ECSN

European Concrete Societies Network

European Concrete Award 2008

Buildings

WINNER

THE GYLDENDAL HOUSE
Sehesteds Square, Oslo, Norway

PROJECT DESCRIPTION
Since the early 20th century Norway's largest publishing house, Gyldendal forlag, has been located on the block between Universitetsgata and Sehesteds Square in the middle of Oslo. Hidden behind the 19th century façade is the new, modern headquarter. From the main entry one is invited into a thoroughly urban main floor, where auditorium, cafeteria, and conference room (Inside the "Danish House", a replica of the original façade of the former Danish mother company in Copenhagen) open up for interaction between the publisher and the public. In the center of the building is Ibsenhallen (Ibsen Hall), a large open space going up five floors and surrounded by galleries with adjacent offices. Balcony fronts in light grey, almost white, concrete form evenly spaced ribbons surrounding the hall.
A massive concrete stairway, in itself a very decorative sculptured structure, connects the floors. Concrete pyramid skylights allow soft light to enter.
The play between the large hall, the office areas and the facades give the whole place a thoroughly lit appearance, while simultaneously providing intimacy to the work areas. The major mass of the building is in cast in place concrete. The floor surfaces in the building areas as well as the built-in furnishing and balcony handrails, are in light, oiled oak.
The combination of the wood and the almost white concrete surfaces give the whole interior a very soft and an unusual appearance, causing the visitor to stop and admiration as he enters the building.

ENVIRONMENTAL ASPECTS
OF THE USE OF CONCRETE IN GYLDENDALHUSET

The use of environmentally correct building materials has been of great importance in the project.
The use of concrete as a major building material in most of the exposed surfaces give a thermally heavy structure serving as a reservoir of thermal energy. The ventilation and cooling systems are all optimized in order to take advantage of these properties.
The windows are located and the skylights are shaped in such a way in order to minimize direct sunlight, while still allowing plenty of daylight into the building.
The floor construction has an inclined soffit, allowing daylight to penetrate further into the building. The combination of the light concrete surfaces, and the indirect lightening gives a higher natural light intensity than what is to be expected, reducing the necessity for electrical lighting resulting in less use of energy.
The use of the light coloured exposed concrete reduces the need of painted surfaces and gives a healthy environment inside the building.
It has also been of great importance throughout the project to make a solid and durable building.

OTHER ASPECTS

Design and construction
One of the big challenges was to retain the old masonry facades while tearing everything down inside.
This made the construction site extremely tight with complicated structures and logistical challenges.
Long spans in the office area required quite a large construction depth. This gave way for the slanted ceiling. The hollow space between floor slab and ceiling was utilized for ventilation ducts and other technical installations.

Gyldendalhuset

The exposed interior concrete surfaces required spotless and tight formwork surfaces, a concrete mix with very small variations and very careful placement of the concrete. This was masterly solved thanks to close cooperation between the architect, contractor and the concrete supplier.
Also the prefabricated 5 by 5m skylights were a challenge. They were all in various shapes, but were all put together and erected in a perfect fit.

Properties of the concrete

The concrete is made from light coloured sand, local aggregate and white Aalborg Portland cement.
This proved to be a challenge for everyone. The mix was stiffer than ordinary concrete and reacted differently to additives.
During the concrete production the mixing plant could not produce ordinary grey concrete in fright of discolouration. The plant had to be 100% clean, and the production required accurate assistance from technical support.

Innovative use of concrete

The combination of utilization of thermal mass, sculptured shapes and almost white concrete in an architectural very pleasing way make the project outstanding in Norwegian measurements. The difficult concrete mixture and the very accurate and complicated formwork was a challenge which was solved in an excellent way.
The pyramidically shaped skylights are worth studying as they lead the light into the rooms below avoiding direct sunlight.

Workmanship and finish

Our experience is that the key to great results in white or light grey concrete is a good cooperation between architects, contractors and concrete suppliers. In this respect the Gyldendal Project is a role model in the dialog between the main actors in the design and construction process.
Looking at the final result it is an outstanding example of a very tactile and honest use of light coloured concrete - both from a structural as well as an aesthetical point of view.
The use of concrete, both in details and the general interplay with other materials, is masterly composed to give an interior where concrete is expressed in a very natural way, with all its natural small "imperfections" exposed and almost emphasized as aesthetical qualities - which is in fact one of the trademarks for the architecture of Sverre Fehn. Succeeding in creating this balance between structural and aesthetical perfection of concrete design, is an even greater achievement when taking the logistical challenges of the construction site into account.
Again the early and constructive dialog between architect, contractor and concrete supplier has made a big positive difference in effectiveness on the construction site and on cost focus general, without compromising the intended architectural qualities.

COMPANIES INVOLVED

Architect Arkitekt Sverre Fehn AS
By Professor Architect MNAL Sverre Fehn,
Project supervisor
Architect MNAL Inge Hareide
and Architect MNAL Kristoffer Moe Bøksle

Owner Gyldendal ASA
Completion date November 2007

Other companies involved in the concrete construction

Strøm Gundersen AS
(Concrete contractor)
Egil Lundhaug, Trond Dihle

Unicon AS
(Ready mix concrete)

Aalborg Portland
(White cement)

Con-form AS
(Pre-fabricated concrete skylights)

Rambøll Norge AS
(Engineering)
Ommund Hansen

Vedal Prosjekt AS
(Project leader)
Egil Vedal

Vedal Entrepenør AS
(General contractor)
Anders Palm, Stein Karlsen

Honourable mention

DUTCH INSTITUTE FOR SOUND AND VISION, Hilversum, The Netherlands

Introduction

The new building for the Institute for Sound and Vision is a composition of four blocks, of which two are situated above the ground level and two beneath it. The lower blocks make about half of the total volume and were built as much as 10 m' below the groundwaterlevel.
The two subterraneous blocks are separated bij a deep "canyon" and the upper blocks are separated by a long and high atrium. This atrium is placed perpendicular to the canyon and it has a stepped ceiling, like a cascade. Due to this arrangement the visitors and users of each block have visual contact to all the other areas.
To give all the blocks a similar expression from outside the facade is the same at four sides of te building.
In the building there is place for 10.000 m^2 of depot and archives, 6.000 m^2 officespace, 850 m^2 of public space and 6.300 m^2 museum. In all parts of the building concrete is the mayor building material in creating a rational structural concept. Sometimes it is also used as a architectural element.
By combining several possibilities of the use of concrete at the end there was a complex structure that of course complied with all demands of strength, stiffness and also of course to the demands of the client and the architects.

Museum

The museum is a compilation of a great number of big spaces in a very large empty box.
The number of supports of this box is very limited, due to the wish to make an atrium without columns.

Dutch Institute for Sound and Vision

Concrete is used for:

- The floor of the museum is made of prefabricated, prestressed VIP-beams, on a centre to centre distance of 2,4 m and with a span of 23,4 m. On top of the beams the precast floor is a good example of a highly integrated design. In the free space between the beams all mechanical and electrical pipes and ducts are located. Despite the very large span it was possible to limit the floor to floor height. This floor is designed so that no temporary supports were necessary during construction. Due to the canyon and the atrium, supports should have a length of approx. 18 m.
- The roof is made of TT-beams with a span of 18 m. The supports of this beams is on a steel structure near the concrete core and on a truss with a 54 m long span near the atrium.
- For the large slender facades in situ concrete is used. In this way is was possible to make cantilever end of 14,8 m. The facades are supported by very slender V- shaped columns of highly reinforced concrete. To make these structures self compacting concrete is used grade C52/65.
- By using in situ concrete there is made a 7,2 m cantilever extending from the concrete core. The structure acts as a “vierendeel” beam. This structure made it possible to create a 54 m wide free atrium in which the museum is hanging as a cascade. These structures also needed the use of self compacting concrete.

Offices

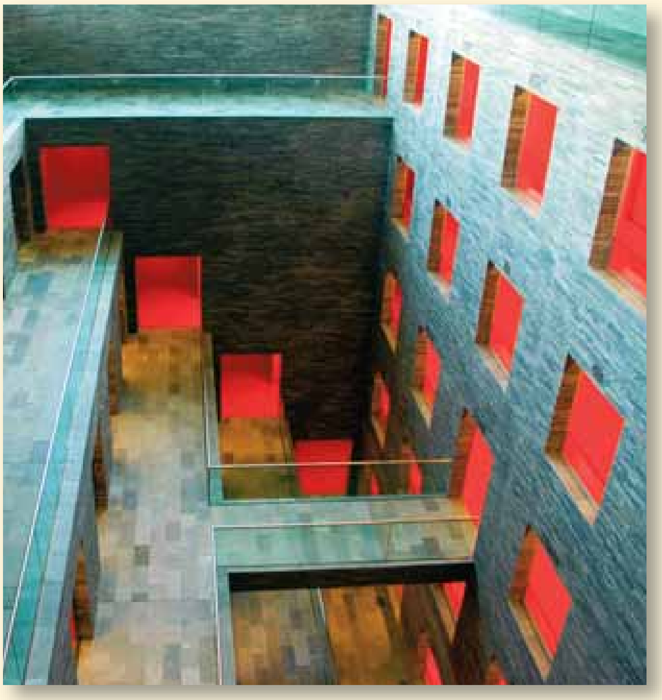
The bottom of the floors of the offices remains in sight so that the concrete can be activated in terms of the regulation of the inside temperature. For that purpose hoses are put in the concrete which are filled running water. The variation of the inside temperature is highly minimized by this system. To create a nice ceiling it is necessary to put strict demands on the tolerances.

Depot/archives

To make sure that a high building speed was possible, the walls of the depots and archives are made of two precast plates, on a distance of approx. 150 mm. The space between both plates is reinforced and concrete is poured between the wall-elements.

Building pit

At the site there is no impermeable horizontal ground layer available that can be used as a waterstop. The subsoil is sand which is a very bad barrier for water. Therefore the bottom of the pit is made by underwater concrete floor with vertical anchors to resist the 10m waterpressure during construction. On the perimeter of the building a slurry wall is made which is supported by the underwater concrete floor and anchored with goundanchors.
Inside this simple concrete box, the actual building is erected. The concrete box keeps the water away from the precious archives.



Honourable mention

SILLOGUE WATER STORAGE FACILITY, Dublin, Ireland

Project Description

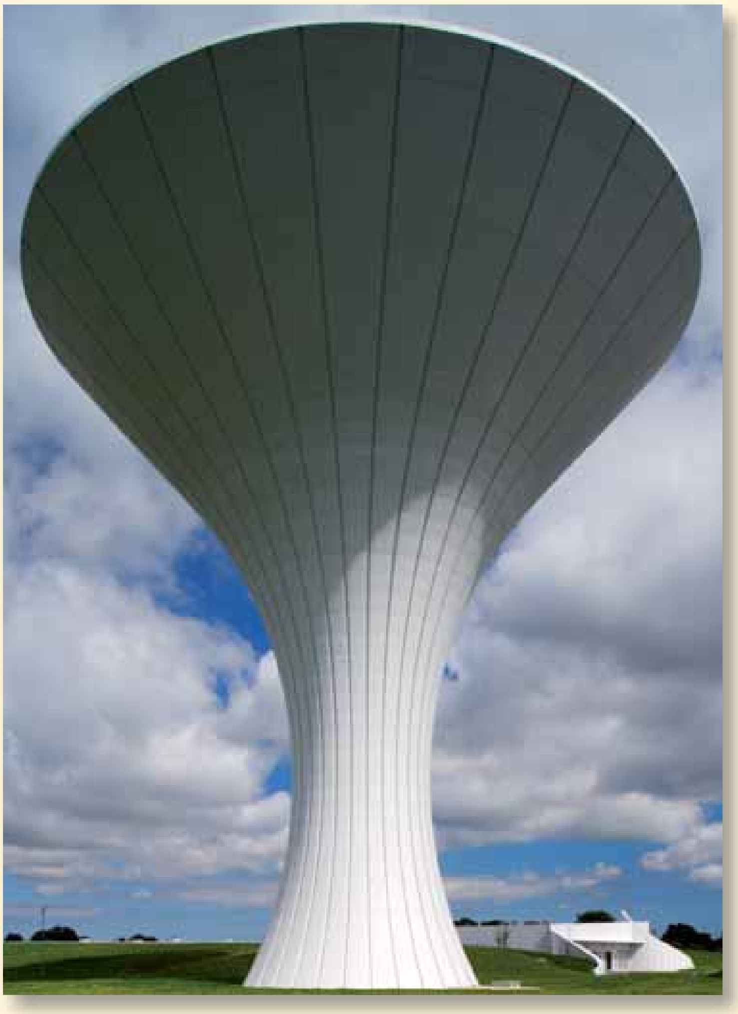
The recently completed Sillogue Water Storage Facility is the most visible element of the major North Fringe Water Supply Scheme constructed to improve the existing water supply to north Dublin and serve the rapidly developing areas along Dublin City's north fringe.
The site of the facility is immediately adjacent to the M50 motorway at Sillogue near Dublin Airport in north Dublin.

The main features of the storage facility are reinforced concrete structures including a 39m high water tower with a capacity of 5 million litres, ground level reservoir with a capacity 30 million litres and a pumping station.

The location of the site which is immediately adjacent to the M50 and close to Dublin Airport meant that the tower and pumping station in particular would be highly visible to the general public. The tower is a large and prominent structure and the challenge was to achieve a design that would be both elegant and structurally efficient. This challenge was successfully met by consulting engineers McCarthy Hyder Consultants and architects Michael Collins and Associates by the use of a double parabolic curve profile accentuated by vertical recessed fluting. The design was translated into reality by contractor John Cradock Ltd. and the new water tower, although designed primarily as a functional structure, stands out as an impressive piece of urban sculpture on the Dublin skyline. The tower is floodlit at night to further enhance the overall effect of this unique structure.

Construction of the tower involved large concrete pours, complex reinforcement at high level and the achievement of high quality finishes using intricate curved formwork. The contractor John Cradock Ltd met all the construction challenges of this project by implementing a stringent quality control system on concrete supply and workmanship and using custom made formwork supplied by Austrian company Rund-Stahl-Bau. Close co-ordination between the Consultant, Contractor and RSB ensured that a high degree of concrete finish was achieved. By designing the inner and outer bowl formwork as two independent and self supporting units the loads carried by the formwork were transferred directly into the cured concrete of the main shaft main shaft eliminating the need for support scaffolding. Safety was a paramount concern during construction particularly as much of the work was carried out at height and the cooperation of all led to a construction phase with no serious accidents.

The project is funded by Dublin City Council with Fingal County Council and the Department of the Environment, Heritage and Local Government through the National Development Plan.



Sillogue Water Tower

Sillogue Water Storage Facility - Technical Details

Tower	
Capacity	5,000m^3
Overall Height	39m
Concrete Volume	4,950m^3
Reinforcing Steel	580 tonnes
Formwork	6,300 m^2

Ground Reservoir

Capacity	30,000m^3
Internal Height	6 m
Overall length	92 m
Overall width	66m
Concrete Volume	5,600 m^3
Reinforcing Steel	770 tonnes
Formwork	12,200 m^2

COMPANIES INVOLVED

Promoters
Dublin City Council; Fingal County Council; Department of Heritage and Local Government.

Project Managers & Consulting Engineers
McCarthy Hyder Consultants (Joint venture between PH McCarthy Consulting Engineers and Hyder Consultants)

Architects
Michael Collins Associates

Contact
BrianMurphy (8) 676-0916
Newmount House
22-24 Lower Mount Street
Dublin, 2
Ireland
T + 353 1 676-0916
E bmurphy@mca.ie

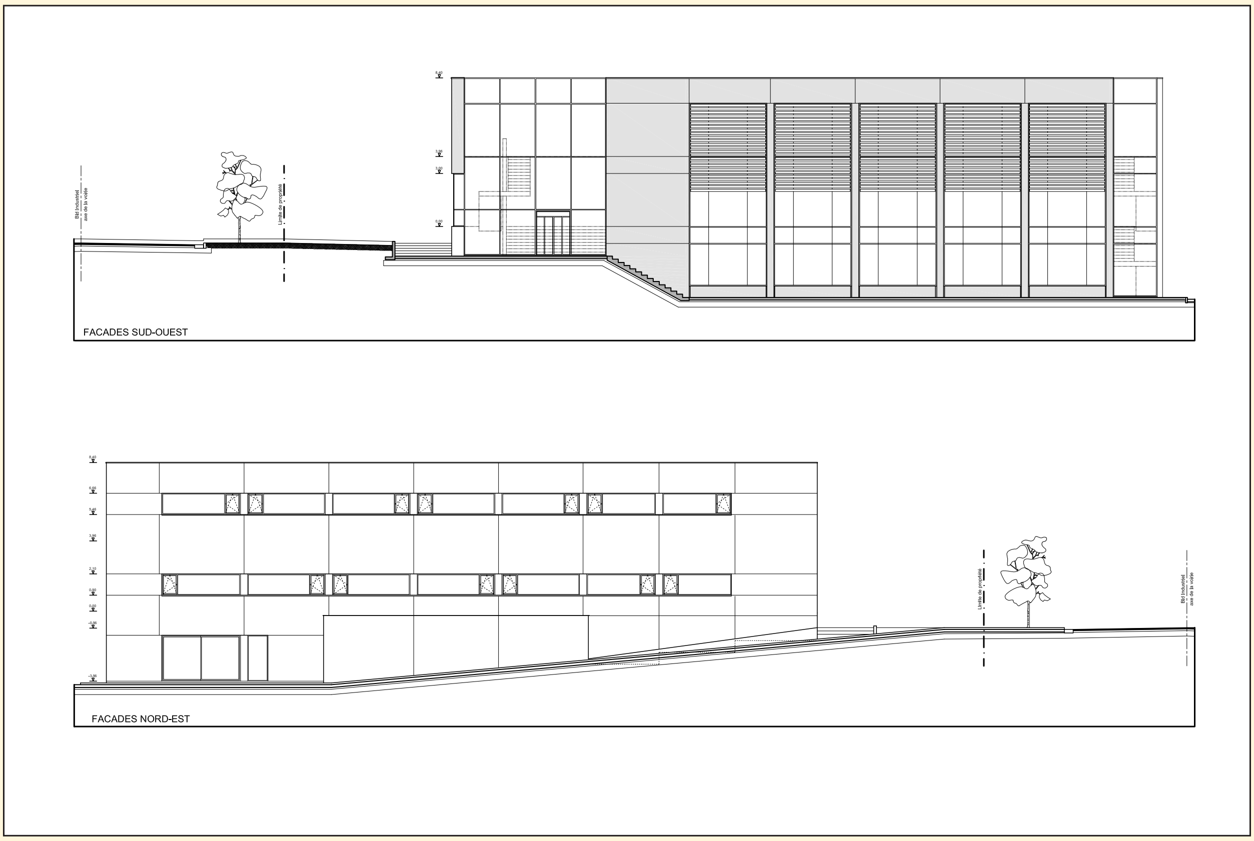
Contractor
John Cradock Ltd.

Formwork Supplier
Rund-Stahl-Bau

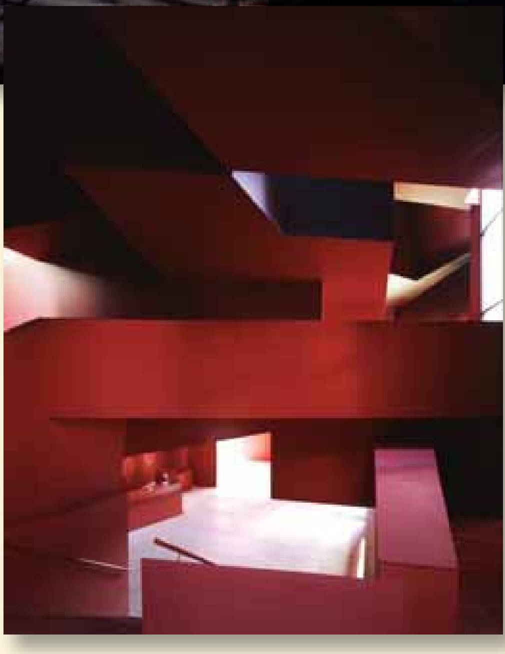
Concrete Supplier
Roadstone

VILLA VAN ESCH,
Tilburg,
The Netherlands

DECOMO SA, Mouscron, Belgium



CENTRE DRAMATIQUE NATIONAL DE MONTREUIL, France



THE SLEEPING GIANT, Ireland

SOHLBERGPLASSEN, Norway

'THE SOURCE' THURLES ARTS CENTRE, Ireland

DIAMOND SYNCHROTON, Oxfordshire, United Kingdom

BEETHAM TOWERS, Manchester, United Kingdom

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European Concrete Award 2008

Civil Engineering

WINNER

TUNNEL RODENRIJSEVAART (KW17 in de N470), The Netherlands

Introduction

The architectonic design made high demands to the structural design (DHV) and the technical realization. Heijmans Beton- en Waterbouw (concrete and hydraulic engineering) and Holcim Betonmortel (concrete mortar) co-operated in the complex job.
Condition: fair face concrete that folds like a curl of butter. The colour needed to be consistent everywhere and air bubbles were unacceptable. Besides, the structural design soon showed that the oval shapes could
only be casted using self-leveling concrete on site.
The tunnel is divided into various different slices that continually were poured in two parts with B65 concrete. The upper parts got a completely closed formwork. That was minute carpentered, inch by inch. For the very liquid concrete would absorb all unevenness. With two pumps in four different places the concrete was steadily and simultaneously forced up through pressure valves. In such a way it flew symmetrical into the formwork. Never before a project was executed in such an innovative manner. According the DHV consultant the project balanced on the edge of impossibility.

To attend the requirements for the surface quality, the time to dismount the formwork and pre-stressing were precisely defined. To ensure balance in production, quality and logistics an efficient and tight organization was required. Continuous supply of concrete was essential because concrete could not be given the opportunity to set or segregate.

Building sustainable

The Provence of South Holland set high demands for the sustainability of the design. Therefore various high-quality materials were applied in the design choices. This way the amount of required material was reduced.

The concrete strength B65 has environment class 4 for construction, the timbers are FSC certified and the metal parts are made of aluminum and stainless steal. For the dimensioning of the complex form design a 3D model was developed. From this model the construction was further detailed and the specifications were set.

Not just any tunnel

Never before a tunnel was designed and constructed like this. With two pumps the concrete was steadily forced up simultaneously at four sides.
The oval shapes could only be casted using self-leveling concrete on site.
The concrete recedes gradually into walls on both sides and then pulls back into a carpet.

Tunnel Rodenrijsevaart

BRIDGE OVER RYBNÝ CREEK, Czech Republic

Introduction

The Bridge across the Rybný Creek is being built on the section H of the Freeway D8 that crosses the mountains forming a border between the Czech Republic and Germany. The bridge that is situated up to 52 m above the terrain is formed by an incrementally launched continuous box girder of seven spans of length from 34 to 58 m. The bridge of the width of 31 m is being built by Metrostav a.s. a subcontractor of the Joint Venture 7/II H, that is formed by firms STRABAG a.s., Beroun and SKANSKA DS a.s., Brno, Czech Republic.

In a bid project the crossing was formed by a traditional twin bridge. The structure of each bridge was formed by one cell box girder that was supported by piers of the box section of the height up to 47 m. The design supposed that the bridge will be incrementally cast beyond the abutment and consequently launched into the design position. The static effects in the launched cantilever were reduced by a steel nose. Due to the launching technology, the box girder had relatively large depth – 4.20 m.

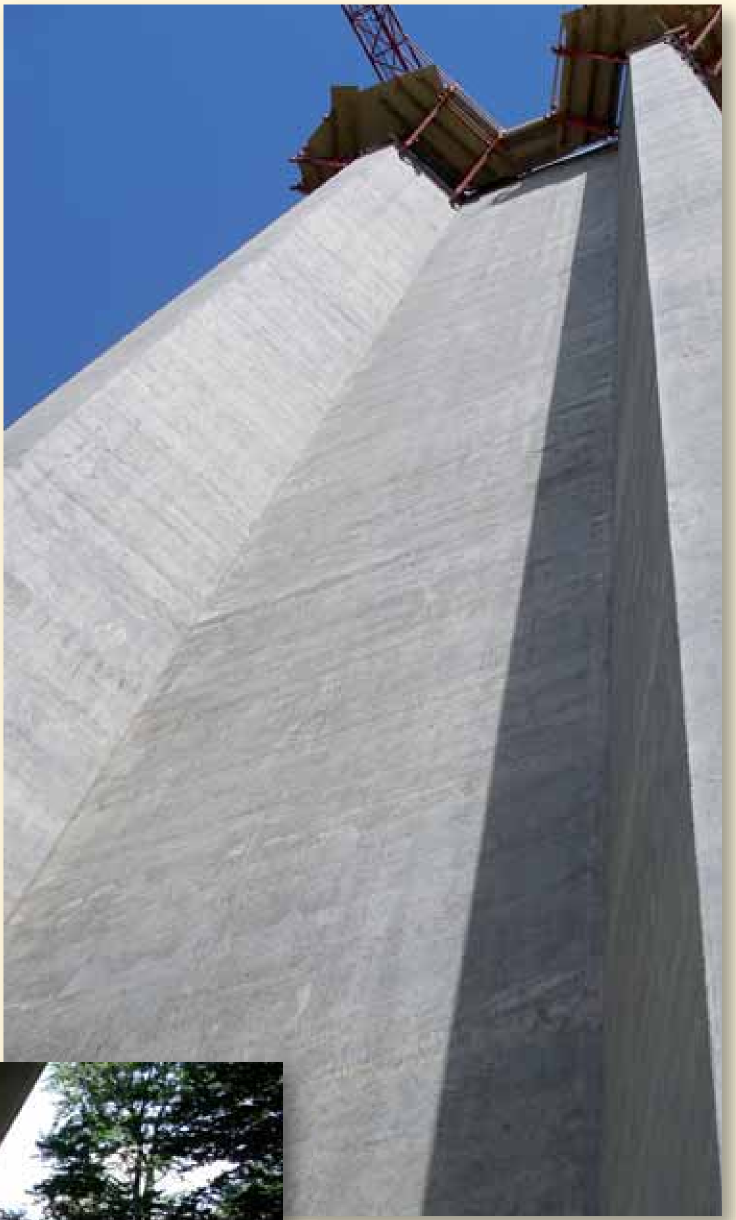
Due to the severe winter, the construction seasons are very short at the bridge site. Since the bridge has to be built within two years, the both bridges would have to be built simultaneously. That means that it would be necessary to use two forms and to procure two launching equipments and two launching noses.
That is why the Metrostav, a.s. asked the Department of concrete structures of the Brno University of Technology to work out an architectural and structural study of the bridge that would convey both freeway's directions.

Bridge over Rybný creek

The study that was done in June 2004 was worked out
in two options. In the first option the bridge had the same span length and structural depth as the bid structure; in the second option the span length was doubled, structural depth was increased to 5.20 m and for launching temporary towers were situated in the place of omitted piers.
In both options the deck was formed by a one cell box girder with large overhangs supported by single precast struts.
After an economic evaluation the Metrostav, a.s. submitted the first option to the Joint Venture 7/II H and to the client – Directory of the freeways and highways of the Czech Republic, Prague – for an approval.
After accepting of the proposed solution, the design firm Strasky, Husty and Partners, Ltd., Brno has worked out the detailed design.

Architectural And Structural Design

In the place of the crossing the bridge axis is in the plan circle with a radius R = 1,750 m that transfers into a transition curve with a parameter A = 1,387 and in the sag curve with a radius of R = 24,500 m.
The freeway was designed in one sided cross-slope of 2.5%.



BRIDGES ZUIDERPARK, Rotterdam, The Netherlands

Introduction

The bridges in the Rotterdam Zuiderpark owe their especially pleasing aspect to the aesthetic use of concrete in the slender structure. The final design process has made full use of ingenious shuttering techniques with double-curved surfaces and prefabrication, enabling a whole family of bridges to be constructed that are related in appearance, but offer a variety of length, widths, and shapes.

Concept

The green heart of Rotterdam South has been given a new lease of life. The renovation plan for the park includes wider stretches of water, undulating terrain, improved connections, and added atmosphere. The traditional city park has been adapted to the citizens of today. More people of many more different ages, lifestyles, and cultures will be making use of the park. The bridges will form an important element as part of the routes through the park, and to provide a means of crossing the various stretches of water. The competition-winning design developed by DP6 and ABT for the new family of bridges is a redefined interpretation of the old Zuiderpark bridges – with a strong identity emanating a sober kind of beauty.

Design

The new bridges were developed as objects, elegant and bold. Just like the existing bridges, the new bridges are sober in appearance, but differences in bridgeheads and centre sections, with a range of lengths and widths, combine to produce an endless variety within the family.

Bridges Zuiderpark

The lines of the landscape flow into the lines of the bridge. The bridge appears to grow naturally from the landscape, but retains its own identity.
While the structural requirements, load figures, production restraints, maximum inclination, and minimum headroom all contributed to the final shape of the bridge, it remained important to maintain the flowing lines, the tension in the bridgehead lines, and the slenderness of the centre section.

Preparation

The bridgeheads and the bridge deck use prefabricated concrete. The shuttering for the various bridgeheads was constructed with great precision, with plywood forming the double-curved surfaces. An ingenious system for assembling, removing, and adjusting the shuttering enabled the same components to be reused in different locations.
The bridge deck shuttering was adapted for multiple use in bridges of various lengths and widths by the simple expedient of adjusting the forms' width and arch shape.

Production

The concrete elements were produced in series. The composition of the concrete had to be carefully adjusted in order to obtain the correct shape, colour, and surface texture for each element. The cement skin was carefully removed by means of light grit blasting to create a surface blend of dark pebbles against a background of light concrete.

Construction

In the park, the extremely thin bridge decks were installed between the bridgeheads, with the prefab components being interconnected using wet joins.
In order to ensure perfect flow of the bridge line, the specifications included strict tolerance requirements.
The gradual reduction in size of the bridge sides combines with the flow of the arch to ensure maximum viewing clearance under the bridge.

COMPANIES INVOLVED

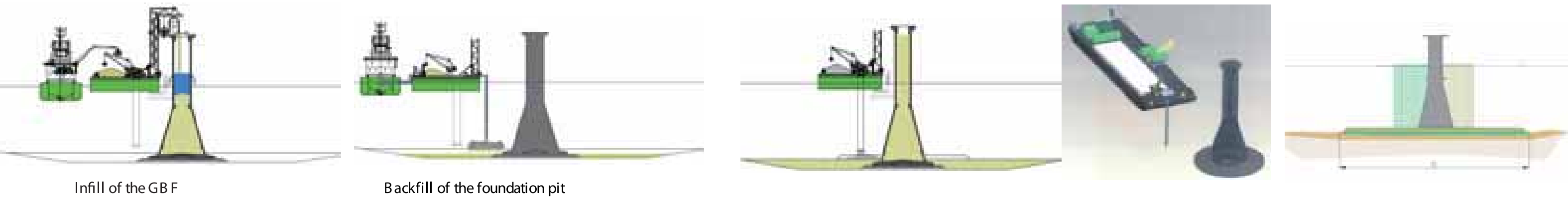
Client
dS+V/ OBR, Gemeente Rotterdam.

Design team
Architectuurstudio, Delft / ABT adviesbureau voor bouwtechniek, Delft

Structural consultans
ABT adviesbureau voor bouwtechniek, Delft / Gemeentewerken Rotterdam

Contractor
Aannemersbedrijf Colijn, Werkendam

THORNTONBANK WIND FARM, Belgium



Infill of the GBF

Backfill of the foundation pit

Scour protection filter and armour layer

BRIDGE OVER THE LABE AT NYMBURK, Czech Republic

LE PONT DU LANGUEDOC, France

CATHALEENS FALLS BRIDGE, Ireland

SAVENA BRIDGE,
Italy

VIADUCT OF SS 23, Italy

HSL-ZUID, The Netherlands

CENTRAL PARK ENTRANCE GATEWAY, United Kingdom

The members of the Jury of the ECSN Award 2008

Michel Denayer, CFE Engineering Department, Belgium

Prof.dr.-Ing. E.h. Manfred Nussbaumer M.Sc., DBV, Germany

Assoc. Prof. Ing. Jaroslav Navratil, Phd., Czech Concrete Society, Czech Republic

Ole H.Krokstrand, Byggutengrenser.no, Norway

Bob Cather, Director Arup Materials Consulting, United Kingdom

Prof.Bo Göran Hellers, KTH/Arkitektus, Sweden

Prof.ing. Marco Menegotto, AICAP, Italia

Michel Virlogeux, Virlogeux Consulting, France

Wim Anemaat, RWS Bouwdienst, The Netherlands

Paul Hackett, John Sisk & Son Ltd, Ireland

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