

cobiax[®]

insight

Customer Magazine 01-2010

Lightweight Solutions in Concrete
... for Slim Slabs and Large Spans

**Winner of the Swiss
Environmental Award 2010**

UMWELTPREIS
SCHWEIZ
PRIX
SUISSE
ENVIRONNEMENT

Dear Partner

Time goes by – it's been 10 years since our company was founded and 5 since Cobiax was first introduced into the market. We cordially thank you for your trust and your collaboration.

We think it is time for us to keep you regularly informed of our latest findings. In order to do this without being intrusive we have released the Cobiax Insight publication.

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Since the beginning, we have been pursuing a vision: To become THE recognized construction method for concrete slabs in structures optimized for sustainability. And this not only for long span applications or to resolve problems concerning the reduction of weight.

Time is on our side. Sustainability is becoming an ever more important market factor in the building industry. Investors, project developers, architectural and engineering planners recognize their responsibility towards society and place more and more value on exploitation flexibility as well as energy and resource efficiency. It makes no sense that energy efficiency should only be considered when designing systems such as heating, ventilation and in the building's facades but neglected in the structural construction. This is exactly where Cobiax has something to offer. Naturally we are not "green idealists" but we stand for resource efficiency on an economical basis demonstrated by our modern "Cleantech" standard and we prove our commitment everyday.

In this first publication of Cobiax Insight, you will find some of our current and interesting projects, and for each example, some indications on the amount of reduced mass and CO₂-emissions, thus an important contribution to the protection of the climate and environment. We would like to take this opportunity to thank all the participants involved in these projects for their trust in the Cobiax Technology.

As of December 2009, The Cobiax slab technology is the first and thus far only voided flat plate slab allowing a bi-axial load transfer holding the "National Technical Approval", awarded by the DIBt, the German Institute of Building Technology.

We have recently been awarded the Swiss Environmental Prize 2010, granted by the Pro Aqua – Pro Vita foundation which is sponsored by the Federal Office for the Environment FOEN – You can read more about this subject in the chapter Development / Resource Efficiency.

Both of these honorific distinctions will reinforce the confidence in Cobiax on the market. Furthermore they validate us in our work and strengthen us on our way to transforming our vision into reality. As we strive towards our vision, we attach great importance to good "team-spirit" and high quality service when advising partners how to increase the ecological and economical value of structures with "Cobiax Cleantech".

We would be pleased if you were to take interest in Cobiax. Our "Value Engineering Services" in our agencies in Zug, Darmstadt and Vienna are at your disposal for any information free of charge or commitment. We look forward to working with you.

Have fun while reading this Cobiax Insight edition 01-2010!

Hugo Meier
CEO and Partner



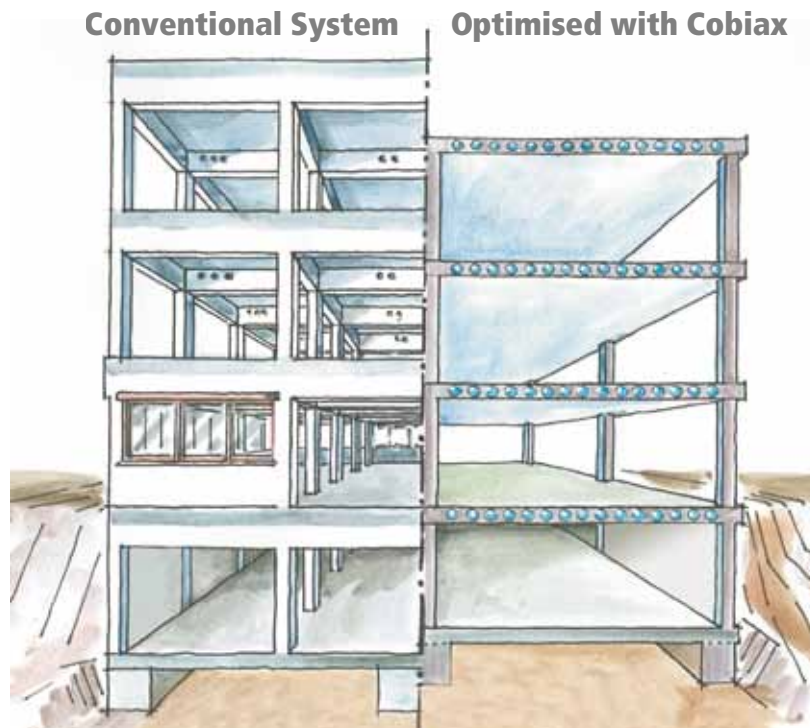
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Technology

The numerous advantages of the Cobiax Technology offer a great amount of utility for all participants in the building process.

„smartdeck“

Resource efficiency generates a very high structural capacity, economical costs and optimized and sustainable concrete constructions respectful of the climate.



Weight reduction

- Up to 35% lighter than solid slabs
- Up to 15% less load on building foundations
- Greater planning flexibility

Span length

- Up to 20m span length
- Flat bottom-view without beams
- Up to 40% less columns

Earthquake protection

- Reduced accelerated mass
- Simplified earthquake design
- Reduced potential for damage

Economy

- Spared concrete and reinforcements throughout the overall constructions
- Optimization of building foundations
- More effective retrofitting

Sustainability

- Resource efficiency by means of building material savings
- Reduction of CO₂-emissions as well as of other pollutants by 20% through reduction of required concrete volume
- Recycled materials used in the Cobiax products



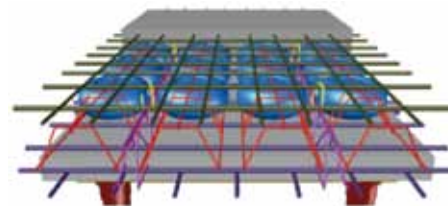
Current Projects

National Stadium, Warsaw, Poland



Cobiax

The poor subsoil conditions next to rivers requires a pile foundation. The weight reduction provided by the use of Cobiax modules minimizes the volume and costs needed for this foundation. A time-saving construction method is imperative to insure the completion of the stadium in time for the opening championship game. For this reason, prefabricated filigree slabs are used that will be supplemented on site with Cobiax modules. The rate of production is about 6'300 m² of constructed slab surface per week. The reduced amount of concrete decreases the CO₂ emissions by 2'878 tons. This can be compared to the performance of an automobile over 20 million kilometres (middle-class passenger car 140g/km) or in other words, 500 times the world tour. It therefore has a very important impact to protecting the climate.



Typical cross-section of Cobiax Slim-Line cage module with precast application



Owner:	Polish Sport Ministry
Architect:	JSK, Warsaw
Structural Eng.:	Matejko I Partnerzy, Warsaw
Contractor:	Alpine-PBG / Hydrobudowa
Precast supplier:	Baumat, Torun
Slab surface:	152'000 m ²
Max. span:	10 m
Slab depth:	40 cm
Concrete reduction:	13'704 m ³
Load reduction:	34'260 t
Reduction of CO ₂ emissions:	2'878 t
Start of construction:	July 2009
Completion:	May 2011

The national stadium in Warsaw will be finished just in time for the European Football Championships 2012 which will take place in Poland and the Ukraine. Along the Vistula, a multifunctional Arena is being built which will be able to welcome 55'000 spectators. In addition there will be a gymnasium with 15'000 seats and a swimming stadium with 4'500 seats. The opening game of the championships will take place in this national stadium.

The roof construction of this stadium possesses a "membrane-interior roof" which can be pulled over the playing field to insure that any sort of event can be held independent of the weather.

The geometry of the rows allows a temporary transformation into an athletic stadium by lifting the playing field up to the height of the intermediate rows. The exterior aspect is formed by a corded intertwined envelop and, with its red and white colours, reminds you of the polish flag.

UEFA, Nyon, Switzerland

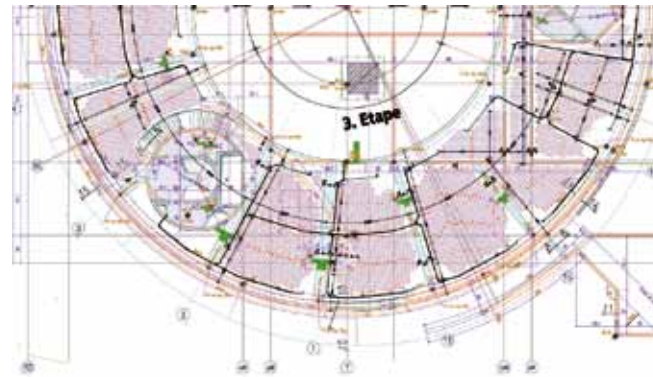


The Union of European Football Association UEFA is one of the six continental confederations of the International Federation of Football Association FIFA. The UEFA headquarters were originally located in Paris until it was moved to Bern in 1959. Since 1995 however, the administration headquarters lie on the shores of the Lake of Geneva in Nyon. The business area and activity of UEFA are increasing steadily. The development of its marketing, the success of the Champions League as well as activities in correlation with new media requires a growing number of collaborators. The present building however, can't accommodate all the new staff members. Hence the construction of a new building in close proximity to the previous site, reuniting functional needs, the existing environment and the energetic and technical demands. Inspired by the round form of a football and of the UEFA logo, this new building, called "La Clairière" is being built and will be able to welcome 250 new staff members. Next to it, a two-story underground parking garage is being built, the second story of which will be called the "VIP-Parking", and will be reserved for UEFA guests. This project implements the guidelines of MINERGIE® and MINERGIE®-ECO.

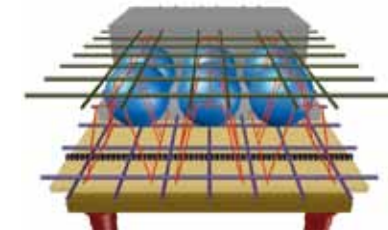


Cobiax

The round form of this building without interior supports combined with filigree facades and glass separation walls demands a lot towards the slab construction. To reduce the deformation of the slabs and at the same time optimize the dead load, the engineers have opted for the combination of the Cobiax modules with post-tensioning of the slabs. The slabs of the parking area are made up of conventional reinforcements and implemented with Cobiax modules. The chosen span length is 15.7 meters and allows parking spaces without disturbing columns.



© Photos: Massimo Simone, magazine Chantiers & Rénovation, Renens



Typical cross-section of Cobiax Eco-Line cage module with in-situ application

Owner: UEFA, Nyon
 Architect: Bassi et Carella, Geneva
 Structural Eng.: Guscetti & Tournier, Carouge
 Schopfer et Niggli, Lausanne
 Frame contractor: Bernard Nicod, Nyon
 Contractor: Marti, Lausanne

Slab surface: 7'400 m²
 Max. span: 15.7 m
 Slab depth: 40 to 60 cm

Concrete reduction: 941 m³
 Load reduction: 2'370 to
 Reduction of CO₂ emissions: 197 to

Start of construction: January 2009
 Completion: March 2010

Elbphilharmonie, Hamburg, Germany

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Cobiax

A building, so to speak “New on Old”, demonstrates a particular challenge to work out the reinforcement structure and is an extreme form of extension.

In the slabs for this new construction, various types of Cobiax Modules have been used which resulted in a decrease in weight with important advantages. Besides this static solution and the reduced amount of concrete and steel needed, 90 tons of CO₂ emissions have been avoided by using Cobiax.



© Herzog & de Meuron

On the west coast of the “HafenCity” the new landmark of the city of Hamburg, the “Elbphilharmonie”, is being constructed and will be completed in 2012. This project was designed by Swiss architects Herzog & de Meuron. In regard to its quality and appearance, the “Elbphilharmonie” will be among the ten best concert halls throughout the world. The particularity of this construction project is that on top of the former “Kaiserspeicher”, which is being repurposed into a parking lot, now arises a brand new building. This building will be accessible through a 37m high Plaza and will reach a height of 110m.

The “Elbphilharmonie” will include a total of 3 concert halls. The west side of the building will provide first-class apartments and the east side – facing the “HafenCity” – will become a high-class hotel. The concept laid forth by Herzog & de Meuron combines classic brick construction with the audacious swing of the glass facades and roof scape.



Owner:	Freie- und Hansestadt Hamburg
Architect:	Herzog & de Meuron, Basel
Structural Eng.:	WGG Schnetzer Puskas, Basel
Slab surface:	12'000 m ²
Max. Span:	10 m
Slab depth:	25 to 45 cm
Concrete reduction:	440 m ³
Load reduction:	1'100 to
Reduction of CO ₂ emissions:	90 to
Start of construction:	2009
Completion:	2012

ÖBB Praterstern, Vienna, Austria



The infrastructural department of the Austrian Federal Railways will be given a new office in Vienna which will also become its new headquarters. The existing sites will henceforth be centralized and combined on the new site in Praterstern.

Through the dissolution of the smaller sites, communication and operations can be improved and a higher efficiency and reduced costs obtained. The new infrastructure headquarters will be constructed on 5'000m² and will be seven stories high. The constructor's goal is to offer modern working and communication infrastructures for the round 800 employees so as to insure the quality of their work. In addition to the working spaces, it will be possible to rent out the ground floor to commercial and gastronomical businesses. The total investment in this project amounts to 47.5 million Euros.

Cobiax

The poor subsoil conditions, the demands for flexible layouts, and the large working space as well as the need for a modern energy system calls for a technologically first-class but nevertheless simple solution.

By using Cobiax modules, it is possible to conform to the efficiency and economical demands. An essential criterion for the use of the Cobiax Slim-Line modules was the need to equip the upper stories with concrete core thermal activation tubes for heating as well as cooling. With a slab thickness of only 32cm, a highly effective and attractive solution for the slim slabs has been found. Altogether, 65% out of the total amount of 33'500m² of slabs are Cobiax slabs.



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Owner: ÖBB-Immobilienmanagement
 Architect: S. Tillner & A. Willinger, Vienna
 Structural Eng.: Vasko & Partner ZT, Vienna
 Contractor: A. PORR AG, Vienna

Slab surface: 33'500 m²
 Max. Span: 11 m
 Slab depth: 32 to 45 cm

Concrete reduction: 2'200 m³
 Load reduction: 5'500 to
 Reduction of CO₂ emissions: 660 to

Start of construction: July 2009
 Completion: End 2010

Polipol, Diepenau, Germany



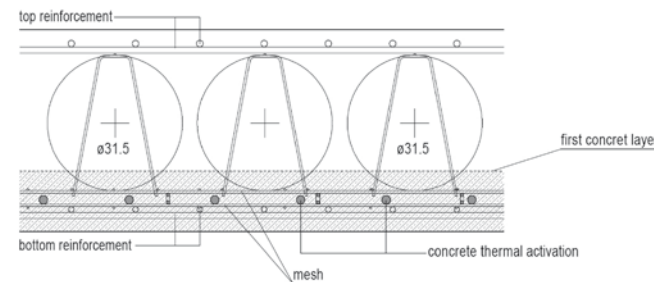
Cobiax with concrete thermal activation

The Polipol group and its subsidiaries Polipol, Zehdenick and Polinova is a company with about 4'000 collaborators both domestic and abroad, and with the main headquarters in Rahden. The company is considered to be one of the most successful companies in upholstered furniture in Europe and attracts customers with its innovative products, its high standards for customer orientation and its flexibility.

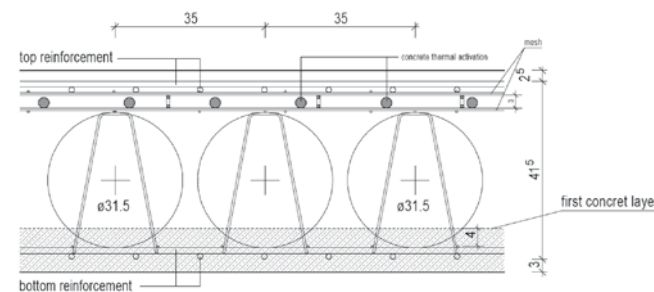
These guidelines were also followed in order to elaborate a new building for administration, distribution and research. During this project, conceived by the architectural office Karl Lindstedt and overseen by the engineering office Diekmann in regards to structural aspects, the Cobiax modules were used. Consequently, a solution to the client's request concerning greater span length and flexible room layout could be provided.

The concrete structure was constructed by the Schäfer Bauten firm. This company has previously gathered experiences with Cobiax products in the scope of other projects (for instance: "Zollvereinschule" in Essen and "Zerstäuberfabrik" in Dortmund) and can now be considered a specialist in the use of Cobiax technology.

It is worth mentioning that this project included the use of concrete core thermal activation tubes as well as, in certain portions, a floor heating system integrated into the slabs.



Slab cross-section with concrete thermal activation in the tensile zone



Slab cross-section with concrete thermal activation in the compression zone

Owner: Polipol, Diepenau
 Architect: karl lindstedt architekt bda, Lübbecke
 Structural Eng.: Ingenieurbüro Diekmann, Bünde

Slab surface: 10'000 m²
 Max. Span: 12 m
 Slab depth: 47 cm

Concrete reduction: 694 m³
 Load reduction: 1'737 to
 Reduction of CO₂ emissions: 146 t

Start of construction: 2008
 Completion: 2009

Altra Sede, Milan, Italy



The new administration headquarters of the region of Lombardy, Italy allows the union under one roof of all its working spaces that are at the moment scattered in various parts of the city. At the same time, this building will become the new architectural landmark of the city and surrounding region.

It is a steel and glass complex in the shape of a sinusoid with two tall towers at its centre which mutually intersect each other to form one single body of 39 stories.

The base complex is 9 stories high and will provide cultural functions and services such as a post office, a bank, restaurants and bars. The tower itself will mostly accommodate administrative working spaces and presentation areas for the Lombardy region. The highest stories of this tower will be publicly accessible and include a panoramic restaurant and roof terrace.

This building was constructed on a surface area of 33'700 m². With a total height of 163m, the tower is the highest building in Italy and beats the Pirelli Tower by 36m. The architectural concept comes from Pei Cobb Freed & Partners in New York, which also designed the glass pyramid of the Louvre in Paris.

The project also sets itself apart through the use of recent technologies. Electricity is gained by additional photovoltaic panels incorporated into the façades. An "air-conditioned masonry" composed of voids between the exterior facades and windows absorbs the solar heat and transforms it energetically.



Cobiax

Seeing as how there is a great risk of earthquakes in northern Italy, it was very important to minimize the dead-load of the structure. Through the use of the Cobiax technology, a better dynamic behaviour was achieved and the load on the foundation was considerably reduced. Furthermore this could be done without beams, commonly used in Italy for span lengths of 10m, and thus the building height was reduced by 7m. Overall, there was a decrease of 30% and 10% respectively in the amount of concrete and steel needed. The flexible and simple laying of the Cobiax modules as well as the lesser number of crane and pumping hours needed led to an optimized construction time and cost-effectiveness.



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Owner:	Regione Lombardia, Milan
Architect:	Caputo Partnership, Milan Sistema Duemila, Milan Pei Cobb Freed & Partn., New York
Structural Eng.:	Prof. Ing. Franco Mola, Bari Thornton-Tomasetti, New York
Contractor:	Consorzio Torre
Slab surface:	35'500 m ² on 39 floors
Max. Span:	10 m
Slab depth:	35 cm
Concrete reduction:	2'900 m ³
Load reduction:	7'200 to
Reduction of CO ₂ emissions:	600 to
Start of construction:	2008
Completion:	2010

Concrete Slabs - „Cleantech” Research

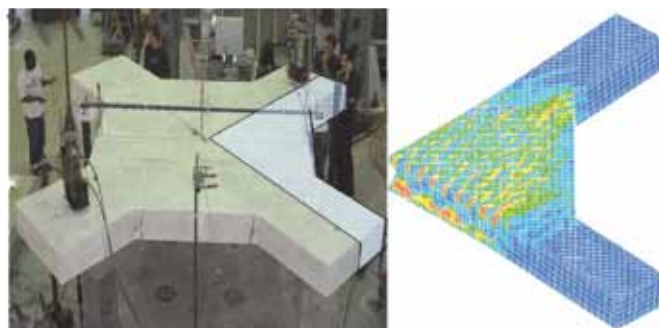
Cobiax research, development, design and application techniques over the last ten years have led to a very high degree of know-how about slab construction and numerous international patents.

Thanks to this specialization, we are now a recognized interlocutor for architectural and engineering planners concerned with optimized concrete construction, sustainable buildings and cost effective construction.

Carried out by universities, theoretical and experimental analysis and proof of structural security, serviceability and resource efficiency form our intellectual basis. This, after a long approval period by the German Institute of Building Technology, the DIBt, have lead to the “National Technical Approval”.

National Technical Approval, number Z-15.1-282

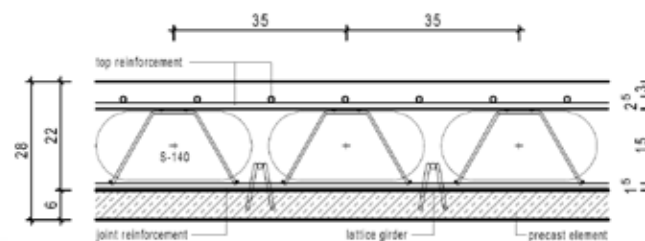
For this reason, the Cobiax Technology is the first and so far only voided slab allowing a bi-axial load transfer with DIBt approval on the market.



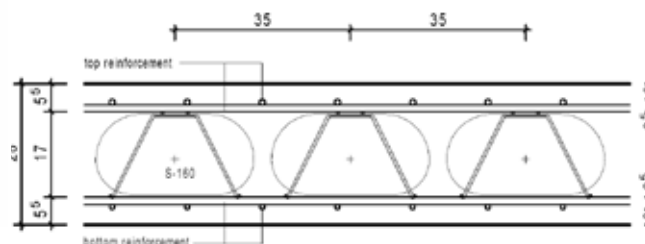
3D finite element calculation test and verification of torsional behaviour

Slim-Line for slim slabs

The latest development, with flattened void formers fabricated with recycled material – the so-called Slim-Line product line – improves the structural capacity of Cobiax by 30% in the field of slim slabs at favourable prices. This is why the Cobiax technology is used as well for smaller spans, thus with slab depth of 20 to 35cm for a modern high-performance and economical construction that spares resources. The positive secondary effects on the vertical support elements reducing the loads on the foundation improve the effectiveness of the concrete construction. As a result, the Cobiax Technology provides an important contribution to ecology and profitability. As usual, the Slim-Line void formers are also applicable for the „cast-in-place” method or in combination with industrial prefabricated filigree slabs. Moreover, the two Cobiax product lines, Slim-Line and Eco-Line can easily be combined with concrete post-tensioning – the ultimate solution for slim long-span slabs.



Typical slab cross-section for „cast-in-place” application



Typical slab cross-section for precast application

An important criterion in our research and development activities is our present “Cleantech” approach, that is, resource sparing on a solid economical basis.

Why „Cleantech”?

At this stage, our society’s global and ecological footprint already exceeds the bio-capacity of our planet by 30%. The world population is rapidly increasing and expects an ever increasing standard of living. The pollution of our climate becomes worse and worse.

At the present time, 50% of the world’s energy consumption and CO₂ emissions come from building construction. With an average 50 year life cycle of a building, the conditioning and exploitation accounts for about 60% of this consumption. The remaining 40% come from the structural construction: the active domain of Cobiax.

A resource sparing construction method and consequently a greater degree of effectiveness in the structural construction allows ecological and economical advantages and defines precisely the term “Cleantech”.

Cobiax Technologies AG won the Swiss Environmental Award for 2010, one of the most distinguished Swiss awards for environmental technologies.

Winner of the Swiss Environmental Award 2010



Cobiax Technologies AG won the Swiss Environmental Award, one of the most distinguished Swiss awards for environmental technologies. The award was granted by the Pro Aqua – Pro Vita foundation and carried among others by the main sponsor, the Federal Office for the Environment, FOEN.