basin running parallel to the Danube River was submitted for approval in 2006. The basic authorisation for the construction project was obtained the same year, so that the construction work was able to commence in 2008, after the formation of the Machland-DAMM GmbH. The flood protection project Machland North was constructed as eight project units on the left side of the Danube between Mauthausen and St. Nikola an der Donau between 2008 and 2012 and now protects seven municipalities. The project is Central Europe's largest flood control protection programme and the largest one in the history of Upper Austria.

Pumping station 1 with HWP wall, Labing
Image: Photo studio Wurst

The Contracts

Machland-DAMM GmbH awarded the contracts for project unit 3 Baumgartenberg, project unit 4 Saxen, project unit 6 Grein and project unit 8 for the dotation structure to a consortium over which PORR has significant influence. PORR NL Oberösterreich was in charge of the technical management and the overall site management in all the consortiums.

Project unit 3 Baumgartenberg

Project unit 3 involved the construction of a 13 km long flood control protection dam between Mitterkirchen and Baumgartenberg.

Overview of construction lot 3 construction section 3
Image: Froschauer

Stream and river rerouting

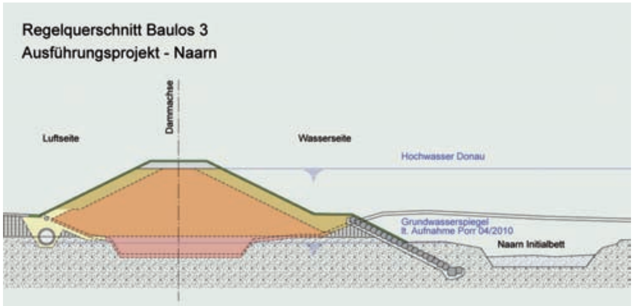
For the construction of the flood control protection dam, it was necessary to re-route several streams and rivers. The largest was the relocation of the Naarn, where a 2 km long stretch had to be re-located.

For ecological reasons, it was necessary to finish the entire relocation work during the winter months before the start of the spawning season. The re-naturation work was carried out and constantly monitored by the ecological site inspectors. Roughly 5,000 rhizomes and 4,500 willow cuttings accumulated within the project unit were used for the replanting work.

Renatured Naarn
Image: PORR

In the course of the re-routing of the River Naarn, the Wagra Bridge, an existing slab-type supporting structure, was demolished and replaced by a new, integral bridge with a span of 28.70 m.

Waagra bridge with renaturated Naarn
Image: PORR



Typical cross-section of dam
Image: PORR

Dam construction

The dam segments in the Machland dam were constructed as one homogeneous dam.
Due to the magnitude of the surface layer covering the crushed Danube rock, the geological experts specified that a 3 m wide 1.5 m thick cut-off be constructed, and that this be completely wrapped in fibrous webbing. In the area of the Naarn and the flats, a 1.5 m wide embankment comprised of blasting debris material was required since the existing groundwater table was higher than the old creek bed.

Incorporation of blast debris material
Image: PORR

The procurement of about 350,000 m³ of comprehensive waterproofing material that had to meet the high requirements of permeability as well as the shearing angle, posed a special challenge. The suitability testing was carried out at the construction site using prepared test fields. By blending two materials which occurred naturally in the vicinity of the construction site, it was possible to meet these requirements without the addition of binding agents. The mixing of the waterproofing material required a mixed-in-place procedure, i.e. the materials were deposited in 20 cm thick layers using GPS-controlled bulldozers, blended using a self-propelled milling crusher and were finally compacted using a roller compactor and rubber-tired roller. The compaction and permeability were checked in situ in an extensive test programme using a Troxler probe and standpipe tests. Then, the entire water-proofing material was shaped using GPS-controlled excavators and covered with fibrous webbing. The crushed Danube rock obtained from a gravel pit operated by the consortium could finally be applied as a support material. GPS-controlled excavators were also used to produce the proper contours.

Soil mixing in the mixed in place procedure
Image: PORR

Gravel extraction at Froschauer pit
Image: PORR

Channelling and drainage work
In order not to change the ground water conditions, the dam was not tightly bound to the existing aquiclude. Only the previously described cut-off wall with a thickness of 1.5 m to the undercurrent extension was executed. The return seepage encountered from the undercurrent and the rain water encountered in the hinterland necessitated extensive sewerage and drainage work. Reinforced concrete pipes of up to 1,400 mm in diameter were executed in depths of up to 5.5 m and 1.5 m below the groundwater.

Channel branch C
Image: PORR

Pump stations
The water found in the hinterland is pumped to the water side of the dam using 14 pump stations with up to eight pumps per pump station. The pump stations are constructed of reinforced concrete and are situated in the dam. In order to be able to protect the buoyancy of the pumping stations in the event of a flood, some of the pilings used to secure the pit had to remain in the subsoil. The backfilling of the pump stations had to be done using highly malleable material to prevent the movement of the water's current.

Electrical power supply and transformer stations
To supply the electrical power for the pump stations, it was necessary to construct five transformer stations.

Flood control walls
Where the construction of earth dams was not possible due to space constraints, flood control walls were used. The notice called for a water-proof connection to the striation level in the area of the flood control walls. This was guaranteed as a result of the cutter-soil-mixing walls and/or pilings.

In the area of the cutter-soil-mixing walls, the transfer of force into the bedrock occurred by using adjustable HEBB 300 beams. In the case of flood control walls with pilings, the forces could be dissipated by means of recesses/voids with push-through reinforcement.

In the case of the Labing flood control wall, however, pressure grouted ductile cast iron piles were produced in addition to the pilings.

Vibration of rolled girders
Image: PORR

Finished MIP wall with rolled girders
Image: PORR

Overtopping stretches

Both the dam and the flood control walls were equipped with a 50 cm or 15 cm free board. A mandatory requirement for the Machland Dam was that there would be no deterioration in the flood protection measures already completed on the lower side of the Danube compared to the 2002 flooding. As a result, topping stretches, were planned in accordance with the 2002 flood water levels and constructed using rocks interspersed with concrete.

Finished overflow section
Image: PORR

Main materials project unit 3 Baumgartenberg

Topsoil removal	460,000 m³
Excavation	443,000 m³
Water-proofing material	378,000 m³
Supporting material	185,000 m³
Frost-resistant barrier (Frostkoffer)	60,000 m³
Structural concrete	8,600 m³
Reinforcement	580 t
Cutter-soil-mix walls	5,500 m²
Steel beams in MIP walls	250 t
Pilings	9,700 m²
Sheet pile walls, remaining	4,500 m²
Asphalt	87,000 m²

Project Unit 6 Grein

Generally, project unit 6 Grein involves the construction of a new flood control wall made of reinforced concrete with mounted mobile walls along the “Donaulände” in Grein, the construction of several flood control polders for individual apartment houses as well as protection for the senior’s residence, a Billa market and the road maintenance depot inclusive of all the required pump stations. A separate warehouse for the storage of the mobile walls was also constructed on behalf of Machland-Damm GmbH.

View over building site project unit 6
Image: PORR

The construction site facilities

Because of space constraints and the inherent danger of flooding during the spring and summer months, PORR decided to erect the construction site facilities on scaffolding towers. This had the consequence that the container village turned into an eye catcher in the tourist town of Grein and offered a wonderful panoramic view of the site itself and the town. The fact that the decision was the right one, not only aesthetically but also economically, was proven to us in January 2011 by the 7 year flood waters, when the roughly 1.5 meter deep flood waters surged through underneath the construction site facility.

Building site disposition on scaffold towers at high water
Image: PORR

The "Donaulände"
The largest challenge in project unit 6 Grein was the construction of the new reinforced steel wall with mounted mobile flood control elements along the "Donaulände". The work for the reinforced concrete wall had to commence with a foundation made of bored piles on a roughly 8 meter wide strip of land between the B3 highway and the Danube. After removing the rock protection erected during the course of constructing the Ybbs-Persenberg power plant and re-locating the two boat mooring areas situated on the "Lände Grein", the securing of the rock including the reclaiming of land and the drilling plenum were able to commence. According to the structural analysis, the bored piles had to be tied 1 m into the rock face to accommodate the horizontal loads. Normal drilling tools could not be used to sink the bored piles in the rock, so in January 2011 it was decided, after numerous drilling attempts with special tools, to pin the bored piles into the underground using Gewi piles DN 63 mm and subsequent compaction of the piles using high-pressure soil stabilisation.

Auger pile and sheet piling work
Image: PORR

The subsoil of the eastern area of the "Donaulände" was backfilled using rubble material from the "Schwalleck", a rock, which protruded into the Danube River and which had to be removed during the course of constructing the power plant. As it turned out, it was not possible to drill the loosely stacked layers either. As a result, they tried to displace the blocks by means of a sheet pile wall. This was successful to a driving depth of about 8 m. The remaining windows up to the rock had to be sealed using high pressure soil stabilisation following a suitable pre-injection process. The deflection of the horizontal loads with this type of execution occurred at an angle of 15 or 30 degrees from the Danube side using drilled Gewi anchors; a special stage had to be produced as a drilling platform for their production.

Sheet piling work
Image: PORR

Creation of Gewi anchors with staging as drilling platform
Image: PORR

Visible sheet piling
Image: PORR

Foundation slabs were poured and the 85 cm thick flood control wall including the installation parts for the 3.60 m high mobile wall were mounted on top for both of these foundation types. The connection into the hinterland terrain was done in the east using a gravity wall mounted on the rock.

Flood control wall – Senior's residence
In the west, the flood control wall for the Lände transitions seamlessly into the flood control wall of the senior's residence. This was constructed as a sheet pile wall with a mounted, rigid reinforced concrete wall.

Flood control wall – Billa market
The Billa market flood control wall was built using the same design as the senior's residence flood control wall. The required re-routing of the lines and valve boxes turned out to be extremely complicated. Parts of the parking lot drainage including two new mineral oil separators, the entire sewer for the building including the grease separator and the entire roof drainage systems had to be rebuilt in a very confined space.

Flood control wall – Road maintenance depot
The sheet pile wall in the flood control wall for the road maintenance depot was not clad in concrete because of cost considerations. The wall was implemented as a visible sheet pile wall with a mounted cap.

Drainage and sewer construction work
In order to safely dispose of any leaks from the mobile walls, as well as any damages in the subsoil waterproofing and water from the hinterland, full seepage pipes (weeping tiles) were laid along the respective flood control walls to divert any accumulations of water in the event of an incident to the associated pumping stations. All existing sewer pipes which lead into the flood control polders, are sealed off in the event of a flood by the newly built valves structures and are also diverted to the pumping stations.

Surface landscaping – Esperanto Square and Donaulände
The consortium was awarded the contract for the landscaping of the new, enlarged "Donaulände" and Esperanto Square by the town of Grein. Extensive work involving the laying of pavers and asphalt was carried out and a new exemplary stage made of reinforced concrete was constructed.

Main materials project unit 6

Bored piles	2,800 m
Pile concrete	2,850 m³
HP soil stabilisation bores	4,450 m
HP soil stabilisation cement suspension	7,200 t
(Permanent) sheet pile walls	8,900 m²
Structural concrete	7,700 m³
Reinforcement	810 t
Formwork	12,100 m²
Drainage and sewers	4,200 m
Empty pipework	8,200 m

Project unit 4 Saxen
Project unit 4 Saxen consists of the Saxen South Dam and two smaller dams along the B3. In addition, several smaller polders were also constructed to protect individual

residential properties. The Dornach Castle and Dornach guesthouse flood control wall as well as the construction of 14 pump stations also belongs to this project unit.

Saxen South Dam

All the dams in project unit 4 Saxen were constructed as a homogeneous dam, in a similar manner to the dam in project unit 3. The fact that all the qualification tests for the water-proofing materials from project unit 3 could be reused made it possible to complete all the fill work, totalling about 72,000 m^3, in just six weeks before the onset of the winter.

Saxen Süd dam with overflow section
Image: PORR

Flood control wall – Dornach Castle

A roughly 150 m long and up to 4.80 m high reinforced concrete wall was erected for flood protection of the grade II listed Dornach Castle. Due to space constraints, it was necessary to build the flood control wall very close to the existing grade II listed buildings. Therefore, parts of the castle wall as well as the entire tower had to be underpinned using high pressure soil stabilisation. Injection bored piles were used for the foundation of the wall; these were partly drilled into the existing rock.

The flood control wall was designed in collaboration with the Bundesdenkmalamt (*Federal historical monuments department)*. Formwork moulds resembling rock were used. Mounted merlins with interspersed glass elements were constructed in addition to the complicated formwork.

Flood control wall – Dornach Gasthaus (guesthouse)

The guesthouse was provided with a flood control wall with mounted mobile walls up to 3.60 m in height. These were constructed immediately in front of the existing building - no underpinning with HP soil stabilisation was mandatory as a result. To level out the irregularities in the stone façade, a layer of shotcrete had to be applied and rubbed in before concreting the flood control wall.

The waterproofing of the base employed permanent sheet pile walls, which were tied into the reinforced concrete foundation using welded-on head stud anchors. To transfer the load into the subsoil, injection drilled anchors were used in combination with ductile piles.

Main materials project unit 4 Saxen

Excavation	53,000 m³
Water-proofing material	72,000 m³
Supporting material	30,000 m³
Structural concrete	5,300 m³
Reinforcement	480 t
Sheet pile walls, remaining	6,400 m²
HP soil stabilisation columns	820 m
Ductile piles	170 m
Injection drilled anchors	1,020 m
Frost-resistant barrier (Frostkoffer)	6,500 m³
Asphalt	9,000 m²

Project unit 8 "Dotation" structure

Franz Hrebik

Part of project unit 8 is the construction of a 'Dotation" structure including a migration ramp for organisms (Organismenwanderhilfe) on the left bank of the Danube dam at kilometre mark 2106.1 on the Danube. This structure is used to maintain the water level in the so-called flood basin or 'Flutmulde' (project unit 8 of the flood protection measures of Machland North) in the municipal area of the villages of Naarn and Mitterkirchen and to enable the migration of organisms using the Wallsee Mitterkirchen reservoir.

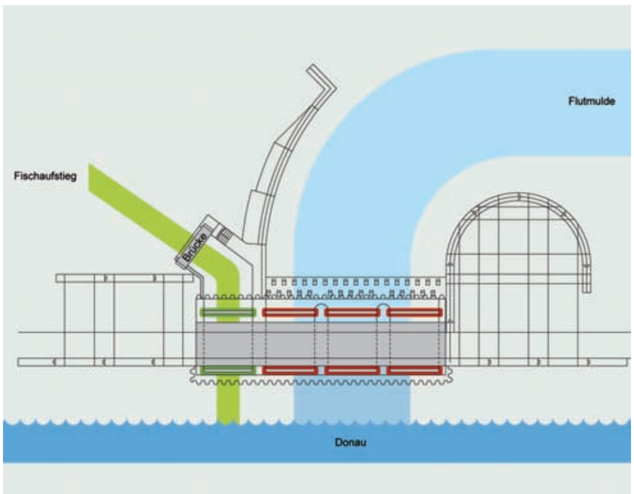
Image: APA/Land OÖ

The project includes the following system components:

- The dotation plant with the functional units for the dotation of the water levels for migrating organisms (permanent dotation) as well as dotation using

excess water (dynamic dotation)
- Rough-textured ramp to the secondary trench beside the Danube
- Redesigning of the rough-textured ramp to the secondary trench beside the Danube
- Migration ramp for organisms, consisting of a slot-shaped pass and an asymmetric rough-textured channel with a small fish channel on the side, connecting with the flood basin
- Connecting structure for installing the secondary trench beside the Danube below the migration ramp for organisms
- Connecting channel between migration ramp for organisms and the existing dotation channel in Aist-Mühlbach
- Switch room
- Pump station 1.22

What is the dotation structure used for?
The flood basin in the meadow between Naarn and Mitterkirchen is created to steer the flow of minor flooding and to protect any communities nearby. To ensure that this flood plain remains fully functional at all times and does not get silted up over time, it must be "flushed out" occasionally. To be able to introduce the Danube water in a targeted manner, a dotation structure is now being constructed in front of the Wallsee/Mitterkirchen power plant. This is a type of weir with which one can allow water to flow in and flush out the flood basin when the water levels are very high (45 days a year on average). This water can then be redirected into the Danube along with the sediment it contains via the Hüttinger cut-off. In order to protect the ecological equilibrium of the meadow, this measure is only carried out when it is really necessary. As a result, the natural meadow landscape of the flood basin can be used for its intended purpose: on the one hand, as an equalising reservoir for flooding and on the other hand, as a refuge for our extensive flora and fauna. (www.machlanddamm.at)



Design sheet – dotation structure
Image: www.machlanddamm.at

Dotation structure – landside
Image: PORR

The dotation structure consists of four weir fields, each with a width of 6.8 m, a length of 36 m and a depth of approximately 12 m.

There are two different operating states:

Permanent dotation
Danube water is supplied by means of the upstream fish migration ramp at a rate of 3 to 5 m³ per second. Connecting with the dotation structure, there is a reinforced concrete slot-shaped channel, connecting to the ecologically designed migration ramp for organisms, which ultimately ends in the flood basin.

Dynamic dotation occurs via three other weir fields within the dotation structure providing up to 70 m³ of Danube water per second into the flood basin. This discharge into the flood basin may only occur when the design flow of the Wallsee-Mitterkirchen power plant exceeds 2,700 m³/s. As soon as the Danube reaches the HQ7 mark, this is approx. 6,800 m³/s. and the overflow stretch situated upriver from the dotation structure starts up, thereby flooding the hinterland. As the Danube is very rich in sediments, sediment deposits in the secondary trench or in the flood basin when the flood waters subside. To prevent these deposits, the weir fields are opened and the secondary trench is flushed with water at a rate of 70 m³/s. The dynamic dotation must be shut off once the 2,700 m³/s level is reached in the area of the Wallsee/Mitterkirchen power plant. From a statistical point of view, this can occur on a maximum of 48 days per year.

A rough-textured ramp connects with the dotation structure. Its purpose is to allow the dotation water volumes to flow off as parallel as possible to the secondary trench beside the Danube and to introduce as little excess energy as possible into the tail water.

Rough-textured ramp
Image: PORR

The slot-shaped channel
This has the purpose of intercepting waves and incoming level changes from the Danube and to maintain largely constant flow conditions in the bypass channel downstream from the slotted passageway.

The concrete baseplate is lowered by 1 m within the slotted passageway and covered with a 30 cm thick layer of rocks 2 - 30 cm in size. The maximum flow speed within the slot-shaped channel is 1.4 m/s

Slotted passageway
Image: PORR

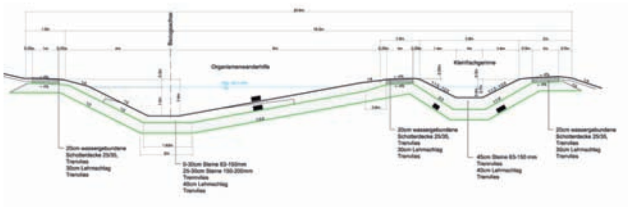
Bypass channel (Rough-textured channel and channel for small fish)

The rough-textured channel is connected to the slot-shaped channel and facilitates the downstream migration from higher levels up to the secondary trench beside the Danube with an average down-grade of around 10%. The channel is a semi-natural rough-textured channel with an asymmetrical profile, which is constructed on a blanket of 40 cm of puddle clay.

Varying depths from 0.7 to 1.1 m are created as a result of a variation in the substrate thickness. This is a crater and ford sequence resembling natural channel ways. Thresholds or even drops must be avoided.

The 150 mm thick baseplate is comprised of size 63 round gravel. Roughness elements in the form of short platforms are created along the steep bank on the channel baseplate using stones sized between 150 and 500 mm.

The essential point here is that continuous migration corridors are available along the flat bank zone both for large fish at the depth line as well as for those individuals who are small, weak swimmers.



Standard section
Image: PORR

Bypass channel
Image: PORR

The culvert structure
The secondary trench beside the Danube must be deviated because of the migration ramp for organisms and this is carried out by employing a culvert structure underneath the migration ramp. The cross-section measures 4.6 m x 2.2 m, the length is around 49 m.

Culvert structure
Image: PORR

The switch room contains the required switchgear cabinets and equipment for the control unit and the test data. The facility has a size of 6 x 4 m and is planned to be upstream of the dotation structure on the land side of the towpath.

Switch room
Image: PORR

Completed project
Image: helipix.at

Pump station 1.22
The pump station is used as a run-off capability in the event of flooding of the district Au on the Danube. It is situated at the beginning of the flood control dam (project unit 1), approximately at km 0.0 +25 m, beside the existing headrace channel, where the pipework for the Danube secondary trench terminates.

Pump station 1.22
Image: PORR

Concluding remarks

Trial operations took place following completion of the structures and the migration ramp for organisms in April 2012. The flow speed and water volumes were measured at that time after correcting a few of the baffles.

It was possible to build the dotation structure within the specified time and to the full satisfaction of the principal (Machland-Damm GmbH).

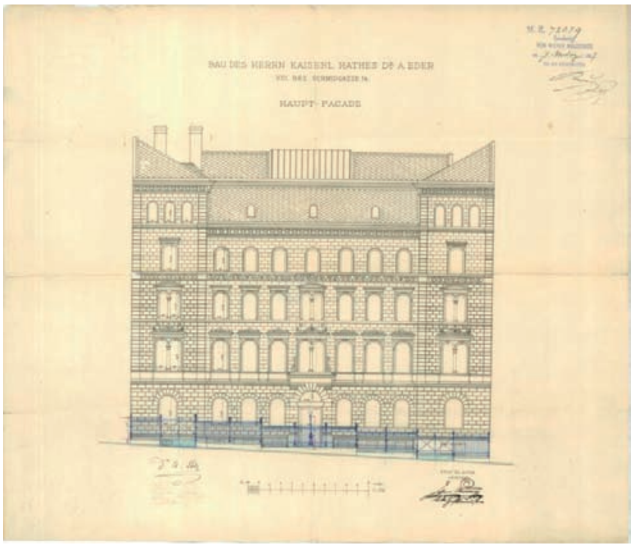
All the project units of the Machland Dam, a technically demanding and interesting ground construction structure, will be completed by the end of 2012 by the respective commissioned consortiums. During the course of the execution, the fact that the main sub trades were awarded to companies from the PORR group, meant they were able to respond to problems very flexibly and without major construction delays, especially in regard to geological matters in project unit 6 Grein, resulting in the Machland Dam being completed in record time.

Palais Fürth, Schmidgasse 14

Conversion of office block into luxury residential complex

Georg Koller

Palais Fürth, garden view
Image: Architekt Heinz Neumann



Elevation drawing 1887

Project data

Client	Schmidgasse 14 Entwicklungs GesmbH
Represented by	Strauss & Partner Development GmbH
Contractor	Porr Bau GmbH
Architect	Neumann & Partner
Structural design	Brusatti GmbH
Building services design	ZFG-Projekt GmbH + Eipeldauer&Partner GmbH
Construction supervision	BB-PM GmbH
Building analysis	iC Consulenten Ziviltechniker GesmbH
Start of construction	January 2012
End of construction	February 2013
No. of apartments	17
Size of apartments	150 m² - 490 m²
Underground garage	33 parking spaces
Garden	approx. 1,500 m²

Original building

The four-storey building was designed by Hans Wilhelm Auer in the neo-renaissance style. It was erected in 1887 and further extended in 1892. Its most notable features include two projecting tower-like structures on each side of the façade with striking cornicing. The ground floor is ashlar-veneered while the upper floors are plastered and feature arched windows and frames. The entrance windows exhibit lateral volutes and broken pediments. Sweeping round the polygonal foyer is an iron-railed gallery resting on pillars and arches.

The building has been listed since 2007. Besides the façade, the generously proportioned Art Nouveau atrium and the spacious garden are to be preserved.

General information

The Palais Fürth is located in Josefstadt, one of Vienna's most beautiful and prestigious central districts.

While retaining the building's historical fabric, which is under heritage protection, special attention is being paid in areas of aesthetics, quality and contemporary architecture in order to create luxury flats which meet the most modern requirements concerning safety and comfort.

There has been a particular focus on the use of exclusive materials. The apartment floor plans are flexible and can be easily adapted to future residents' wishes. Living spaces of up to 750 m² can be acquired on the same floor.

The new top floor is characterised by its excellent city centre location and rather generous dimensions. The roof-top terraces assigned to the flats afford magnificent panoramic views over the city of Vienna.

Visualisation
Image: Architekt Heinz Neumann

Historical octagonal railing
Image: PORR

Construction work

Renovation of original building

In addition to adapting and refurbishing existing rooms, some of the non-supporting partition walls and load-bearing centre walls were demolished to create larger rooms. The remaining structural elements were underpinned using steel girders and reinforced concrete beams in compliance with structural requirements.

Installation of underpinning structures
Image: PORR

Underpinning structures in basement
Image: PORR

To ensure seismic resistance, the ceilings were constructed using 20 cm shear stress resistant reinforced concrete or wood and concrete composite slabs.

As for the wooden beamed ceilings, the old panelling was removed and new OSB boards screwed into place. In addition, the slab edges were fixed to the walls by means of solid steel brackets.

The original “Wiener Platzl” ceilings above the basement remained in place. New reinforced concrete ceilings were added above the new garage entrance and in the atrium.

The shell of the new top floor was largely constructed out of reinforced concrete (“coffin lid”). For the roofing of the fourth floor and both projecting tower structures, the steel and wood construction method was chosen.

Garden side coffin lid shell construction
Image: PORR

All supporting inner walls in the building were constructed using continuous solid brickwork.

Each flat was provided with a new insulated brick fireplace with incorporated rear ventilation and thermal airflow.

The historical panelled doors inside the building were dismantled and taken into storage before the demolition work began, some of which were later re-fitted. The new single-winged entrance doors to the flats were constructed as replicas of the historical panelled doors and in compliance with E130 fire doors with a resistance class of RC3.

The existing lift in the building was dismantled and a new lift and lift shaft installed to provide access to the newly created floor levels.

Construction of reinforced concrete columns
Image: PORR

Underpinning work
Image: PORR

Improvement of masonry
Masonry improvements, which took the form of synthetic resin injections, were performed in the basement, on the ground floor and on floors 1-4, i.e. at all points where it was judged necessary by the engineers to increase stability.

Specialist foundation work performed by PORR Foundation Engineering
Existing buried walls that would continue to bear loads after the refurbishment were underpinned in the foundation pit area by means of jet grouted cement mixture elements. The underpinning was fixed with a single or double anchorage system depending on the depth.

Jet grouting in basement
Image: PORR

Jet grouting in the garden
Image: PORR

The underpinning of buildings in city areas during the construction of foundation pits constitutes the main application of the jet grouting process, which ensures that deformation of adjoining buildings is reduced to a minimum. Due to space limitations in the basement, a small-size drill was employed.

Supports carry weight of building
For the construction of the underground garage, supporting steel girders were mounted. In order to temporarily support the building, two pairs of supports approx. 11 m in length were installed on shotcrete elements.

During the excavation work, stability was continually monitored and the support foundations were clad section by section with reinforced shotcrete.

Support structures
Image: PORR

Support structures
Image: PORR

Foundation pit stabilisation in the garden
The foundation pit was stabilised by means of jet-grouted or shotcrete walls. Both types were additionally stabilised by soil pinning using a double anchorage system.
For the construction of the jet-grouted underpinning in the garden, large machinery was employed. Owing to a lack of access on the site, the equipment first had to be disassembled and lifted into the garden with a rotating tower crane.

Stabilisation of foundation pit
Image: PORR

Stabilisation of foundation pit
Image: PORR

Construction of underground garage
In the basement adjacent to Buchfeldgasse, two garage entrances have been planned, along with a car lift for two cars. After core removal, a two-storey garage will be built in the direction of the garden. The ceiling above basement level one is to be constructed out of 35 cm point supported reinforced concrete slabs with girder framework (2 m soil cover) and the ceiling above basement level two out of 25 cm point supported reinforced concrete slabs. The foundations will be constructed using 30 cm floor slabs with girder framework below the supports.

Renewal of façade
The original plastering is registered by the Federal Office for the Protection of Monuments (BDA) as follows:

- "Wiener hydrauer" bonded rough mortar, pink, fine-grain, control class 20 mm
- Finishing plaster, lime-bonded, approx. 2 mm thick, whitish, fine-grain
- Initial paint coating light grey, several coatings
- Final paint coating mineralised, relatively thick, probably plastic additive

The plastered features such as the main cornicing, the cornicing between all floors, window reveals and cornices, dressed stone on both basement floors and all other profiled features were in a relatively good state. This was primarily due to the very homogenous and hydraulic building agent "Wiener hydrauer" (Roman cement) and favourable hardening of the features during construction.

Each step in the renovation of the façade was checked by the BDA.

Façade adjacent to Schmidgasse 14
Image: PORR

Owing to the tight construction window, the façade scaffolding in the garden had to be constructed using cross and overhanging and re-suspended steel girders as a tread area.

The wooden frame windows and cladding were refurbished according to the BDA's requirements. The old single-glazed panes in the inner windows were replaced with new double-glazed panes.

The façade of the inner courtyard was covered with a heat-insulating system employing 12 cm thick non-flammable stonewool insulation slabs.

Restoration and reconstruction of historical decorative paintwork
The composition of plaster required in this type of decoration is stucco. As is common in historicism, this was produced using various techniques. There are castings, panel and profiled features on site which have been mounted at appropriate points.

The restoration team's activities involved the following steps:

- Restoration of support material and plaster
- Restoration of paintwork involving exposure, retouching and reconstruction.

The techniques applied varied according to the materials used (resin-coated stucco elements, oil technique, stucco lustro surfaces, etc.).

The distemper painting method was the main technique used for reconstruction. The tempera painting method was used for the painted areas, particularly the representational images.

Restoration of historical decorative paintwork
Image: PORR

Restoration of historical decorative paintwork
Image: PORR

The Palais Fürth is due to be handed over to the client in February 2013, following a construction period of 13 months. Apartment fit-out, which is to be carried out by the owners themselves, is expected to be completed by autumn 2013.

Despite all the difficult conditions presented by an inner-city construction site, the excellent cooperation between district representatives and authorities, project management, architects, on-site supervision, engineers and builders has led to the prospect of a very satisfactory conclusion to the scheme, both for the client and for PORR.

Sonnwendviertel development, Lot C03.01

Construction of a residential complex including an "oasis of well-being"

Roman Ofenböck

General

Once completed, the new Sonnwendviertel residential quarter currently under construction in Vienna's Tenth District will provide some 5,000 homes. The site, which is located close to the city's new central station, will also house a school campus, shops, office buildings and a spacious park.

Work on the first 1,160 apartments in Section C of the wider station redevelopment scheme commenced in January 2012.

In Section C, covering the area east of the Sonnwendgasse, Porr Bau GmbH is constructing residential facilities for different developers on three of the total seven lots.

Lot C03.01 in brief

On 30 January 2012, Porr Bau GmbH's Building Construction branch in Vienna (Neubau 2) was contracted by developers GESIBA (Gemeinnützige Siedlungs- und Bauaktiengesellschaft) and GSG (Gesellschaft für Stadtentwicklung und Stadterneuerung Gemeinnützige Gesellschaft m.b.H.) to build a residential complex. The completed works are scheduled for handover at the end of a 24-month contract period in January 2014.

The development comprises a varied mix of occupancy types: Intergenerational Living (Houses 4 and 5), Leisure (House 6), Home/Office (Houses 7 and 8), Loft (House 1), Veranda Block (Houses 2 and 3), Family Home (House 9), Silver Generation (House 10) and . Each component is carefully styled and tailored to the needs of the relevant occupants while remaining open to the possible accommodation of further user groups.

General view of Sonnwendviertel/Section C
Image: Albert Wimmer ZT GmbH

The Intergenerational Living unit comprises 60 apartments on the first to ninth floor of House 4 and the first to sixth floor of House 5. A 300 m² unit on the ground floor houses a flat-sharing community. The building elevations are accentuated by a smooth, metal rainscreen system.

The Leisure "tower" (House 6) is a self-contained recreational facility including children's playroom, sauna suite, changing room area, fitness room and projecting rooftop swimming pool, complete with spacious outdoor sundecks and rest areas. The swimming pool is protected from excessive wind and sun by glass screens and awnings fitted over the water. The exterior features an exuberant aluminium/glass assembly and a rear-ventilated Alucobond rainscreen.

The Home/Office section (Houses 7 and 8) contains 41 apartments, mainly in the form of interlocking maisonettes, occupying the levels between ground floor and seventh-floor penthouse. The ground-floor maisonettes house office spaces with entrances opening onto the street.

View of Houses 8, 7, 6, 5
Image: Albert Wimmer ZT GmbH

The Loft structure (House 1) comprises 31 apartments (between first floor and eighth-floor penthouse) plus a ground-floor commercial unit. The elevations feature ceramic brick slips and windows with sliding shutters, while the apartment interiors boast a ceiling height of 2.82 m.

The Veranda Block (Houses 2 and 3) accommodates 53 apartments, mainly in the form of interlocking maisonettes, spread between the ground floor and ninth-floor penthouse. The units are provided with spacious verandas or (projecting/recessed) balconies.

View of Houses 1, 2, 3, 4
Image: Albert Wimmer ZT GmbH

The Family Home component (House 9) incorporates 12 apartments and 30 sheltered housing units between the ground floor and fifth-floor penthouse. The wet areas of the sheltered units are specially designed for disabled residents. This component will also feature a full-scale green facade.

The Silver Generation component (House 10) contains 25 apartments spread between the ground floor and fifth-floor penthouse. The ground floor also houses a caretaking centre serving the whole complex.

All components bar two have a double-level basement, with Houses 9 and 10 having only one below-ground level. The basement areas house plantrooms, cellar compartments for the residents, cycle-parking spaces, a transformer room and indoor parking for 228 cars.

The circulation routes linking the complex with the neighbouring park ("Europapark") and adjoining development lots are designed to a high standard. The centre of the site is reserved for an intergenerational open space that offers exciting play facilities for children.

Enabling works and start on site

The initial works on site were quite different from the usual preliminaries and establishment measures for a project of this nature.

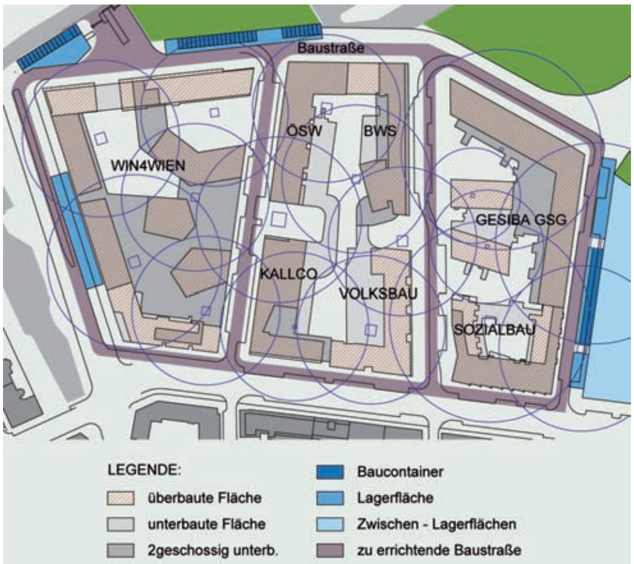
The project was subject to the Austrian "RUMBA" Guidelines for Sustainable Construction Site Management, which had already been addressed during the contracting procedure. These were now complemented by a site logistics regime set out in a special logistics manual that specified rules governing site traffic during the structural works.

These entailed the following:

The entire Sonnwendviertel (Section C) area was to be fenced-in and accessed solely via a single entrance and single exit route protected by transponder-controlled barriers. To ensure the balancing of cut and fill during the earthworks, an additional vehicle exit with truck-weighing station was to be provided for the excavated material. All private car access was prohibited.
Moreover, the building logistics company Bauserve drafted a penalty catalogue applicable in case of non-compliance with the RUMBA/site logistics provisions.

To guarantee safe excavation, the entire lot was investigated for unexploded ordnances. Site procedures were further complicated by the investigation and documentation of each truckload of spoil by a chemist and a geologist. Depending on its chemical and geological properties, the excavated material was deposited or temporarily stored at the relevant tipping point on the adjoining ÖBB (Austrian Federal Railways) site or moved to a landfill site.

Given that up to 18 cranes would be operating simultaneously during the peak periods of the structural works, the drafting of a site layout plan covering all the lots was a further essential part of the preparations.



Site layout plan
Image: PORR

Cranes
Image: PORR

In view of the project location, compliance is also required with ÖBB's safety regulations for works near railway tracks. The relevant instructions are provided to site managers and, above all, to the operators of cranes, whose slewing radius encroaches on the critical track areas.

Despite the complexity of the requirements, the full commitment of our general foreman and site management team ensured the proper performance of all pending tasks. The incurred penalties were negligible and work on site was able to proceed without any notable obstructions.

Basement retaining structure

The earthwork support and foundations specified by the client took the form of freestanding secant bored pile walling and deep piles. These were installed by PORR's Foundation Engineering division.

Installation of deep-foundation piles
Image: PORR

Structural works

All structural works commenced on schedule. These comprised a reinforced-concrete shell incorporating precast floor slabs and double walls together with fully prefabricated elements, such as lift shaft walls, recessed balconies and stairs. Work has proceeded rapidly thanks to synergies in the construction programme and optimized reinforcement design, thus ensuring that the penalty deadline for completion of the shell within 12 months will be met in January 2013.

Reinforced concreting works to basement
Image: PORR

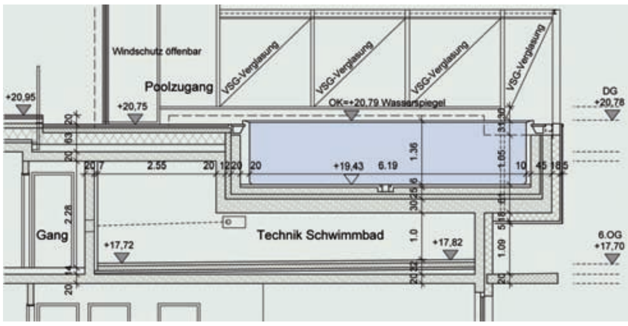
"Dancing columns"
Image: PORR

Rooftop swimming pool

Among the highlights of this residential scheme is the outdoor swimming pool on top of House 6. Installed at a height of 19.5 m, the stainless-steel pool is supported by a double-skin concrete trough and projects from the line of the facade by 1.5 m.

With noise control as a key issue here, Sylomer® insulation is incorporated to reduce structure-borne sound transmission. Comprehensive waterproofing measures to the reinforced-concrete trough and pool installations will protect the living and social spaces below.

The pool includes various attractive features (massage jets, underwater lighting and underwater benches) and, to safeguard children, a roll-over cover. Additional heating for the 70 m² pool is provided by an approx. 100 m² solar panel system.



Execution of swimming pool – House 6
Image: PORR

Project data

Excavation volume	26,500 m³
Bored piles	1,090 pieces
Concrete	21,150 m³
Precast double walls	9,900 m²
Precast floor slabs	20,730 m²
Reinforcement	1,825 t
Gross total area	39,230 m²

Usable dwelling area	20,275 m²
Gross cubic content	123,912 m³

Final thoughts

Thanks to the outstanding collaboration across the entire project team, the fit-out works are similarly running to schedule and we are confident that handover can take place punctually in January 2014.

South Approach Roads (SAR), Belgrade, Serbia

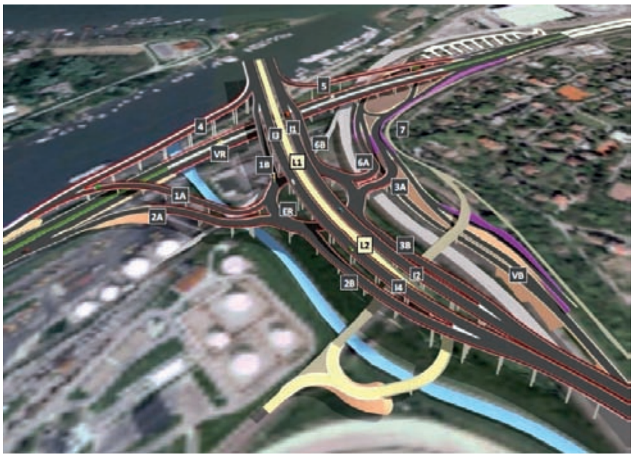
A three-level interchange serving road, tram and pedestrian traffic in four directions

Martin Steinkühler

Introduction

The City of Belgrade is building an inner-city ring road whose main structure is the new Ada Bridge over the Sava River. Flowing into the Danube at the foot of the Kalemegdan Fortress, the Sava forms the dividing line between Belgrade's historic core and new districts. The new Sava Bridge was completed by a PORR-led consortium and opened to traffic on 1 January 2012. Its 200 m tall pylon has become a new city landmark.

The new Inner City Semi-Ring Road (ICSRR) scheme was split into several work packages. One of these, referred to as the "South Approach Roads" (SAR), comprises the highly complex interchange adjacent to the new bridge on the southern bank of the Sava River. With two lanes in either direction, this southern extension links up the Sava Bridge carriageways to the existing road network while also providing on/off ramps for east- and west-bound traffic heading into and out of the city.



General view of SAR
Image: PORR

At the same time, the SAR package requires the tram viaduct – also designed to accommodate the future Belgrade Metro (BGM) – to be threaded out from between the two carriageways and connected up to the existing tram system. A further element of the scheme is a three-level bus/tram interchange with links in all directions.

PORR was awarded the contract as sole general contractor (GC) at the end of 2010. The project started on site in January 2011.

Extremely challenging framework conditions

- Constricted site bounded by stream, four-track electrified railway line, major four-lane arterial road and two-track tram line
- Design and construction of Sava Bridge extension (two lanes in either direction) with 380 m and 350 m long viaducts within 12 months of start on site
- Site crossed by industrial siding providing access to Belgrade's main petrol storage depot
- Attention to and relocation of public infrastructure (telecom network, old water main, sewer, power cables, Secret Service cables about which only scant details were available etc.)
- Difficult subsoil conditions, with deep foundations required for all structures
- Works to proceed with minimal disruption to existing traffic flows
- Site located near petrol tank farm
- River bed required to be kept clear in line with flood control zone regulations
- Anticipated ground contamination
- Co-ordination of works with adjoining packages
- FIDIC Yellow Book design and build contract, with British engineer (British site supervision) and Serbian authorities, for completion within only 25-month construction period

Demanding contract scope

All structures required deep foundations in the form of large-diameter bored piles up to 30 m long. In total, PORR's Foundation Engineering division installed 404 bored piles of 150 cm diameter.

The first work stage involved construction of the two 20 m tall ICSRR viaduct structures forming the southward extension of the Sava Bridge. A bus stop with pull-in bay, platforms, access stairway and lifts was required for the carriageways in either direction. The 1 January 2012 deadline for opening this section of the works to traffic at the same time as the Sava Bridge was successfully met.

Casting of ICSRR structures with movable scaffolding system in September 2011
Image: PORR

After crossing over the ground-level tram route, the tram viaduct between the two carriageways of the Sava Bridge extension drops down and curves round to join up with the existing track system. The contract included a tram stop allowing easy access for passengers to and from the connecting bus stops below.

The "elevated ring" or roundabout – built at the level below the ICSRR viaducts when these were already in service – stands 10 m above ground level and has an average structure width of 13 m and an external diameter von 100 m. This roundabout allows traffic to be routed in all directions.

Roundabout with B ramps in front of Sava Bridge pylon
Image: PORR

The roundabout is linked to the Sava Bridge extension via the four "B" ramps, which allow north-and south-bound traffic to join or leave the ICSRR.

Roundabout below ICSRR set amid a forest of piers with bus stops
Image: PORR

The four "A" ramps provide access from the roundabout to the zero (i.e. ground) level and the existing "Radnička Street" artery from the city centre. These ramps pass over a stream, a tank farm site and an electrified railway line, with tight radii in some places due to the spatial constraints.

Finally, the contract also included replacement of a makeshift steel bridge, dating from 1970 and still in use, plus a tunnel under the railway lines by modern overpasses. The two new high-performance structures, each 320 m long, will carry city-bound and outbound (west-bound) traffic along the "Radnička Street" route.

The above-mentioned structures are summarised in the following table:

Die genannten Bauwerke lassen sich wie folgt kategorisieren:

Structure	Length (m)	No. of spans	Standard span length (m)	Height above ground level	Width (m)	Construction method
ICSRR South	380	14	27	10-20	12	Movable scaffolding
ICSRR North	350	14	25	10-20	12	Movable scaffolding
BGM/tram	500	19	26	2-20	10	Movable/heavy-duty scaffolding
Elevated ring (roundabout)	250	16	16	10	13	External diameter 100 m, heavy-duty scaffolding in five segments
Ramp 1 B	135	5	27	10-20	9	Heavy-duty scaffolding
Ramp 2 B	150	5	30	10-20	10	Heavy-duty scaffolding
Ramp 3 B	130	5	26	10-20	10	Heavy-duty scaffolding
Ramp 6 B	135	6	23	10-20	10	Heavy-duty scaffolding
Ramp 1 A	190	6	32	5-10	10	Heavy-duty scaffolding
Ramp 2 A	110	4	28	5-10	10	Heavy-duty scaffolding
Ramp 3 A	70	3	23	5-10	11	Heavy-duty scaffolding, elevated casting above track with lowering
Ramp 6 A	80	3	27	5-10	14	As above
Radnička South	320	12	27	5-10	10	Heavy-duty scaffolding, 45 m main span with suspended scaffolding, elevated casting and lowering
Radnička North	320	12	27	5-10	10	As above
Topcider crossing	35	1	35	5	40	Precast concrete girders with in-situ concrete slab
Pedestrian bridge	35	1	35	5	3	As above

The SAR package thus comprises 16 bridge structures with a total length von 3.2 km. The total bridge area to be constructed runs to 37,000 m².

Overall SAR package in August 2012
Image: PORR

Technical requirements placed on construction

Particularly noteworthy among the various construction techniques adopted (movable scaffolding, heavy-duty scaffolding, elevated casting and lowering of superstructures, superstructure with precast-concrete girders and in-situ concrete slabs, integral structures) are the following engineering solutions:

Suspended scaffolding for track area with lowering of superstructure by 2.20 m

As the new structure crosses only 6.70 m above track level – and at glancing angle that necessitates a 45 m span length – the construction method to be adopted for this span was the subject of intense discussion. Given the spatial constraints and high steel price, the initial proposal of using a hybrid drop-in girder was ultimately rejected. The adopted solution featured heavy truss scaffolding held at the piers by two support frames and freely spanning the track. The superstructure formwork was fixed to the trusses by means of suspension rods. During the night-time closure periods, the forms were hoisted up, moved lengthways over the track area and assembled. After concreting, the main span was pre-stressed and repositioned. This was achieved by releasing the formwork such that the entire 1,500 tonne superstructure was suspended on four 75 mm dia. threaded rods in each of the two support frames. After removal of the forms (as for installation, by lengthways movement above the overhead lines and lowering), the superstructure was dropped to the required height using the suspension rods and set on top of flat jacks. Once the element was correctly positioned, the missing spans between this and the side approaches were shuttered and concreted by conventional means. Additional pre-stressing was performed to achieve a continuous girder system and the oil in the flat jacks was replaced by cement mortar. To complete the bridge, final concrete lifts were cast to carry the two piers through the superstructure.

Elevated casting of superstructure above track installation
Image: PORR

Elevated casting of superstructure above track installation
Image: PORR

Five superstructures carried across tram lines during two summer closures

Apart from the nightly shutdowns from midnight to 5 a.m., the only full closure period offered by the tram authorities to facilitate construction of the tram track crossings for the ICSRR was during the two-month summer holidays. In the first summer period (2011), two movable scaffolding systems with front and rear nose sections set up next to the tram route were used to construct the viaducts within the specified deadline. Likewise, during the following summer (2012), a further three superstructures (for Ramps 2 B, 3 B and BGM) were built across the tram lines, this time using heavy-duty scaffolding. Given that the minimum clear height above ground level was only 3.75 m, any attempt at performing these works outside the closure periods would have been unthinkable. Implementation of a night-shift regime coupled with a sophisticated logistics concept for scaffolding provision and relocation made it possible to hand back the site two weeks ahead of the scheduled reopening to tram traffic.

Five structures spanning tram route
Image: PORR

Changes to programme and construction of Radnička viaducts under traffic conditions

The client's inability to release one of the plots needed to build the "A" ramps prevented the implementation of the original traffic control concept for the "Radnička Street" artery.

The original intention had been to route the city-bound and outbound traffic flows via the roundabout so as to prevent these from impeding construction of the Radnička viaducts.

The new situation prompted PORR to submit a proposal to the client for a change in the design of the structures. This included a series of measures – shortening of the elongated structures by some 100 m, lateral relocation and insertion of an embankment with a single wide bridge across the stream – to free up space for traffic management via the existing roads on the plot.

Despite the severe complications to the construction programme due to the limitation of erection works to the night-time closure periods, the revised procedure managed to halve the total delay in completion caused by late site possession and, importantly for the client, substantially reduce the cost overrun.


Construction above and below traffic
Image: PORR

Final thoughts

Through its meticulous planning and design, solution-oriented construction methods and collaborative approach to on-site operations, PORR is making a major contribution to the improvement of infrastructure in Belgrade, as the capital of a country, Serbia, which is aiming for closer European integration.


In the shadow of Sava Bridge
Image: PORR

Project data

Client	City of Belgrade, represented by Land Development Agency
Site supervision	Louis Berger Corporation, Washington DC
Funding	European Investment Bank (EIB)
Start on site	January 2011
Concrete	60,000 m³
Reinforcement	8,000 t
Formwork	50,000 m²
Bored piles	8,500 m
Bridge area	37,000 m²

A1 Westautobahn (A1 western motorway) – New construction of Kasern Viaduct

and general reconstruction of A1 Westautobahn at km 287.000 km to km 289.000

Heinz Flotzinger

Contract

In January 2011, the Salzburg branch of TEERAG-ASDAG AG was contracted by state-owned ASFINAG Baumanagement GmbH for the reconstruction of the 143 m long, 17 m high Kasern Viaduct on Austria's A1 Westautobahn in Salzburg, as well as the demolishment of the existing bridge and the general reconstruction of the Vienna-bound carriageway over a length of 2 km and the Munich-bound carriageway at the accesses to the bridge.

The challenging project started on site in March 2011 and, with all interim and completion deadlines met, the Vienna-bound carriageway opened to traffic on 27.11.2011 and the Munich-bound carriageway on 09.09.2012.

Background

The Kasern Viaduct crosses the valley at section km 288.177 on the A1 Westautobahn with a steel bridge carrying traffic in both directions. The bridge spans the double-track of the Westbahn mainline of the ÖBB (Austrian Federal Railways), the branch line leading to Salzburg-Gnigl station and the Carl- Zuckmayrstraße as well as the works entrance to hoisting equipment manufacturer Palfinger Krane.

The viaduct is flanked, at a short distance on either side, by two further bridges carrying the junction slip roads. The building site logistics posed a tremendous challenge due to the extreme spatial constraints.

Built in 1938, the 2x2-lane bridge had reached the end of its service life and was in need of reconstruction.

The existing facility took the form of a steelwork structure with a four-span, skew girder grid made up of eight 2.20 m tall main girders and cross-girders.

The carriageway comprised arched metal plates topped by a load-spreading concrete pavement. The structure was 142.60 m long and 24.50 m wide. The contract required replacement of the existing bridge by a new composite steel structure and required dismantling of some 1,200 tonnes of steelwork as well as reconstruction of the pier caps, abutment seats and cut-off walls. The new steel structure has a total weight of 950 tonnes.

Apart from the new bridge, the contract also included a general reconstruction of the motorway pavement in certain areas. This involved renewal of the existing concrete surfacing and road base, stabilization of the subgrade, and rehabilitation of the central drainage system and traffic control installations.

General view of Vienna-bound carriageway
Image: LBS Redl

To maintain traffic flows and safety, a two-phase traffic management regime was implemented:

Traffic Management Phase 1

Completed in 2011, Phase 1 consisted of the demolition and reconstruction of the bridge structure for the Vienna-bound carriageway as well as resurfacing of the bridge accesses over a length of 2 km. The two lanes of the Munich-bound traffic were redirected along the northern slip road. The two lanes of the Vienna-bound traffic were redirected along the original Munich-bound carriageways. Site access for construction traffic was provided via the temporary safety barriers.

Traffic Management Phase 2

Phase 2, in 2012, comprised the demolition and reconstruction of the bridge structure for the Munich-bound carriageway plus resurfacing of the bridge accesses. As in Phase 1, the two lanes of the Munich-bound traffic were redirected along the northern slip road. In the area of the bridge, the two lanes of the Vienna-bound traffic were slewed outwards and separated from the work location by means of concrete safety barriers. Site access for construction traffic was again provided via the temporary safety barriers.

Project

The key priorities for the bridge construction works were to maintain two-lane traffic flows in either direction throughout the contract period and to minimize disruption to the existing roads and railway lines. This led to the following solution:

The total width of the structure was increased from 24.50 m to 29.50 m so as to accommodate a 4+4 traffic management system via a single structure during later reconstructions.

This was further supported by the replacement of the existing single structure with two separate structures, one for each traffic direction. The spans and overall lengths remained unchanged.

Construction sequence

Prior to commencement of the actual works, scaffolding was suspended from the existing structure to protect the railway lines. This comprised 40 m long, suspended HEA 650 beam sections into which lightweight roofing panels spanning up to 19.50 m were inserted. All protective scaffolding had to be installed at night during the extremely limited track closure periods and train breaks.

Protective scaffolding over Westbahn railway line
Image: PORR

Standard protective scaffolding was installed over the Carl-Zuckmayrstraße.
Moreover, all rerouting of traffic was exclusively limited to nights and weekends.

After completion of the preliminary works, the existing bridge was dismantled and the new bridges erected in predetermined phases. The removal and insertion of all girders was limited to nights and weekends, in line with the track closure periods and train breaks.

Construction Phase 1: Vienna-bound carriageway

- Phase 1/1: Removal of individual sections of first existing girder (weighing up to 38 tonnes) plus first part of existing pier caps and abutment areas
- Phase 1/2: Construction of first part of new pier heads and abutment areas, and insertion of individual sections of first main girder (weighing up to 62 tonnes)
- Phase 1/3: Removal of individual sections of second and third existing girders plus existing pier caps and abutment areas
- Phase 1/4: Construction of second part of new pier heads and abutment areas, and insertion of individual sections of second main girder
- Phase 1/5: Removal of individual sections of fourth existing girder plus existing pier caps and abutment areas
- Phase 1/6: Construction of third part of pier heads and abutment areas, and insertion of individual sections of third main girder
- Phase 1/7: In-situ casting of concrete slab with formwork carriages (in 10 stages) using alternate-bay method, waterproofing, edge kerbs, concrete pavement and steel safety barriers
- Phase 1/8: Reopening to traffic

Construction Phase 2: Munich-bound carriageway

- The same sequence as for Phase 1 was adopted for the Munich-bound carriageway.

Demolition of bridge superstructure
Image: PORR

Demolition of existing structure
Image: PORR

Removal of existing girders
Image: PORR

Bridge abutments
Image: PORR

Bridge substructure

The condition of the existing piers necessitated their rehabilitation by means of cased injection borings and cement suspension grouting over a total length of around 1,500 m. The existing pier caps were removed and replaced by in-situ concrete caps.

The abutment seats and cut-off walls were similarly replaced by in-situ concrete constructions. In addition, the abutments were tied back to the adjoining rock face by means of 65 partially bonded anchors with a total length of approx. 1,000 m.

Bridge superstructure

The bridge superstructure comprises separate composite steelwork assemblies, each with three main steel girders and in-situ concrete pavement slabs. Transverse steel girders were incorporated at the abutments and piers.

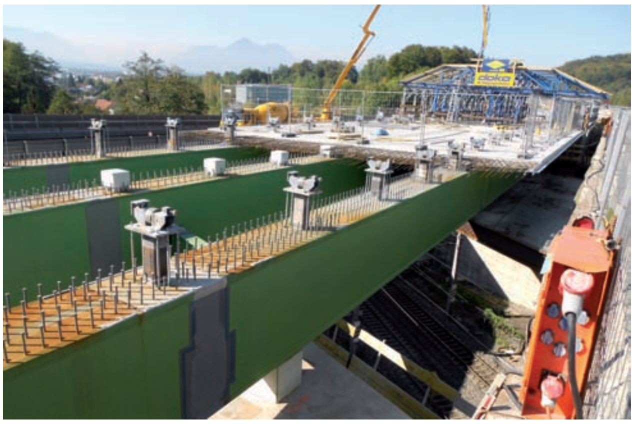
The main girders consist of longitudinal and vertically braced, 1,000 mm wide and 1,800 mm high seal-welded boxes. The transverse girders are executed as 400 mm wide, 750 mm high, open I-section beams.

The 35 cm thick, in-situ concrete pavement slabs were cast with formwork carriages using the alternate-bay method. They taper to a thickness of 25 cm at the outer edge of the carriageway.

New steel structure for the Vienna-bound carriageway
Image: LBS Redl

New steel structure for the Munich-bound carriageway
Image: PORR

Formwork carriage for the composite structure
Image: PORR



Formwork carriage for the composite structure
Image: PORR

Road construction

Due to the poor condition of the Vienna-bound carriageway, this was completely stripped away over a length of 2 km. The subgrade was stabilized with cement and the road base and concrete pavement renewed. An alternating construction programme was adopted in order to maintain traffic flows between km 288.000 and km 287.000. The central drainage system and traffic control installations were also reinstalled along this section.

Concrete paver
Image: PORR

Concluding remarks

TEERAG-ASDAG AG (Salzburg branch) as contractor, the steelwork subcontractor, the design engineer and the site supervisor, faced major challenges due to the spatial constraints imposed by the island site and resulting complexity of the steelwork dismantling and assembly. Equally demanding, however, was the task of maintaining road and rail operations, utilizing the short, precisely specified intervals between the passage of trains and meeting the tight construction deadline of eight months per bridge structure.

Yet, TEERAG-ASDAG AG – as a key PORR Group company – has once again proved its outstanding expertise in tackling technically demanding and tightly scheduled infrastructure projects.

Project data

Client	ASFINAG Baumanagement GmbH, Vienna
Contractor	TEERAG-ASDAG AG, Salzburg branch
Work package length	2,000 m
Bridge length	2 x 142.60 m
Bridge width	2 x 14.70 m
Bridge are	4,192.44 m²
Span lengths	31.00 m + 31.00 m + 43.40 m + 37.20 m
Bridge height	17 m
Structural steelwork	950 t
Concrete volume	3.100 m³
Steel reinforcement	450 t

Injection borings	1,500 m
Partially bonded anchors	1,000 m
Dismantled steelwork	1,200 t
Demolished concrete	1,850 m³
Demolished concrete pavement	9,300 m³
New concrete pavement	26,200 m²
Cement stabilization	22,500 m²
Asphalt road base	29,800 m²
Frost blanket course	8,700 m³
Construction start	28.03.2011
Overall completion	28.09.2012

Storchengasse Hotel and underground car park

Hotel development for Star Inn Group on Linke Wienzeile in Vienna's Fifteenth District

Othmar Laister

Project data

Client	Storchengrund GmbH & Co KG (Strauss & Partner Development GmbH – Rhomberg Bau GmbH)
Contractor	ARGE Storchengrund consortium (Porr Bau GmbH – Rhomberg Bau GmbH)
Start on site	15.05.2011
Handover	28.02.2013
Opening of hotel + underground car park	01.03.2013

Introduction

At the start of May 2011, the ARGE Storchengrund consortium was awarded a turnkey contract for the construction of a hotel plus two-level underground car park. The consortium was also entrusted with existing planning assignments (architectural design, structural design, building physics, transport planning etc.).

Visualization
Image: ZOOM

Project Description

The new hotel development is the Star Inn Group's first establishment in Vienna. The L-shaped complex contains 283 hotel rooms spread over eight storeys. The podium and ground floor house the lobby, reception, bar, two seminar rooms and a spacious breakfast room that commands a splendid view of the internal courtyard. The hotel offices are located on the second rooftop level and are reached via an open stairway.

The scheme also incorporates a ground-floor local store at the junction between Linke Wienzeile and Storchengasse. The seven storeys above the shop will serve as a hostel providing temporary accommodation. This facility was the subject of a separate contract awarded to the consortium by the charitable housing company Österreichisches Siedlungswerk (ÖSW).

A two-level underground car park spanning the entire site area provides a total of 204 parking spaces for hotel visitors, shop customers, hostel residents and the general public.

Of particular note is the scheme's prime location, in immediate proximity to Vienna's celebrated baroque Schloss Schönbrunn palace. Vienna's key locations are easy to reach by public transport, specifically via the Längenfeldgasse metro station (U4/U6 lines) directly in front of the hotel.

Aerial photo
Image: Luftbildservice Redl

Foundations, Dewatering and Excavation

A diaphragm wall was sunk around the entire site boundary to a depth of 20 m to ensure its full embedment in impermeable strata. Apart from serving as a foundation retaining structure, the diaphragm wall was also integrated in the structural concept for the finished building. Given the disproportionate cost – on account of the neighbouring developments – of anchoring back the diaphragm wall into the surrounding ground in the course of the works, the construction was stiffened through insertion of a 70-80 cm thick concrete cover slab between the podium and the parking decks below. Due to the different support column grids adopted for the parking levels and the storeys above, this slab was designed to double up as a load-transferring structure for the columns.

To facilitate top-down excavation and construction of the two parking decks below the cover slab, two recessed access openings with a total area of around 900 m² were created.

Before excavation work below the cover slab could commence, it was necessary to install an active dewatering system capable of lowering the groundwater level to and maintaining it at a level 1 m below the projected raft foundation. Despite the need for numerous temporary piles – whose function is described more fully in the next section – the excavations below the cover slab were completed and casting of the raft foundation commenced after just under three weeks.

View of pit with parts of upper shell already under construction
Image: PORR

Special features of Structural Works

For the duration of the works, the cover slab was carried by 20 temporary CFA (augercast) piles. To meet the tight construction programme, the decision was taken, in consultation with the structural and geotechnical engineers, to sink an additional 47 temporary CFA piles in the area housing the main hotel block. This allowed construction of the first five storeys above the cover slab (podium to third upper storey) prior to completion of the basement levels below this.

Temporary CFA piles with parts of upper shell already under construction
Image: PORR

Only after completion of all structural works below the cover slab and closure of the two access openings was the structural continuity of the works sufficient to allow erection of the remaining upper floors (fourth floor to second rooftop level). As the temporary CFA piles had also been designed as tension piles to resist uplift, these could only be removed when the constructed works imposed adequate dead loads to allow shutdown of the dewatering system.

A further notable feature was the mounting platform for the tower crane in the pit. Like the "fast-track" sections of the shell, this was also supported by temporary CFA piles.

Despite the complex construction procedure, the concerted efforts of the entire contractor team allowed successful completion of the shell at the end of March 2012, one month ahead of schedule.

Temporary CFA piles for tower crane
Image: PORR

Building Envelope and Interiors

The longer building front overlooking Linke Wienzeile was clad from first-floor to second rooftop level with Eternit fibre-cement rainscreen panels, punctuated with rows of projecting sheet-metal window frames. A stick-system assembly was adopted for most of the podium/ground-floor frontage. All remaining facade areas were fitted with an external thermal insulation composite system (ETICS).

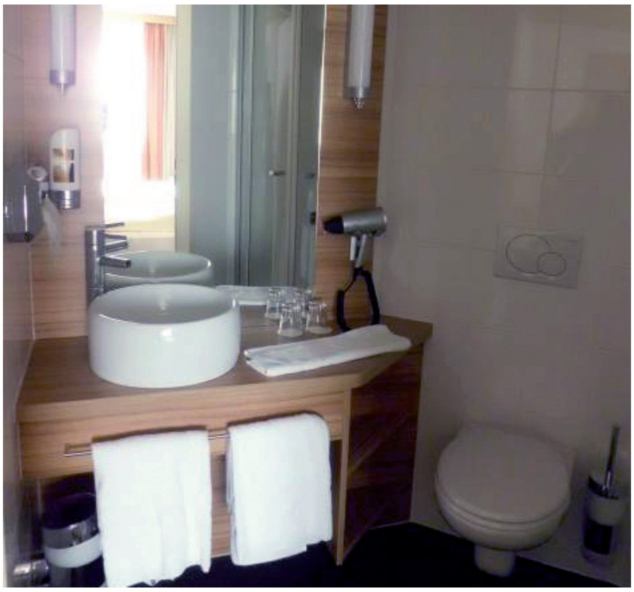
Eternit fibre-cement rainscreen cladding
Image: PORR

Traditional dry-construction systems were used for the interior walls and ceilings. Imitation-parquet-strip PVC flooring was laid in all rooms, including bathrooms. The bathroom walls were finished with full-height tiling.

To demonstrate the design of the future accommodation, two mock-up rooms were completed on the first floor of the hotel during the structural works phase, in time for inspection by the guests at the topping-out ceremony.

All furnishings for the hotel rooms, reception, bar, breakfast room, kitchen etc. are provided by the user.

Mock-up hotel room
Image: PORR



Mock-up bathroom
Image: PORR

Building Services Installations

The rooms are heated and cooled by means of two-pipe fan coil units with individual room control. The plantrooms necessary for building services are installed on the rooftop of the transverse block (refrigeration plant and air-handling plant for rooms) and at podium level (air-handling plant for common spaces). Heat is supplied by Vienna's district heating system while power distribution is via the building's own transformer room, with three transformer boxes, located at podium level.

All public areas, including the lobby, breakfast room and seminar rooms, are also served by air-conditioning.

Concluding Remarks

Despite the tight construction window, the first storeys were handed over to the operator, for commencement of the interior furnishing works, as early as the end of November 2012. Of crucial importance in meeting this deadline was the close and efficient collaboration between all members of the project team.

As things stand, there are no obstacles to the punctual completion of the overall scheme - in which case the hotel will be ready to welcome its first guests as of 1 March 2013.

Project data

Building footprint	3,711 m²
Site area	3,711 m²
Gross floor area	19,750 m²
Usable hotel area	10,173 m²
Usable car park area	6,572 m²
Cubic content	69,159 m³
External grounds area	1,503 m²
Number of above-ground storeys	9
Number of below-ground storeys	3
Number of rooms	283
Number of parking spaces	204

Building quantities

Excavation/earthmoving	40,800 m³
Diaphragm walling	4,900 m²
Concrete	15,600 m³
Reinforcement	1,440 t

Construction of continuously-circulating single-cable ski lift with 8-seater cabins (8 EUB) connecting Alpbach and Wildschönau in the Tyrolean Alps

Creation of the new "Ski Jewel" skiing area

Stefan Plankensteiner

Introduction

Alpbachtal and Wildschönau are tributary valleys rising from the main valley of the river Inn in the Kitzbuehel Alps. Both valleys are well-known summer and winter tourist hot spots serving the Tyrolean lowlands. For many years, both regions have fought for a ski lift system to connect Inneralpbach to the Schatzberg summit. This represents a major opportunity for the "Alpbacher Bergbahn GmbH & Co. KG - Schatzberg OG" and "Wildschönauer Bergbahnen" ski lift operators since both areas have continually lost skiers in recent years to the larger resorts. This market share loss can be attributed to the fact that the surrounding rival ski resorts have a larger network of ski-runs. The new connection will extend the Alpbachtal and Wildschönau ski areas to include 145 km of pistes and 47 lifts, placing the newly named "Ski Jewel" resort among the top ten of the 78 ski resorts in the Tyrolean Alps, with the add-on effect of enhancing tourist infrastructure.

The connecting lift system will be constructed directly in Inneralpbach. From there the new gondola lift will ascend up to "Pechalm", where the mid station is being constructed, and continue up to the top station on the Schatzberg summit. The two-kilometre connecting piste that will lead from the top of Schatzberg to the mid station will increase the options for skiers. In future, guests will be able to enjoy a thoroughly modern and sustainable ski experience in the natural environment of the Tyrolean Alps.

Planned connection between Wildschönau and Alpbachtal
Image: www.skijuwel.com

Project profile

The 1,898 m high Schatzberg peak separates the two mountain valleys of Alpbach and Wildschönau. The eastern side of Schatzberg is connected to Auffach by cable car. The western side, including Inneralpbach, has not been developed for skiing: the natural piste (ski route) from Schatzberg to the village of Alpbach is regularly used by cross-country and off-piste skiers alike. The 8-EUB Pöglbahn ski lift connects Inneralpbach, located at approx. 1,000 m above sea level, to the Alpbach ski area. The two ski areas lie approx. 2,500 m apart as the crow flies.

The connecting lift – also known as the Schatzberg lift – has been designed as a continuously-circulating, single-cable lift with 8-seater cabins (8-EUB) split into two sections. It will be able to transport 2,400 people / hour at a speed of 6 m / second. The valley station is located in Inneralpbach directly next to the "Pöglbahn" lift valley station. From here, the new gondola lift will ascend up to "Pechalm", where the mid station (1,440 m) is being constructed. The horizontal length of this first section is approx. 1,810 m. The second section of the lift makes more than a 90° shift to the east, continuing 1,355 m to the top station on the Schatzberg summit, towards Wildschönau. The altitude difference between the bottom and top station is approx. 870 m. The lift is only intended for use in winter. In addition, a new 1,400 m long piste equipped with snow machines is being developed between the top and mid stations (section 2). The first section does not have its own piste and will serve only as a connecting lift between Inneralpbach and the second section.

Valley station

Lying at an altitude of 1,009 m, the valley station will house the coupling station, a service room, storage room, tea kitchen, WC for employees and crew quarters. Power will be provided via an underground cable leading from the existing 8-EUB Pöglbahn lift, supplied from the TIWAG network. Water and sewage pipes will be connected to existing lines.

Mid station

The mid station (altitude 1,441 m) is the centrepiece of the connecting lift system, housing the drive stations for both sections and offering boarding in both directions as well as a continuous through ride. In addition, the mid station has a carrier station of some 1,030 m² to accommodate a total of 112 cabins, as well as two service rooms, a WC for employees and crew quarters. A power substation supplied and operated by TIWAG will be installed in the basement. A compression chamber for the snow machines and thyristor room are also planned.

Top station

Lying at 1,876 m above sea level, the top station will house the coupling station, a service room, storage room, tea kitchen and WC for employees. Power will be provided via an underground cable leading from the existing lift to the summit and supplied from the TIWAG network. Water and sewage pipes will be connected to existing lines.

Supporting tower foundations

A total of 18 support posts with concrete foundations averaging 25 m³ plus a cable trench will be constructed along the length of the first and second sections.

Construction contract

The contract for building the new connecting lift was awarded to TEERAG-ASDAG AG (Tyrol branch) after intense negotiations had been carried out by the Alpbacher Bergbahn GmbH & Co KG - Schatzberg OG lift operators in May 2012. The contract included carrying out all construction work required for the mid and top stations and building the lift support tower foundations. All other work, e.g. installation of the ski lift, including electrical equipment, steel construction work, piste construction, etc. was carried out by other companies.

Construction procedure

The reinforced concrete structures used to build a ski lift are largely hidden from view once construction is completed and are therefore not registered by users or skiers. They do, however, form the structural foundation of the facility and perform the continuous function of dissipating all forces derived from the facility's operation into the underlying bedrock.

The building procedure for all station structures and ski lift foundations was carefully coordinated with the scheduling requirements for the subsequent installation of the lift and cables. Client and planners alike gave special priority to the exact positioning and height (+/- 5 mm) of the reinforced concrete structures, since the subsequent assembly of steel structures and lift installations were to be carried out to the highest degree of precision and within the tightest timeframe. The same applied to the detensioning and coupling stations in the mid and valley stations and all lift support tower foundations along the path of the lift.

Both access to the different construction areas and provision of construction equipment were by means of steep, zig-zag forest paths, which meant a particularly arduous journey full of bends for the crane. There was no access path to nine out of 18 supporting tower foundations, which meant the necessary formwork, reinforcement and a total of 240 m³ of ready-mixed concrete had to be flown in by helicopter. The volume of concrete required for each supporting tower foundation, including the top and base, was as much as 50 m³, presenting a particular challenge for the concreting process in terms of scheduling and logistics.

Shell construction work – Mid station
Image: PORR

Completion work on lift installations – Mid station
Image: PORR

Completion work on lift installations – Mid station
Image: PORR


Completion work on lift installations – Mid station
Image: PORR


Shell construction work - Top station (altitude 1,876 m)
Image: PORR


Completion work on support tower foundations near mid station
Image: PORR


Concreting work on a support tower foundation with the aid of a helicopter
Image: PORR


Completion work on support tower foundation no. 16
Image: PORR

Concluding remarks
Thanks to the cooperative partnership between all project participants, from the client, site management, cable car designers, authorities, to various contractors and local residents, work has proceeded to everyone's complete satisfaction and is fully on schedule. Construction work

was completed on time in October 2012. The whole project will be completed, with the official handover and operational start-up of the new lift in December 2012, in time for the start of the 2012/2013 winter season. Particular challenges posed to TEERAG-ASDAG AG (Tyrol branch) by the project included the steep and extended access routes to the various construction areas in elevated, mountainous terrain, the adverse weather conditions and extremely tight construction window.

Starting with the first project in the cable car division of TEERAG-ASDAG AG (Tyrol branch) in 1999, which involved constructing a storage pool and pump station at Schönjochl for the Fisser Bergbahnen lift operators, and continuing up to this year with the construction of the Alpbach - Wildschönau connecting ski lift, a considerable number of building schemes of varying magnitudes have been managed in mountainous terrain to the complete satisfaction of various cable car operators in Tyrol and Bavaria. In addition to lift and cable car construction, the range of services offered by TEERAG-ASDAG AG in Alpine regions also includes piste construction, snow machine installation and all services related to the construction of storage pools.

Project data

Start of construction	July 2012
End of structural building	October 2012
Project completion	December 2012
Lift type	Continuously-circulating, single-cable lift with 8-seater cabins (8-EUB) in 2 sections
Cable altitude at valley station	1,013 m
Cable altitude at mid station	1,446 m
Cable altitude at top station	1,878 m

Mid station

Volume of concrete	1,800 m³
Reinforcement steel	110 t
Area of formwork	5,800 m²

Top station

Volume of concrete	240 m³
Reinforcement steel	17 t
Area of formwork	600 m²

Support tower foundations

Volume of concrete	500 m³
Reinforcement steel	33 t
Area of formwork	1,300 m²

Transported by helicopter	240 m³ concrete

Construction of bypass brings relief to population of Bad St. Leonhard

Background

Lying at the heart of the Styria/Carinthia region, the municipality of Bad St. Leonhard in Lavanttal (district of Wolfsberg) has a population of approx. 5,000 and an area of 111.72 km². Through its sulphur springs it became popular as a spa resort and is part of the "Paracelsus" region of Upper Lavanttal. In the town itself there are numerous fountains, e.g. the Preblauer fountain, whose natural mineral water is available under the same name and is sold both for its taste and medicinal properties. In addition to its historic centre, Bad St. Leonhard has some admirable castles and churches.

The B78 state highway that led through St. Leonhard (north-south thoroughfare) was one of the most heavily used main roads in Carinthia. With an average of 10,000 vehicles passing through the town each day, local residents had to contend with considerable noise and pollution levels. In addition, the numerous approach and exit roads produced a series of road safety issues and challenges.

As a result of these circumstances, the province of Carinthia, in close collaboration with the municipality of St. Leonhard, has begun to plan a bypass which will ease traffic through the town, reduce the noise and pollution and increase road safety.This will have the add-on effect of significantly increasing the quality of life for local residents, spa guests and large numbers of care home residents in the town. Besides relieving traffic, the new bypass should provide a positive economic stimulus for the region.

Planning and tender

Following an intensive planning and preparation phase (several residential properties had to be demolished along the planned route, leading to objections and causing various hitches and delays), the "ODF Bad St. Leonhard" building scheme was put out to public tender in 2008.

At a total cost of EUR 47 million, it was to be the largest road construction scheme in Carinthia in recent years. The project was split up and advertised in four construction lots, the first of which was outsourced to a consortium led by the Baugesellschaft m.b.H. Erhard Mörtl on account of their offering the best and cheapest bid. The project client was the Provincial Government Office of Carinthia.

Implementation

Construction was due to begin in the spring of 2009. Owing to high cost overruns for construction lot 4 (underpass), the Regional Court of Audit of Carinthia intervened, resulting in substantial modifications to the scheme and a one-year delay in construction. The consortium was finally able to start with construction work on lot 1 in the spring of 2010.

During construction, several unforeseeable problems occurred, including the discovery of explosive remnants of war, abandoned illegal landfills and a sensitive site issue (sulphur springs). Further challenges were presented by the need to maintain railway services and traffic flow at connection points and by the unpredictable weather conditions in summer and winter. Furthermore, the shortened construction period led to additional coordination being required since all four construction lots were realised simultaneously, resulting in an overlapping of activities among the various project participants.

Project data

Clearance of	12 properties
Excavation	49.000 m³
Embankment filling	89.500 m³
Drainage channels	4.650 m
Recycled mix	19.000 t
Sound barriers	2.200 m
Detention systems (amphibian protection)	3.800 m
Concrete for anchor walls, other concrete structures + cantilever retaining walls	3.000 m³
Stone walling	3.250 m³
Concrete surfacing	1.750 m²

Completion – Inauguration

Thanks to the excellent cooperation among all project participants, from the client to the site management, municipal authorities, project engineers, planners, administrative bodies and local residents, and despite the start of construction being delayed by over one year, building was completed on schedule in July 2012 and the bypass was opened to traffic on 15.7.2012. Despite heavy rain, 2,500 people attended the inauguration ceremony, but due to the bad weather, celebrations were transferred to the newly constructed underpass.

The Baugesellschaft m.b.H. Erhard Mörtl in Wolfsberg, which is part of the PORR Group, was once again able to prove its experience and competence in realising such a complex and major project, adding to its list of successful projects undertaken in the last few years.


Asphalting works
Image: PORR

Excavation works – Clearance works
Image: PORR


Stone wall construction
Image: PORR


Backfilling of retaining wall and embankment construction
Image: PORR


Drainage and channel laying during stone wall construction
Image: PORR

A4 Ostautobahn (A4 eastern motorway) – construction of Fischamend and Maria Ellend rest areas

Peter Hanak

Introduction

Austria's "eastern" A4 motorway, which opened in October 1994, is the main east-bound artery from Vienna, providing links to Vienna-Schwechat Airport, Hungary and Slovakia.

The start of the motorway is at the Stadionbrücke bridge, west of the Prater interchange, in the Erdberg district of Vienna. From here, it passes Vienna-Schwechat Airport and the towns of Bruck an der Leitha and Neusiedl am See, before reaching the border at Nickelsdorf. On the Hungarian side, it then continues as the M1 motorway to Budapest.

The importance of the A4 motorway was further enhanced in 2006 with the opening of Vienna's S1 outer-ring expressway between the Schwechat and Vösendorf interchanges, which directly links the A4 to the south-bound A2 and west-bound A21 motorways.

To accommodate the resulting increase in traffic volumes, the A4 was widened to three lanes per carriageway between Vienna-Schwechat Airport and the Schwechat interchange. The improved section opened in May 2007.

In 2009, Austria's government-owned motorway construction and management company, ASFINAG, decided to extend and modernize the Fischamend and Maria Ellend rest areas. This necessitated the acquisition of some 3,300 m² of agricultural land from the municipality of Fischamend.

The A4 Fischamend/Maria Ellend rest area scheme was put out to public tender by ASFINAG at the end of May 2011.

Contract award and scope

In July 2011, ASFINAG contracted a consortium including PORR subsidiary Allbau to construct the Fischamend and Maria Ellend rest areas.

The Fischamend rest area is located at km 22.4 on the carriageway heading for Bruck an der Leitha.

The Maria Ellend rest area is on the Vienna-bound carriageway, also at km 22.4. Both rest areas were built on the site of existing car parks.

The project largely comprised the construction of two new rest areas, including vehicle circulation routes and parking spaces, new entry and exit slip roads to the A4 motorway plus all associated drainage works, including provision of a new water pollution control system.

The incorporation of adjoining land allowed the extension of both rest areas to accommodate 60 heavy-goods vehicle (HGV) parking spaces, 84 car parking spaces, six disabled parking spaces as well as provision for eight coaches and ten motorcycles.

Technical description

Asphalt paving was used for the vehicle circulation routes on both rest areas, the entry and exit slip roads, the car and coach parking spaces, and the footway areas.

The existing asphalt pavements were planed off by milling machine. To minimize the environmental impact, the milled material was recycled for incorporation in the frost blanket courses.

Moreover, the asphalt pavements were built with a cement-stabilized instead of an unbound road base, thereby allowing the thickness of the asphalt construction to be reduced to 15 cm. Consequently, the total construction thickness runs to only 65 cm.

Westward view of Fischamend rest area
Image: ÖBA

Asphalt paving was also used for the footways, the areas fronting the amenities blocks and the waiting zones, although here with a total construction thickness of 39 cm.

The scheme required the widening and lengthening of the existing asphalt-paved acceleration lanes for both rest areas. The deceleration lanes were adapted to the new configuration where they formed a junction with the rest areas.

The service roads were paved with asphalt over a width of 3.50 m with 0.50 m verges on either side. The access route for tank maintenance was paved over a width of 3.0 m, again with 0.50 m verges on each side.

The two rainwater collection tanks adjoining the amenities block are drained via a DN 2000 manhole and a connection to the local sewage system. The HGV parking spaces were mechanically surfaced with a 25 cm concrete layer. The total construction thickness here is 73 cm.

The contract also embraced the below-ground drainage network, including provision of a sewage pump, and the water supply system from the improved well installation.

The wastewater from the Maria Ellend rest area is carried via gravity pipe to the pumping station at the Fischamend rest area. From here, the wastewater from both rest areas is pumped into the municipal sewage system at Fischamend. The pressure pipe section at the new rest area was renewed.

The existing well at the Maria Ellend rest area was retained and upgraded to present-day standards so as to supply the car park facilities with drinking water. It was enclosed by a fence to prevent contamination and unauthorized access. An 8,000 l drinking water storage tank was installed to accommodate the projected demand.

The picnic areas adjoining the amenities blocks were manually paved with concrete and fitted with tables and benches.

Eastward view of Fischamend rest area
Image: ÖBA

The 24,600 m² rest areas are comprehensively lit by a total of 68 LED luminaires. Each rest area is provided with an amenities block (toilet and shower facilities) plus relaxation areas. A closed-circuit television (CCTV) system and emergency call buttons installed in the car park serve to enhance comfort and security.

Also included in the contract were all electrical and plumbing works in and around the amenities blocks. The sanitary facilities were improved and new ventilation, heating and cooling systems added.

A listed wayside shrine also had to be disassembled and relocated as part of the works.

Listed wayside shrine
Image: ASFINAG

Traffic control measures

The traffic management regime prescribed by the transport authority provided for the full maintenance of motorway traffic flows on both lanes of either carriageway. The works to the entry and exit slip roads were thus carried out under severe spatial constraints in the period from 9.8.2011 to 19.9.2011.

Quality control

In addition to the prescribed acceptance tests, the asphalt mixes were also subject to ongoing quality controls during placing by ARGE Bautech, so as to ensure compliance with the required quality standards.

Quality control with nuclear density gauge
Image: ASFINAG

Final completion and concluding remarks

The inauguration ceremony for the rest areas was held on 18.06.2012. The first-class collaboration between all project parties – from client to site management team – ensured that the project was brought to a successful conclusion. The rest areas were completed and opened to traffic exactly on schedule.

The foremost challenge faced by the consortium and the other project team members was to avoid any disruption to the motorway traffic.

The contribution made by the Pfaffstätten branch of Allgemeine Straßenbau GmbH (a PORR Group company) was a further shining testament to its in-depth know-how and experience in this field.

Inauguration of rest areas
Image: ASFINAG

Project data

Client	ASFINAG Baumanagement GmbH
Start on site	01.08.2011
Completion	18.06.2012
Total excavation	70,000 m³
Asphalt pavements plus base	22,500 m²
Hand & machine-placed concrete pavement	6,400 m²

North Burgenland wind farm

Construction of foundations for expansion of wind power in North Burgenland

General view of North Burgenland Wind Farm
Image: PORR

Introduction

A wind turbine uses its rotor to capture the wind's energy, which is converted into electric power and fed into the grid. The decision where to locate a wind turbine is dependent on topological features and prevailing wind conditions. The foundation serves to anchor the turbine in the ground. It not only ensures the turbine's stability but also transmits all forces deriving from the rotation of the blade and movement of the turbine itself into the ground.

History

Wind power is one of the oldest forms of energy used by man. Long ago, mechanical tasks such as grinding corn and pumping water were already being carried out using wind-driven mills, hence the name "windmill". The very first tapping of wind power goes back to the simple windmills used in the Arab world in antiquity. In the last few centuries, wind power became more widespread; one of its applications was to drain the dykes in the Netherlands. In the mid-19th century there were as many as 200,000 windmills in Europe, but these were replaced by other means of power at the beginning of the 20th century. Modern wind-tapping systems used for the generation of electricity appeared in Denmark just before the turn of the 20th century. However, the ongoing boom only started after the first energy crisis in 1973/74 as the result of an effort to reduce dependency on oil. The energy crisis also sparked off Austria's interest in renewable energy sources. It was long believed that Austria's wind potential was insufficient for use in turbines. It was only through measurements taken by wind power supporters at the end of the 1980s that the favourable conditions were revealed. Several locations in eastern Austria, particularly in Burgenland, are even able to compete with areas lying 15 km off the coasts of Denmark and Germany.1994 saw the first introduction of a wind energy support scheme, which was followed by the construction of Austria's first sizeable wind turbine, with an output of 150 kW, in Marchfeld. By 1996, wind turbines were producing an output of 500,000 kW. The adoption of the Austrian Electricity Industry and Organisation Act (EIWOG) in 1998 for the first time created a purchase obligation with fixed rates (feed-in rates) for eco-electricity plants, and triggered a building boom.

Wind energy in Burgenland:

1997: Construction and operational start-up of first wind farm in Zurndorf
2003: Construction of wind farms in Neusiedl am See, Weiden, Gols and Pama
2004/2005: Construction of further wind farms: Neudorf, Kittsee, Parndorf, Deutschkreutz, Potzneusiedl
2005: Historic date: 27 August is the first day that more electricity was produced by wind power than is consumed by the whole of Burgenland.

2005: In September, wind energy expansion in Burgenland is provisionally complete.
2006: Eco-Electricity Act limits development of wind farms.
2009: New Eco-Electricity Act allows for development of further locations.
2010: Drawing up of Environmental Impact Assessment for several wind farm projects.
2011: Construction of wind farms in Potzneusiedl and Halbturn-Nord.
2012: Construction of wind farms in Nickelsdorf, Halbturn-Süd, Andau, Albrechtsfeld.

According to the latest rankings of the European Wind Energy Association (EWEA), the Burgenland district of Halbturn and Andau is to accommodate Europe's eighth largest wind farm. Produced by Enercon, 79 E-101 turbines with a total capacity of 237 MW are being installed and will feed clean wind power into the Burgenland grid for use in around 150,000 households. The TEERAG-ASDAG company (Burgenland branch) has been commissioned to construct the foundations.

The wind farm is scheduled to be completed in 2014 and will be operated by Energie Burgenland Windkraft (formerly AWP), ImWind and the Püspök Group. Among wind farms installed with the modern 3 MW class of turbines, Halbturn and Andau is the largest wind farm in Europe and will remain so until 2016.

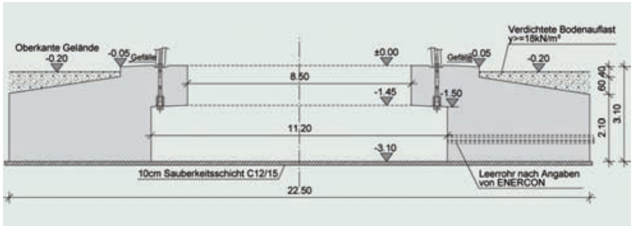
Burgenland is set to double its wind energy output in the next two years. By 2014, the easternmost federal state will be producing more eco-electricity than it consumes, enabling it to become the first region worldwide to export eco-electricity.

Wind energy economics

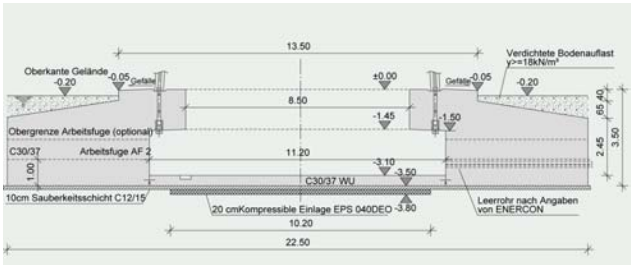
Constructing wind turbines in Austria brings high added value. The whole wind energy sector in Austria, including suppliers and service providers, creates around 3,300 jobs. 2011 was a successful year for Austrian wind energy, with 31 turbines with a combined output of 73 MW being installed. At the beginning of 2012, Austria had a total of 656 wind turbines in operation with a combined output of 1,084 MW. In 2012, more than 100 turbines with a capacity exceeding 300 MW are being installed, which will increase output by nearly one third. The current wave of expansion will increase Austria's annual output of wind-generated electricity from 2.2 billion kWh to 2.8 billion kWh, bringing the number of households supplied with clean wind energy to 800,000, or one fifth of households in Austria. The rapid expansion of wind energy set to take place in the coming years can and will eliminate imported nuclear-generated electricity from the Austrian power grid.

Nickelsdorf Wind Project Presentation:

The period between March 2012 and August 2012 saw the construction of 22 wind turbine foundations, 13 of which were shallow foundations without uplift protection and nine were shallow foundations with uplift protection.



Foundation without uplift protection:
Image: PORR



Foundation with uplift protection:
Image: PORR

General building procedure for constructing wind turbine foundations

Before construction can begin, a complete service road network needs to be developed by the operator to enable easy access to the turbines.

The bedrock is inspected in advance by a geotechnical expert to determine the measures required to ensure the stability of the foundation and later the tower.

During this process, test pits are constructed and deep drilling used to determine ground consistency.

The groundwater level and granulation of the soil can be such that special foundation engineering measures are required, leading to considerable additional overheads.

Inspection of the bedrock establishes which ground improvement measures need to be carried out and whether a shallow or deep foundation is required.

Construction work begins once the client has indicated the midpoints necessary for correct positioning and measurement of the foundations.

Handover of midpoints
Image: PORR

Concrete displacement columns (VCC; the appropriate deep foundation piling system chosen for this project) are installed from the site surface down to the compact bedrock to achieve a secure base for the foundation.

Concrete displacement columns
Image: PORR

After the VCC procedure, excavation for the foundation can begin. The earth is sorted according to consistency and transported to the disposal site or stored nearby for subsequent filling.

Aerial view of foundation excavation works
Image: PORR

When the previously specified excavation base level has been reached, plate load-bearing tests are used to determine whether the ground is sufficiently stable or whether further improvement measures are necessary.

Foundation excavation base
Image: PORR

The next stage involves starting to build up the load-distribution matting, which varies in strength with each foundation. A compression test is carried out between layers.

Installation of load-distribution matting
Image: PORR

Successful testing of the load-distribution cushion is followed by installation of the blinding layer.

Blinding layer
Image: PORR

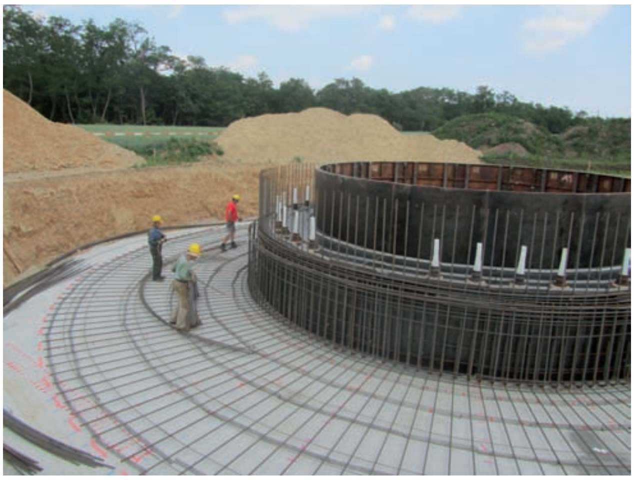
Now the construction of the foundation can begin. First the foundation core formwork is assembled.

Start of inner formwork assembly
Image: PORR

At the same time, reinforcement for the foundation is delivered so that on completion of the foundation core, reinforcement assembly work can begin.

For shallow foundations subject to uplift, installation of the blinding layer must be followed by construction of a base slab to exclude subsequent foundation uplift. As a precautionary measure, an injection tube is attached to the base slab to allow future compression.

Compression tube - Detail protective box
Image: PORR



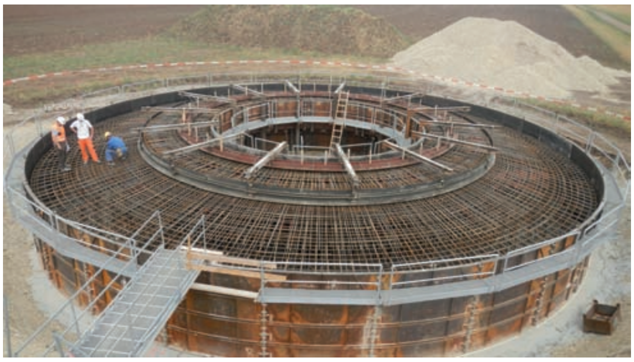
Start of reinforcement assembly work
Image: PORR

Compression tube around base slab
Image: PORR

The reinforcement steel is assembled into a cage-like structure with radially bent steel. Between 70 and 100 t of reinforcement steel is required for each foundation. The earthing system and empty conduits are installed in parallel.

Completion of reinforcement cage
Image: PORR

After successful inspection of the reinforcement works, the foundation outer casing can be constructed.



Reinforcement + outer casing completed
Image: PORR

Now concreting can begin. The volume of concrete required for each foundation amounts to between 680 m³ and 920 m³. Using a pump, concrete is introduced into the formwork under vibratory shock. Concrete mixer lorries arrive on site almost by the minute in order to guarantee a continual concreting process.

Concreting works
Image: PORR

To prevent any defects in the concrete, several after treatments need to be carried out after concreting has been completed on account of the sheer volume of concrete and resulting shrinkage.

Aerial view of completed, covered foundation
Image: PORR

As soon as the concrete has reached the required rigidity, the supporting formwork is stripped and the concrete structure inspected by the client so that filling and covering can proceed.

Foundation with formwork removed, approved for filling
Image: PORR

Next, the remaining steel earthing strips are connected and filling is carried out in layers. Specific values relating to the construction of the tower must be achieved.

Filling works
Image: PORR

After the foundation has been successfully filled, it is handed over to the site road builder so that an appropriate access route can be constructed to facilitate crane assembly and tower construction.

Completed filling
Image: PORR

Now there are no obstacles to constructing the tower and the rest of the turbine.

Tower construction
Image: PORR

Project data

Foundations	22
Earth excavation	52,000 m³
Earth replacement	12,500m³
Earth disposal	32,000 m³
Filling and compaction	25,000 m³
Geo grating	8,500 m²
Spacers	12,000 m
Compression tubing	350 m
Steel earthing strips	7,200 m
Turf edging stones	1,000 m
Structural steel	1,850 t
Concrete	17,000 m³

To date, TEERAG-ASDAG (Burgenland branch) has been commissioned to construct 317 wind turbine foundations, 245 of which have already been completed and 72 of which are still under construction and scheduled for completion by the middle of 2013.

Panoramic view of North Burgenland Wind Farm at sunset
Image: PORR

Panoramic view of North Burgenland Wind Farm at sunrise
Image: PORR

Start-up ceremony for district heating main tunnel in Gudrunstraße, Vienna

Start of first drive celebrated on 12 July 2012

Image: PORR

Image: PORR

Construction of the 3.2 km long "Gudrunstraße" district heating tunnel, in the immediate vicinity of PORR's headquarters, started in early 2012. Only six months later, the tunnelling machine was hoisted into the 27 m deep pit to commence work for the first of a total of three pipe jacking sections.

In keeping with an age-old tunnelling tradition, a statue of St Barbara was blessed by Pastor Loucky prior to commencing the drive. During the start-up ceremony, our own tunnel patroness, Manuela, was elected as St Barbara's worldly representative.

Vienna's district heating company Fernwärme Wien contracted a consortium led by Porr Bau GmbH (Tunnel Construction division) to perform the work. The contract, worth EUR 25 million, is due for completion by the start of 2014.

Pipe jacking techniques are to be used over a distance of 2.5 km, with the cut-and-cover method adopted for the remaining approx. 750 m. The tunnels will be excavated using an earth pressure balanced shield (EPB) machine with an external diameter of 2.7 m.

Signature of Polish railway contract for Toruń-Bydgoszcz link

Work starts on PORR's biggest ever railway contract in Poland.

Image: PORR

The Railway Engineering unit of PORR (POLSKA) S.A. has managed to land its biggest ever contract since entering the Polish railway engineering market two years ago.

The contract to modernize Railway Line No. 18 between Toruń and Bydgoszcz was formally signed in Toruń on 2 August.

The line between Toruń and Bydgoszcz will be upgraded over a distance of 45 km so as to accommodate speeds of up to 120 km/h. As of yet, some stretches of track only permit speeds below 40 km/h. The overhaul will reduce journey times to just under 40 minutes

Following a call for tenders by Poland's railway network operator PKP PLK, PORR submitted the winning bid, beating out challenges from ten competitors. On the 52 km long double-track rail section, the entire track and parts of the sub-base will be renewed, 54 points replaced and 17 level crossings modernised.

The contract allows a 20-month window for planning and execution.

Image: The contract signature paves the way for the start of work on PORR's biggest railway contract to date in Poland.

Completion of lining works to Eierberge Tunnel

Deutsche Bahn AG (German Federal Railways) commissioned the Eierberge Tunnel Consortium – under the technical lead management of Porr Bau GmbH – to design and construct a 7.7 km long stretch of railway (German Unity Transport Project 8.2, new Ebensfeld-Erfurt rail link, Bad Staffelstein section). The contract included the 3,756 m Eierberge Tunnel, up to 170 m² in cross-section and hollowed using the conventional sequential method with blasting and mechanical excavators. Given the prevailing water pressures of up to 6 bar, the tunnel structure was provided with a pressure-tight waterproof ring comprising polymer membranes and a waterproof concrete lining up to 95 cm thick. The lining works commenced at the north portal in August 2011 and proceeded concurrently with the tunnel drive. After a 14-month construction period, during which 305 invert arch and the same number of concrete lining segments were cast, the last section was completed at the south portal on 8 September 2012. Three emergency exits, with two 30 m deep shafts and a 400 m long access tunnel, were also constructed during the lining works.

Image 1: PORR

Image 2: PORR

Image 1: In his celebratory address, the Technical Director of the NBS Eierberge Consortium, OIng. Kurt Joham (PORR), paid tribute to the outstanding achievement of not having lost a single working day during the entire contract – after 305 days of concreting, with up to 650 cu m material placed each day. He described this as "unique, exemplary and world-class".

Image 2: Party time! The successful completion of the Eierberge Tunnel section was celebrated in appropriate fashion until late into the night.

A painstaking and highly professional contract planning regime, backed up by the supreme workmanship of the entire on-site team, allowed installation of the concrete lining without the loss of a single working day. As programmed, a 12.5 m long invert/lining segment incorporating up to 540 m³ concrete and 30 t reinforcement was cast every day, from Monday to Saturday.

Image 3: PORR

Image 3: The project was a compelling topic of conversation, even during the celebrations. An active partnership at all stages of project development is the key to delivering successful results.
Mr. Anhalt, DBPB Project Manager in conversation with Consortium Project Manager Mr Karlbauer (PORR)

Project data

Perimeter waterproofing	182,000 m²
Structural concrete	148,000 m³
Reinforcement	8,000 t

The successful achievement of a further project milestone by means of an impressive, if arduous, feat of engineering was naturally celebrated in appropriate fashion on site following the issue of spontaneous invitations to all parties involved in the tunnel lining works. The festivities were attended by representatives of the client, designer and site management teams along with many of the subcontractors and suppliers - not to mention the consortium managers and employees.

Emscher Canal breakthrough

Emscher Canal rerouted along new bed as of Thursday 14 June 2012.

Image: PORR

After a near-four-year construction period, the command to flood the new bed of the Emscher Canal at Henrichenburg in the German Federal State of North Rhine-Westphalia came punctually at 11 a.m. on 14 June 2012. The event sparked enormous interest among the local population.

The breakthrough also marked the operational start of the new Emscher Duct, which passes below the Rhine-Herne Canal. The new Emscher Canal bed runs upstream and downstream of the throughlet.

Spectators flocked to witness the breakthrough live as excavators stripped away the last separating embankment. The big moment came bang on time at 11 a.m.

The contractors had opened the Emscher service road off Wartburgstraße to allow visitors to access the site. From a vantage point overlooking the breakthrough location, they were then able to enjoy a full view of the event.

Image: The many guests of honour were joined by crowds of visitors eager to witness the breakthrough.

Inauguration of HPP (hydropower plant) Ashta

HPP Ashta 1
Image: PORR

It took only a 30-month construction period for Energji Ashta, a joint-venture between VERBUND and EVN, to generate its first electricity with the new hydropower plant on the River Drin in northern Albania. Representing an investment of some EUR 213 million, HPP Ashta is set to supply power to around 100,000 Albanian households. The numerous guests of honour invited to the inauguration ceremony on 18 September 2012 by VERBUND AG Managing Board Chairman Dipl.-Ing. Dr. Wolfgang Anzengruber and EVN Executive Board Member Dipl.-Ing. Dr. Peter Layr included Austrian National Council President Mag. Barbara Prammer and Albanian Prime Minister Sali Berisha. Porr Bau GmbH also had every reason to celebrate given that the efficient completion of its EUR 60 million contract had paved the way for the success of this Albanian/Austrian joint venture. The Managing Director of the Infrastructure division, Dipl.-Ing. Hubert Wetschnig, was particularly proud of the young PORR team working on site in Albania. Porr Bau GmbH is not only ready, but also ideally equipped for future hydropower plant projects.

Image 1
Image: PORR

Image 2
Image: PORR

Image 1 (pictured from left): Dipl.-Ing. Wolfgang Anzengruber, Dietmar Reiner, Sali Berisha, Mag. Barbara Prammer

Image 2 (pictured from left): Dipl.-Ing. Dr. Alfred Lehner, Ing. Martin Pauser, Dipl. Betriebswirtin Anja Forster, Dipl.-Ing. Karlheinz Strutzmann, Dipl.-Ing. Hubert Wetschnig, Univ.-Prof. Dipl.-Ing. Dr. Dietmar Adam, Dipl.-Ing. Andreas Jancar

Inauguration of Austria Trend Hotel Doppio and Doppio Offices in Neu Marx

Expansion of Neu Marx area with Austria Trend hotel and office complex

Image: Jürgen Christandl

A new 155-room, Verkehrsbüro Group four-star hotel and a 7,514 m² office complex built by Strauss & Partner Development opened in the Neu Marx urban development area on 13 June 2012 as the final components of the civic-award-winning T-Center scheme. The two edifices, attached to each other in an L-shaped arrangement, offer a graceful response to the sculptural contours of the neighbouring T-Center. The hotel and office development on Rennweg in Vienna's Third District took 20 months to complete.

"The Austria Trend Hotel Doppio and Doppio Offices are key drivers for the Neu Marx quarter as Vienna's new life science and media location," explains Mag. Renate Brauner, Deputy Mayoress of the City of Vienna. "For example, business customers and visitors to events now have the option of staying overnight directly on site in the Austria Trend hotel."

By 2016, at least 15,000 people will be living and working in Neu Marx. Even today, some 6,000 people are employed at the site of the former St. Marx abattoir.

"The Austria Trend Hotel Doppio benefits from its proximity to over 70 businesses and institutions at the up-and-coming Neu Marx site, which are active in the fields of research, media and technology," is the happy verdict of Mag. Harald Nograsek, CEO of hotel operator Verkehrsbüro Group. He sees the locational quality of the 370,000 m² urban district as a key asset: "Even now, the booking situation is very good and our occupancy rate looks set to reach around 50% by the end of the year."

Strauss & Partner Development is responsible for the overall management of the Doppio scheme. "With the Hotel Doppio and Doppio Offices, the Neu Marx development area has considerably expanded," adds Dipl.-Ing. Claus Stadler, Managing Director at Strauss & Partner Development. "We are delighted to have found, a strong partner in the Verkehrsbüro Group to support us in bringing to fruition our concept for a modern business hotel." Letting negotiations for the Doppio Offices are currently in progress with potential tenants. Here, the prime location, interior fit-out and proximity to the new hotel represent particularly attractive features for an office site. Further prime assets include the transport links to the airport, via the "Tangente" motorway, and to Vienna's city centre via underground, tram and bus.

Image: PORR AG CEO Karl-Heinz Strauss officially hands over the keys for the new hotel to the Austria Trend Group Pictured from left: Strauss & Partner Project Manager Martin Bartl; Hotel Manager Andreas Granner; PORR AG CEO Karl-Heinz Strauss; Deputy Mayoress of Vienna Renate Brauner; Verkehrsbüro Group CEO Harald Nograsek.

PORR in action on Upper Austria's biggest industrial construction site

New Tencel fibre plant under construction in Lenzing under lead management of Porr Bau GmbH's Upper Austrian branch

Image: PORR

The new Tencel plant at Lenzing heralds the return of new-generation fibre technology to Upper Austria. This project has also given Porr Bau GmbH another prime opportunity to showcase its wide-ranging expertise.

The deep foundations for the new facility, comprising around 8,000 m of 90 and 120 cm dia. bored piles, were constructed by PORR's Foundation Engineering division. In partnership with another contractor, the Upper Austrian branch of Porr Bau GmbH is now constructing the plant shell under a contract worth some EUR 16 million.

The site celebration held by Lenzing AG on 14 September 2012 hailed the return of leading-edge fibre technology to Upper Austria. The significance of this investment for the town of Lenzing was a key theme in the speeches of Lenzing AG CEO Mag. Dr. Untersberger and Upper Austria Provincial Governor Dr. Pühringer. PORR's representatives included Josef Pein, Executive Board Member of Porr Bau GmbH, Gerhard Tischberger, Head of the Building Construction unit in Upper Austria, and Kurt Berger, Group Leader for Building and Industrial Construction.

Image: The new industrial plant is already at an advanced stage of construction.

Topping-out ceremony at Sonnwendgasse 13-15

Structural works for Phases 1 and 2
Image: Luftbildservice Redl

Sonnwendgasse visualization
Image: Architekt Holnsteiner

Porr Bau GmbH is currently building an office block and hotel facility in Vienna's Tenth District, directly behind the new main station, for developer Construct Bauplanungs- und Errichtungsgesellschaft.

The contract covers the construction work and parts of the fit-out.

Construction of the office building, which also houses two retail units, commenced in September 2011. Three months later, in December, PORR also picked up the contract for the neighbouring hotel component.

Handover of the office block to the future tenant, the Austrian Federal Academy of Finance, and the other occupants Billa and Oberbank, is scheduled for December 2012. The Hotel Zeitgeist will open its doors in March 2013.

The two volumes, with six and eight upper storeys respectively, are linked by a common car park. The shell, of composite construction with reinforced concrete, was completed on time and without incident after respective construction periods of eight and seven months.

The guests were welcomed to the topping-out ceremony by Bmstr. DI Gerhard Dinstl, Managing Director of Construct Bauplanungs- und Errichtungsgesellschaft, Deputy Divisional Head at Porr Bau GmbH DI Martin Schilling and Mag. Arch. Ing. Günther Holnsteiner.

The official part of the ceremony closed with the traditional topping-out toast and a vote of thanks to the client for the topping-out payment.

The evening was rounded off in congenial style with a sumptuous buffet and selection of drinks.

Topping-out speaker DI Gerhard Dinstl
Image: PORR

Handover of Hygiene Centre to City of Vienna

PORR completes construction after only 12 months.

Vienna's new Hygiene Centre
Image: PORR

On 18 June 2012, after a construction period of only 12 months, the PORR-built Hygiene Centre was handed over to the client, the City of Vienna, represented by Mr Mag. Kittel from the Vienna Business Agency.

Once occupied by the team from Municipal Department 15, headed by Mr Flaschner, the industrial-style building finally came into operation on 2 July 2012.

The building houses the "Co-ordination Centre of the Emergency Public Health Services" together with hygiene support facilities (e.g. for delousing, decontamination etc.).

PORR constructs largest building shell in Austria

Vienna North Hospital

Image: Health Team KHN

Image: PORR

Following a pan-European call for tenders by the Vienna Hospital Association, Porr Bau GmbH (Major Building Projects department) was contracted to erect the shell for the new Vienna North Hospital at the largest unified structural works site in Austria. The contract – a testament to PORR's expertise in the healthcare construction sector – is worth some EUR 98.4 million.

The foundation-stone-laying ceremony held on 18 September 2012 marked the official launch of the structural works. After the celebratory addresses, a deed was signed by Vienna's Mayor Dr. Michael Häupl, City Public Health Councillor Mag.a Sonja Wehsely, City Housing Councillor Dr. Michael Ludwig, Deputy District Head Ilse Fitzbauer, Vienna Hospital Association General Director Dr. Wilhelm Marhold, Deputy General Director Ing. Mag. Dr. Maximilian Koblmüller and Arch. DI Dipl. TP Albert Wimmer, and embedded in the foundation raft.

The PORR Group was represented at the ceremony by CEO Ing. Karl-Heinz Strauss, MBA, Bmst. Ing. Josef Pein, Executive Board Member of Porr Bau GmbH, and Porr Bau GmbH directors Karl Wally and DI Olugbenga Oduala.

The official ceremony was followed by a congenial gathering with food and drink. This, like the previous foundation-stone-laying, was also attended by numerous local residents from Vienna's Floridsdorf district.

The Vienna North Hospital is a key plank in the city's 2030 Hospital Concept, aimed at optimizing healthcare services for the local population. Designed by architect Albert Wimmer as a "feel-good" hospital, the facility offers 785 beds in one- and two-bed rooms and can accommodate over 400,000 inpatients per year. It also has capacity to treat a further 3.4 million outpatients every year.

Image: Health Team KHN

Image: Health Team KHN

Project data

Site area	111,579 m²
Excavation volume	approx. 150,000 m³
Site coverage	51,452 m²
Concrete volume	approx. 212,000 m³
Gross floor area	214,910 m²
Steel reinforcement	approx. 24,000 t

Celebration of Margaretenstraße project completion

Half of apartments already sold by completion date

Margaretenstraße scheme – a resounding success story
Image: AnnA BlaU

On Thursday 23 August 2012, the project team joined District Head Mr Wimmer and the first apartment owners in celebrating the completion of the "Wohnen in Margareten" residential scheme. The Strauss & Partner Development-led project was completed on schedule in only 22 months.

Occupying four blocks between Margaretenstraße and Gießaufgasse, the units range in size between around 30 and 140 m². All parts of the development meet the low energy standard. While most units include a recessed or projecting balcony, the generously designed roof terrace apartments add a particularly stylish note. The ground-floor areas house modern office and commercial units, measuring between 60 and 130 m², to complement the existing neighbourhood amenities. Stone sculptures, over 100 years old, lend a distinctive flair to the thoughtfully planted inner courtyards. Thanks to a meticulous restoration effort, these sculptures – which were included in the original development on the site – have been given a new lease of life.

District Head Mr Wimmer is overflowing with enthusiasm about the project: "This high-class housing development has further upgraded our neighbourhood while improving and expanding the local amenities. I am delighted to welcome the new owners and tenants, and am sure that they will soon feel at home in the Margareten quarter."

The project's success is confirmed by the voracious demand for apartments. As Mag. Carolin Strauss, Managing Director of Margaretenstraße 131-135 GmbH, happily points out, "Over half of the 235 apartments have already been snapped up."

Reopening of Klinikum Bad Gastein

PORR underlines its leadership credentials in the healthcare sector.

Klinikum Bad Gastein in an idyllic setting
Image: PORR

The official inauguration of the fully refurbished and extended Klinikum Bad Gastein, an orthopaedic and rheumatology clinic in the Austrian Province of Salzburg, was held on 21 September 2012. Numerous guests from politics and the business community joined the Managing Director of the Klinikum Besitz- und Betriebsgesellschaft (KBB) mbH, Dipl. Ing. Bernd Martetschläger, in celebrating the event. Over the previous 24 months, the clinic's medical and therapeutic services have undergone comprehensive restructuring in line with state-of-the-art healthcare standards.

The full refurbishment programme, which had to be carried out under full operating conditions, also embraced an extension to increase the bed capacity from 135 to 155. The alterations included insulation measures to the building envelope to achieve a level of performance just short of passive house standard.

The overall alteration and extension contract (excluding the building services installations) was let to a consortium under the technical lead management of Porr Bau GmbH. PORR's work package was handled in partnership by the Upper Austrian and Styrian branches.

Palais Hansen Kempinski in Vienna celebrates topping-out

Image: PORR

The Palais Hansen project team welcomed guests from politics and the business community to celebrate the topping-out of the revitalization scheme. The civic building is one of the pearls in a "necklace" of edifices encircling Vienna's inner city on the Ringstraße. After a painstaking makeover, the listed palace, which is steeped in history, will house a 25,655 m² Kempinski luxury hotel together with 17 exclusive private apartments. The Palais Hansen refurbishment will further enhance the architectural splendour and tourist pulling power of Vienna's First District. The hotel is due for completion and handover to Kempinski in January 2013.

Originally built to the designs of Theophil Hansen and Heinrich Förster, the eight uniformly fronted tenements continue to form a homogeneous ensemble. The building was later converted into a hotel ahead of the 1873 World Exhibition and, most recently, housed some of Vienna's municipal departments as well as office units. Through the present refit, the Ringstraße "pearl" is now being reconverted into a hotel. Its future operator, the internationally distinguished Kempinski Group, ranks among Europe's oldest hotel companies that runs a worldwide chain of establishments. The top two storeys are reserved for premium residential units that will revel in a congenial mix of old and new. The recipe for success devised by the owners and developer team – a consortium comprising Strauss & Partner Development, Warimpex, insurer Wiener Städtische and Wien Holding – has already paid dividends. As Dr. Christine Dornaus, Managing Board Member at Wiener Städtische, underlines, "The voracious demand and the number of luxury apartments already sold bear out the project's success."

District Head Ursula Stenzel is full of praise: "Vienna's First District can truly take pride in this magnificent scheme. The topping-out of the Palais Hansen – one of the most captivating architectural icons from Vienna's 'Ringstraße' epoch – represents a milestone for the entire inner city. The palace, which bears the name of its creator Theophil Hansen, is being restored with the utmost sensitivity by leading contemporary architects Boris Podrecca and Dieter Hayde. When completed, this glorious hotel will not only enhance Vienna's appeal as a tourist destination, but also embellish the entire quarter."

PORR CEO Karl-Heinz Strauss adds: "The architectural conservation aspects of this project pose myriad challenges. The Palais Hansen team have drawn on their tremendous pool of expertise, professionalism and creativity in satisfying all requirements."

Strategy vindicated – first contract in Qatar

Underground railway project with international partners as stepping stone for market entry

At the start of August 2012, a consortium comprising PORR, SBG AND HBK scooped a contract worth something in the high double-digit million range to execute all the enabling works for construction of the Doha Metro underground railway system. The contract includes building demolition, pipeline relocation, the establishment of logistics areas, excavation, site clearance and other ancillary construction work. The temporary road-building measures and pipeline relocation alone require extensive preparation in terms of planning and associated authority approvals.

CEO Strauss: "Unique opportunity for PORR"

CEO Karl-Heinz Strauss is delighted at his company's successful bid: "Qatar is progressively evolving into the key hub of the entire region. Infrastructure investment already exceeds that of the other Middle Eastern countries and the 2022 World Cup is certain to generate additional momentum. For PORR, the market entry in Qatar offers a unique opportunity to capitalize on the region's burgeoning economy. Our know-how and decades-long experience in the infrastructure sector have cemented our credentials in the local market as an expert, reliable partner."

Market entry through infrastructure projects

PORR has positioned itself in the Middle East as an expert, premium provider and infrastructure specialist, particularly in the fields of railway and tunnel engineering. This international expansion is governed by a selective and professional strategy geared to profitability and with a strict focus on risk management. Qatar is a promising market for a variety of reasons. First of all, the volume of infrastructure investment in the country offers immense opportunities for technology leaders in the construction sector. Moreover, the 2022 World Cup will spawn a string of further projects. At the same time, these projects will enjoy sound, long-term financing thanks to the country's high capital reserves.

The enabling works contract for the Doha Metro has put PORR in a strong position to capitalize on the projected investment in stadiums and other infrastructure ahead of the 2022 World Cup. PORR's local partners – HBK (Qatar) and SBG (Jeddah, Saudi Arabia) – are internationally experienced and have operated successfully in the region for decades.

Special NÖGKK Rheumatic clinic at Baden

Launch of Full-Scale alterartion and extension project

Image: PORR

Image (pictured from left): Josef Pein (Executive Board Member of Porr Bau GmbH), KR Gerhard Hutter (NÖGKK ombudsman), Kurt Staska (Mayor of Baden), Johann Aigner (Head of Lower Austria Branch Office of Porr Bau GmbH)

A scheme for the complete refurbishment of a celebrated healthcare facility in Lower Austria kicked off on 9 July 2012. The Special Rheumatic Clinic at Baden, operated by the Lower Austrian Regional Health Insurance Organization (NÖGKK), is being upgraded to contemporary standards and extended to house two new clinical functional areas. In addition to inpatient rehabilitation for musculoskeletal disorders, the facility is to offer outpatient rehabilitation for the same conditions as well as rehabilitation for pulmonary disorders.

During the public signature of the contracts, NÖGKK ombudsman Gerhard Hutter gave a presentation of the project and Kurt Staska, Mayor of the Municipality of Baden, underlined the significance of the rehabilitation centre for the spa town. "After 35 years of service, a building of this size is quite simply in need of an upgrade," Hutter added. "The mechanical and electrical installations, heating systems, bathing areas and the patients' rooms without showers – wherever you looked, contemporary standards were no longer met."

After all the relevant bodies – the last of these being the Austrian Federal Ministry of Health – had given the go-ahead for the megaproject, the official contract award was announced at a press conference. The scheme will be implemented in several stages as a design-and-build package by a consortium comprising PORR.

The refurbishment is due to commence in Q1 2013 following submission of the planning application and grant of all planning authority approvals. While some parts of the complex will be stripped to the shell, other building sections will be completely reconstructed. The new rehabilitation centre, which will boast 151 beds and new outpatient therapy facilities, is scheduled to resume operation in around mid-2015, after two years' construction time and a subsequent trial period. The project costs are estimated at around EUR 40 million.

PORR joins ground-breaking celebration for Sternbrauerei residential development, West Section

Image: PORR

Scheduled to coincide with the summer solstice, the ground-breaking ceremony for the second phase of the Sternbrauerei Riedenburg residential scheme in the City of Salzburg was held on 21 June 2012. The development site, which lies between the 50 m tall rock face of the Rainberg and magnificent old-town villas in the Riedenburg district of Salzburg, is set to house exclusive private apartments designed by New York-based architects Gisue and Mojgan Hariri. Four sculptured structures, set atop a 90-space basement car park, will accommodate dwelling units of between 47 and 247 m².

The client, Rainbergstraße Immobilien-Projektentwicklungs GmbH, is a subsidiary of UBM Realitätenentwicklung AG. In the spring of 2012, PORR was contracted to carry out the foundation and structural work, which was executed by an internal partnership between the Salzburg and Tyrolean branches.

Among the guests at the ground-breaking ceremony were the Chairperson of the Salzburg Planning Committee, Municipal Councillor Hannelore Schmidt, UBM Board Member Dipl.-Ing. Martin Löcker, Rainbergstraße Managing Director Bmstr. Dipl.-Ing. Markus Lunatschek and the two PORR branch managers Direktor Dipl.-Ing. Hans Missbichler (Salzburg) and Direktor Ing. Herbert Gigler (Tyrol).

Project data

Apartments	66
Usable living area	6,000 m²
Bored in-situ concrete piles	1,200 m; 90 cm dia.
Concrete	11,000 m³
Reinforcement	800 t

Continuing Success in Healthcare Sector

Ground-breaking ceremony for the Health Service Centre of the Vienna Private Clinic (Wiener Privat Klinik) on 14.08.2012

Image: PORR

Porr Bau GmbH has been commissioned as the sole contractor by WPK Health Service GesmbH & Co KG to construct an office and health service centre at Lazarettgasse 25, 1090 Vienna.

On a total of 8,389 m² GFA, the complex is to house private practices, day surgeries, administration offices for WPK, a diagnostic centre with X-ray facilities, MRT, CT and PET-CT as well as an underground car park for 21 cars, a drive-in storage facility on the 2nd-level basement and required engineering rooms.

Immediately after the ground-breaking ceremony, work was started on the passageway connecting the existing and future buildings of the clinic. Planning permission for the changes is expected to be granted by the end of 2012, enabling work to begin on the main building in January 2013. The project should reach completion after a construction period of 16.5 months.

Image (pictured from left): Josef Pein, Master builder and Graduated Civil Eng. (Managing Director of Porr Bau GmbH), Chief Physician Dr. Walter Ebm, Chairman of the Board of Directors and Josef Wandling, Business Graduate (both from WPK)

PORR clinches further contract for Stuttgart 21 Megaproject

PORR Germany has been awarded a further major contract by Deutsche Bahn AG (German Federal Railways) for the Stuttgart 21 station and rail project. Worth over EUR 100 million, the contract covers civil engineering works in two sections at Untertürkheim and Obertürkheim.

The two highly demanding packages (2A and 3) in public planning approval section 1.6a directly adjoin the large ATCOST 21 tunnel contract awarded by Deutsche Bahn a year ago and now under the technical lead management of PORR.

The new commission underlines the client's enormous confidence in PORR's construction expertise. Given their extreme technical complexity, both packages pose a formidable challenge for the engineers at PORR Germany. For example, some of the works will need to cross under track installations over a length of around 300 m without any disruption to rail operations and will be carried out during night and weekend closure periods spanning three years.

CEO PORR Karl-Heinz Strauss is delighted at the follow-up contract: "This vote of confidence emphasizes Deutsche Bahn's absolute satisfaction with our know-how and achievements. In addition to the financial significance of this project, it further confirms that PORR is moving forward along the right path."

Topping-out ceremony for new VIG provincial headquarters at St. Pölten

Traditional topping-out ceremony attended by some 150 guests

Image: PORR

Image (pictured from left): Wolfgang Lehner (designated Wiener Städtische Provincial Director), DI Florian Rode (architect at Neumann & Partner), Daniel Pfeffer (PORR apprentice), Dr. Ralph Müller (Member of Wiener Städtische Managing Board), Mayor of St. Pölten Matthias Stadler, KommR Helmut Maurer (Wiener Städtische Provincial Director), DI Heinz Neumann (architect at Neumann & Partner), Mag. Johanna Stefan (Donau Versicherung General Manager), Ing. Karl-Heinz Strauss (PORR AG CEO)

The topping-out ceremony for the new provincial headquarters of insurers Wiener Städtische and Donau Versicherung at Dr. Karl Renner Promenade 14/Schulring 21 in St. Pölten took place on 19 June 2012. The event was attended by some 150 guests, including representatives of the City of St. Pölten, members of the project management, technical supervision, architect and contractor teams, planning authority staff, local community representatives and employees of insurers Wiener Städtische and Donau Versicherung. The provincial headquarters scheme was led by Strauss & Partner Development, with Porr Bau GmbH acting as general contractor.

The traditional topping-out toast, spoken by an apprentice at Porr Bau GmbH, was followed by an on-site buffet meal and hearty celebrations.

The selected site occupies a central location in St. Pölten. Scheduled for completion by the end of 2012, the new-build provincial headquarters scheme is headed by distinguished architect Heinz Neumann from the practice Neumann & Partner. Strauss & Partner and Neumann now form a seasoned team, having recently obtained gold ÖGNI (Austrian Green Building Council) certification – the highest sustainability rating for office buildings – for the EURO PLAZA 4 development in Vienna. "We have also applied the proven EURO PLAZA standards to the VIG provincial headquarters," PORR Group CEO Karl-Heinz Strauss proudly points out. "Supreme quality, state-of-the-art technology and individual indoor climate control provide everything that is needed for a relaxed and efficient work environment," he adds. "The on-site operatives merit special thanks for their high standard of workmanship. The smooth, brisk and accident-free progress of the works underlines their outstanding achievement."

Hartberg city centre to receive makeover

Parking deck, business areas and housing to enhance northern end of old town centre

After years of negotiation, the Alleegasse Hartberg project is now being realised. The starting signal was the ground-breaking ceremony which took place on 10.05.2012 in the presence of numerous representatives of all those involved in the project. Three years of building are scheduled to produce 270 car parking spaces, 30 flats, six offices and 1,200 m² of business space. The project comprises an order volume of EUR 13.5 million.

Image: Municipality of Hartberg

f.l.t.r.: GR Kurt Massing, Vice-Mayor Lutz Pratter, CEO Mag. Dieter Johs, City Admin. Dir. Dr. Gabriele Gaugl, Mayor Dir. Karl Pack, Dr. Reinhard Hohenberg, CEO DI Manfred Schuller, GR Ing. Marcus Martschitsch, BM DI Martina Kürzl

The TEERAG-ASDAG syndicate has bid accepted for first building phase

The overall scheme will be realised in three phases of construction. The first will involve road building (L421 Franz-Schmidt-Gasse) and infrastructure development, the second will entail constructing the parking deck and the third will encompass the superstructure work with the creation of homes, shops and offices.
TEERAG-ASDAG AG, Greinbach construction district, was commissioned in syndicate with the first phase of construction. In a painstakingly detailed process, all utility lines and cables in the Franz-Schmidt-Gasse will be re-laid, including power, water, telecommunications and district heating connections as well as rainwater and sewage channels. The L421 will be completely remodelled and reconstructed.

The particular challenge in this building project lies in having to maintain traffic flow at all times. This will be guaranteed by building a new access ramp to the existing city-centre parking spaces in Alleegasse and by diverting HGVs.

Private investor as alternative to public funding

The borough of Hartberg enlisted the firm of WEGRAZ from Graz as a private investor for the major project. Since federal state subsidies have been shrinking appreciably, this may be the procedure to be followed in the future. In this project, the state of Steiermark is only involved in the construction of Franz-Schmidt-Gasse.

Enhancement of the old town as a contribution to Cittàslow

Along with Enns and Horn, Hartberg is one of Austria’s three “Cittàslow” towns. “Cittàslow” stands for increased quality of life, the Slow Movement and sustainable development of urban concepts. The Alleegasse project forms a further element in this innovative urban development.

TEERAG-ASDAG AG, Greinbach construction district, is making a major contribution to the successful implementation of the Alleegasse Hartberg project.

Milling of bit. layers	500 m³
Open collection + disposal	6,000 m³
Trench excavation	5,500 m³
Sewage channels d 400	320 m
Rainwater channels d 1,000	200 m
Rainwater channels d 800	65 m
Empty conduits	11,000 m
In-situ concrete shafts	60 m³
Frost protection	3,000 m³
Hot mix	2,000 t
Granite bordering	700 m

Another big contract for PORR in the German high-speed rail network

New confirmation of competence in the infrastructure sector.

As part of the German Unity Transport Project VDE 8 Nuremberg-Berlin, in November 2012 Porr Bau GmbH was awarded a further contract by DB Netz AG, a subsidiary of Deutsche Bahn AG, for the equipping of a topped-out new-build section between Coburg and Ilmenau. The ballastless track system “Slab Track Austria – System ÖBB-PORR elastisch gelagerte Gleistragplatte” (elastically encased sleepers) with its proven 23-year record will likewise be deployed over some 44 km of high-speed section. There are a total of 13 valley bridges and 12 tunnels in the section. The total contract volume of around EUR 100 million is to be spent in the core building period from July 2013 to December 2014. The entire VDE 8 section between Berlin and Munich is scheduled to come into operation in 2017 – the travel time between the two cities will then be about 4 hours. The contract volume also includes the erection of around 14 km of noise barriers.

Increased installation of this proven system began in Germany in 2001 with the project “Lehrter Hauptbahnhof Berlin”, Berlin’s central station, in 2001. The Coburg-Ilmenau subsection is a follow-up contract to the section VDE 8.2 “Erfurt–Gröbers” already awarded to Porr Bau GmbH in 2011. Here the ballastless track has been in the process of installation over some 90 km of two-track section since June 2012.

Chairman of the Management Board at PORR AG, Ing. Karl-Heinz Strauss, sees great potential in the system: “‘Slab Track Austria’ has already proven to be excellent in Austria, Germany, the Czech Republic and Slovenia. In view of these positive references I look forward to further big international contracts.”

Topping-out ceremony for Nordbahnhof residential complex, Site 15b

View of inner courtyard
Image: PORR

At the start of November 2011, the Nordbahnhof Bauplatz 15b consortium, with the participation of Porr Bau GmbH, was commissioned as general contractor to erect the residential complex Nordbahnhof Site 15b on the corner of Schweidlgasse/Ernst Melchiorgasse in the second municipal district of Vienna.

With a slight delay in actual structural completion, the topping-out ceremony took place on 27.09.2012 in the presence of District Head Gerhard Kubik, Managing Directors of the MIGRA G.m.b.H public utility housing company, Ms Regina Feistritzer and Prof. Manfred Wasner, and architect, Prof. Ernst Hoffmann.

On the site of the former Nordbahnhof area – one of the largest and most important inner-city development areas – a new city district is being created fully in the spirit of “intercultural living”. In an area of almost 75 hectares, approximately 10,000 homes are scheduled to have been built in several construction stages by 2025.

Plot 15b lies in the centre of the site, and from April 2013 will provide new homes for 101 tenants. The two office units to be constructed in the current project will be occupied by Vienna's Integration House organisation, which aims to integrate recognised refugees and will be responsible for allocating around 35 homes.

In spite of certain necessary ground improvement measures, the structural work was erected in only eight months of building and completed in mid-August this year.

Finishing works began on schedule in July. The consortium is pursuing the ambitious goal of handing over the residential complex to the principal at the end of March 2013, eight weeks earlier than contractually agreed.

Foundation-stone-laying ceremony for Hotel Steigenberger am Kanzleramt

The foundation-stone-laying ceremony for the new Hotel Steigenberger am Kanzleramt near Berlin Central Station in the new Europacity quarter was held on 1 November 2012.

The developer, Hotel am Kanzleramt GmbH & Co. KG, a STRAUSS & PARTNER company, is putting up a new four-star superior hotel to be operated under the Steigenberger brand on a site south of the Central Station.

In the words of PORR AG CEO Karl-Heinz Strauss, speaking at the foundation-stone-laying ceremony, "We are delighted to be handling this project for Steigenberger – one of Europe's most distinguished hotel brands – at this blue-chip location in Berlin. Construction is now in progress on practically all the Europacity plots south of the Central Station and the Steigenberger hotel scheme marks a key milestone in the development of this new district. The decision to build a luxury hotel shows just how positively we rate this location, and its pulling power will be further enhanced by the direct link to the new airport."

The centrality of the site in the new Europacity quarter inspired the modern concept adopted for the four-star superior hotel. With a gross floor area of around 23,000 m², it will provide 339 rooms, including 11 standard and 12 junior suites. An approx. 700 m² restaurant, offering exclusive private dining services and open cooking stations, will invite guests to linger. An approx. 850 m² congress centre, complete with exclusive business area and 400 m² ballroom and multi-purpose venue, will host conferences and events. The top level of the eight-storey building will house a luxurious 600 m² spa and wellness suite directly overlooking the government quarter and River Spree. Additional rental units, covering around 480 m² on the ground floor, will accommodate catering and retail outlets. A basement car park will provide capacity for 38 cars.

A long-term lease was signed last October with Steigenberger Hotels AG, an international operator well acquainted with the challenges facing today's hotel trade and well-equipped to run an intensive marketing campaign for the hotel at home and abroad.

Porr Deutschland GmbH was responsible for turnkey construction of the hotel, including all production information. The architectural concept was developed by Berlin-based Ortner & Ortner Baukunst, Gesellschaft von Architekten mbH, while the interior design was delegated to Markus-Diedenhofen Innenarchitektur, Reutlingen. In the opinion of Dipl.-Kfm. Christian Berger, Managing Director of Strauss & Co Development GmbH, one notable triumph was recorded even before work started on site thanks to the official recognition given to the project's sustainability and eco-friendly credentials: in early October, at the EXPO REAL international real estate trade fair in Munich, the project had been presented with a silver pre-certificate under the German Sustainable Building Council (DGNB) system.

Completion of the modern, high-grade four-star superior hotel, which will target business travellers, conference participants as well as private tourists, is scheduled for spring 2014.

Foundation-stone-laying ceremony at EURO PLAZA

Ten years after completion of the first buildings at EURO PLAZA, Vienna's biggest office park, a fifth development phase is set to add a further 35,000 m².

Deputy Mayoress Brauner, Dr. Kapsch, Mag. Kapsch, CEO Strauss
Image: Astrid Knie

The laying of the foundation stone for the next EURO PLAZA development phase was celebrated by the project team on 5 November in the presence of Vienna's Deputy Mayoress, Renate Brauner.
Not only is EURO PLAZA Vienna's first and largest office park, it has also become something of a flagship project. Despite the recently ailing state of the Viennese office market, the 156,000 m² previously created by the scheme have been completely snapped up.

“Vienna scores well by international standards and is a highly appealing business location,” explains Deputy Mayoress Brauner, City Councillor for Finance and Economic Affairs. “Of course, apart from the excellent quality of life, stable economic situation and good infrastructure, the intriguing and innovative properties on offer are a further magnet. As its list of tenants shows, EURO PLAZA offers just what the local office market needs.”

“The demands placed on office accommodation – including maximum quality and flexibility, high customer service, wide-ranging amenities and cost-efficient asset management – are constantly rising. The satisfaction of our tenants and the high demand for the EURO PLAZA units have vindicated our strategy,” proudly adds Karl-Heinz Strauss, mastermind of the successful project.

Sustainability is EURO PLAZA's number-one priority. Indeed, EUROPLAZA 4 was Vienna's first office building to obtain gold ÖGNI (Austrian Green Building Council) certification. The next stage of development is aspiring to the same rating. EURO PLAZA phase 5 will also include new amenities, with plans already concretized for a further restaurant and a pharmacy.

The project is being developed and realized by STRAUSS & PARTNER Development. A PORR Group member since the start of 2012, the company has from the start targeted a combination of prime quality and excellent price-performance ratio for the EURO PLAZA scheme. The office space at the site has consequently attracted unbroken interest and some of the phase 5 units now under development are already pre-let.

Development phase 5 of EURO PLAZA, Vienna's biggest office park, involves the addition of three new office buildings. The architectural design was developed by Büro HN+P (Heinz Neumann + Partner). The implementation of state-of-the-art technology and maximum functionality in the interior spatial arrangement has so far paid dividends and has also informed the design of the new facilities.

Says Heinz Neumann: “The purpose of architecture is to serve people. The attractive design of the new office buildings with their high-quality facades and external sunshading, mechanical supply and extract ventilation, draught-free cooling and sophisticated communications technology, will create a first-class working and social environment with an atmosphere conducive to relaxed and concentrated activity.

Bild: Astrid Knie

Ground-breaking ceremony for the “Celleswald” avalanche gallery in the Tyrol

The Tyrol branch of TEERAG-ASDAG celebrates the ground-breaking ceremony for the 210 m long “Celleswald” avalanche gallery on the L348.

The 25 October 2012 saw the ground-breaking ceremony for the “Celleswald” avalanche and rock slide infrastructure project on the L 348 Spisser Landesstraße highway. The priority of this demanding building project was underlined by the presence of the Governor of Tyrol, Günther Platter, his deputy Anton Steixner, as well as other personalities from public institutions.

The realisation of the approx. 210 m long avalanche and rock-slide gallery will considerably improve access to the Tyrol’s highest-lying municipality as well as to the Samnaun customs enclave in Switzerland.

The construction period of just 18 months will not only include the removal of 10,000 m³ of rock, but also the erection of the structure with approx. 3,000 m³ of concrete and 500 tonnes of steel, while maintaining road traffic, in an alpine landscape.

Further cornerstones of the building project are the extensive safeguarding and foundation measures using approx. 1,000 m of small bored piles, as well as 1,500 m² of sprayed concrete work.

As has already been the case in some building projects in the state of Tyrol, the “**V**orgespannte **V**ernetzte **A**nkerwand **VVA**” (prestressed cured anchor wall) system developed by TEERAG-ASDAG Tirol with a ground engineer, and under protection of utility patents, is also being applied by the awarding authority in this gallery structure as a foundation and embankment retaining system.

PORR awarded contract for tunnel at Albaufstieg on the new-build section from Stuttgart to Ulm (S21)

PORR with a substantial stake in the new EUR 635 million contract

The consortium led by PORR AG has been contracted by Deutsche Bahn for the technically demanding "Albaufstieg" section as part of the overall Stuttgart-Ulm project. This project, with a total volume of around EUR 635 million, is a particularly demanding task to be solved by the new building of the 60 km long high speed line between Wendlingen and Ulm.

The consortium will build two tubes, each 9 km long, at the Bosslertunnel, and two tubes of around 4.5 km each at the Steinbühltunnel.

The tunnel tubes will lie 40 m apart, and will be connected by cross-cuts at 250 m intervals. The total of approx. 27 km of tunnel forms the biggest contract package on the Stuttgart-Ulm new-build section. Building will commence in March 2013, and the work is to be concluded by 2018.

PORR CEO Karl-Heinz Strauss appears very pleased with the contract. "The commission from Deutsche Bahn is a great mark of confidence in PORR and its partners. It shows that our clients are obviously very satisfied with our services to date. The new project is particularly demanding in geotechnical terms, as the tunnel tubes lead through squeezing ground as well as karst, where underground cavities must be expected. So the long-term and internationally recognised expertise of PORR in tunnel construction will once again be applied here."

PORR wins contract to expand Berlin Underground network

The U5 underground line in Berlin is being expanded in order to bring the east-bound line across Alexanderplatz to the Central Station.

PORR has been awarded a contract by the Berlin Transport Company (BVG) to expand the Berlin Underground network. The 2.2 km section, which includes the Berliner Rathaus station (BRH) is to be completed by 2016. The contract involves building the foundation pits and shell construction for the station, the connection to the existing tunnel at Alexanderplatz and part of the track-switching system (GWA Block 02).

The "Berliner Rathaus" underground station will contain three levels. The lower level will be connected to the lowest level of the existing tunnel. Four tracks in the existing tunnel will be directed into the new station structure and used as storage sidings. The approximately 110 m long side platforms of the U5 station concourse will be located approx. 7 m below ground level and form the U5 "platform level". The concourse ceiling will be carried by the side walls and in the centre between each platform by elliptical mushroom-shaped supports. The connecting level will span the length of the U5 platform level at the west and east ends of the concourse and link both side platforms via stairways. As far as the overall appearance of the architectural design is concerned, the mushroom supports constitute the most significant element of the shell construction.

The Berliner Rathaus underground station will be constructed within a braced and anchored diaphragm walled foundation pit, as an open and covered monolithic frame structure. The watertight foundation pit base will be formed by a sealing bed. The construction of the various elements will take place section by section in sealed foundation pits. Works access will be via two openings in the same area as the NW and NO stairway openings will be located. The diaphragm walled foundation pit will consist of approx. 30 m deep diaphragm walls, a low-lying DSV-sealed bed (approx. 28 m below ground level) and a DSV grid. Approx. 22,000 m³ of concrete and approx. 5,200 t of reinforcement steel will be used for the shell construction.

Ahrental access tunnel, a subproject of the Brenner Base Tunnel, broken through

4,300 m of tunnel dug by ARGE EBN from the Sillschlucht Gorge towards the Brenner Pass

The successful team
Image: PORR

Barely three years ago, on 4 December 2009, the construction work to the Brenner Base Tunnel (BBT) officially began with the reconnaissance gallery in the Sillschlucht Gorge. In July 2010 the breakthrough of the Ahrental lateral access tunnel was begun north of the Europabrücke below the A13. 4,300 m of tunnel have since been dug by ARGE EBN from the Sillschlucht Gorge towards the Brenner Pass and on 11 October 2012 the 2,404 m long access tunnel has now also been completed.

300 m below Patsch, the Ahrental access tunnel now meets the Sillschlucht Gorge reconnaissance gallery. This means the reconnaissance gallery now meets the connection with the access tunnel for the first time.

The final blast was heard at 4 p.m. precisely. The last 2 m still separating the two tunnels were successfully breached. “This means we have completed the first access tunnel on the Austrian side and can now continue construction southwards”, said a visibly pleased Konrad Bergmeister, Chairman of BBT SE. 3 to 5 blasts were carried out daily in the Ahrental access tunnel, lengthening the tunnel by between 4 and 6 m per day. The tunnel has a diameter of over 100 m², and was excavated according to the Austrian tunnel construction method.

The Ahrental access tunnel will play an important role in the construction of the Brenner Base Tunnel, since it will be used both to bring building material into the tunnel and also to transport the rock from the mountain directly to the spoil area. At the end of the access tunnel a large assembly cavern will be set up, where the individual parts of the tunnel boring machines will be assembled.

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The enclosed brochure is an automatically generated print version of the original electronic publication:
worldofporr.porr-group.com

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