THE **ACO MAGAZINE** ON THE INTERFACE

architecture water

Issue 1 - February 2012

Not only built on sand

The selection of Qatar to host the football World Cup in 2022 met with strong criticism from some quarters. In our cover story we deal among other things with possible solutions which could turn the World Cup into a success after all.

"The best of all things is water."

Pindar, Greek poet, Olympian Odes

Dear Readers,

I am delighted to be able to present you today with the first issue of our magazine *architecture _ water*. As the global market leader in the field of drainage technology, ACO has always been closely involved with the interface between water and architecture in its product development, consultancy and communications. We do not regard this interface as a boundary but rather as a connecting, shaping element - as an area of transition. We want to fascinate, surprise and, of course, inform you with the contents of our magazine - sometimes close to, sometimes a bit further away from the **interface** *_ architecture _ water*.

The cover story of our debut issue is the vigorously discussed football World Cup in Qatar in 2022. A topic which has affected us especially as a long-standing drainage partner of the football World and European Championships as well as the Olympic Games since 1972. In particular, the mega event in the desert will impose tremendous demands on planners and architects. Two German offices have been examining the two major challenges - extreme climate and subsequent use - and have reached fascinating solutions in completely different ways.

I hope we have aroused your interest with our choice of subject and already making you curious about issue No. 2 at the **interface** *_ architecture _ water*.

Best regards,
Hans-Julius Ahlmann


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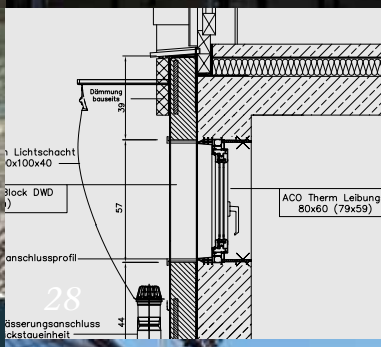


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Football World Cup 2022 in Qatar

Not only built on sand

A cry of horror went through the football world when FIFA President, Sepp Blatter, announced on 2 December 2010 that Qatar would host the World Cup in 2022. The small emirate on the Persian Gulf had completely surprised everyone, beating off competition from the USA, Australia, South Korea and Japan.

Questions quickly arose as to whether petrol dollars had played their part in this extremely disputed decision. After all, in the past there had already been rumours about various kinds of gifts to members of the Executive Committee responsible for the selection. But the die is cast. The state of the size of a small German federal state will be hosting the world's largest single sporting event in a good ten years time. Therefore, it's time to deal with the problems which the selection of the host country entails and present result-oriented solutions.

Today, some 1.7 million people live in Qatar – and therefore only half as many as the number of people who attended the matches of the 2006 World Cup in Germany. Stadia will have to be built even if only approximately as many people visit the emirate on the Persian Gulf for the major event in 2022. Many stadia and large, architecturally appealing ones. No problem for the seriously rich country – but who will fill the seats after the final whistle? And who can bear the unbelievable heat – daytime temperatures of considerably more than 40°C in the non-existent shade are not infrequent? How can very pleasant conditions be created for the spectators and sportsmen without postponing the entire event to the winter?

The planning architects were therefore put to a serious test.Two completely different approaches come from Germany. The architects' office, Albert Speer & Partner in Frankfurt, together with the Munich-based agency group Serviceplan and Pro-Projekt (contd. on page 10)

AL SHAMAL STADIUM

Planned capacity: 45,120
The shape of the structure in the north of the country, directly beside the sea, was inspired by the dhows, the traditional fishermen's boats of the region. The spectators reach this stadium, with its inspiring shape rising up on both sides, by water taxi among other things and - from neighbouring Bahrain - over the Qatar-Bahrain Friendship Bridge - the then longest bridge in the world.

To obtain moving images of all the stadia presented here, scan the QR codes with your smart phone and take a look now at the year 2022.

AL GHARAFA STADIUM

Planned capacity: 44,740
The structure is being expanded with a modular upper tier to double its present capacity. The facade made of strip-like elements transforms the stadium into a real explosion of colour. The use of the various colours symbolises the friendship of all participating nations as well as mutual tolerance and respect.

AL KHOR STADIUM

Planned capacity: 45,330
This stadium, where the group and quarter-final matches are to be played, is reminiscent of a sea mussel and offers a view over the Persian Gulf from the west stand. The spectators are to be able to reach the new building by water taxi, among other things.
(Picture bottom)

AL RAYYAN STADIUM

Planned capacity: 44,740
The membrane-like structure of the outer shell of the stadium can be used as a huge screen. Matches, information on the tournament and other film material can be projected onto it. In this way, the modular stadium becomes a gigantic open-air cinema.
(Picture right above)

AL WAKRAH STADIUM

Planned capacity: 45,120
The arena with the transparent outer shell is situated in a sports complex with a multi-functional hall, swimming pools, spas and shopping centres and is located in the heart of a large, impressive park landscape.
(Picture right bottom)

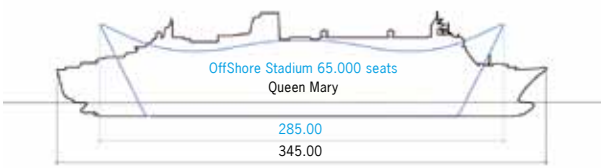
(contd. from page 6) Planungsmanagement, is responsible to a not inconsiderable extent for the fact that Qatar's bid was accepted by FIFA. They convinced the committee with their 4 kg heavy bid and the innovative draft plans contained in it. The plans are based on motifs which characterise Qatar, at least outwardly, and therefore stand for the wide diversity of the country. Every stadium will gain control over the extreme desert climate by means of a sophisticated cooling system: the fact that Qatar not only has a surplus of oil and gas but also of sun was exploited. The stadium interior is cooled by solar thermal energy to the 27°C demanded by FIFA, the heavy cold air is pumped from the seated terraces into the stands, it sinks downwards and lies like a bell over the pitch. Initial trials in a test stadium thus achieved an amazing cooling effect down to 23°C. Solar collectors in the car parks and on roofs generate the required energy. Opaque roof elements, which are pulled over the stadium two days before the start of a match, provide additional cooling. They reflect the sunlight and prevent direct solar radiation, thus stopping the steel structure from heating up.

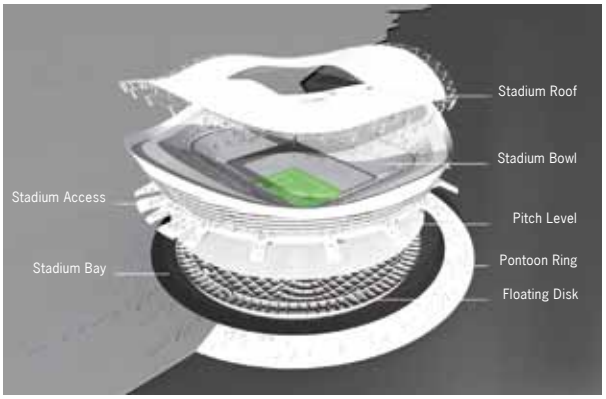
Planners and architects are therefore solving in this impressive way part 1 of the „extreme case Qatar" – the climate – brilliantly. Part 2 – the stadia not required in this size after the World Cup – will be dismantled in a quite mundane way and, in some cases, donated to poorer countries where football is not so well developed.

The fact that the second part of the task can also be solved in a different way is proved by the vision of the Düsseldorf architects' office, stadiumconcept, together with the Frankfurt-based project developer arenaCom. Together they developed a unique project – a floating stadium to hold 65,000 people which, after the final match, can be towed to any country in the world with access to the sea. As Qatar is a peninsula with a long coastline, the basic requirements are definitely fulfilled. According to the chief planner, Peter Knoebel, people often shy away from dismantling owing to the horrendous costs. Not a problem for the rich desert emirate but a crucial advantage for any subsequent users. The floating stadium minimises construction costs and implementation risks of future organisers and would be a global symbol of sustainability and – what's more – of fair play and international relations. Whether the revolutionary structure, which is to rest on a foundation of two pontoons and comprise recyclable and energy-extensive materials to a great extent, will in fact be built rests in the laps of the Arabian gods – but it would definitely be a sign that sustainable architecture on water is feasible and sensible.

OFFSHORE STADIUM

Planned capacity: 65,000 spectators
The vision of a floating, fully FIFA-compatible offshore stadium impresses by its unique concept, distinctive architecture and its sustainable, eco-efficient overall concept. Apart from this, it offers various opportunities for alternative events and commercial uses, attractive development possibilities for the entire area as a marina site combined with buildings, as well as alternative financing options through global leasing capacity.


OffShore Stadium 65.000 seats
Queen Mary
285.00
345.00

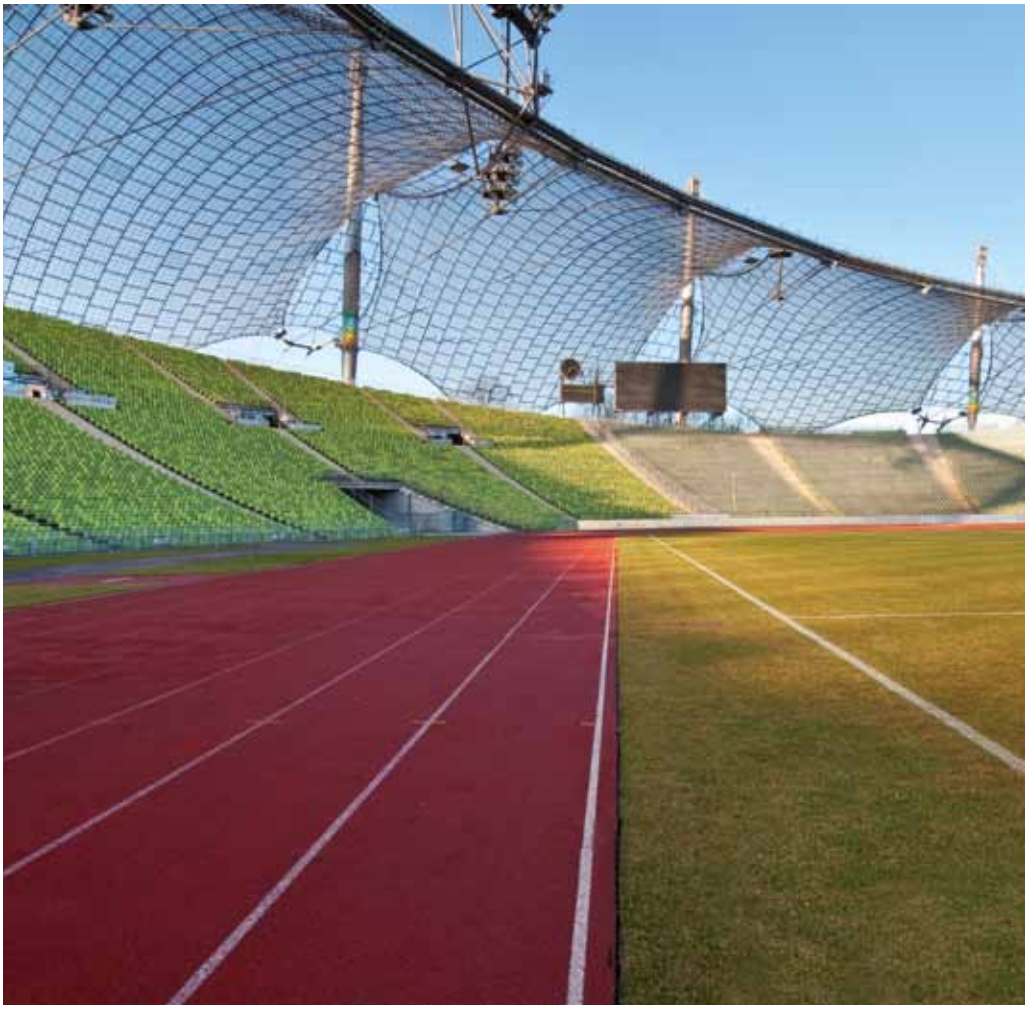

Stadium Roof
Stadium Bowl
Stadium Access
Pitch Level
Stadium Bay
Pontoon Ring
Floating Disk

Olympic time travel

From Munich ...

The award-winning Olympic Stadium in Munich, which was set in the ground, was designed by the Günter Behnisch und Partner bureau of architecture, whose idea of a tent roof has become an integral part of global architecture as a pioneering technical achievement and design element. It was the architectural response to its Berlin counterpart, symbolising cosmopolitanism and democracy to this day. Just as it was at the Munich Games 40 years ago, and at all past Olympic Games since 1972 (except Moscow), so it will be again in London next summer: ACO is present with its products at the most prominent global sports event and helps to ensure that the contests run smoothly.

On the track of the stadium, the Soviet sprinter Walerij Borsov celebrated his gold medals for the 100 and 200 metre contests, while drainage channels from ACO provided perfect drainage.



... into the whole world

Many sports venues have been and still are icons of architecture. They express the pride of the host nations to be welcoming the youth of the world. Join us on an architectural and sportive trip around the world.

Olympic Stadium, Seoul
The elegant curves of the arena situated on the bank of the Hangang river symbolise the vases of the Joseon dynasty. Today, this remarkable building is somewhat overshadowed by the new building which was constructed for the World Soccer Cup in 2002, located on the opposite bank of the river. Opened in: 1984.
Architect: Kim Swoo Geun.

Spyridon Louis Olympic Stadium, Athens
This stadium was named after Spyridon Louis, winner of the first Olympic marathon contest of modern times. Construction work was completed in 1982. For the Olympic Games in 2004, the stadium was completely remodelled and provided with a 17,000-tonne roof made of polycarbonate panels, designed by Santiago Calatrava. With 25,000 m², it is the largest roof of its kind in the world, and it covers 95% of the seats.
Opened in: 1982 and 2004 respectively
Architect of the roof structure: Santiago Calatrava

Beijing National Stadium
In cooperation with artists such as Ai Weiwei, the architectural team won an international contest with their design commonly known as “Bird’s Nest”.
The documentary film “Bird’s Nest – Herzog & de Meuron in China” accompanied the architects’ construction work between two cultures, two architectural traditions and two political systems.
Opened in: 2008
Architects: Herzog & de Meuron

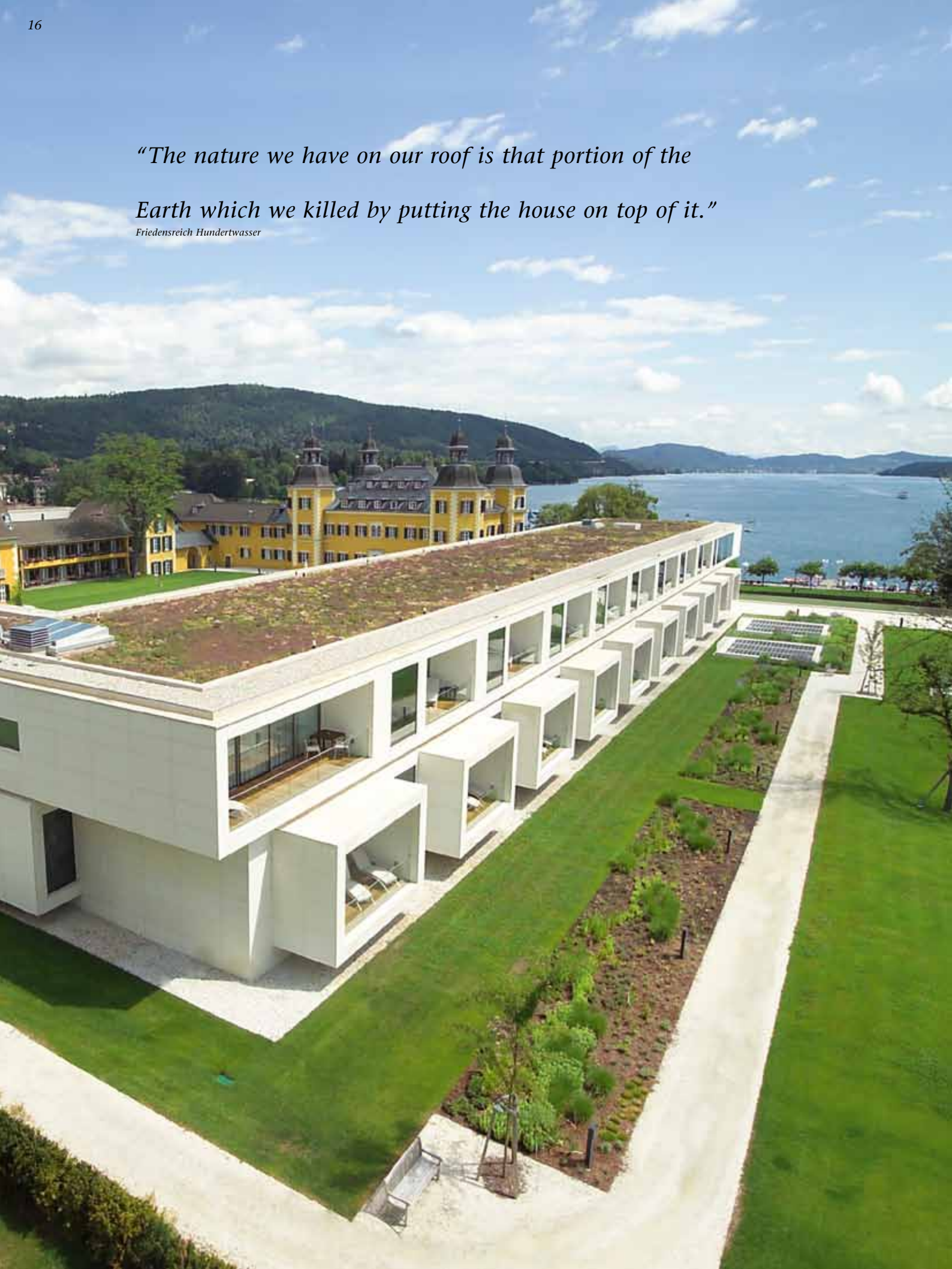
Lluís Companys Olympic Stadium, Barcelona
Built on Montjuic as part of the 1929 world exhibition, this sports venue was originally intended to host the Olympic Games of 1936. 56 years later, this classic stadium was finally given over to its Olympic purpose, supplemented with several new buildings in its neighbourhood, such as the Torre Telefónica by Calatrava. Opened in: 1929, Architect: Pere Domènech i Roura

Olympic Stadium Montreal
The eye catcher of this spectacular building is the 75-metre inclined tower with an inclination angle of up to 81 degrees. The tower was completed only eleven years after the Olympic Games, with the Salon Montréal at its top, which is able to hold 240 people.
Opened in: 1976
Architect: Roger Taillibert

"The nature we have on our roof is that portion of the

Earth which we killed by putting the house on top of it."

Friedensreich Hundertwasser



ACO green roof drainage

Green innovations at lofty heights

Green roofs decisively increase the value of buildings – which was already demonstrated by the "hanging gardens of ancient Babylon" – and offer a number of ecological benefits such as air cooling and oxygen production, regulation of air humidity, dust absorption and rain water storage. Roof greening has also an insulating effect and protects the roof from rapid weathering.

The many advantages of flat roofs are offset by a static problem: the amount of rain water which collects on large roof areas, and which can quickly accumulate to large volumes and consequently have an enormous weight. For safe rainwater drainage from roof areas of all kinds, ACO has developed suitable drainage systems for a great variety of applications such as gravel roofs and green roofs, inverted roofs, warm roofs and parking decks. SPIN flat roof drainage systems are available for gravity drainage and JET flat roof drainage systems for siphonic drainage. Vacuum drainage systems are ideal for the large roof areas of shopping and logistics centres and industrial buildings. Gravity drainage is primarily suitable for effective drainage of relatively small areas, such as parking decks, green roofs and terraces. Emergency drainage systems ensure safe drainage of rainwater quantities which exceed the calculated rainfall and could otherwise overload the normal roof drainage system.

For the sake of sustainability, the materials used are genuinely recyclable substances such as cast iron and stainless steel. Modern roof areas are also designed for outdoor use. Since, for this purpose, drainage must be provided to suit a great variety of different surfaces – such as tiled, greened or sand-covered areas – components are required which meet such demands.

SPIN roof drainage systems can be used for gravity drainage in green roof areas. The installation situations include a two-part flat roof drainage system equipped with two compression sealing flanges, to which the upper roof insulation system and the vapour barrier below the heat insulation system are connected. A 50-cm wide gravel embankment must be placed around the flat roof drainage system to prevent the drainage grate from becoming overgrown by the roof greenery.

To protect rooms against flooding by torrential rainstorms, we recommend having Profiline terrace gutters installed especially near entrance doors, which are capable of safely absorbing large quantities of rainwater and draining them away safely via roof drainage systems (see picture on the right). This helps to avoid high thresholds in entrance areas, which substantially reduces the risk of accidents.

Heat-insulated concrete flat roof with gravel embankment and heated SPIN flat roof drainage system made of cast iron – the ideal compromise between free roof area design and safe drainage.

Terrace structure with basement, ACO Profiline facade guttering and ACO SPIN flat roof drainage systems for terrace drainage – the facade gutters with design element function combined with the surface drainage system to which they are connected serve as an effective overall surface drainage system, thus providing an interface between architecture and water.

The Sea Orbiter floating research station

In the footsteps of Jules Verne

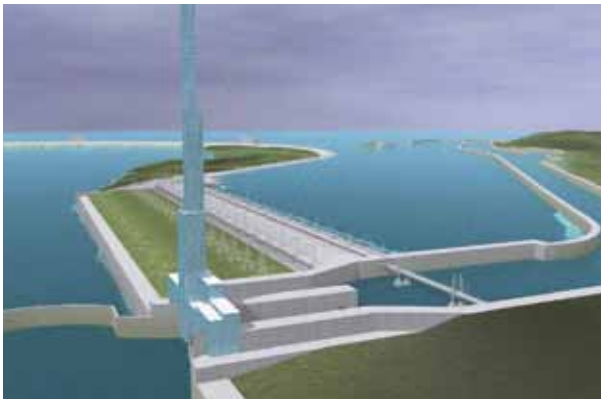
The dream harboured for 40 years by the renowned French architect, Jacques Rougerie, could become reality as early as 2014. This is when the 51 metre high Sea Orbiter is to put to sea with 18 researchers from very diverse fields.

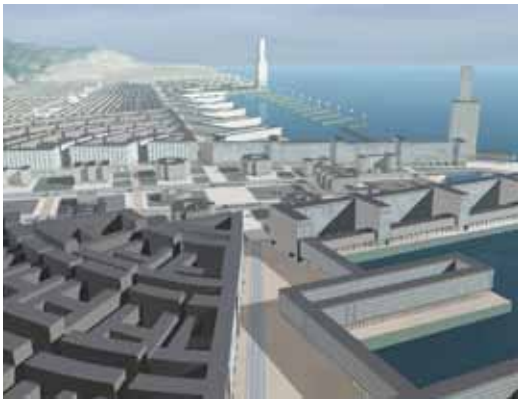
Jacques Rougerie with a model of his dream of a lifetime on a bridge across the Seine.

Five out of the total of nine decks on the impressive structure are below the surface and offer an unobstructed view of the fascinating world below the waves. The so-called aquanauts are able to explore it during spontaneous expeditions thanks to special pressurised cabins.

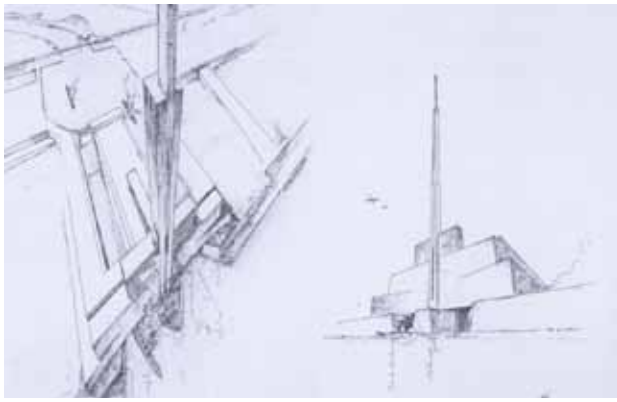
The aim of the project is to gain an entirely new view, indeed a real feeling for the myriad potential of the oceans. For conventional ocean navigation is unable to do so, according to Rougerie. It focusses too much on structures above the surface of the sea. This is why a habitable structure, similar to that of a space station, is needed below the ocean surface. Groundbreaking discoveries are what the research team hopes for, especially in the fields of renewable energy, climate change, zoology and pharmaceuticals.

While the Sea Orbiter only exists so far on a computer and as a small-scale model in a Norwegian research centre, the chances are good that construction will start as early as this year – the company has powerful champions in the current French minister for the environment Jean-Louis Borloo and in President Nicolas Sarkozy. If Rougerie has his way, then over the medium term there will be a whole series of similar stations in all the oceans, which will deepen man's awareness that the sea is the crucial element for the future of generations to come.





Planet earth would have gained an area of land equal to that of France and Belgium combined, had Sörgel's plans come to fruition. Old seafaring cities like Genoa or Venice would have become inland cities. In order to retain the character of Venice, the famous lagoon would have been turned into a lake and connected via an approx. 500 kilometre long canal with the Adriatic, which itself would have become part of a vast lake by this time. In a further phase, Italy would have been connected with Tunisia via Sicily and a direct rail connection would have been made possible from Berlin via Rome to Cape Town.



Top: design drawing of the skyscraper over the lock in the Gibraltar dam by Peter Behrens; left: New Genoa after lowering of the sea level

Visionary "Atlantropa" dam

The dream of a new continent

What the architect Herman Sörgel planned was more than groundbreaking: the uniting of Europe and Africa to form the new supercontinent of "Atlantropa". Plans for the project started in 1927 with two huge dams – one at the Dardanelles and one, with foundations 2.5 kilometres wide the bigger of the two, in the Straits of Gibraltar.

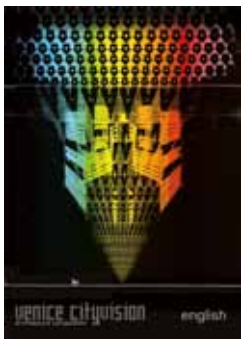
As a result of the dams, the flow of fresh water from the Atlantic was to be reduced and new land gained in this way, covering an area equal to that of France and Belgium combined. The remaining flow of water was to provide electricity for the whole of Europe and North Africa and would have meant an environmental disaster, which was not foreseeable at that time however. The project met with broad support at a time that was marked by financial crises and hyperinflation, particularly in Germany. Even respected architects like Peter Behrens provided contributions to substantiate the feasibility. The Second World War and the power politics of the National Socialists that were oriented towards the East caused the project to be consigned to oblivion; later on, reconstruction and the new development of nuclear energy did the rest. Only Sörgel himself remained true to his utopia and fought for "Atlantropa" until his accidental death in 1952.

And it would appear that the magic, which the vision of a megadam between the Pillars of Heracles emits, has lost nothing of its impact on planners and architects to this day. For instance, the Austrian architect Michael Prachensky wants to protect the Mediterranean from the consequences of climate change, meaning the dramatic rise in sea level. However the exchange of water is not to be prevented in this case in order not to put the ecosystem at long-term risk. Among other things, pipes up to 20 metres in width are planned for whales, dolphins and other marine creatures. In addition, wind and solar energy systems are to be built on top of the structure that has a mass equal to 400 times that of the Great Pyramids. At the present time, Prachensky's ideas seem to be just as long a way off as Sörgel's were almost 90 years ago.

Visions of cities

Architects, engineers, designers, students and other creative people have taken part in the international "CITYVISION" design contest of the magazine, which is published in Italian and English, to develop visionary urban plans for modern cities. So far, innovative ideas have been presented for Rome and Venice.

What could the city of the future be like? Internationally creative people set out for the second time to answer that question without giving much thought to feasibility. The result was a number of designs which were just as impressive as they were utopian for the historic lagoon city, and which could serve as inspirations and suggestions for future planning. The various designs, the contest as such and the jury are all presented on www.cityvision-competition.com. Extensive browsing will certainly be worth your while. By the way, the theme for the third competition will be the city of New York – again something to look forward to.



The winning design of the "VENICE CITYVISION" contest by A. Bottero, S. Della Rocca and V. Bruni

Award-winning design of the “ROME CITYVISION” contest by Matthieu Gabay and Guido Maciocci

The "Ynea" catamaran concept interprets yachting not as a sporting challenge but focuses on the aspect of relaxation instead. The vision consists in relaxed enjoyment of the sun and the sea on a yacht, without requiring a crew of several sailors. This is achieved by wingsail technology mounted on the edge of the deck.

A visionary concept for a new way of sailing

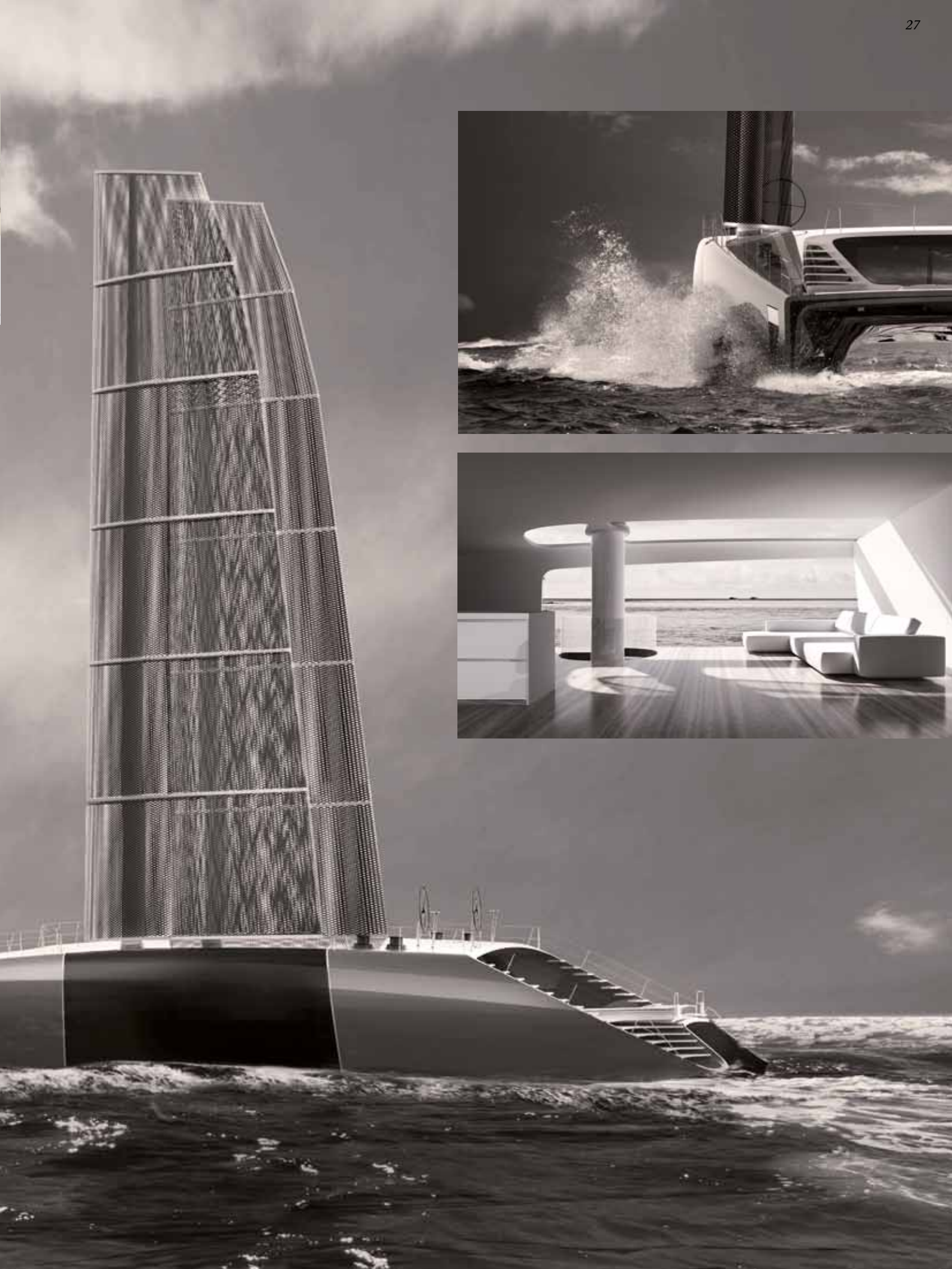
Architecture on water

Nicht Performance, sondern Komfort steht im Mittelpunkt des Konzepts Ynea. Das heißt, die Masten stehen auf dem Rand des Decks, jeweils über einem Rumpf, sodass dazwischen eine weiträumige Fläche zum Entspannen und Genießen entsteht. Aus dieser Position genießt man den faszinierenden Blick auf die Segel, jedoch ohne den physischen Kontakt, wie man es von der traditionellen Segelyacht mit ihrem zentral platzierten Segel kennt.

Bei einem Wingsail handelt es sich um ein flexibles Segel in Form eines Flugzeugflügels. Mehrere am Mast aufgehängte, frei bewegliche Spanten geben dem Segeltuch die gewünschte Form. Bewegt werden sie durch eine motorisierte Seilwinde, die den gesamten Aufbau auf Knopfdruck auf- und abbaubar macht. Die Profile werden zum Wind ausgerichtet. Mehr ist für das Segeln mit Ynea nicht erforderlich.

Steuerelemente und Masten liegen an der Peripherie und schaffen Platz auf dem Sonnendeck. Durch die weitestgehend automatisierte Steuerung sind zwei erfahrene Segler oder Crewmitglieder ausreichend, um Ynea zu manövrieren. Die übrigen acht Passagiere haben die Wahl zwischen Sonnendeck am Bug oder Sonnendeck am Heck, Lounge oder Daybed mit Blick auf den Ozean – Entspannung und Erholung garantiert.

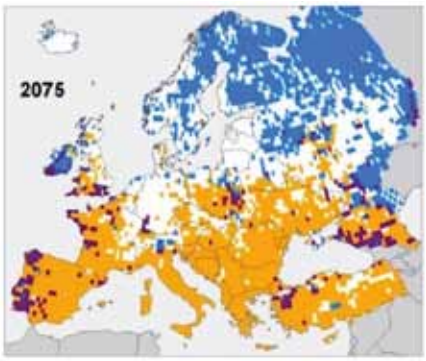
Phoenix Academy
Design lab for visions
Ynea is the subject of the industrial designer Ralf Kittmann's diploma thesis, which was written under the auspices of Phoenix Academy. With the Phoenix Academy funding programme, the renowned Stuttgart design studio supports selected students in developing visionary concepts. "The Phoenix Academy is a design lab for creative experiments and visions. In this area of freedom, experienced designers cooperate with young talents to shape the world of tomorrow", say Andreas Haug and Tom Schönherr, the two founders of Phoenix Design. Since graduating in Industrial Design from the school of art Kunsthochschule Weissensee, Berlin in October 2010, Ralf Kittmann, the creator of Ynea, has been a permanent member of the Phoenix design team.



ACO Therm – smart solutions for new buildings and renovations

Systematic protection of cellars

The summer of 2011 will be remembered by many because of its weather: the land was plagued by frequent rainstorms, often in the form of torrential downpours. The consequences of the global climate change are clearly being felt here, too.



A drought which used to occur once a century now occurs every 50 years (or more frequently).

A flood which used to occur once a century now occurs every 50 years (or more frequently).

Both droughts and floods which used to occur only once in a century are now occurring every 50 years (or more frequently).

The change in the frequency of severe droughts and floods by 2075 according to a scenario without climate protection measures.

The occurrence of heavy rainstorms has risen sharply in the last two decades. Since more and more areas are being sealed as well and the ground dries out after long periods of dry weather, the masses of rainwater suddenly coming down cannot drain away. In many cases, devastating floods are the consequence. In Germany, an increase in the incidence of flooding can be observed; the frequency and violence of the Oder and Elbe river floods in 1997, 2002 and 2010 could already be attributable to climate change. The damage caused by the Elbe flood in Germany cost 20 billion Euros.

While the summers are becoming dryer in East Germany and rainfall is likely to decrease by about 50 per cent in North Germany, there will be more rain in the winter in the Central German Uplands. In the mountainous regions of Eifel, Hunsrück, Odenwald, Spessart and Rhön, an 80 per cent increase in rainfall is probable. According to many experts, the frequency of floods and consequently of damage to buildings will increase dramatically in the coming years, too.

Avoiding costly water damage

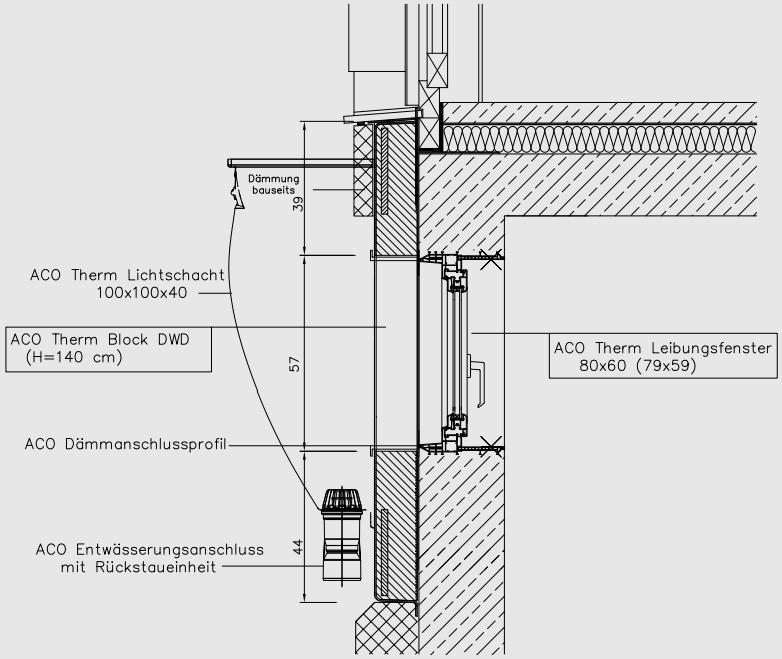
How can architects and planners protect residential buildings from expensive water damage?

Above all else, flooding of cellars must be prevented since, similar to backwater flooding, the penetrating water can cause considerable damage there to installations and walls. With its new ACO Therm block, the ACO Therm reveal window and the ACO Therm light well, ACO now offers a complete system for cellar windows. The revolutionary feature: the window can be assembled in only a few steps, using a prefabricated, heat-insulated installation plate (ACO Therm block) with a foamed frame – with double heat insulation glazing as standard and with a flood proof or triple-glazed tilt-turn window sash as an option (Ug 0.8).

This makes it possible for the first time to set the cellar window directly into the insulation area. The ACO Therm block is glued directly onto the front of the cellar wall and not screwed on, so as to reduce thermal bridges. Water pressure-tight attachment to the cellar wall is effected by means of a sealing flange round the unit. The ACO Therm block consists of a plastic shell filled with extremely effective PUR foam (heat conductivity 0.025W/(mK)). Around the inside of the ACO Therm block, there is an assembly core, to which the ACO light well can be attached in a time- and cost-saving way, with back-flow protection as an option.

ACO thus offers a complete solution ensuring water tightness and insulation as well as burglary protection. The advantage: the system comes from a single source, industrially prefabricated and quality-tested. Moreover, thanks to its perfectly matched components, it is extremely quick and easy to install.

- www.kellerschutz.de



ACO Therm block (DWD) with window box-out

Thanks to the integrated assembly core in the ACO Therm block, it can be turned round if required – for a flexible response to the position of the windows. The ACO Therm block is also available as a standard model (not water pressure-tight), with or without integrated window frame.

Our service for architects and planners:

the ACO application technology team can be called in at any time at the planning stage.

The new ACO Therm block in the DWD version with integrated window

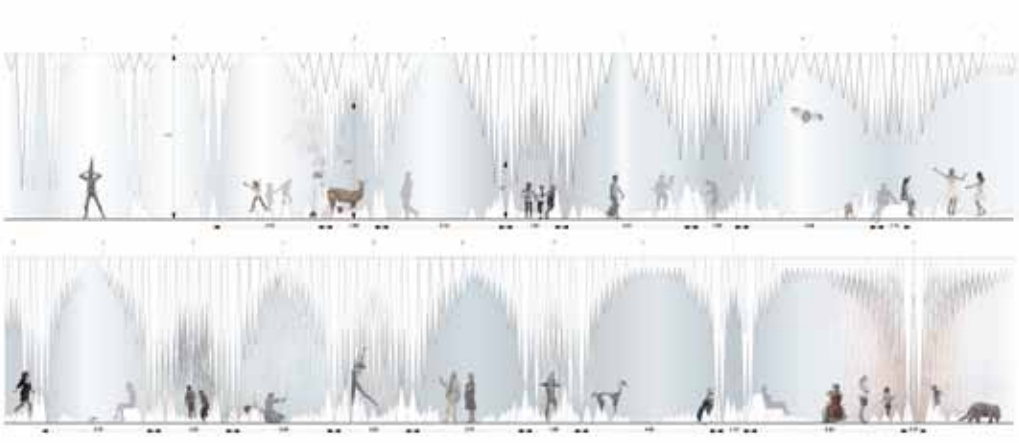
Video: ACO Therm block: water pressure-tight assembly of light wells on heat insulation

The water cathedral in Santiago de Chile

Raining spaces

For twelve years MoMa_PS1, one of the largest and oldest institutions for contemporary art in the USA, has offered young architects a platform for temporary projects. In conjunction with the Museum of Modern Arts, the institution organises the "Young Architecture Program" (YAP) – an annual competition, which allows aspiring architects an opportunity to put their prize-winning projects into practice. Recently the German-Chilean practice GUN emerged as the winner with its design for a 'raining' water cathedral.

Realisation of the design project from the GUN practice in Santiago de Chile.
Architects: Jorge Godoy and Lene Nettelbeck.
Contributors: Alexis Machado, Francisco Calvo, José Manuel Morales



A dripping summer pavilion was opened on 15th December 2011 in the Matucana cultural centre in the Chilean capital of Santiago. The design by the architects Jorge Godoy and Lene Nettelbeck looks like an impressive urban nave and won out against four other finalists in the competition. The stalactites hanging in the cavernous space fill with water at a constant rhythm, they drip, drizzle and rain on visitors to the special events and allow them to experience and sense the water as an element on their own bodies. A visit to the unusual structure during the extremely hot and dry summer will be a more than welcome refreshment for each visitor time and again.

Social enterprise founder Paul Polak

A capitalist as bringer of water

"Meaningless words: rights of the poor – meaningless words: duty of the rich" – this is the literal translation of the second verse in the German version of the Internationale. Although access to clean water was declared a fundamental human right by the United Nations on 28 July 2010, it is still not enforceable – like all human rights.

Thus meaningless words. But where "duty of the rich" is concerned, at least one man fulfils this beyond all measures – Paul Polak, a convinced free market economist, capitalist and multimillionaire. Polak earned his money mainly with property and oil. However instead of delighting in his millions and enjoying his well-deserved retirement at the age of 77, he is listening to the poorest of the poor. Both in Bangladesh and in Orissa, the poverty-stricken Indian state, where there is nothing to remind you of Bollywood or even the glittering façades of the computer firms in Bangalore or Hyderabad.

However he is not listening just for the sake of it – he wants to help. And he wants to earn money, expand his wealth – but without exploiting people. That this can succeed has already been demonstrated by Polak: he had a pump developed from sheet metal and bamboo, which is foot-operated and independent of the moods of the monsoon. The pump costs an unrivalled 20 euro and triples the annual income of the many farmers in Bangladesh. The ingenious design is now being put to use with success in India, Vietnam and Nepal as well. Public funds were used only for marketing.

However Polak would like to avoid this too. With his newest business venture: "Spring Health". Spring Health sells clean water to people who earn less than two US dollars a day – the UN definition of the threshold between very poor and extremely poor. For Polak, this means: 2.5 thousand million potential customers worldwide. Filthy wells with water that poses a risk to health affect almost 700,000 villages in India alone. State aid flows, if it flows, into expensive pumps, which also only deliver contaminated water to the surface. Precisely because the authorities do not listen to the people, do not plan according to their actual needs. In contrast, Spring Health produces a simple disinfectant from a saline solution that converts contaminated water into drinking water. Small village shops in the pilot area of Orissa are given the 3000 litre tank, the disinfectant and professional marketing by the company. The shopkeeper sells the safe water and is allowed to keep one quarter of the profit in return. And in passing, the environment also benefits from this method: instead of having to transport thousands of plastic bottles all across the country, only the chlorine compound needs to be supplied.

The effect is astonishing in many aspects: the customers obtain affordable water, they fall ill less frequently, are absent from work or school less often and have to spend less of their limited means on medicines. The shopkeeper in turn increases his sales and boosts his status in society. And Spring Health, meaning Paul Polak too, makes a profit. In three years he intends to supply 10,000 shops with the disinfectant and is considering – ever the businessman – expanding the range of products: a drink mix with vital nutrients to increase profit and, at the same time, combat malnutrition. This is all reason to hope that in the less developed countries of this world a reconciliation can be achieved between workers, farmers and capital – without any kind of "final confrontation".

Front parlour of the city of Heide (Holstein): the recently remodelled pedestrian zone in Friedrichstraße

Highlights in Dithmarschen

One highlight was set by the kessler.krämer bureau of landscape architects with the remodelling of the pedestrian zone in the city of Heide in western Schleswig-Holstein. The street with a length of 250 m underwent comprehensive basic renovation. The ACO DRAIN Powerdrain drainage channels were installed here, combined with ACO Freestyle channel covers and ACO Eyeleds LED light spots. We have interviewed Martin Keßler, the architect responsible, about the project.

a_w: **Mr Keßler, what was the situation you found at the beginning of the project?**

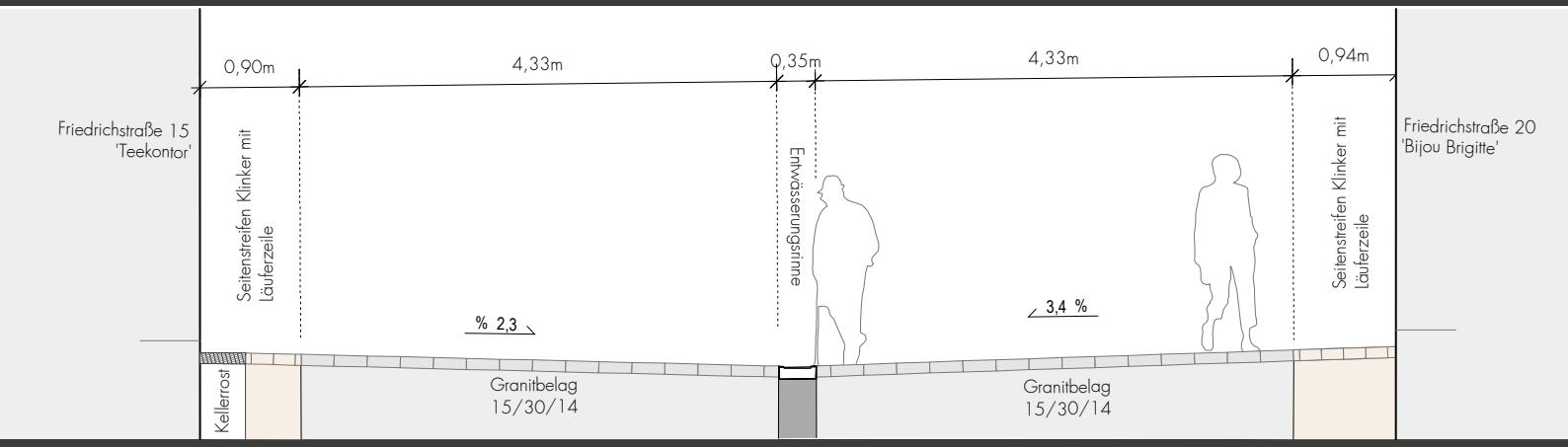
M.K.: The existing situation was a pedestrian zone from the 1970s which was altogether very run-down. The surface and other existing materials such as the street furniture were defective, there were also some ground settlements, and above all a drainage system which was not functioning. Everything was very disorganised and untidy – vegetation elements were placed at random and showcases obstructed the flow of pedestrian traffic. Our first thought was: here we must tidy up!

a_w: **What is the significance of Friedrichstraße for the city of Heide?**

M.K.: Friedrichstraße is the eastern entrance to the city and leads directly to the market place. This urban structure has already been in existence since the Middle Ages: Friedrichstraße as a strong linear element between the gateway through the rampart and the market place. Both sides of Friedrichstraße are built up, with an unbroken line of facades. The street as a whole presents a very harmonious picture.

a_w: **What was the basic idea for remodelling the street?**

M.K.: Our approach was to emphasise the linearity of Friedrichstraße and to reopen the view along this axis. We basically realised this concept with two main elements: at the eastern end we placed an illuminated stele to mark the historic gateway to the city. From there, the channel run with a length of about 200 m leads straight to the market place. The channel is placed in the middle, which makes the axis clearly visible. At the beginning of the project, a steering committee was formed consisting of business people, residents and representatives of the municipality. One explicit goal of the steering committee was that the axis should remain visible by day as well as by night. Therefore we decided to integrate illumination in the form of ACO Eyeleds in the channel. The spots of light are continued in the stele.



Cross-section of the road profile

a_w: **Just now, you spoke about tidying up ...**

M.K.: Yes, we have also created zones in the street area by our choice of pavement. We placed a strip of clinkers directly in front of the shops, the zone of outdoor catering and displays. We decided to pave the adjacent walking zone with grey red granite, which is typical for North Germany. This provides a good pedestrian traffic area. Making room for events such as the May festival parade was also an important consideration. The street furniture, i.e. benches and beds of vegetation, has been placed at the outer edges of the walking zone. It is made of steel with a coat of iron mica.

a_w: **Why did you decide to use ACO Freestyle?**

M.K.: The decisive reason was that we were able to create a customised design for the channel with ACO. We choose a suitable partner for each project we engage in. While we used standard products for the street furniture, an individual design for the channel was very important to us, since it is of course the central element. We have had previous experience of working with ACO, too. Together with ACO, we developed the "Flensburg channel" with a prominent cast-iron mound for the city of Flensburg.

a_w: **What is important to you in your designs?**

M.K.: We always search for a quiet street picture which looks natural. We want to avoid short-lived fashion features, since a street environment is intended primarily to function on a long-term basis.

a_w: Mr Keßler, thank you for the pleasant interview.

ACO Freestyle – individual design

ACO Freestyle, the new generation of channel covers, comes with a standard length of 500 mm and in widths of NW (nominal widths) 100, 150, 200 and 300, to fit the Multiline universal channel system. The visible upper grating surface can be individually designed by the planner. The covers are manufactured from ductile cast iron and delivered either uncoated or coated, according to customers' choice. The design-oriented covers can be supplemented with ACO Eyeleds, i.e. LED light spots integrated in the grating. This system offers highest standards of water-tightness and a long service life. Assembly of the system is effected by simply joining the cable connections; there is no need to call in an electrician. ACO LED light spots are offered on corrosion-free grating made of class B plastic materials as standard, to fit all ACO DRAIN channels in nominal width of 100.

But ACO Eyeleds have more to offer than just decorative effects, illumination for orientation and highlighting purposes and special eye catchers. They also contribute to public safety in areas with much pedestrian traffic.

ACO DRAIN Powerdrain with an ACO Freestyle channel cover in customised design. The LED light spots (ACO Eyeleds) were included in the delivery, firmly installed in the cast iron grating.

International Garden Show Hamburg 2013

Water worlds and other worlds

26 April 2013 will be the day when the international garden show hamburg (igs 2013) will open its doors in Wilhelmsburg until 13 October. On just under 100 hectares of park area in the heart of the Elbe island, it will showcase the wealth of ideas from gardeners, plant breeders and landscape architects.

"Around the world in 80 gardens" is the motto under which the show is inviting guests to visit the metropolis on the Elbe in little more than a year from now.

In the next issues we will follow the progress of the garden show and view this event from a great variety of aspects. This time, we have interviewed Claudia Mohr, who is responsible for "project coordination of free space planning", about the planning, objectives and ideas of this event, and the important part the element water plays in this show.

a_w: **Ms Mohr, could you please outline your sphere of responsibility in connection with planning and organising the igs 2013 for our readers!**

C.M.: The site of the igs 2013 has been divided into different areas. Each of these areas is being supervised by different colleagues from the igs team. I am responsible for planning and coordinating the water worlds and the area around the historic water works. I work with the horticulture and landscape architects at the various stages of planning, obtain permits and approvals where necessary, take care of applications for building permits and many small details besides. There are also some general tasks such as guiding visitors, working out the basic conditions for a barrier-free garden show – and, last but not least, planning of the various playgrounds for our youngest visitors.

a_w: **"Around the world in 80 gardens" is the motto of this event. What is the idea behind this concept, and how will it be realised at this major event with about 2.5 million expected visitors?**

C.M.: This idea originates from the RMP Stephan Lenzen Bureau of Landscape Architects in Bonn, which won an international competition with this motto in 2006. Inspired by Ju-

les Verne's book "Around the World in Eighty Days", the winner of the contest fulfilled our demand to give the existing site a logical, creative structure. Thus the entire area is divided into seven worlds, in which a total of 80 gardens are placed.

In this context I must explain that 80 is an extremely high number of gardens, unprecedented in any previous garden show. Thus the visitors will be presented with a demanding, but also extremely fascinating challenge. In each world, they will be taken once around our planet with all of its diversity. Whether it be the different cultures of the earth, which also can be understood to symbolise peaceful coexistence especially here in Wilhelmsburg with its diversified society, the five major world religions, or the various climate zones which are so totally different from each other. So we can rightfully claim: in 2013 it will be possible to experience the whole world here on the Elbe island in Hamburg.

a_w: **Hamburg is a city of water, and consequently a city where "water architecture" is of special significance. The igs 2013 is taking place on Europe's largest river island. What part are the "water worlds" and/or the "world of harbours" playing in this context among the seven worlds?**

C.M.: Of course, the water worlds in particular play a special part on the garden show site, since Hamburg sees itself as a green waterfront metropolis. So they will incorporate 18 of the 80 gardens and lead visitors along a 500-metre path from scarcity to abundance of water, or the other way round. On their way, they will learn how water influences the life of plants, animals and people. They will experience the landscapes of savannahs and deserts as well as that of a cloud forest.

But a garden does not necessarily need to be a garden in the traditional sense. For example, you will meet a gushing fountain in the middle of a gravel field, or you will find yourself among very commonplace objects which all have something to do in various ways with water or the use and consumption of water. The gardens themselves are modelled on the typical polygonal form of dried-out mud and placed on elevated slabs of compressed concrete.

a_w: **Our magazine deals with the interface between architecture and water. This is why the "water worlds" are naturally of special interest to us. What is to be expressed by the worlds of water? What is the intention behind them?**

C.M.: With the water worlds, we want to sensitise visitors, to start them thinking without preaching to them, and to show them how much respect we owe to this element so essential for all forms of life, and how great a responsibility we, as humans, bear towards it.

As already indicated, we demonstrate by taking various everyday objects how much water is required to produce them, for example 450,000 litres for one car. We hope that from the great variety of impressions every visitor will be able to take something home to influence his future behaviour in using water.

a_w: **You are also aiming to sensitise children for the element of water and its significance for mankind. How do you intend to achieve this goal? Are there any activities planned to accompany igs 2013, such as visits to schools and kindergartens?**

C.M.: The entire site, not just the water worlds, is designed in such a way as to invite children to romp and play, in a real hands-on experience. They can actually learn through playing. We also have the educational "Klasse!" programme targeting all grades of school children. More than 1,500 educational programmes are planned for the 171 days of the igs 2013 – among others "Wasser Klasse!" (water class). There children and teenagers will learn about responsible water management, examine water for harmful substances and nutrients, study the vegetation on the banks, learn interesting facts about aquatic fauna and much more.

a_w: **Now, apart from the gardens dedicated to special themes, where on the site of igs 2013 can more points of contact between architecture and water be found?**

C.M. Simply due the fact that we are on an island and that the water worlds as such– at least on one side – also border on water, architecture next to water and on water is more or less unavoidable. Here, the various bridges must be mentioned, whose architecture is embedded in their natural environment, as well as canoe ramps and stairs inviting visitors to linger by the waterside. Moreover, there is the "Fountain of Religions", which emphasises water as an element of common ground for the five major world religions, and of course the historic water works, which has been renovated for igs 2013 as a catering centre. Here, old elements of "water architecture" have been preserved, such as the impressive tanks, which serve as seating areas today. The main building and the atomisation facility, which can be hired for various events, will remain as culinary venues after the show is over.

a_w: **Ms Mohr, some criticism has also been raised against your concept. On the one hand, attention is drawn to various problems in connection with climate change, but on the other hand, will not even more areas of ground be sealed by the newly constructed buildings, so that the rain water can no longer be absorbed by the soil to be channelled into the groundwater and thus returned to the natural water cycle? How would you answer this objection?**

C.M.: The existing drainage system as it stands now is not effective enough. Therefore another channel will be added, for example, around the basin near the "Water Houses" of IBA Hamburg (International Building Exhibition Hamburg, 2007-2013). This system will provide sufficient dimensions to cope with the water of torrential rain in channels and transport it "to the outside" into the Elbe or other bodies of water. Moreover, we are providing additional evaporation facilities through roof greening, and we are also unsealing previously sealed areas to a considerable extent, a fact which should not be forgotten.

a_w: **Finally, just a general question: Hamburg's reputation is not the best when it comes to the weather. How are you going to keep up the impression of a steppe or savannah once its notoriously rainy weather sets in?**

C.M.: You know, Hamburg's weather is really not quite as bad as people think – for example the sun shines considerably longer here than, say, in Cologne. But it occasionally rains in the savannah, too, otherwise it would have no vegetation. Well, I simply sell the rain to the visitors as I experienced it once when I was travelling myself, as "liquid sunshine"...

a_w: **Ms Mohr, thank you for this pleasant interview.**

ADIDAS HEADQUARTERS IN HERZOGENAURACH

Building: adidas office and research complex
Site: Herzogenaurach
Completion: 2011
Principal: adidas
Bureau of architects: kadawittfeldarchitektur, Aachen
Area: approx. 62,000 m2 floor space
ACO products used: ACO DRAIN Multiline V 100 G, V 150 G, V 200 G, V 100 S;
ACO DRAIN slot gutter V 100 S, ACO DRAIN slot frame V 100 S, ACO DRAIN safety lock

In the service of sports

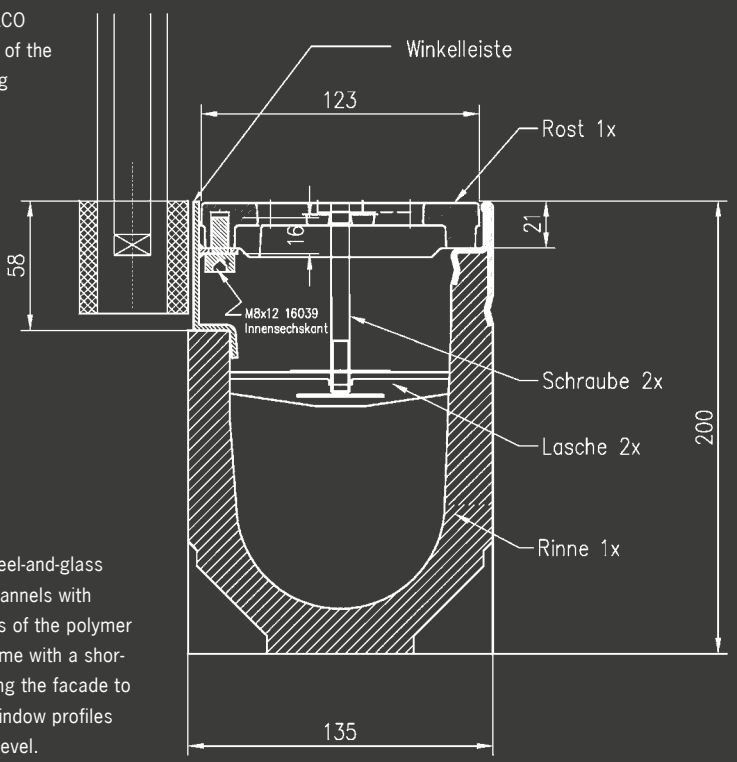
In the laundry of his parents' home, the company founder Adi Dassler already made the first sports footwear during the 1920s. Since then, the company has developed into the world's second largest manufacturer of sports accessories. adidas AG employs 3,760 people in Germany alone.

With the opening of the "Laces", designed by the kadawittfeldarchitektur GmbH Bureau of Architecture in Aachen, some 62,000 m2 of floor space are now available, distributed over seven storeys. The interior is dominated by a large atrium, where the "laces" (= shoe laces) effectively connect the individual departments with each other with slender bridges and simultaneously from a creative, communicative landscape. The office areas with generous glazing open up to both the internal atrium and to the remarkable landscaped outdoor area of the surrounding campus. White bands integrated in the facade recall the famous adidas stripes and represent a continuation of the laces design inside the building as well.

As a floating counterpart to the horizontal, black structure of the adidas brand centre, the new Laces building is integrated in the existing complex housing the "world of sports". An inspirational site for research and product development, for which the designing architects chose several innovative products from ACO, thus meeting the stringent demands of a global player in the area of drainage, too.

left:
The “Laces” connect the individual departments with each other like freely floating bridges
bottom:
ACO Drain Multiline V 100 G drainage channels with cast iron gratings in the facade area

left:
Customised structure of ACO drainage channels in front of the facade of the main building



right:
In the terrace area, the steel-and-glass facades are drained by channels with special frames: the frames of the polymer concrete channel body come with a shortened leg on the side facing the facade to allow dismantling of the window profiles reaching down to ground level.

ACO ShowerDrain S-line

Evolution in the shower-bath

While the bathroom was reduced to its mere function as a wet room in former decades, when sanitary products were simply described as "sanitary technology products", it is now gaining more significance than ever before in the daily lives of people of all ages.

Many experts believe that people's self-awareness concerning age has been shifting for some time: hardly anyone aged 70 would call himself old today, people at the end of their thirties feel almost like adolescents, dress accordingly and also strive to conform outwardly to the generally accepted ideal of beauty for as long as possible.

This trend has led to an increasingly strong focus on the body in daily life. The bathroom is that private oasis which is totally geared to personal comfort, and, as a consequence, people tend to spend more and more time there. After all, who would want to spend a lot of time in a wet room?

So atmosphere is added to mere functionality – aesthetic and functional aspects are combined. Areas of comfort made of wood, ceramics, natural stone and glass are presented in daylight and artificial light, bathroom fittings and technical elements almost invisibly integrated in the bathroom design, thus creating an elegant solution in terms of both appearance and technology.
Slot drainage channels are an essential part of architecture in shower cubicles, since they provide an elegant solution reduced to a hardly visible line. With its grating only 2 cm in width, ACO ShowerDrain S-line has achieved an optimal combination of function and design. Not only the visible elements of the channel, but also its body is made of high-grade stainless steel.

Thanks to minimal installation heights of 55, 64 or 80 mm, the channel is suitable for both old and new buildings as well as for showers with very high water flow rates. Therefore it is also predestined for remodelling old bathrooms. But its unobtrusive design is not its only advantage. Its drainage performance of up to 0.8 l/s from an accumulation of 20 mm, and 0.5 l/s if the accumulation is zero, provides impressive drainage rates.
The new ACO ShowerDrain S-line is available in dimensions of 700, 800, 900, 1000, 1200 and 1500 mm as standard. For any conceivable installation – including wheelchair-accessible bathrooms according to DIN 18040-2.

S-line	DN 32	DN 40	DN 50
Installation height	55 mm	64 mm	80 mm
Foul-air trap	25 mm	34 mm	50 mm
Accumulation 0 mm	0,35 l/s	0,50 l/s	0,50 l/s
Accumulation 20 mm	0,55 l/s	0,65 l/s	0,80 l/s

Before NordArt

Kunstwerk Carlshütte

31 January was the application deadline for artists wishing to present their works on the site of the former iron foundry Carlshütte in Büdelsdorf. Four months later, the starting signal will be given for Northern Europe's largest annual art exhibition.

This year's event focuses on contemporary art from China. The occasion is the Chinese Year of Culture, being held to celebrate the 40th anniversary of the establishment of diplomatic relations between the Federal Republic of Germany and the People's Republic of China. This makes NordArt an official venue for the Year of Culture in addition to the Schleswig-Holstein Music Festival. An area of 3,000 m2 in the exhibition halls has been reserved for the guest country, so that the "China Pavilion" has been given the character of an exhibition within an exhibition.

As an "award-winning venue" it is one of this year's prize winners in the contest of "365 Landmarks in the Land of Ideas". The special exhibition with works of the Beijing sculpturer Prof. Zeng Chenggang will be one of the highlights of the Chinese presentation.

On the 22,000 m2 of the iron foundry site and the additional historic park of almost four times that size, which was already converted into a centre for art and culture in 1999 on the initiative of the ACO group, more than 200 international artists will meet this summer and inspire visitors with their remarkable paintings, sculptures, videos, photography and installations, thus making a visit to the exhibition area a memorable experience.

NORDART 2012

In 2012, the NordArt art exhibition will be held for the 14th time. On 2 June 2012, Hans-Julius Ahlmann will open this illustrious event, where works of many more than 200 artists from around the world will again be presented. For further information and opening hours, please visit www.kunstwerk-carlshuette.de.

Film impressions at the opening of NordArt 2011

Inspiring visions of architecture involving water, embedded in a sophisticated supporting programme. A huge landscaped park with a manor house, an old dairy farm and the impressive Carlshütte provided a unique setting for the symposium for architects staged for the first time in June 2011 during NordArt (report on page 44/45), which will take place every year from now on.
On two days, 200 architects from all over Germany concentrated on the points of contact between architecture, water and art.
The opening address was held in the almost completely renovated ACO Thormann hall (report on page 48/49). Tours in small groups guided by art historians, artists and art enthusiasts provided deep insights into the world of art for architects and planners.

Two days at the interface architecture _ water _ art

After an extensive tour of the exhibition ground, the first day of the event drew to a harmonious close at the industrial monument of Carlshütte – among works of art to touch, to ponder about and to look at again and again.

The second day was dominated by the **interface** _ *architektur _ water*. Before the presentation held by the architect Koen Olthuis, Waterstudio NL bureau of architecture, the content was presented in a way geared to the minds of architects, including visions and solutions for daily life, as well as issues ranging from demographic change to problems of increasing urban density and climate change.

Following this extremely successful premiere, the symposium of architects will again be held at this year's NordArt on 14 and 15 June, and in the years to come, in addition to the one-day events staged in Frankfurt/Main and Hattingen/Ruhr. Once again, the participants will not only be given visionary insights into concepts and ideas for architecture next to water, on water and under water, but also be immersed in the extensive panorama of modern art in an inspirational setting like in 2011.
Wolfgang Gramm, Managing Director of Kunstwerk Carlshütte and curator of NordArt, will also hold a presentation on the history of this event and guide the visitors through the exhibition ground.

REGISTRATION FOR THE SYMPOSIA OF ARCHITECTS

ACO invites architects to take part in exchanges of knowledge on a regular basis in various cities. A programme of top-class presentations including a great variety of supporting programmes provides know-how and added value for the guests.

Further information and registration details under www.architektur-wasser.de

Event calendar for the next six months:
22 March 2012, Frankfurt/Main
22 May 2012, Hattingen
14 and 15 June 2012 at NordArt in Rendsburg/Büdelsdorf
27 September 2012, Berlin

Impressions of visionary future architecture in and on water

Orchestral Academy of the Schleswig-Holstein Music Festival

A new home for music

Where else would you find a place where some 120 musicians from around the world can live and practise for two months in summer? Where else would you find a place which so much inspires the creativity of young people just by its ambience alone? Thanks to the support granted by Nordkolleg Rendsburg and the ACO group with its "Kunstwerk Carlshütte" site, a new home was given in 2011 to the Orchestral Academy founded by Leonard Bernstein in 1987, after the State of Schleswig-Holstein was forced, due to budgetary constraints, to put Gut Salzau up for sale.

In this way, it has become possible to secure the existence of this festival orchestra of global significance for the future. To provide an adequate stage for public rehearsals of the festival orchestra, Hans-Julius Ahlmann, Managing Partner of the ACO group, has decided to convert the 1,400 m2 ACO Thormann hall on the site of the iron foundry, which is 120 years old and has a long tradition, into a modern rehearsal and concert hall.
A platform for the fascinating interaction between young music and modern art: at "Kunstwerk Carlshütte," in the extensive park of sculptures with its ancient trees and in the historic buildings, more than 200 international artists exhibit their works at the NordArt every summer. With the Orchestral Academy moving in as well, a completely new dimension has been added to this experience for both artists and visitors.

Information about NordArt: www.kunstwerk-carlshütte.de
Information about the Orchestral Academy: www.smnf.de

Music rehearsals of the Orchestral Academy of the Schleswig-Holstein Music Festival at the ACO Thormann hall

Application to become Cultural Capital in 2017

a transnational approach

Sonderburg (Sønderborg) is lodging its application to become European Cultural Capital 2017 under the motto of "transnational culture". The application comprises the entire former Duchy of Schleswig from Königsau (Kongeå) to the Eider river. Rendsburg/Büdelsdorf, which hosts the NordArt, is an integral part of this concept. The decision is expected in the summer of 2012.

German Arts Sponsorship Award 2011

Award-winning commitment

In September 2011, ACO was granted the German Arts Sponsorship Award 2011 from Kulturkreis der deutschen Wirtschaft im BDI e.V. (Association of Arts and Culture of the German Economy at the Federation of German Industries). This prize is granted to honour business enterprises for their outstanding commitment to the promotion of art and culture besides their core business – in the case of ACO, for "Kunstwerk Carlshütte". The laudator Kurt Kister, Chief Editor of Süddeutsche Zeitung, praised the "great personal commitment" shown by Hans-Julius and Johanna Ahlmann in respect of this extremely relevant project.
Hans-Julius Ahlmann, Managing Partner of ACO, comments: "We need to strengthen local areas and protect them from falling into cultural oblivion."

Cité de l'Océan et du Surf

The perfect wave

In Biarritz, the Museum of the Sea for oceanography and surfing history was opened last year, with an impressive architecture as well as fascinating exhibits. The forms incorporated in the building designed by the two architects Steven Holl (USA) and Solange Fabião (Brazil) allude to the landscape of its environment and to the sea as a habitat for life and a place for aquatic sport. Inside the museum, under its convex concrete ceiling, visitors almost get the impression of being under water themselves and soon feel completely immersed in the worlds presented to them. In addition to housing the museum, the building complex also contains a cultural centre, a hall for events and a restaurant. With this building, the region at the southern end of the Bay of Biscay, with its surroundings of beautiful natural scenery, has gained a good deal of cultural attractiveness.

Official ceremony in Rendsburg/Büdelsdorf

BDA Award Ceremony 2011

For the tenth time, the BDA Association of German Architects has granted the BDA Award for outstanding architectural achievements to a project in Schleswig-Holstein. The renowned prize has been awarded jointly to the architects and the principals. The official award ceremony was held at the ACO Thormann hall on 6 October 2011

ACO architectural consultants

Local partners

Under the motto: “Sharing knowledge means multiplying knowledge”, ACO planners and architectural consultants are offering a special service. As experts for drainage in and around buildings, they share their knowledge with planners and bureaus of architecture. Contact addresses for all parts of Germany can be found under www.architektur-wasser.de/architektenberater

Our offer:

planning of suitable solutions for your project

hydraulic calculations and laying plans

counselling concerning the use of ACO products

preparation of project planning for the bill of quantities (BOQ) in all standard formats (GAEB, XML, TXT, etc.)

support on site

symposia on current topics at regular intervals

expertise through knowledge about regional conditions

Impressum

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