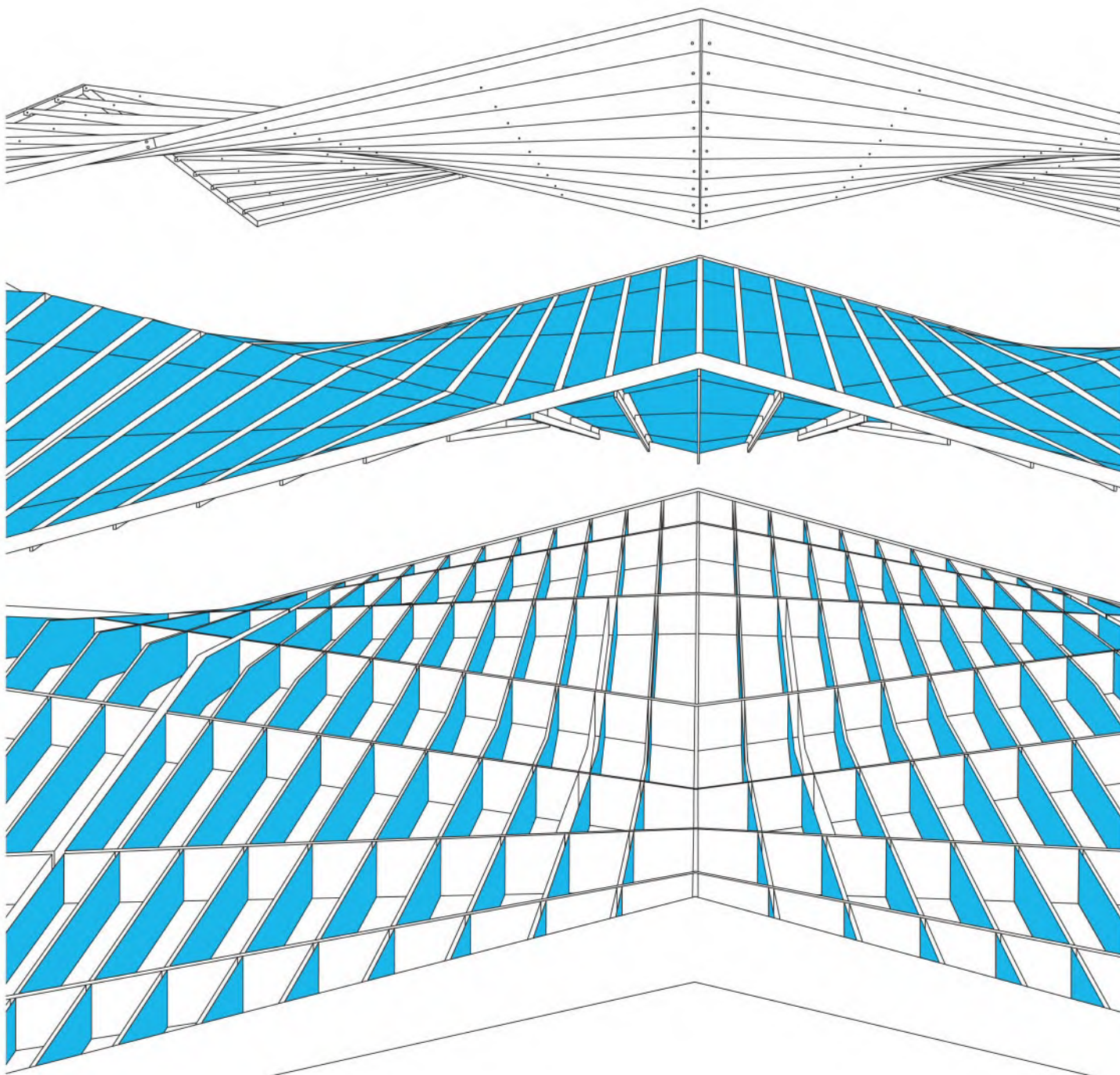


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Editorial

Building with Steel

Precision, performance and technical appearance are all important attributes that architects associate with steel. In this issue of DETAIL, the Fellows Pavilion of the American Academy in Berlin and the EU Council headquarters in Brussels comply with this image in quite different ways.

In contrast, the monumental roof structure over the Telcel Theatre in Mexico City demonstrates the archaic sculptural strength of the material, while the sensual qualities of steel used for the outer skin of a building can be recognized in the restrained form of the pumping station in Bochum with its new facade of partly perforated sheeting. Constructional intelligence is the overriding theme of the introductory article about the lamella halls of the aviation engineer Hugo Junkers as it is, indeed, of the feature on the highly demanding manufacture and tremendous performance of steel monocoque structures.



Discussion

Pure Invention? – The Lamella Halls of the Aviation Pioneer Hugo Junkers

Joram Tutsch, Sven Tornack, Rainer Barthel

"In our day and age, I see the central issue of building in the industrialization of construction," and this process "is a question of materials", Mies van der Rohe wrote in 1924. With these words, he formulated an issue that Hugo Junkers had resolved in aircraft construction ten years earlier. In contrast to what was standard practice in those days, Junkers did not build with wood, a natural material that was unpredictable from an engineer's point of view. Instead, he opted systematically for aeroplanes made entirely of metal. As early as 1925, Junkers had experimented in his own building developments with industrial forms of construction, and there, too, he chose metal rather than

concrete. With the reform building department of the Junkers works, he attempted, by means of a cooperation between the various company sections, to produce a prefabricated building that could be assembled according to serial principles. The basic findings he had made in the field of aircraft construction he now applied to engineering structures, and over the years, scientific building research was implemented in the Junkers plant under the laboratory conditions of the aircraft industry. Aesthetic and formal considerations took a back seat behind physical and technical requirements. His most successful building-engineering achievement, the so-called "Junkers lamella hall", was developed, marketed and propagated by the department for steel construction. The constructional history of this hall will be considered in the following paper.

Hugo Junkers, the person

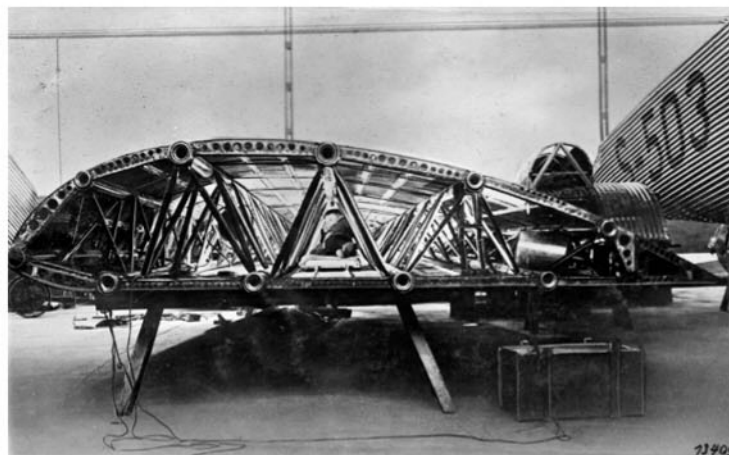
Only when he was 50 years old did the qualified engineer Hugo Junkers turn to aircraft construction, a discipline in which he was ultimately to gain international renown. At that point in his life, he was the father of seven children; he had already developed the first two-stroke opposed-piston gas engine and the calorimeter (an apparatus for measuring the amount of heat generated in chemical reactions); he had founded six companies (with more than 20 further ones to follow); and he had a full professorship for thermodynamics at the prestigious University of Technology in Aachen. There, he was motivated by his colleague Hans Reissner to take an interest in aviation. In 1910, he had already patented the so-called "thick wing", and only five years later, he succeeded with a pioneering construction in creating the first all-metal plane – something which, up to that time, had been regarded as impossible. Animated by an irrepressible urge to participate in research and aided by the economic development of the Junkers works, more than 30 different aircraft models were developed and constructed during his lifetime, the best-known

of which were the Junkers F13 and Junkers Ju52, nicknamed "Tante Ju". These were the most successful passenger planes of the 1920s and 30s.

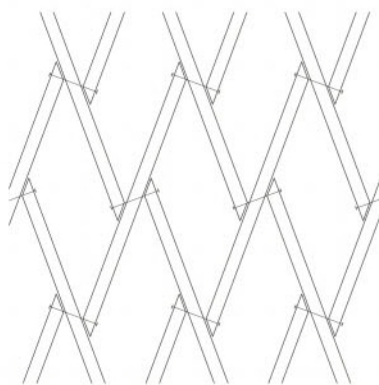
In 1919, Junkers initiated the first air route between Dessau and Weimar and played a participatory role in a number of airlines. The company Junkers-Luftverkehr AG, founded in 1921, merged with Deutscher Aero Lloyd in 1926 to become the German Lufthansa.

In the 1920s, other spin-off and start-up companies were founded in Germany as well as in the Soviet Union, the US, Sweden and Turkey. The concern retained its base in Dessau, however, which at that time can be seen as a Mecca for engineers and technicians. When the Bauhaus was invited to establish itself in that prosperous city in 1925 – with strong support from Junkers – the company increasingly applied itself to the industrialization of building construction. In 1924, under the direction of the architect Ottokar Paulssen, the steel construction department of the Junkers plant applied for its first patent: for the so-called "bar grid". In the following years, a civil-law dispute developed with the Zollbau Syndicate on account of allegations of a strong similarity between the Junkers system and that of Zollinger. This was settled only in 1928. Before the Junkers concern was caught up in the world economic crisis as well, Junkers himself managed to develop the lamella hall into a successful product and to market it worldwide.

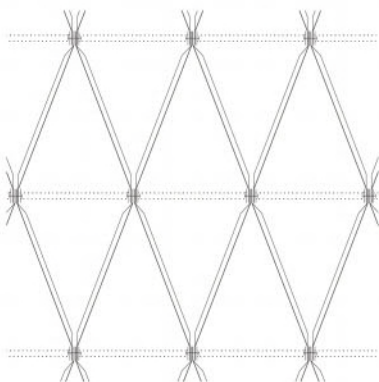
A tragic turn of events for Hugo Junkers and his consortium was the seizure of power in Germany by the Nazis, whose intrigues and threats he felt as early as 1930. Within a few months, Junkers was first dispossessed, then ousted from Dessau and finally, on 3 February 1934, his 75th birthday, placed under house arrest in his holiday home in Bayrischzell. Exactly one year later, Junkers died in Gauting near Munich. Ten years after the end of the Second World War, the journal "Münchener Illustrierte" published a six-part series with the title "Die Junkers Tragödie" (The Junkers Tragedy).



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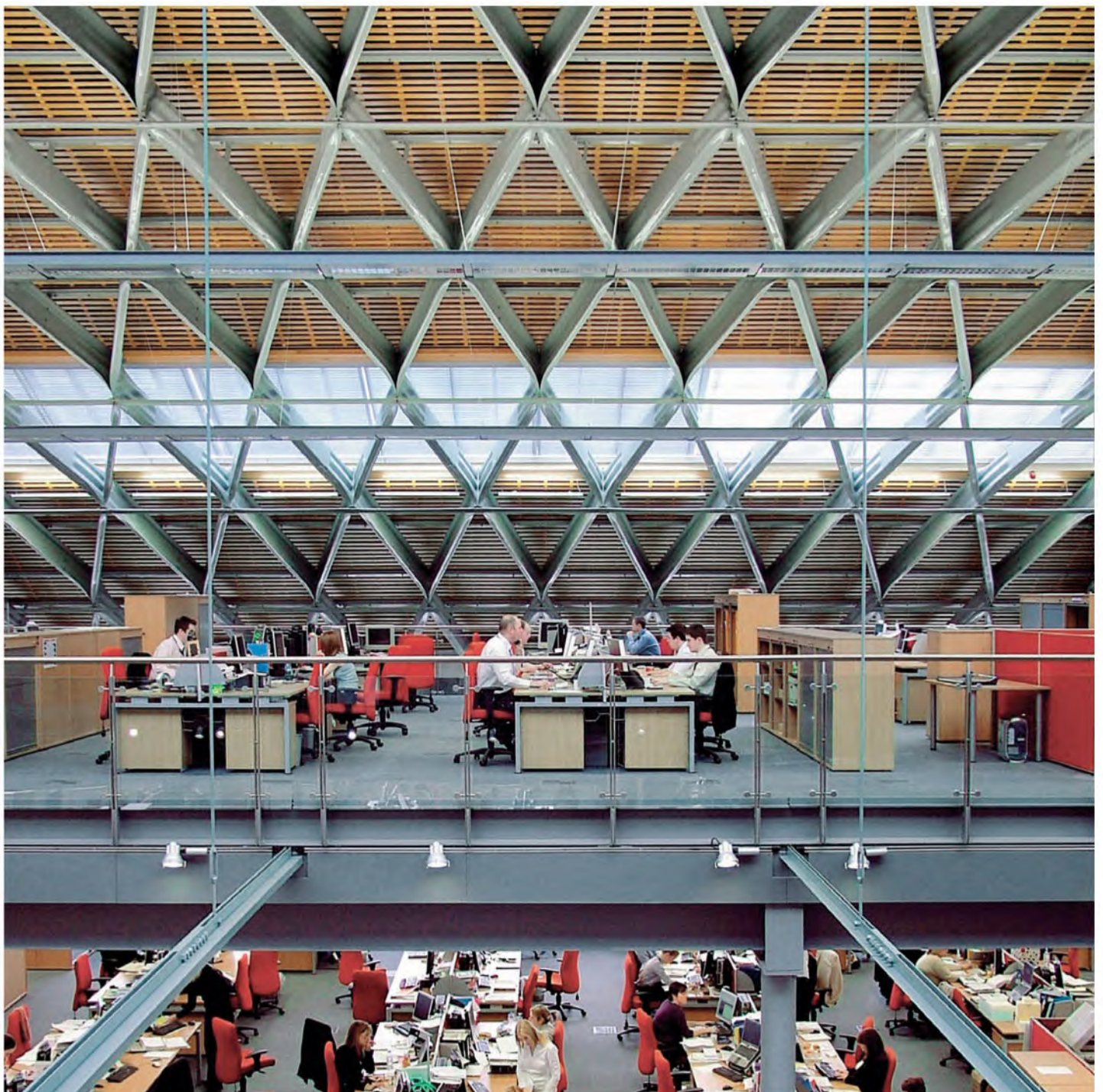


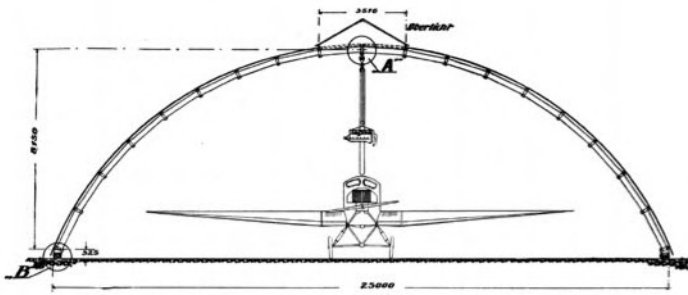
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- 1 View through wing of G24 airliner; braced by space-frame construction, consisting of cold-formed sheet-metal members
- 2 Schematic diagram of Zollinger system
- 3 Schematic diagram of Junkers lamella system
- 4 Interior of Skyways House, Liverpool, with lamella roof construction from 1939, refurbished in 2006; architects: CDA





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The prototype of the lamella hall

The first structure that could be referred to as a “lamella hall” was the so-called “Benzinschuppen” (or “fuel shed”), built on the company’s site in Dessau at the beginning of 1925. This occurred under Paulssen’s direction, following the erection of a number of model versions. At that time, the construction still consisted of two rib types of different lengths which formed a non-hierarchical triangular grid and resulted in an arch with a span of 6.50 m (ill. 7). This corresponded closely with the initial patent application of 1924 (ill. 8). What seems remarkable is that the sheet metal used for this structure allegedly had a thickness of only 1 mm and was shaped by hand.

Apparently, this first hall was received with great enthusiasm. After a loading test ordered by the building authorities and passed with flying colours, Paulssen informed Junkers in an in-house communication that: “Almost all the persons belonging to the building discipline who inspected the structure showed a keen interest in the con-

struction and expressed their conviction that it possesses great potential.” And indeed, they were to be proved right.

The constructional principle

The bearing behaviour of arch-shaped lattice grids is relatively good for evenly distributed loads such as self-weight and those caused by roof coverings. That is because mainly normal compressive forces occur along the rib axes. But as soon as a structure of this kind is exposed to asymmetric loading – from wind or snow on one side, for example – the grid members are subject to bending. With weaker cross-sections or a lack of bracing, this can lead to lateral deflection on the non-loaded side of the arch. In contrast to other contemporary buildings, however, the Junkers halls required neither bracing with stays nor a two-dimensional curvature of the overall structure to overcome this problem. Instead, the individual grid members were optimally adapted to the load-bearing behaviour of arch construction and rigidly connected.



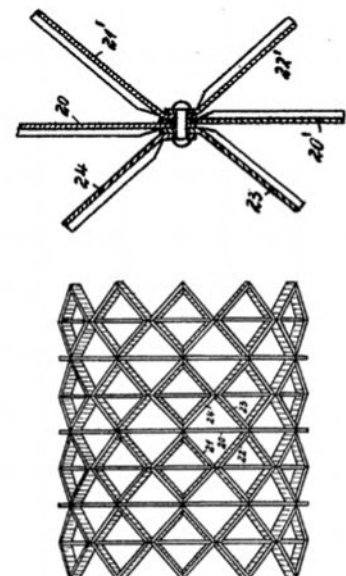
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As part of the technical development, the construction team about Paulssen was able to draw on the progressive know-how gained from the rapid advances made in aircraft construction. In 1926, Paulssen referred to this “technology transfer within the firm” in the journal of the Association of German Engineers (VDI) as follows: “Even in aircraft construction, in the manufacture of cantilevered wings, metal bars are used that, connected to tubular struts, represent a kind of lattice-beam construction (ill. 1). The experience gained here provided the best starting point for a solution to the design of the hall roofs.”

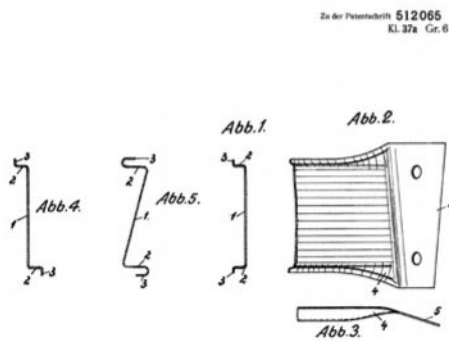
Long-year experience in design and construction, using thin metal sheets that acquire their overall rigidity through the process of bending, together with the appropriate connection of the individual elements, logically leads to a vertical orientation of the cross-sections; i.e. the formation of “lamellae”. To increase the rigidity of these members (without increasing their structural depth) and in particular to enhance their lat-



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eral stability, the upper and lower edges are bent at an angle. The rigid connections of the individual lamellae are achieved with one or two pairs of bolts at each point of intersection (ill. 3).

Differences from Zollinger system

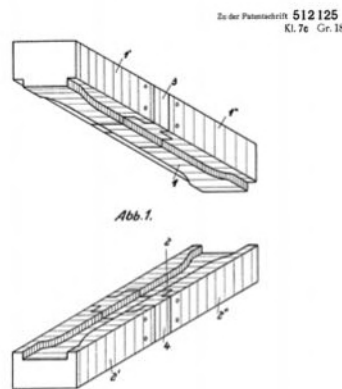
The Zollinger system and the lamella halls of Junkers are related in their triangulated and lattice-grid structural make-up. As barrel-vaulted forms of construction, they are also subject to the structural need for a rigid cross-section. The difference between the two can be seen in the node points, the construction of which varies considerably because of the materials used – wood and steel. In the case of the Zollinger system, the ends of two diagonal bars meet offset to each other on each side of a continuing member and are fixed with a bolt. The bar they abut extends on, terminating at the next node (ill. 2).

The rigidity of this form of construction is achieved solely by the bars continuing through the nodes. In addition, the load-

bearing capacity of the Zollinger system depends on the bracing effect of the roof sheathing. In 1928, the legal battle over Zollinger's accusation of plagiarism was ended with a declaration that the two forms of construction differed from each other considerably in their structural details. Subject to political pressure, Zollinger backed down and agreed to an economic collaboration under the name of Junkers-Zollbau.

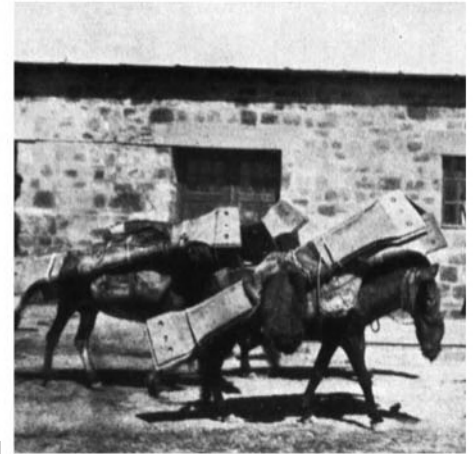
Ongoing technical development

While the Treaty of Versailles imposed tight economic constraints on German industry, around 1924, Junkers was able to set up a company in Turkey. In order not to have to hand over the erection of the production plant to a third party, he instructed the company's building management – which was absorbed in the steel construction department in 1926 – to optimize the lamella-hall type technically and economically in such a way that it could be shipped as a modular system within a few months and erected virtually anywhere within the shortest of time.



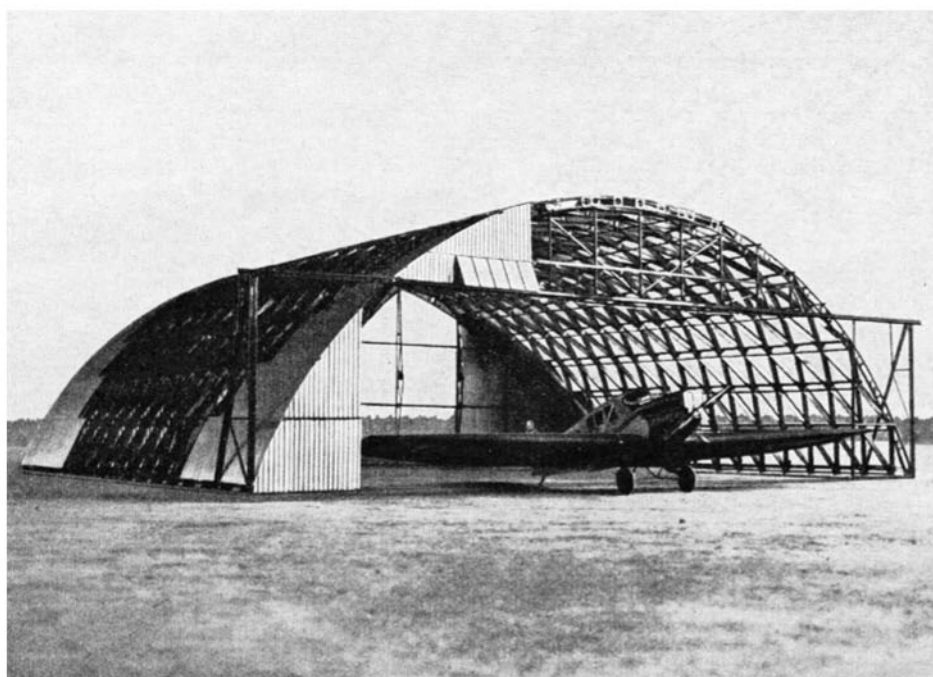
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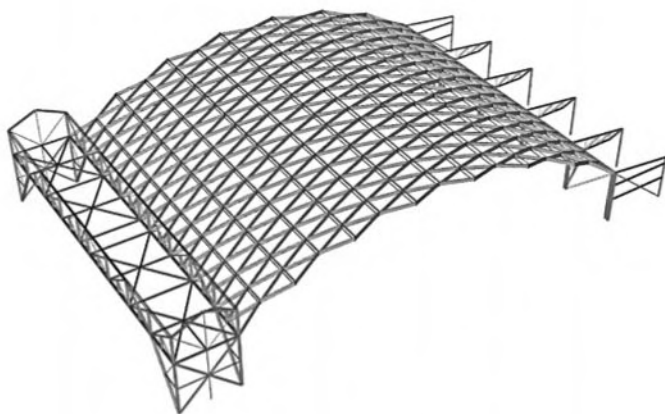


The springboard for the further development of these structures was the "Benzinschuppen", mentioned previously. In a working report, Paulssen described its load-bearing behaviour as follows: "The main load is borne by the diagonal lamellae, while the linking members would seem to be scarcely subject to loading." In terms of stress distribution, the structure was further optimized by adopting the form of a barrel vault. In the longitudinal direction of a shell structure of this kind, only very small forces occur, because there is no curvature in that direction. The logical outcome of this was the use of much more slender purlins (ill. 16). Above all, though, it resulted in an important structural advantage, allowing a clear simplification of the connection points and a reduction of the geometry to no more than single lamellae. It was no longer necessary, therefore to connect six oblique members, but only four.

Using this modified system, two further prototypes were erected at the Dessau works, where they were successfully tested and approved for production. In order to manufacture the large numbers required for the Turkish site – at least ten halls – a pressing apparatus was specially developed (ill. 10). In 1926–27, at three locations in Turkey, large-area production halls were erected in the shortest of time.



- 5 Sectional drawing of aircraft hangar type 11, ca 1929
- 6 Transporting steel lamellae with freight plane Junkers W34f, Guinea Airways, around 1931
- 7 The "Benzinschuppen" on the Dessau works site, ca 1925
- 8 Node detail and top view of "Benzinschuppen": from the first patent application for the "bar grid", 1924
- 9 Z-, S- and C-sections and lamella junction: from patent application for lamella for "bar grid", 1928
- 10 Axonometric drawing of pressing apparatus; from the Junkers patent application for "pressing apparatus for the manufacture of sheet-metal grid bars", 1928
- 11 Transporting steel lamellae with pack animals around 1926
- 12 Prototype structure of aircraft hangar type 11 on Dessau works site around 1929



13

On the partially rough terrain, the modular unit-construction system offered great advantages. In some cases, the lamellae and purlins were transported into remote regions using pack animals (ill. 11).

Following the success of this initial project, the first segmental-arch roof with tension rods as well as a multibay form of construction, consisting of three round-arch roofs, were erected – again on the company's own works site. Smaller commissions in the Dessau area followed, such as the roof over the dining hall of a well-known hotel in the town centre and the outer enclosure of a bolt factory in Finsterwalde.

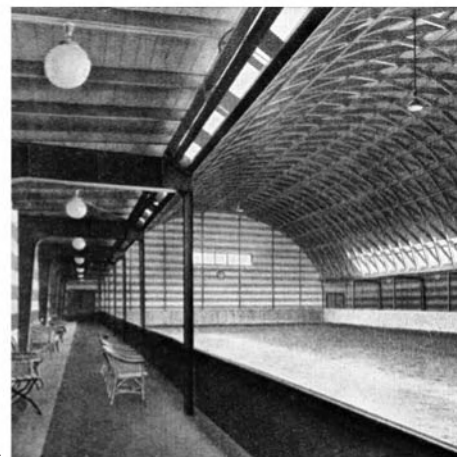
Marketing the product

The end of the patent dispute in 1928 and the engagement of the engineer Wilhelm Klingenberg at the same time as head of the steel construction department mark the beginning of the worldwide proliferation of Junkers halls. Klingenberg implemented the change from Z- and S-section to C-section

lamellae (ill. 9), a modification that clearly simplified the manufacturing method because the new form could be pressed in a single process (ill. 10).

Around 1930, wind-tunnel investigations and further loading tests led to a final modification of the lamella geometry, in which the transition from shaped cross-sections to flat metal junctions by means of a stamped knuckle detail became more pronounced (ills. 13, 16).

At the same time, the standardization of the halls proved to be a decisive factor for their economic success. Klingenberg developed the structures into products that clients could order as finished objects. Modular design and flexibility nevertheless allowed the creation of many different forms. The halls were offered in various sizes, delivered and, where required, erected by the company as well. The first customers in other European countries were quickly found, too. In the case of Britain, not only the finished products were sold; licence and patent rights



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were granted for the manufacture of the halls as well. This led to a situation where a large number of halls were developed in that country in slightly varying forms of construction. Further contracts followed in Brazil, Venezuela and even New Guinea, where the constructional elements were flown in with planes belonging to the Junkers concern (ill. 6).

The halls today

In all, roughly 170 halls and roofs were constructed according to the Junkers system, 120 of which were by the British licence holder. Only an incomplete picture can be drawn of the actual number and the present state of the surviving halls, however. As part of a current research project at the University of Technology in Munich supported by the Meitinger Foundation, a full mapping of the structures is being attempted – at least those built in Germany.

The motivation for this were the halls standing on the former military airport in Oberschleissheim outside Munich, which are now used by aero clubs (ills. 13, 16). The structures are in a multibay form of construction and were built with lamellae 2.75 metres long. The three arched roofs were lined up next to each other and have an effective floor plan approximately 130 × 30 m in size. The halls are listed structures protected by conservation order, although one of the three arched sections of the eastern hangar was lost some decades ago, destroyed during the war, reduced in size or removed after it had collapsed. The others are in a critical state. The halls that are still standing are being analysed with modern methods as a basis for their retention and rehabilitation.



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- 13,16 Hangar at former military airport in Oberschleissheim near Munich (condition in 2015).
 Axometric drawing of arched roof with linking framework to adjoining arch;
 view into hall with lateral framed structure (in foreground)
 14 Indoor riding arena in Connewitz, Leipzig, with frame structure at sides, 1930; destroyed in 1943
 15 Station hall in São Paulo, ca 1935



- 17 Lamella structure reused as a pointed barrel-vault hall: conference space in roof of “Leipziger Volkszeitung” building (condition in 2014)
- 18 Opel building in Leipzig: lamella construction for additional storey on roof, 1929 (condition in 2014)

Not far from this site, in Allach, Munich, are another two halls. They represent the last vestiges of the Junkers research department and motor works, which were established there after being expelled from Dessau.

In Dessau itself, four of the 15 former halls are still in use. Another two are marked by having stood empty for many years. An early version of the all-metal form of construction, dating from 1929, extended some years later and used for industrial purposes until 1996, is the last surviving structure of the former calorifier works of Hugo Junkers and the steel construction department that were located there.

After 2010, despite protests from notable organizations, the municipality removed these factory buildings, which, up to then, had survived largely in their original form. A small listed hangar from the neighbouring town of Köthen was removed in 2012, taken apart and the individual elements stored on the open site of Dessau’s Museum of Technology.

An unusual form of the load-bearing structure still stands in Leipzig. In 1949, the intact elements of a partially ruined pointed barrel-vault hall were re-erected on the flat roof of a publishing house. When the building complex was refurbished in 1996, the steel structure was rediscovered beneath the tim-



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ber cladding. Restored and enclosed within a glass skin, it now houses the impressive conference rooms of a newspaper, the “Leipziger Volkszeitung” (ill. 17).

The lamella roof of the Opel building, dating from 1929 and also located in Leipzig, was erected to increase the height of a multistorey reinforced concrete structure. Used originally as a prestigious showroom for cars, it possesses a wonderful view, but is an almost forgotten garage today (ill. 18). One example outside Europe is in São Paulo: a station hall erected in the 1930s (ill. 15) and still used for its original purpose. Even if no trains now stop directly beneath the lamella structure and the roof has been reduced to roughly half its original length, it nevertheless forms the central entrance hall to the present-day urban station of Brás. In 2006, the hangar of the old airport in Liverpool was converted into the headquarters of a mail-order firm. In Skyways House, the almost 80-year-old structure curves over a modern open-plan office, creating a surprisingly up-to-date and spacious atmosphere beneath the diamond-shaped grid (ill. 4).

Unfortunately, examples of this kind of listed refurbishment are exceptions. The structural simplicity and astonishing lightness of the lamella halls that have survived, however, are reminders not only of the exceptional all-round engineer Hugo Junkers. Their relevance in terms of building technology and history are reason enough to take decisive steps to halt the ultimate destruction with which many of them are threatened. In this way, the disappearance of one of the most significant witnesses to an age of industrial architecture and the early years of aviation could be prevented.

Joram Tutsch is a research assistant in the Department for Structural Planning of the Faculty of Architecture at the University of Technology, Munich. There, he is in charge of the research project to develop a concept to rehabilitate the Junkers halls in Oberschleissheim.

Sven Tornack is an architect who works in Leipzig. He is chairman of the society Industrial Culture Hugo Junkers.

Professor Rainer Barthel is head of the above-mentioned faculty of architecture.



18



Reports

Sculptural Tower – Building with Recycled Plastic Waste

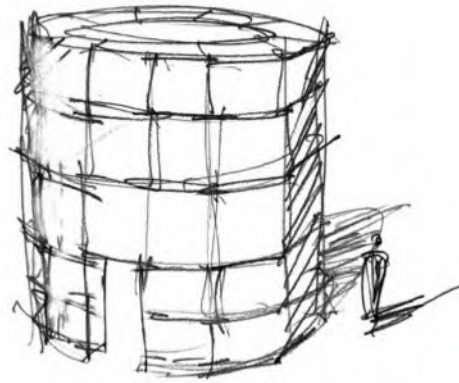
Architect:
Markus Heinsdorff, Munich

Cape Town's popular Greenpoint Park, situated near the 2010 FIFA World Cup stadium, has recently been enhanced by a true attraction – a small tower that glistens in the sunlight. On closer inspection, the colourful enclosure of this structure can be seen to consist of gabions filled with plastic waste. The tower was erected by the Munich installation artist Markus Heinsdorff, who seeks to demonstrate here that even the waste material one finds lying around everywhere can be used to build simple yet well designed houses.

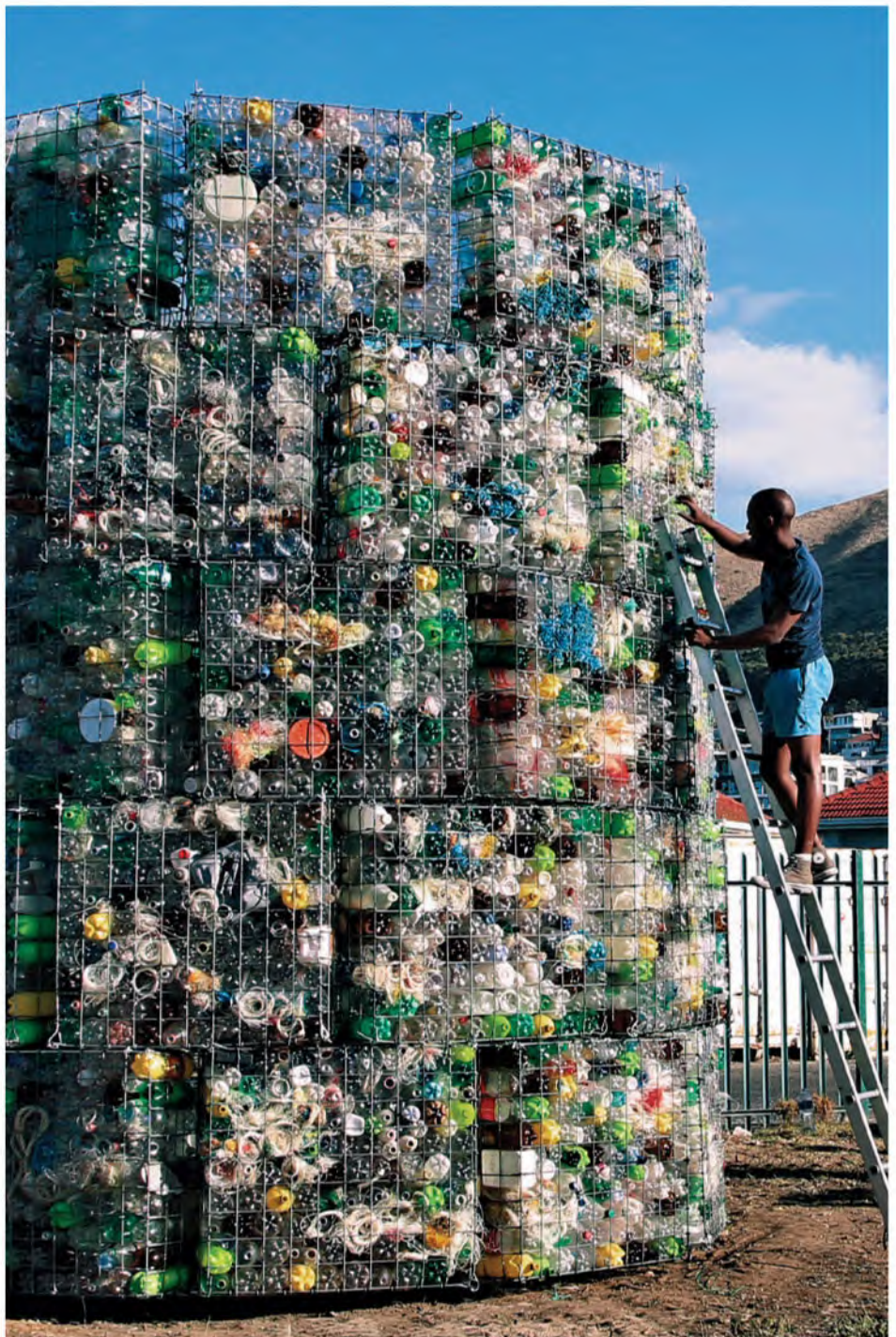
In view of the fact that more than 100 million people in the world today are homeless and more than a billion live in inadequate dwellings, there is obviously a great need for housing of this kind. What is more, these figures are rapidly increasing as a result of climate change, environmental disasters, war and, not least, an enormous population increase in the less developed regions of the world.

In a newspaper article in the "Süddeutsche Zeitung", Hans Joachim Schellnhuber, director of the prestigious Potsdam Institute for Climate Impact Research, recently appealed to the architectural profession not to set its sights on the erection of high-tech tower blocks, but to pursue a concept of economic housing that is as climate-neutral as possible and that might be erected by the future occupants themselves¹. As a sustainable material for the construction, he recommends recycled waste.

Building with refuse – something both sustainable and economically advantageous – is a theme with which Markus Heinsdorff has long been concerned. The experience gained from lightweight structures he has built earlier – including mobile pavilions for China and India and the highly regarded German-Chinese House at the Expo 2010 in Shanghai (see DETAIL 10/2010 and 1–2/2013) – as well as numerous stays in poorer regions of the world have led him to develop technically innovative and at the same time well designed low-cost structures, in particular for the many slums in South Africa. The Ocean Dome, inaugurated 2



1



¹ Literature:
Hans Joachim Schellnhuber, "Der funktionale Slum",
"Süddeutsche Zeitung", 24.4.2015

1–5 "Ocean Dome", Cape Town



3



4

last April, may be seen as a kind of prototype for these. There is really no lack of plastic refuse on the nearby beaches of Cape Town. For his installation, therefore, Heinsdorff used some 5,000 bottles, fishing nets, thousands of metres of fishing line and other plastic waste, piling this all in layers in 50 filigree-wire gabion baskets.

A bolted truss construction serves as a load-bearing system that is relatively stable even in the event of earthquakes. The specially developed members of this structure consist of folded sheet steel, galvanized as a means of resistance against corrosion. Not the least fascinating aspect is the aesthetic appearance of what are otherwise unremarkable waste materials.

Above all, as a result of their translucent properties, the view from the inside towards the light reveals various effects and a play of colours with which one would perhaps be familiar from the stained-glass windows of a church.

This apparent contrast between otherwise worthless refuse and visual quality was important to the artist. With his installation, he wanted to draw attention on the one hand to the littering of the world's oceans. At the same time, he wished to lend his housing a special significance through the distinct design, thereby avoiding the aura of poverty usually associated with slum building. Despite such shortcomings, Heinsdorff sees little works of art in many of the simple dwellings found in the slums of the world and constructed with bare essentials and the humblest of means. Their builders handle the modest, often recycled materials picked up nearby very creatively. What the structures lack, however, is effective thermal insulation. Where gabions are used for constructional purposes, insulation against hot and cold conditions could be provided by the building waste from structures destroyed in natural disasters instead of burning or burying this, as usually happens today to achieve a supposed sense of order.

Heinsdorff also sees scope for finishing refuse-filled walls with loam rendering. In general, though, the houses should retain

their flexibility. In gabion construction, the filling material can be changed at any time, and the waste matter – depending on the means of the residents – subsequently replaced by traditional building materials such as loam, sand or stones from the surrounding area, without having to renew the basic structure or the roof. That also applies to the prototype being created at present in the architectural park in Boisbuchet, France. The basic framework of this 20 m² house weighs just 130 kg and is braced with thin steel wiring rather like the structure of an airship. In areas subject to flooding, this housing type could be assembled on platforms that can float on water if necessary. It could also be

constructed using recycled PET bottles in gabions assembled beneath a boarded framework that serves as a foundation. Another aim is to minimize the construction period. It should be possible for two people to erect the basic structure – delivered as a kind of unit-construction kit – in just two days. A further two days are foreseen for filling the walls and assembling the roof. This structure could serve as a basic framework for the next project on which the Munich artist is working at present: refugee housing throughout the world created from the piles of packing material for relief supplies that arrive every day. Recycling can scarcely be more immediate.

Christian Schittich



5

China Pavilion for Expo Milano 2015

Architects:
Yichen Lu
Tsinghua University, Beijing
Studio Link-Arc, New York

New York-based Chinese architect Yichen Lu won the commission to create the Chinese Pavilion for the Milan Expo in a national competition in 2013. In contrast to the monumental gestures embodied by the Chinese Pavilion at the last Expo in Shanghai in 2010 (designed by architect He Jingtang), Yichen Lu's filigree building is characterized by lightness and transparency.

Detail: What is the concept behind the Chinese pavilion?

Yichen Lu: The theme of China's pavilion is 'the land of hope'. We interpreted this as a 'field' and instead of creating a landmark building, like had been done for the Shanghai Expo, we chose to create a building that is part of a 'field' or larger landscape. The entire pavilion is set back about 30 m from the main entrance. So the way the visitor approaches the building is very defined and choreographed. The way we obtained the form of the pavilion was very specific too. We created a roofline from North to South by combining the profile of the Beijing city skyline with the contour of a mountain range in China. It's an expression of hope that cities and nature can co-exist in harmony.

As an architect you practice mainly in the United States yet you were commissioned to design the Chinese national pavilion. Is this a sign that China is changing and opening up?
I think the entire world is opening up, especially because of the internet. It has changed peoples' lives and changed how people are connected. For example, we are based in New York but I also teach in Beijing and we have been working in Milan. We can have online meetings with people around the world. For this project there was a lot of input from many different countries: the structural engineer was from New York, the architect was based in New York, the mechanical, electrical and plumbing Engineers were in Beijing and the general contractor was in Turin.

You've just given Professor He Jingtang, the architect of the Chinese pavilion at the Shang-

hai Expo, a tour of your building. If the two pavilions are compared it is clear they emanate from very different approaches. In Shanghai the pavilion was a monumental gesture based on traditional Chinese forms, here the building is open, smaller and far more transparent. What are the politics being expressed by this pavilion?

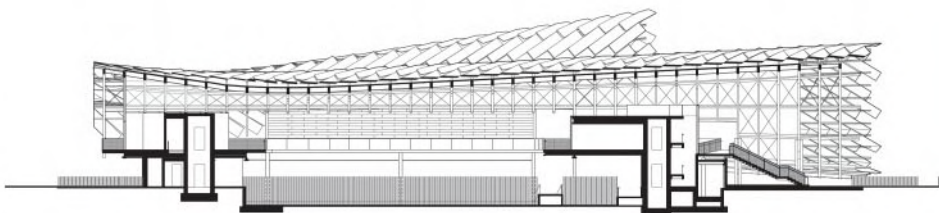
We tried to use materials that were as natural and sustainable as possible and tried to create a special atmosphere by playing with light so that it wasn't just about seeing the building but also about experiencing the space. On the other hand, as a national pavilion at the Expo and a landmark building for a country that is growing very fast, politi-

cal pressures and involvement cannot be avoided. As part of the younger generation in China, however, I am trying to express something new. Everyone has his or her own impression and image of the new China. But for us the new China is about honestly, a lack of affectation and the beauty of traditional Chinese culture.

You've worked for famous American architects and practices such as Frank Gehry, Morphosis and Steven Holl. How did these experiences influence you and the design of the pavilion?

Frank, Thom and Steven are great architects. They are very honest people who are





1

passionate about what they do. Architecture can be a way to connect with the world and other people and even to change something. These are the most important things I learned from them.

What is the biggest challenge for architects and architecture in China at the moment?

I think it's the speed and quality of what's going up. In China everything is changing too fast. Before I came to the US I had worked in China for five years. Now I have lived in the US for about 10 years. During this time the quantity of construction has been growing rapidly but the quality of the architecture has not followed suit. And sometimes, the bigger the project, the worse the quality. That's why we try to practice in New York. We believe that even from there we can create Chinese architecture. The location is not the issue, it's more about what you want to express.

From your experience of working and teaching in China is it a good time to be a young architect there?

There are a lot of young Chinese architects. Many of them are still only 30 or 40 years old but have already built a lot of important or large structures. If we are talking about experience, they probably have a lot more experience than their western counterparts. I think there will be an improvement in terms of design in the next five or ten years, I am expecting exciting things to come out of China.

Detail: Can you tell us something about the design process for the pavilion?

Yichen Lu: We wanted to create a building that embodies Chinese traditions as well as modern technologies. We expressed traditional Chinese architectural culture with a timber structure but we used glulam timber and modern technology to create the long-span exhibition space. We then used parametric design as a tool to create an interesting spatial experience. The form of the roof is designed digitally and made up of over 1,000 bamboo panels in different sizes and

shapes. After an intense optimization process we were able to ensure that the panels would follow the curves of the roof. To realize a large column-free exhibition space some steel profiles were added to the structure.

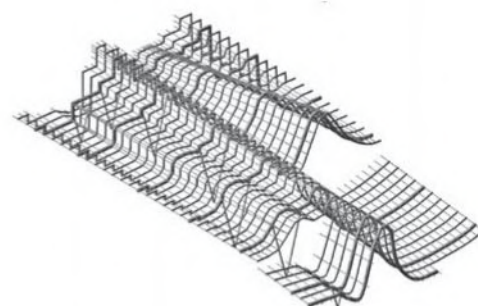
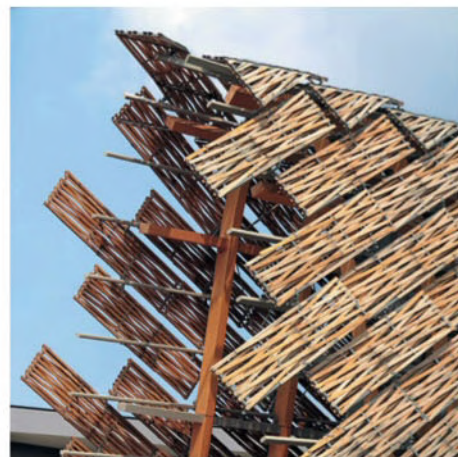
What do you think of the exhibition concept?

This Expo has a very interesting theme and I liked the Spanish, German and Austrian pavilions, they had a great and specific response to it. The exhibition inside the Chinese pavilion is a little too focused on history instead of looking towards the future. This will be the challenge for the next five years. But you have to bear in mind that China is a very large country with many provinces, all of which have very different social and cultural conditions and requirements. This is a huge challenge.

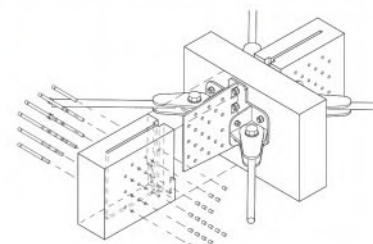
Sustainability was one of the central themes of this Expo. How does your design respond to sustainability requirements?

Sustainability has different levels of meaning. On a basic level we tried to use as many natural and sustainable materials for this building as possible. The structure is made of glulam timber and the roof is made of bamboo panels. Beyond that we tried to eliminate extreme energy consumption, so only a limited part of the pavilion uses air-conditioning. We calculated that the shading provided by the bamboo panels meant that in summer the interior public spaces were at least three degrees cooler than the exterior ones. The project itself also had a very limited budget, something very different from the China pavilion five years ago. Our entire budget was a quarter of that of some of the other pavilions at this Expo. That's also a way to save energy! Finally, an interesting point is the legacy of the building. After the Expo the pavilion will be disassembled and shipped back to China where it will be assembled again in a beautiful mountainous area and probably used as a museum.

Christian Schittich conducted the interview with Yichen Lu in Milan.



2



3

- 1 Longitudinal Section scale 1:750
- 2 Axonometric projection glulam timber structure
- 3 Axonometric projection Wood Rafter/Wood Purlin Joint

The Bauhaus – #itsalldesign

The topics Social Design, Open Design and Design Thinking are currently much under discussion: how can designers situate their work in a larger context and play a role in shaping society?

The proposition that serves as point of departure for the exhibition in the Vitra Design Museum views the Bauhaus as a complex, multi-faceted “laboratory of modernism” that is still closely intertwined with contemporary trends. The show is structured in four segments, beginning with a look at the historical and social context of the Bauhaus. The second segment examines the iconic and lesser known of the Bauhaus design objects, as well as the story of its origination at the interface of art, handcraftsmanship, technology and industry. The third segment draws attention to the fact that different types of design professionals were involved in the formulation of the Bauhaus philosophy – among them actors, architects and artists. The final chapter is concerned with the means with which the Bauhaus communicated its ideas, from typography and exhibitions via experimental filmmaking and photography to the – often systematically orchestrated – creation of myths and clichés.

The present-day connection to the Bauhaus is established by juxtaposing items dating to the Bauhaus era with the work and theory of contemporary designers. The later category includes digitally manufactured furniture by Minale Maeda and Front, Van Bo Le-Mentzel’s “Hartz IV Furniture”, as well as manifestos by designers such as Hella Jongerius and Opendesk, and interviews with designers such as Lord Norman Foster, Enzo Mari and Sauerbruch Hutton. The overall concept illuminates the wide range of the Bauhaus’s influence – from automobile design at Mercedes-Benz to Konstantin Grcic’s “Pipe” furniture series for Muji and Thonet, inspired by Marcel Breuer.

Until 28 February 2016, Vitra Design Museum, Weil am Rhein,
www.design-museum.de

Designing Affordability: Quicker, Smarter, More Efficient Housing Now

The exhibition examines how architects, engineers, planners, policy makers, tenants, and homeowners are crafting innovative ways to reduce the cost of housing by rethinking how we build, maintain, and occupy structures. The 23 case studies explore how to reduce costs without compromising design quality. The strategies include re-imagining public housing, leveraging land, building simply, deploying technology, rethinking home life, constructing modularly, and building incrementally. According to David Burney, executive director of the Center for Architecture: “Innovative design is a key component to these case studies, and architects can deliver the ‘quicker, smarter, more efficient’ solutions that the city’s ambitious housing plan needs.” The featured projects, both local and global, range from zoning-regulation proposals (a study by Peterson Rich Office), to alternative-housing approaches (SsD’s Songpa Micro-Housing in South Korea), and small-scale, tenant-led strategies (the development of informal settlements in Rio de Janeiro).

Center for Architecture, New York City
From 1 October 2015 to 16 January 2016

Superhouse: Architecture And Interiors Beyond The Everyday

The exhibition highlights some of the world’s most extraordinary homes and interesting living spaces, from an intimate prefab space designed overnight to a revitalised 16th-century castle.

“The exhibition demonstrates how architectural experimentation and daring can challenge notions of how we should live. A superhouse delivers a 360-degree completeness of form, its exterior and interior have a seamless execution and above all else, it is awe-inspiring,” said exhibition curator Karen McCartney. The houses presented in the exhibition are brought to life through vivid photography and feature furniture and interior decoration, as well as filmed interviews with some of the architects. ›Superhouse‹ reveals fifteen extraordinary houses across five themes: Re-make, Finding Form, Small Spaces, Roof Tops & Skylines, and The Land. Some examples reveal an extraordinary connection to the landscape on which they sit, such as The Pierre (Olson Kundig Architects, 2013) in Seattle, a house literally built into a rocky outcrop. Others showcase a completeness of form, where the exterior and interior are equally resolved, such as the Flinders House (Wood Marsh Architecture, 2012) in Victoria and Masetti House (Paulo Mendes da Rocha, 1969) in Brazil.

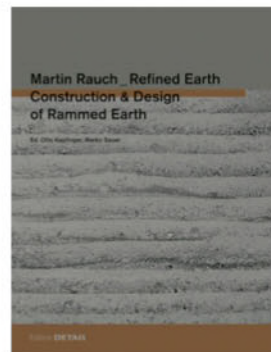
Museum of Sydney
Until 29 November 2015



Asian Flavours. Creating Architecture for Culinary Culture

Christian Schittich (Ed.),
September 2015, 144 pp., Hardcover,
ISBN 978-3-95553-267-3,
€39; £31; US\$55

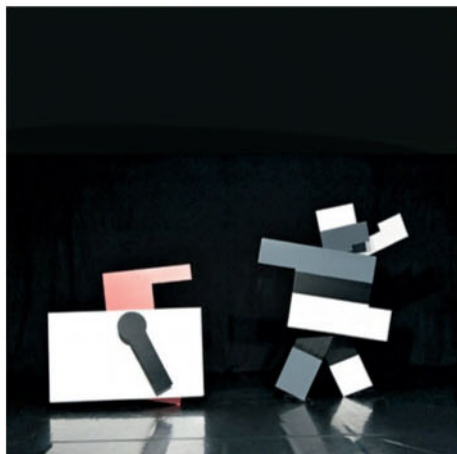
This book presents the projects of Asian and European architects on both continents, ranging from tea houses and sake bars through to entire restaurants. How are architects adapting and interpreting this cuisine in “our” latitudes? How do they respond to the conditions and cultures in these spaces without simply simulating an “Asian decor”? Enhanced with selected recipes from individual restaurants and essays on various Asian cuisines and culinary cultures, the book is also a travel guide to Europe’s many special Asiatic spaces.



Martin Rauch: Refined Earth Construction & Design of Rammed Earth

Marko Sauer, Otto Kapfinger
November 2015, 160 pp., Hardcover, German/English, ISBN 978-3-95553-273-4,
€59; £47; US\$82

For over 25 years, Martin Rauch has been at the forefront of research and development in all aspects of rammed-earth construction. The publication goes beyond projects to focus on structural elements, such as the design and layout of floors, walls, ceilings and openings, which are clearly explained with detailed project information from structures previously realised by Martin Rauch. Various examples help to illustrate how to overcome structural engineering difficulties in earth construction and the design possibilities that result from these solutions.





Documentation

Treetop Walk in Cape Town

Architects:

Mark Thomas Architects, Cape Town

Christopher Bisset, Cape Town

Structural engineers:

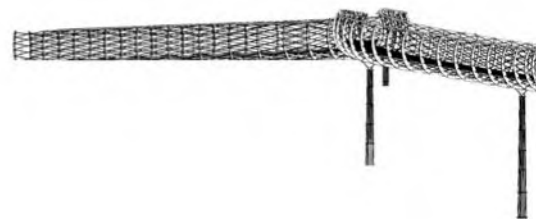
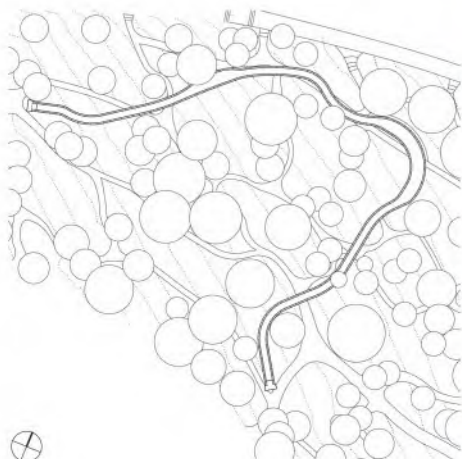
Henry Fagan & Partners, Cape Town

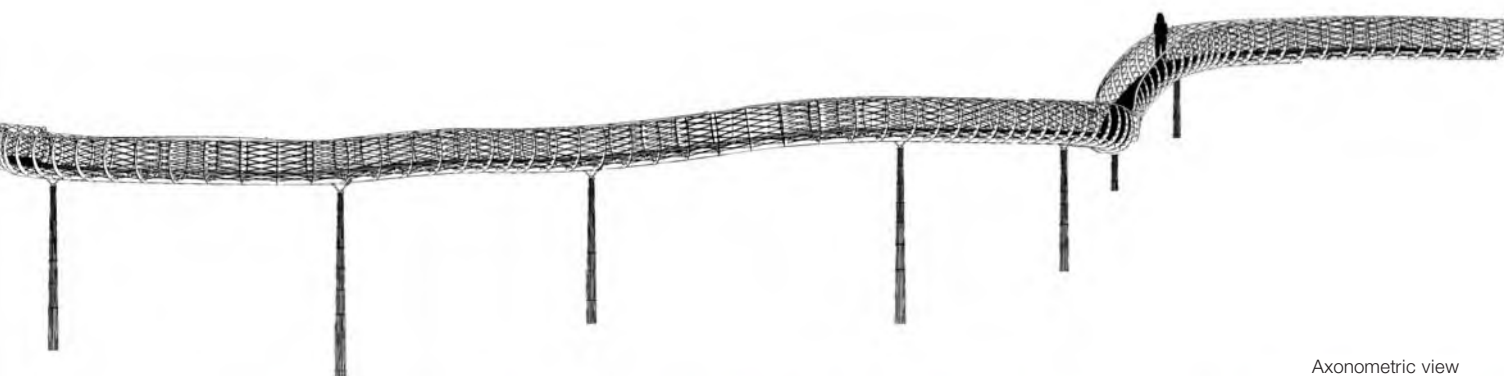
Others involved in the project: see page 644

“Boomslang”, the Afrikaans word for tree snake, is the unofficial name for a spatial boardwalk with a steel structure that describes a meandering route through the forest of the eastern slopes of Cape Town’s Table Mountain. The path was built to mark the 100th anniversary of the Kirstenbosch National Botanical Garden and winds its way through the vegetation, rising and falling between the crests of the trees. At two points, the path broadens to form resting places with bench seating. At the start and finish, there is barrier-free access where wheelchair users can easily rise the necessary 12 metres above the floor of the forest to enjoy the gentle gradient.

The walkway construction comprises a steel “spine” reminiscent of the reversed skeleton of a snake – a 130-metre-long tube on which plasma-cut steel ribs are set. This structure is borne by 12 columns at 12-metre centres that stand on concrete foundations. The six-metre prefabricated galvanized steel bridge sections were hoisted into position on top with a small crane. A special paint finish was then applied that encourages the growth of lichen. In addition, supports were fixed to the columns for climbing plants.

This was meant to allow a complete integration of the walkway into the natural environment. The careful planning of the route as well as two openings in the boarding meant that it was not necessary to fell a single tree.





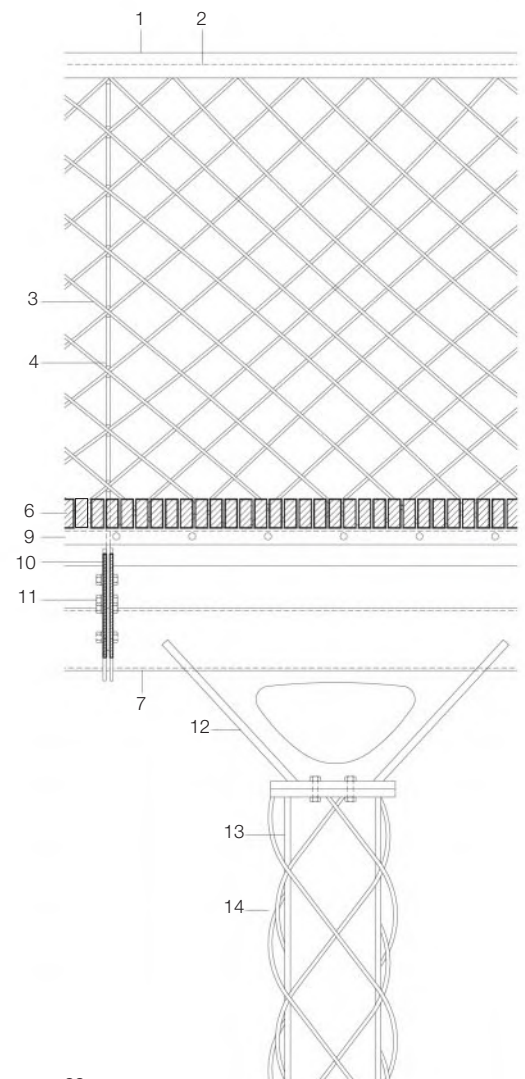
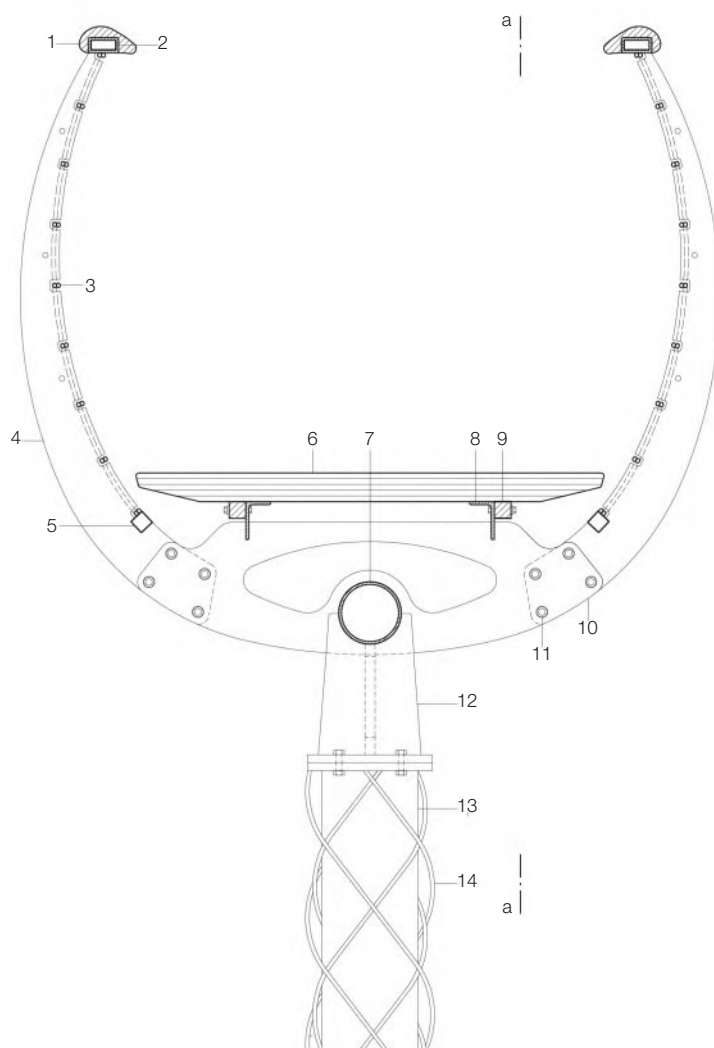
Axonometric view
Site plan
scale 1:7500



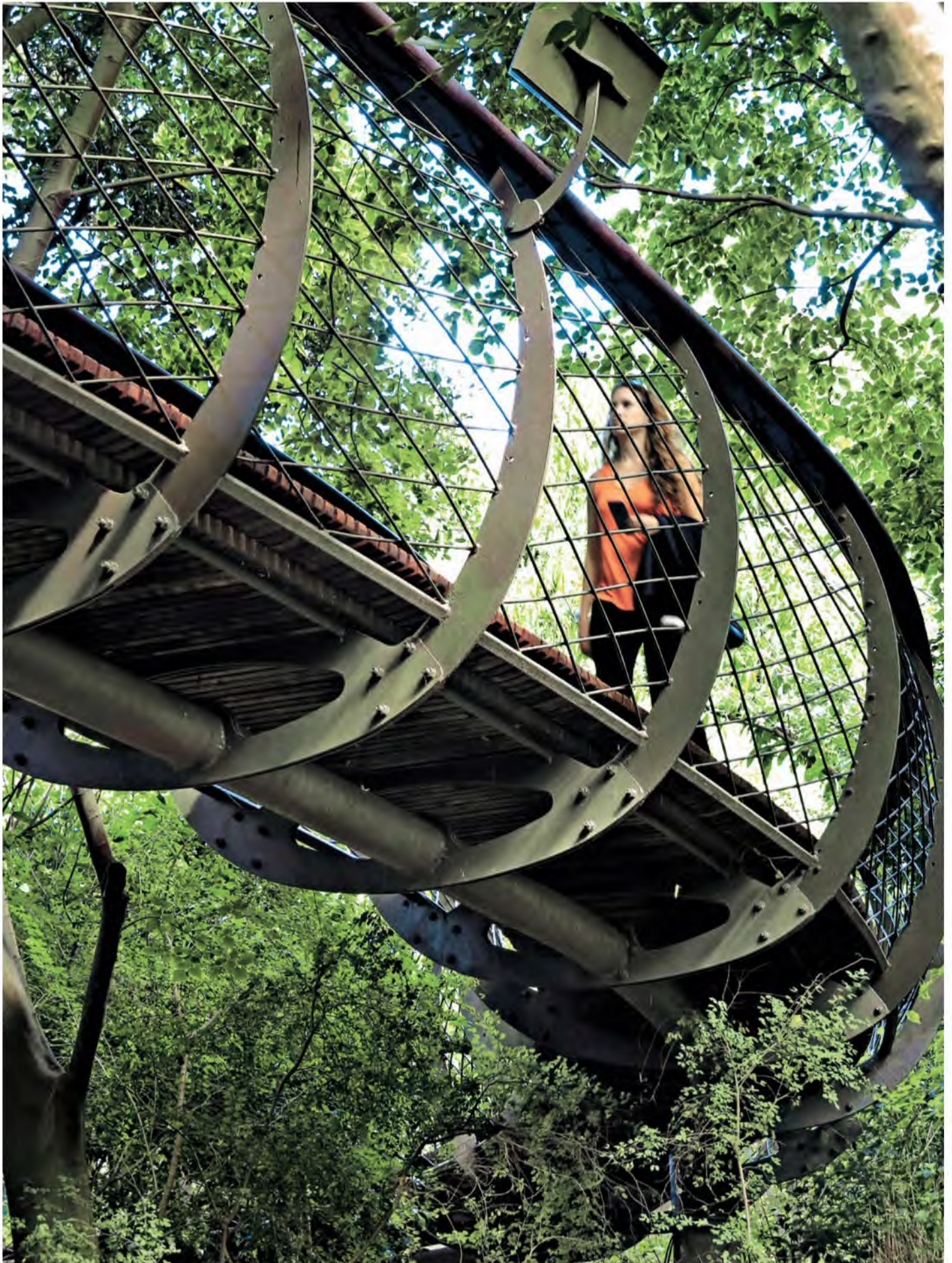


Vertical sections
scale 1:20

- 1 laminated wild teak handrail, oiled
- 2 80/40/6 mm galvanized steel RHS, painted
- 3 2x Ø 10 mm galvanized steel rods diagonally intersecting in two layers nodes welded to balustrade supports in 16/16 mm recesses
- 4 8 mm galvanized steel balustrade support, plasma-cut and painted
- 5 40/40 mm galvanized steel SHS, painted
- 6 32/76 mm sawn pine planking with 5–40 mm spacings; dark-oak stained, impregnated with Tanalith
- 7 Ø 165/6 mm tubular galvanized steel main beam, bent to curved form and painted
- 8 100/65/8 mm continuous steel angle bent to curve
- 9 44/44 mm curved wood bearer, impregnated
- 10 2x 8 mm galvanized steel plasma-cut bearing plates, painted
- 11 4x Ø 16 mm galvanized steel bolts
- 12 20/8 mm flat-steel welded column head
- 13 254/254/73 mm galvanized steel I-column
- 14 2x Ø 8 mm steel-rod trellis for climbing plants, diagonally welded and finally galvanized



aa



Roof over Theatre in Mexico City

Architects:

Ensamble Studio, Madrid

Antón García-Abril

Team:

Elena Pérez, Débora Mesa

(associate architects)

Alba Cortés (construction architect)

Structural engineers:

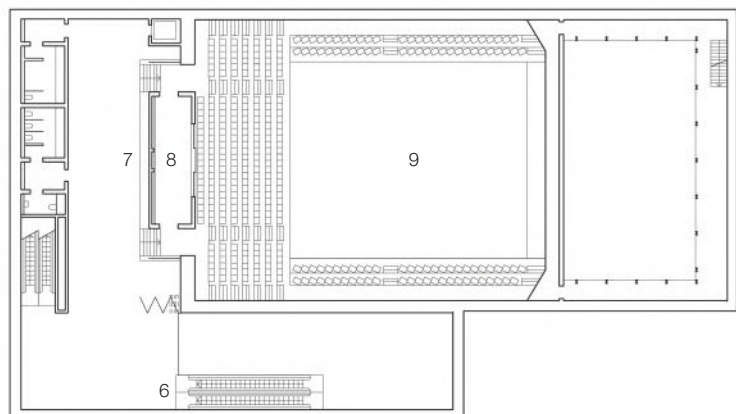
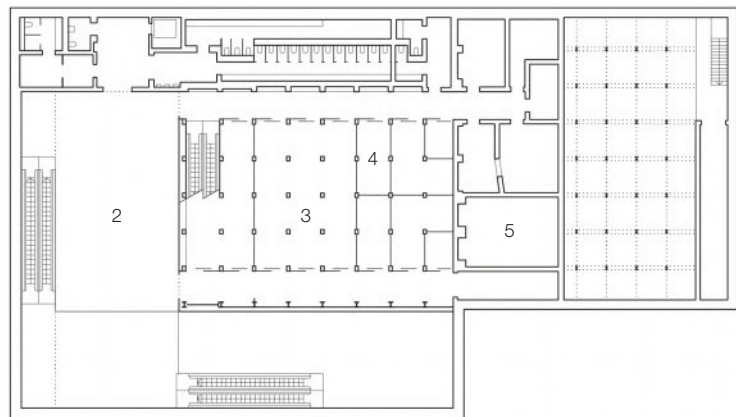
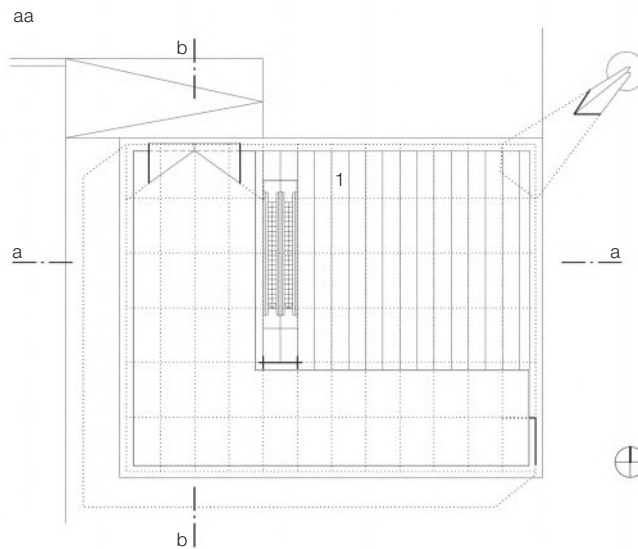
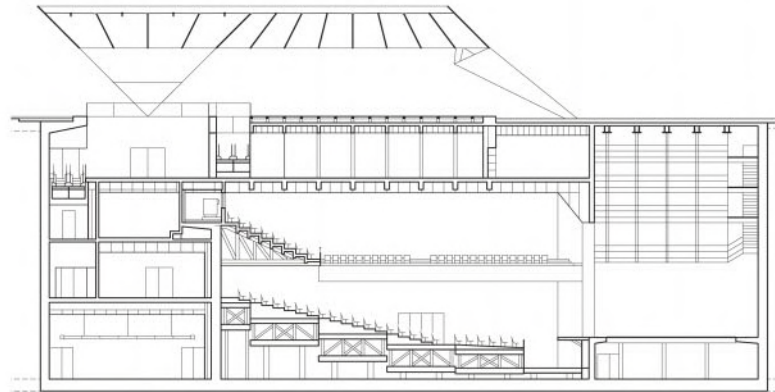
Colinas de Buen, Mexico City

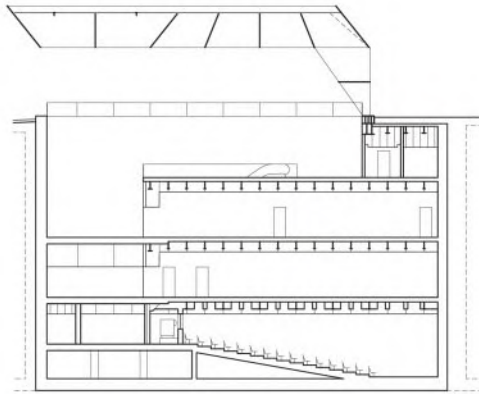
Others involved in the project: see page 644

 www.detail.de



On the Plaza Corso, the centre of a former industrial area that is to be upgraded through the creation of new office buildings, housing and cultural facilities, the Cervantes Theatre “winds” its way eight storeys into the ground. The only visible reference to the structure below, however, is the steel roof, conceived by the Spanish architect Antón García-Abril. This sculptural element creates a counterpoint to the expressive, curved, organic form of the nearby Soumaya Museum by the Mexican architect Fernando Romero. The large-scale grid structure of the theatre roof is constructed – like its smaller counterpart – with interlocking “flat-steel members”. These two-layer sections, reinforced internally with ribs, are 2.85 m high, however, and set at various angles from the vertical. The axial dimensions also differ across the surface of the roof, whereas on the underside, a regular 2.85×4.57 -metre grid exists. To create this structure, steel plates and ribs 12 cm thick were welded together at works to form girders and columns. These were then preassembled in an open space and adjusted. Only after a trial run was the final roof structure erected on an enormous assembly scaffold on site. Slotted together section by section and finally covered with areas of glass laid to a slight falls, the roof sits on four “dancing” piers. As a result, a play of light and shade can penetrate into the depths of the theatre.



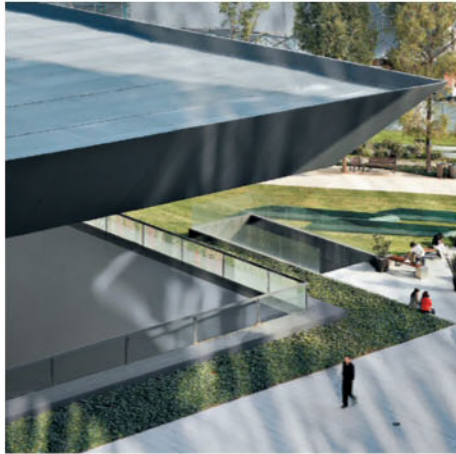


Sections • Floor plans
scale 1:500
Ground floor: Plaza Corso
First basement level
Second basement level

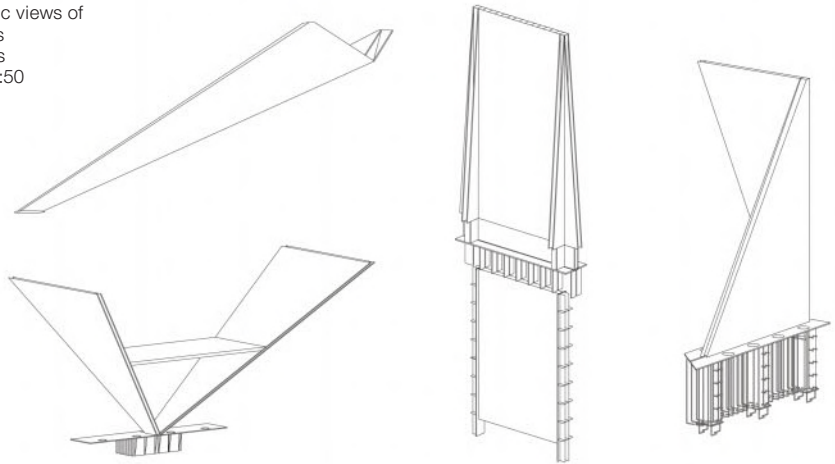
- 1 Forecourt/Access to theatre
- 2 Foyer/Circulation area
- 3 Customer service
- 4 Conference space
- 5 Media centre
- 6 Access to small hall/Stalls
- 7 Theatre foyer
- 8 Stage management
- 9 Main auditorium (void)

bb

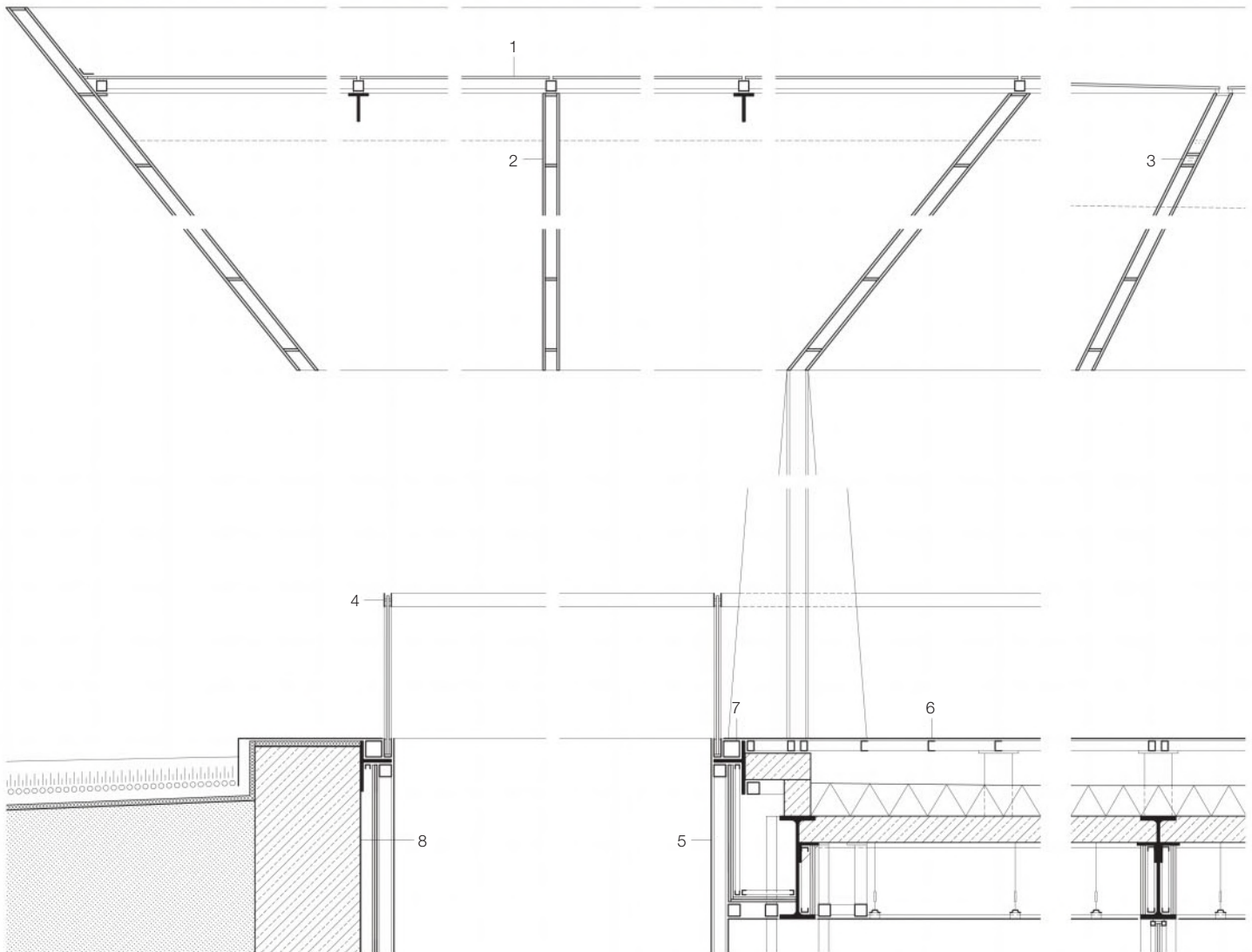


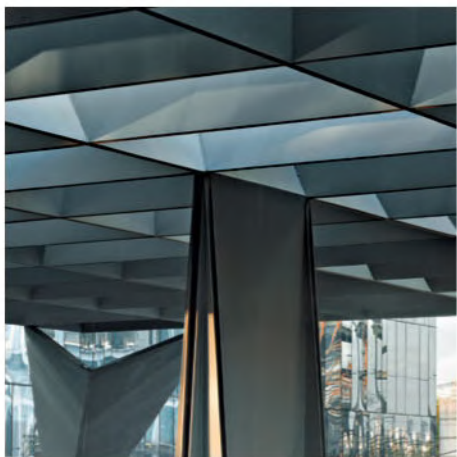


Isometric views of
columns
Sections
scale 1:50

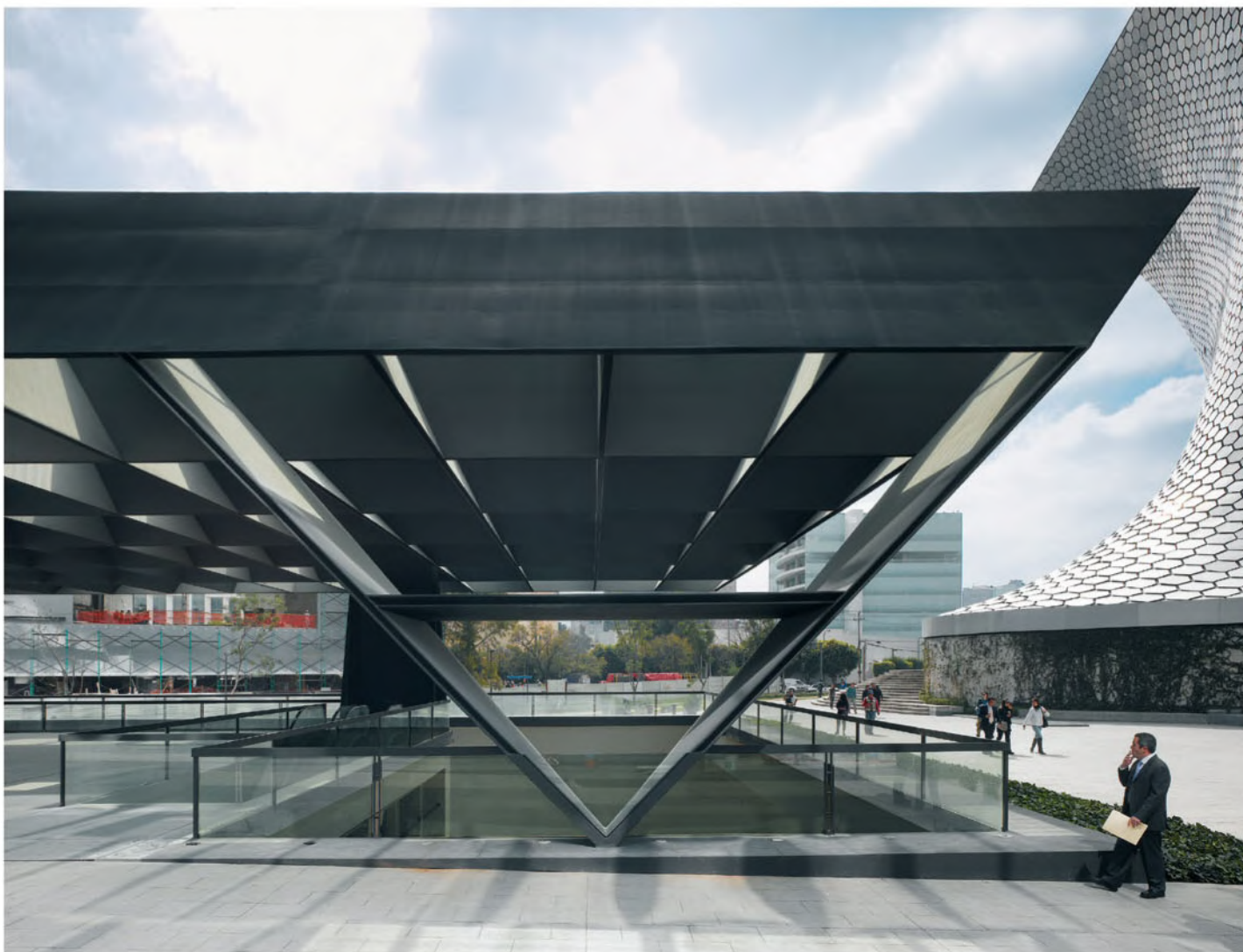
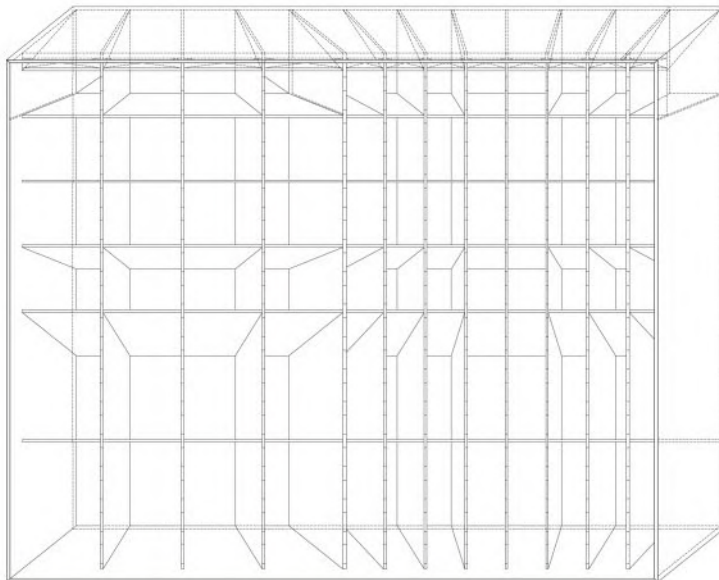
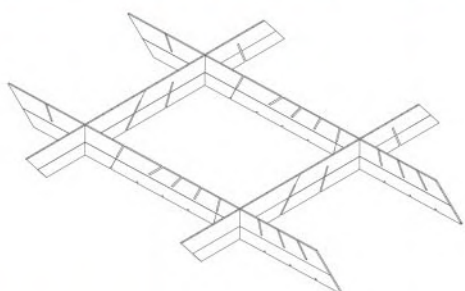


- | | | | | |
|---|--|---|--|---|
| 1 | 2x 9 mm laminated safety glass, extra clear, with PVB layer between 76.2/76.2 mm aluminium SHSs, screw fixed | welded sheet steel with rustproof coating | 103/103 mm horizontal steel SHSs | max. 250 mm insulation to falls |
| 2 | 110/210 mm steel T-sections | 3 3 mm stainless-steel integral gutter | 12.7 mm vertical steel flat | 200 mm reinforced concrete slab with 260/780 mm steel I-beams |
| 3 | 120/2,850 mm main beam, consisting of 2x 12.7 mm | 4 6.35/50.8 mm steel flat handrail | 12.7 mm fibre-cement sheeting | 7 152/152 mm steel load-bearing SHS |
| | | 5 6 mm sheet steel | 5 mm neoprene acoustic layer | 8 800 mm reinforced concrete retaining wall with 6 mm sheet-steel capping |
| | | | 6 floor: 6 mm steel sheeting | |
| | | | 50/103 mm steel channel raising pieces, min. 230 mm high | |





Top view of roof
Sections
Moment diagrams
scale 1:400



Pumping Station in Bochum

Architect:

Heinrich Böll, Essen

Team:

Achim Pfeiffer, Wojciech Trompeta
(project architects)

Hans-Dieter Dressler, Frank Günther,
Birgit Lemmen

Structural engineers:

Lederhose, Wittler & Partner, Dortmund

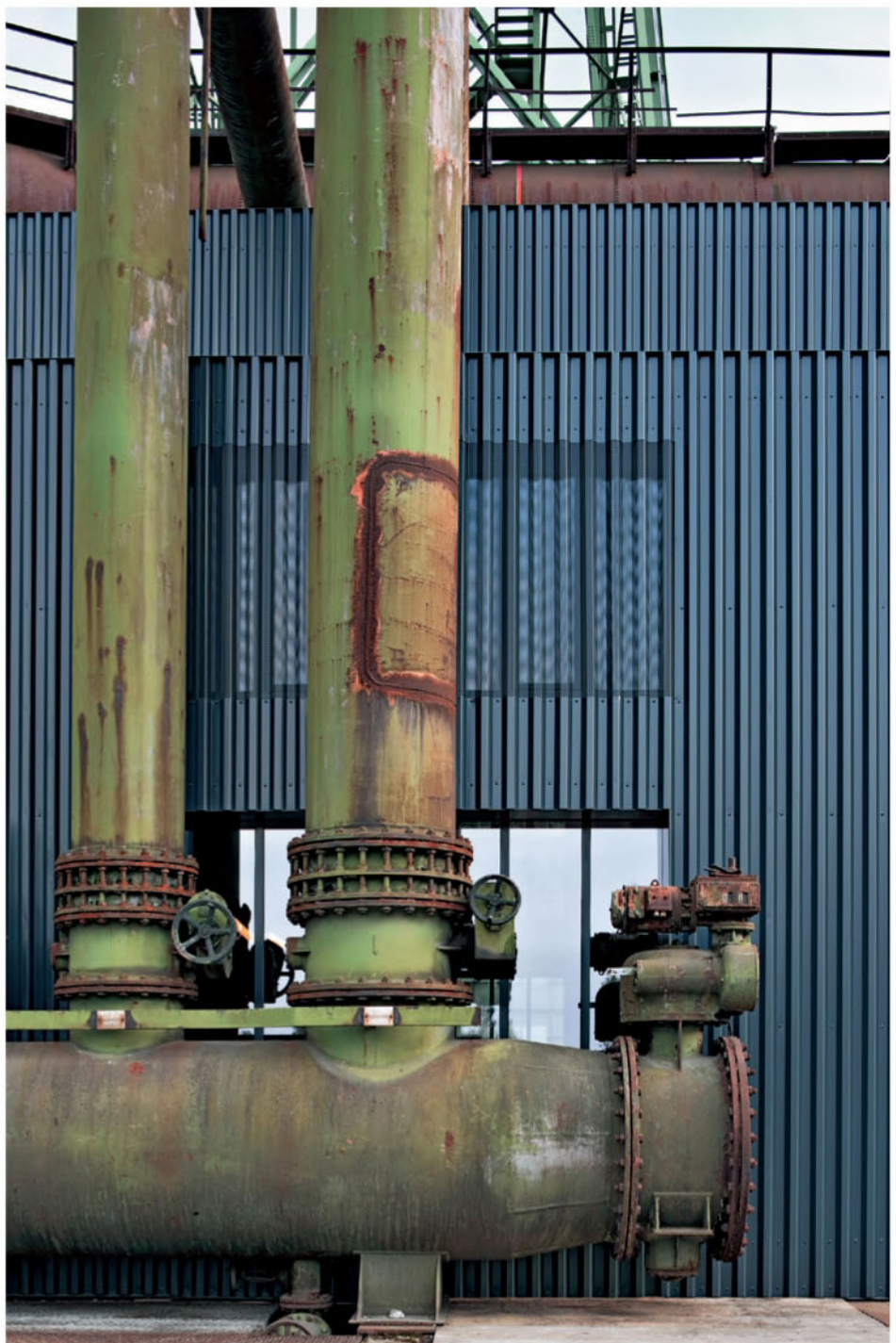
Others involved in the project: see page 644

This small pumping station at the centre of the West Park in Bochum – formerly the location of a steelworks – is situated immediately behind the Centenary Hall, which was rehabilitated in 2003. Whereas the latter was able to establish itself as a venue for the Ruhr Triennial and other events, the pumping station seemed threatened with demolition after its closure a few years ago.

The need for a kitchen and canteen for performers in the Centenary Hall, however, finally aroused an interest in the abandoned building. In response to this, the architects developed a concept in which, in addition to gastronomic facilities, space was provided for a West Park visitor centre. To allow an independent operation of the two areas, the sanitary facilities were set as a dividing element across the width of the column-free internal space.

The construction of the pumping station, consisting of a steel framework with areas of brick infill, did not meet modern-day requirements in terms of thermal insulation; but particularly at those points where the columns of the steel grid occur, an internal layer of insulation would scarcely have been possible without destroying the attractive industrial character of the open hall articulated by its filigree roof trusses with their untreated surfaces. Instead, a new outer skin assumes the functions of thermal and weather protection, while the existing substance remains intact beneath it. Damage caused by corrosion, which was heavy in some places, was eliminated for structural reasons.

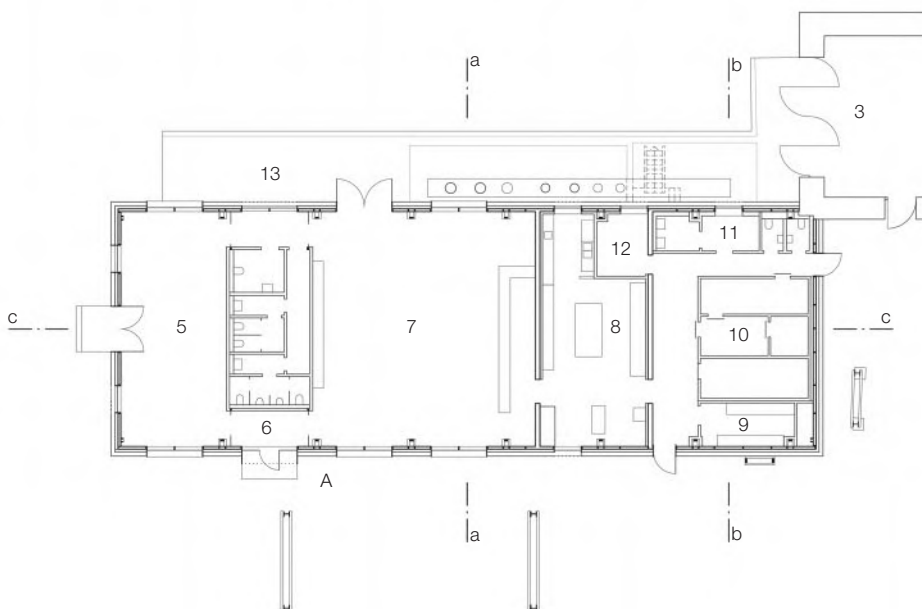
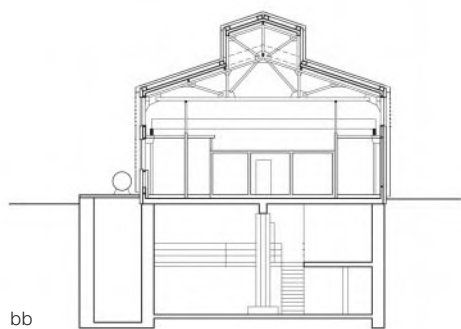
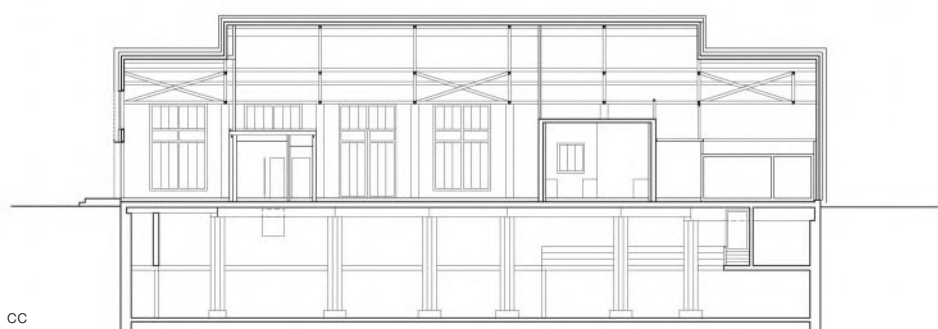
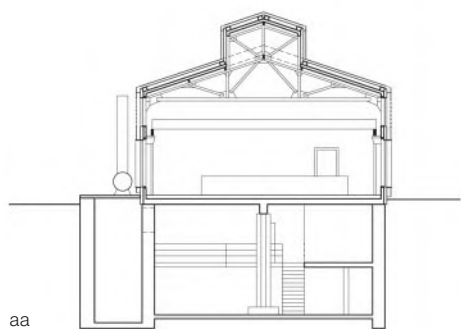
The entire building was covered with a layer of anthracite-coloured, trapezoidal-section steel sheeting fixed to angle supports. The latter are thermally separated from the existing construction. Over the fenestration, the steel sheeting is perforated, and only a few windows are evident as actual facade openings. The careful detailing and execution of the junctions and arrises help to define a sharp-edged, angular building of abstract appearance that, with its reduced formal language, creates an exciting contrast to the agglomeration of steel industrial plants in the area.

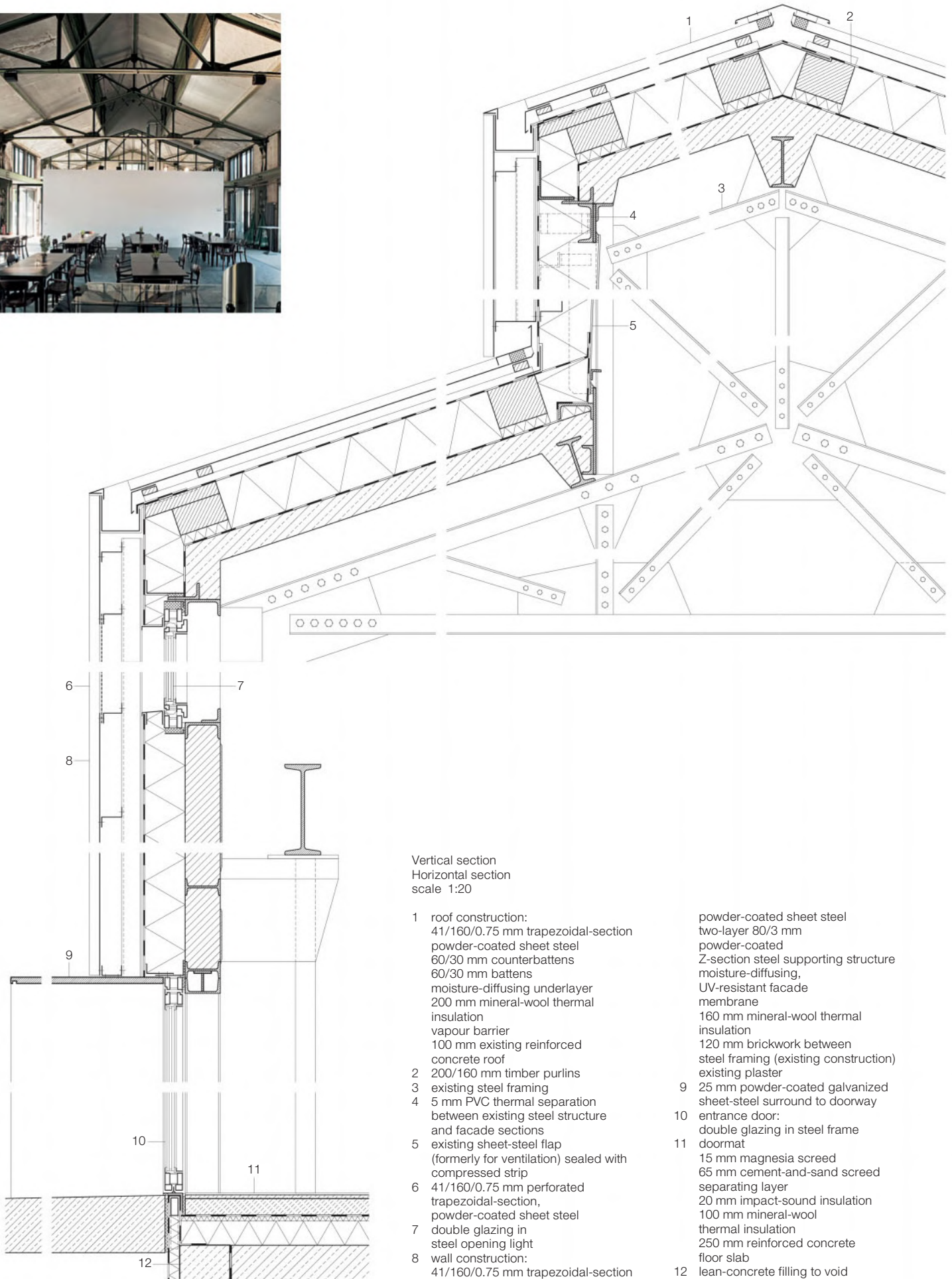




Site plan
scale 1:5000
1 Pumping station
2 Centenary hall
3 Steam-blower house
4 Turbine hall

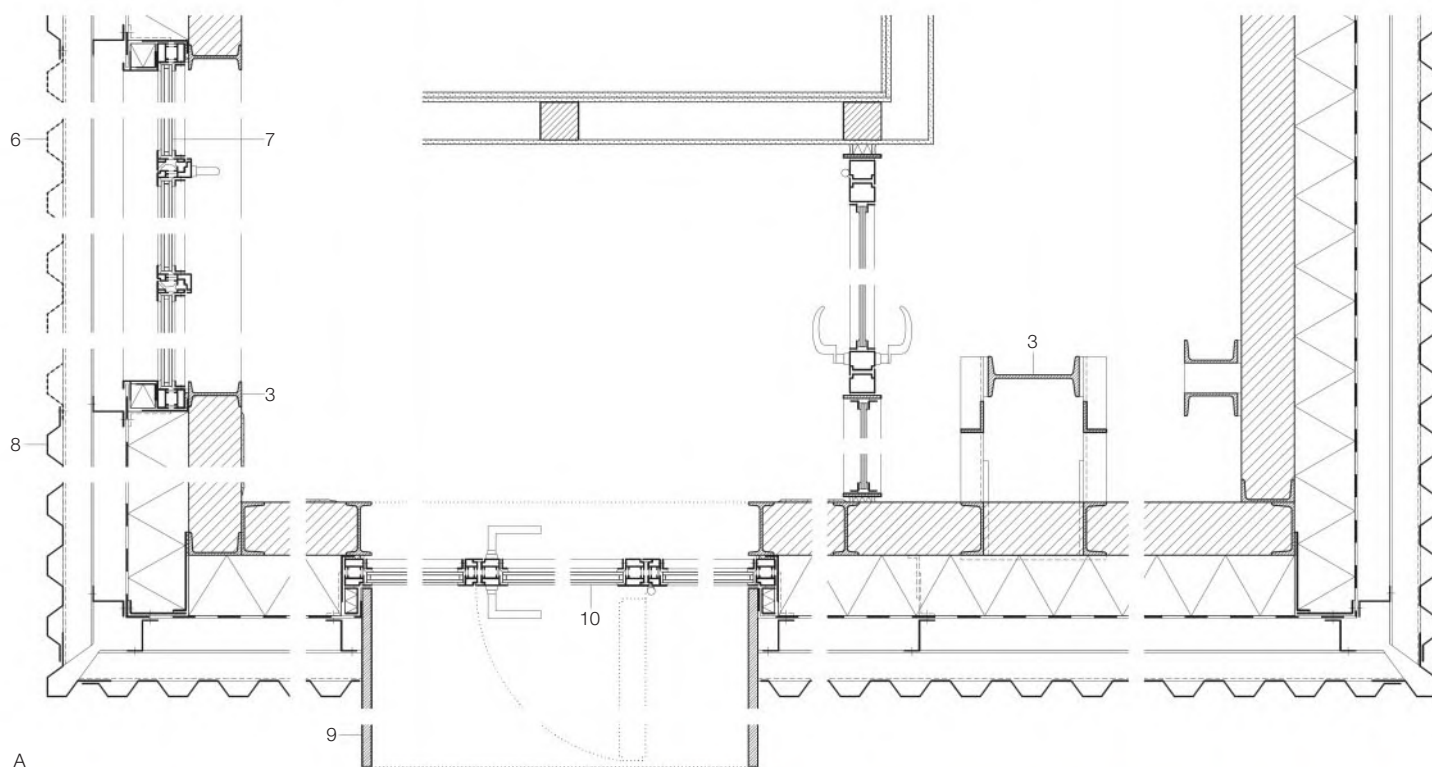
Sections • Floor plan
scale 1:400
5 Visitor centre
6 Main entrance
7 Cafe seating area
8 Kitchen
9 Store
10 Cold store
11 Changing room
12 Staff room
13 Terrace





Vertical section
Horizontal section
scale 1:20

- | | |
|--|---|
| <p>1 roof construction:
41/160/0.75 mm trapezoidal-section
powder-coated sheet steel
60/30 mm counterbattens
60/30 mm battens
moisture-diffusing underlayer
200 mm mineral-wool thermal
insulation
vapour barrier
100 mm existing reinforced
concrete roof</p> <p>2 200/160 mm timber purlins</p> <p>3 existing steel framing</p> <p>4 5 mm PVC thermal separation
between existing steel structure
and facade sections</p> <p>5 existing sheet-steel flap
(formerly for ventilation) sealed with
compressed strip</p> <p>6 41/160/0.75 mm perforated
trapezoidal-section,
powder-coated sheet steel</p> <p>7 double glazing in
steel opening light</p> <p>8 wall construction:
41/160/0.75 mm trapezoidal-section</p> | <p>powder-coated sheet steel
two-layer 80/3 mm
powder-coated
Z-section steel supporting structure
moisture-diffusing,
UV-resistant facade
membrane
160 mm mineral-wool thermal
insulation
120 mm brickwork between
steel framing (existing construction)
existing plaster</p> <p>9 25 mm powder-coated galvanized
sheet-steel surround to doorway</p> <p>10 entrance door:
double glazing in steel frame</p> <p>11 doormat
15 mm magnesia screed
65 mm cement-and-sand screed
separating layer
20 mm impact-sound insulation
100 mm mineral-wool
thermal insulation
250 mm reinforced concrete
floor slab</p> <p>12 lean-concrete filling to void</p> |
|--|---|



Garden Pavilion in Berlin

Architects:

Barkow Leibinger, Berlin

Team:

Tobias Wenz (project architect), Gustav

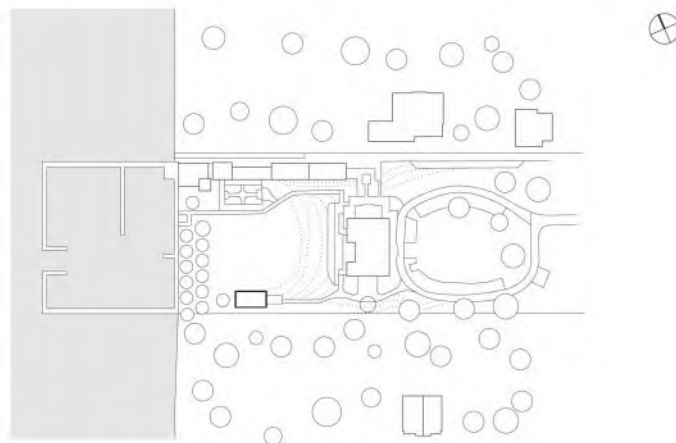
Düsing, Ulrich Fuchs, Annette Wagner

Structural engineers:

Hörnigke-Hock-Thieroff (HHT), Berlin

Others involved in the project: see page 644

 www.detail.de



This fully glazed pavilion with clear rectangular lines and a white-painted steel structure stands before a stock of old trees on the edge of a park. The refined technical character of the pavilion is accentuated by the fact that it seems to hover above the grass – an artefact in pictorial surroundings. Architects familiar with building history may be reminded of Mies van der Rohe's Farnsworth House in Illinois, but the new Fellows Pavilion of the American Academy in Berlin differs from that icon of modern architecture both in its spatial and constructional concept. Situated on the shores of Wannsee, the filigree structure was erected where a bathing house had once stood next to the

old garden wall leading to the lake, a building that had ultimately been left unoccupied. Functionally, the new pavilion is a response to the lack of space in the historical main academy building nearby, which stands somewhat elevated on a hill. A central corridor provides access to seven studies for scholarship holders as well as a small kitchen. The spaces are divided from each other by wooden-clad partitions, while the walls separating the rooms from the corridor and the sliding doors on the outer faces are glazed, with curtains affording privacy. The external timber deck acting as a peripheral veranda is continued internally in the form of parquet flooring. The floor layout is strikingly

simple, in contrast to that of the roof, where shallow gables articulate all four sides of the building. The symmetrical plan of the roof radiating from the centre is divided into four rectangles, each of which consists of a double-curved surface in the form of a hyperbolic paraboloid. The geometry, four axes turned in counterdirections, results in four elevated points – one in the middle of each side of the roof – and four low points at the corners of the building. Surprising perhaps is the fifth sunken point at the centre of the roof. The overall form is most clearly legible from outside at dusk when the interior is illuminated. Over the partitions and the glazed facades, the roof area is divided by joints in-

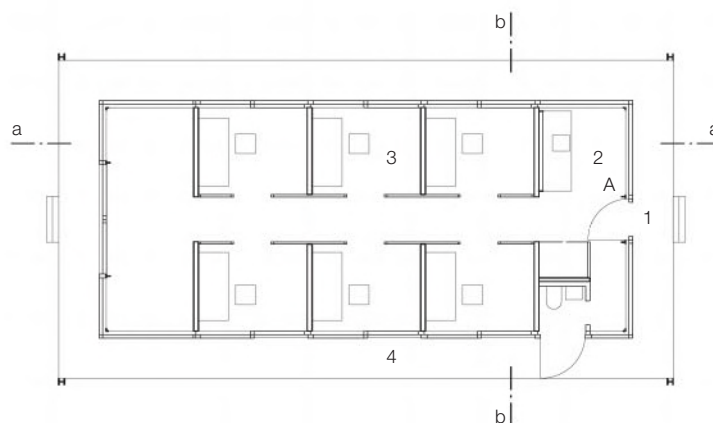
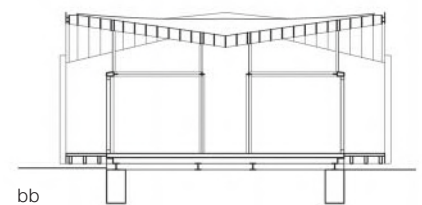
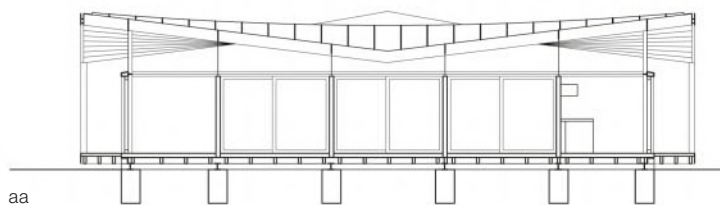




to nine prefabricated framed elements. In the longitudinal direction, the underside is articulated by double-layer steel ribs, each comprising two 5 mm thick walls welded to 10 mm central distance pieces. This intersecting form of construction permits an invisible bolt fixing of the roof structure to the distance pieces. The roof skin consists of narrow sheet-steel members that are fixed to the beams with metal strips. In view of the curved surfaces of the roof, it would have been necessary to cut the roofing members in a minimally trapezoidal form. Because of the large number of elements, however, and with the tolerances that the rectangular strips allowed, it was possible to absorb any

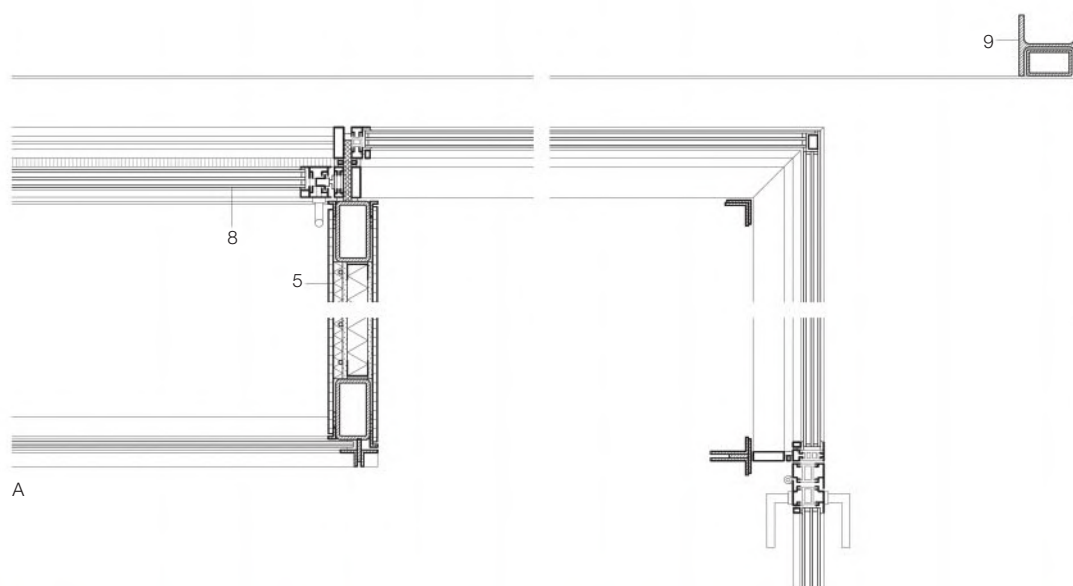
deviations of form. To ensure a proper drainage of the roof to the edges, the thickness of the sprayed-on insulation at the centre of the building (i.e. at the lowest point of the roof) was increased to such an extent that falls were created along the diagonals, at the ends of which the incisive corner columns conduct rainwater down to the ground. Despite the appearance of the building, the roof does not bear solely on these corner columns. They are, in fact, structurally overdimensioned and are meant to form a visual link between the ground slab and the roof, thereby suggesting an integral volume. A large part of the roof loads are carried by 16 narrow steel channels at the ends of the

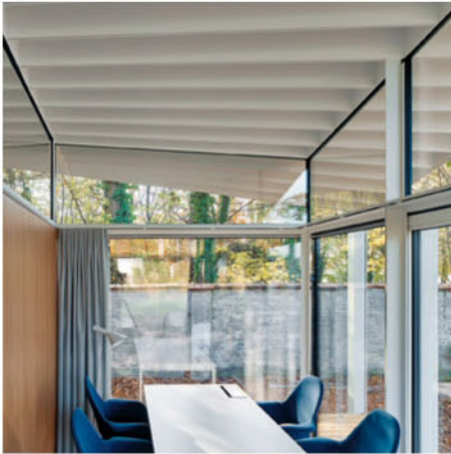
partitions and transmitted down to the floor, where they are borne by steel I-beams. The partitions, which provide cross-bracing and accommodate the heating elements, are therefore an integral part of the structural system together with the columns. Neither a free layout independent of the load-bearing structure nor a continuous, flowing space – a central theme of Mies van der Rohe's masterwork of 1951 – are relevant features of the Berlin pavilion. What is celebrated here is the roof, formulated in a strictly geometric architectural language. In conjunction with the regular, symmetrical layout, it forms an elaborately constructed, carefully detailed composition.



Site plan
scale 1:4000
Sections
Floor plan
scale 1:200

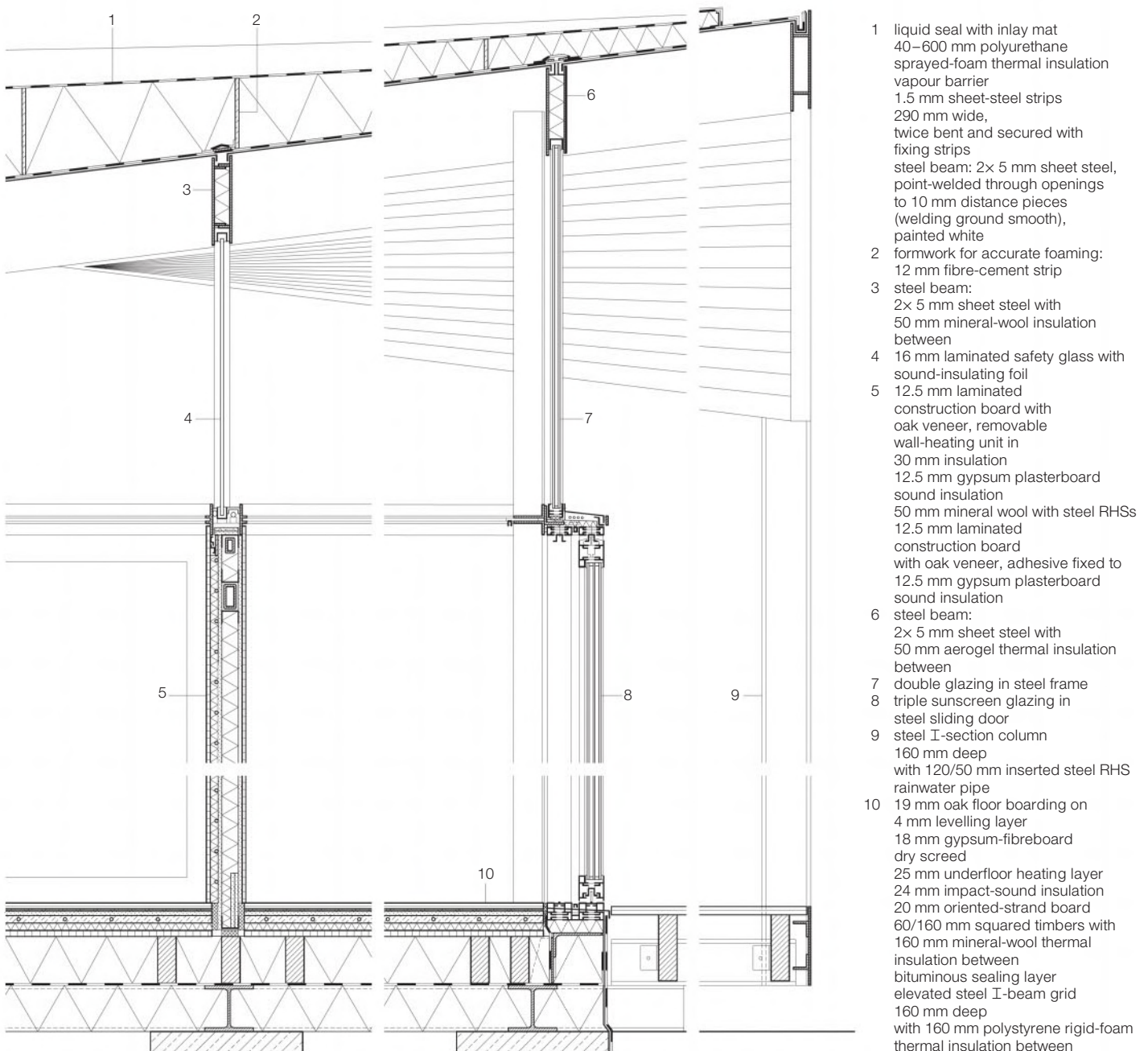
- 1 Entrance
- 2 Kitchenette
- 3 Study
- 4 Veranda

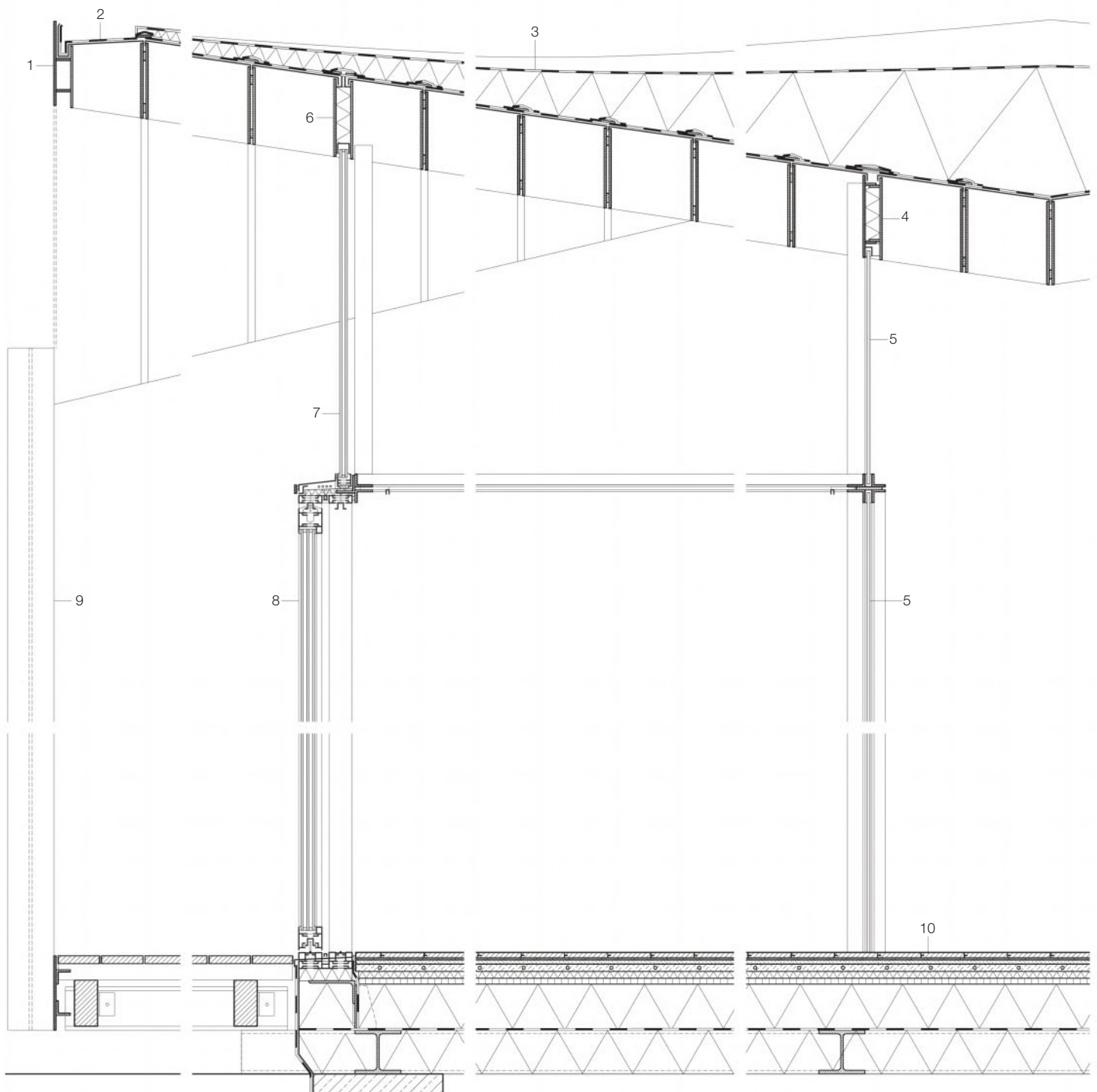


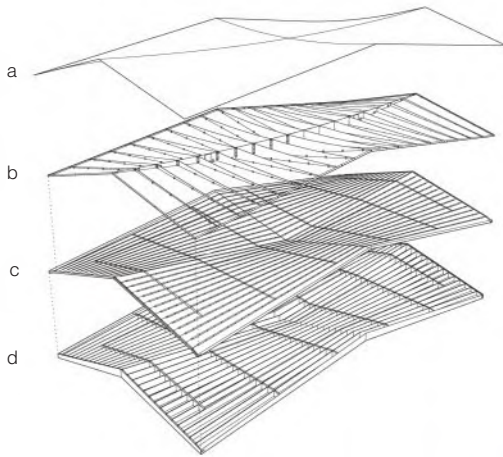


A view of the roof elements at work reveals the welded, bolted and slotted joints as well as the thermal separation at the connection points.

Horizontal section
Vertical section
scale 1:20







Exploded drawing showing the four layers of the roof construction:

- a sprayed polyurethane foam thermal insulation
- b slits/formwork for injecting foamed insulation
- c sheet-steel strips with fixing strips
- d roof structure: nine prefabricated elements

Vertical section
scale 1:20

- 1 5 mm welded steel eaves plate
- 2 1.5 mm sheet-steel gutter
5× bent to shape, secured with fixing strips
- 3 liquid seal with inlay mat
40–600 mm polyurethane sprayed-foam thermal insulation with formwork strips for accurate foaming
12 mm fibre-cement sheeting vapour barrier
1.5 mm sheet-steel strips
290 mm wide, twice bent and secured with fixing strips
steel beam:
2× 5 mm sheet steel point-welded through openings to 10 mm distance pieces (welding ground smooth), painted white
- 4 steel beam:
2× 5 mm sheet steel with 50 mm mineral-wool insulation between
- 5 16 mm laminated safety glass with sound-insulating foil
- 6 steel beam:
2× 5 mm sheet steel with 50 mm aerogel thermal insulation between
- 7 double glazing in steel frame
- 8 triple sunscreen glazing in steel sliding door
- 9 steel I-section column
160 mm deep with 120/50 mm inserted steel RHS rainwater pipe
- 10 19 mm oak floor boarding on 4 mm levelling layer
18 mm gypsum-fibreboard dry screed
25 mm underfloor heating layer
24 mm impact-sound insulation
20 mm oriented-strand board
60/160 mm squared timbers with 160 mm mineral-wool thermal insulation between
bituminous sealing layer
elevated steel I-beam grid
160 mm deep with 160 mm polystyrene rigid-foam thermal insulation between



Main Building in Óbidos Technology Park

Architect:

Jorge Mealha, Carcavelos

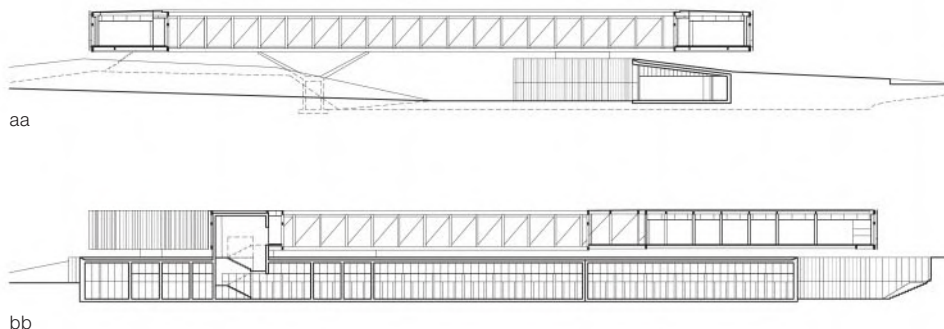
Team:

Andreia Batista, Carlos Paulo, Diogo Oliveira Rosa, Filipa Ferreira da Silva, Filipa Collot, Gonçalo Freitas da Silva, Inês Novais

Structural engineers:

JFA Engenharia, Oporto

Others involved in the project: see page 644

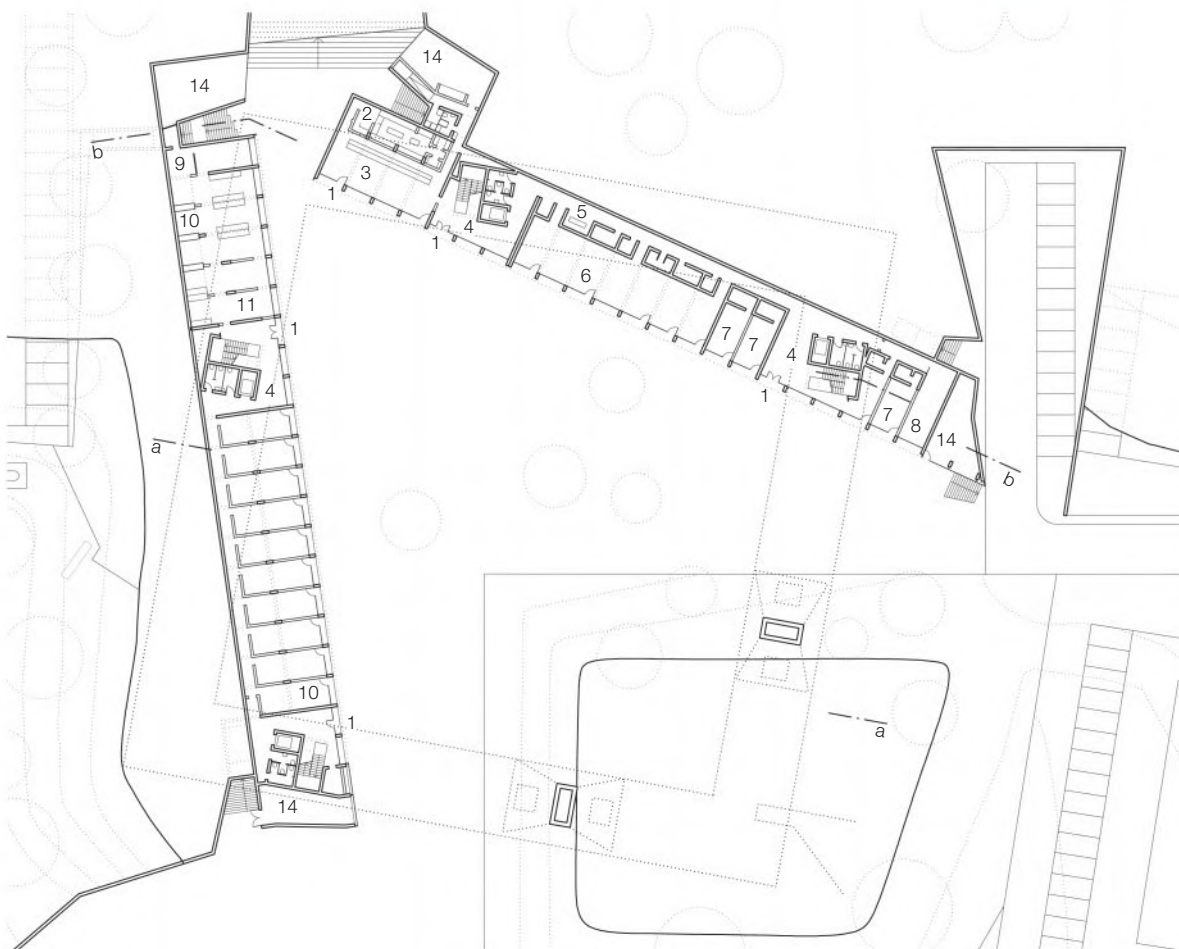
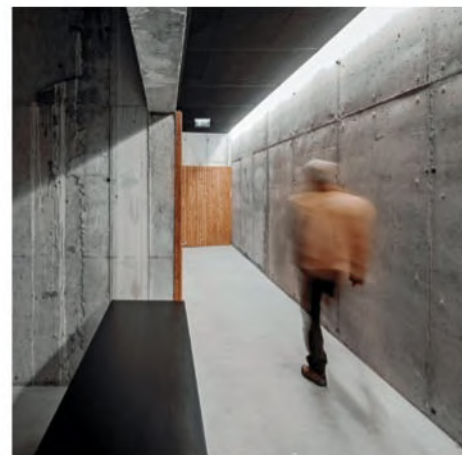
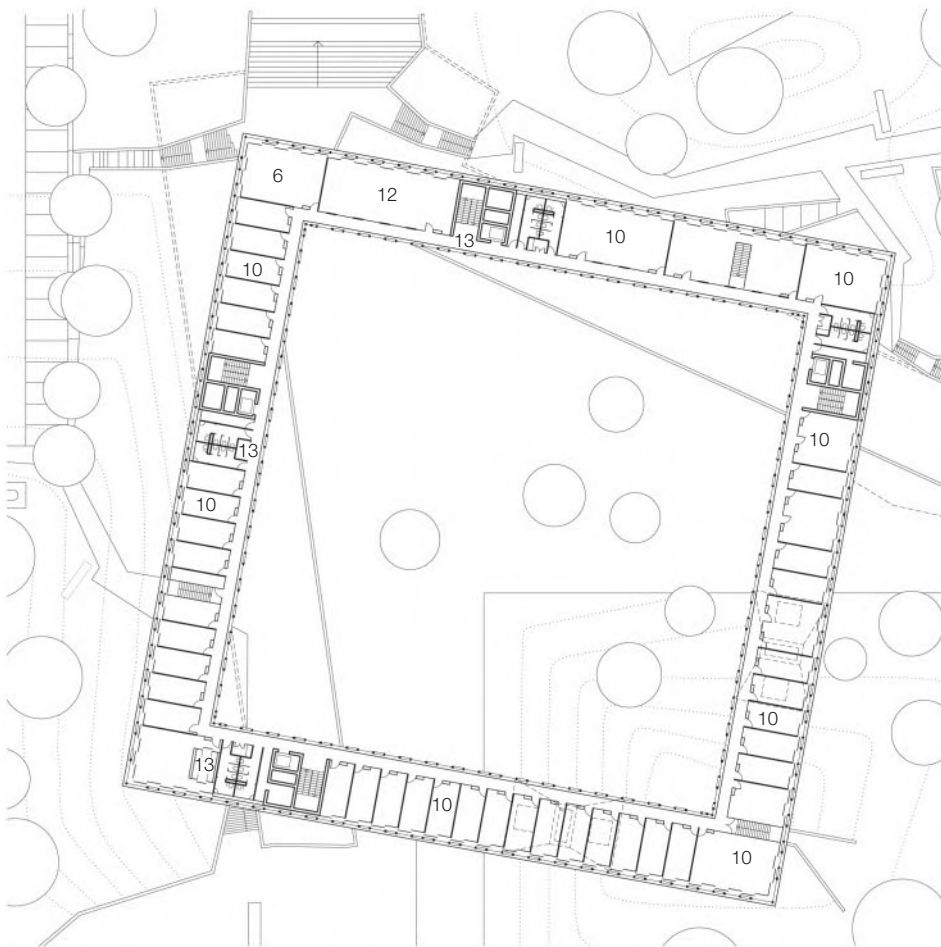


The competition brief for the new technology centre in Óbidos, Portugal, proposed an office building for small start-up firms, with a central “piazza” that forms the heart of the scheme and will act as a link to future extensions. The architects therefore set themselves the difficult task of creating a public open space on the periphery of this small town, which is set in rural surroundings. In the absence of an urban environment, they took as a point of reference the “terreiros” – the open village squares typical of the region – where many social activities take place, such as markets, concerts, village festivals and the like. Formally, however, the architects drew their inspiration above all

from the cloistered courtyards of the large monasteries in the area. They developed a horizontal structure laid out about a square court and raised upon a plinth storey that is sunk partially in the ground. On the elevated “cloister” level, an arcade provides access to a series of small office units, while beneath this, spaces with communal functions, such as conference rooms and a restaurant, open on to the piazza at the lower level. The peripheral office structure, square on plan, is borne by five staircases and a pair of struts that rise from an artificial mound. The ring of offices is contained within a storey-height steel trussed girder made up of white-painted I-sections and diagonal tubu-

lar members. Internally, the girders are unclad, and the glazing to the arcade allows an unimpeded view of the courtyard. Externally, perforated white metal scaffolding decks provide a visual screen as well as weather protection for the facade. The outer skin is also applied to the solid construction of the plinth storey in the form of preoxidized elements of various widths. Rough exposed-concrete surfaces dominate within the communal realm, accentuated by black-painted areas that mark the central zones such as staircases and the reception. Metal filings strewn in the concrete floors will oxidize in the course of time and assume the reddish coloration of the steel facades.

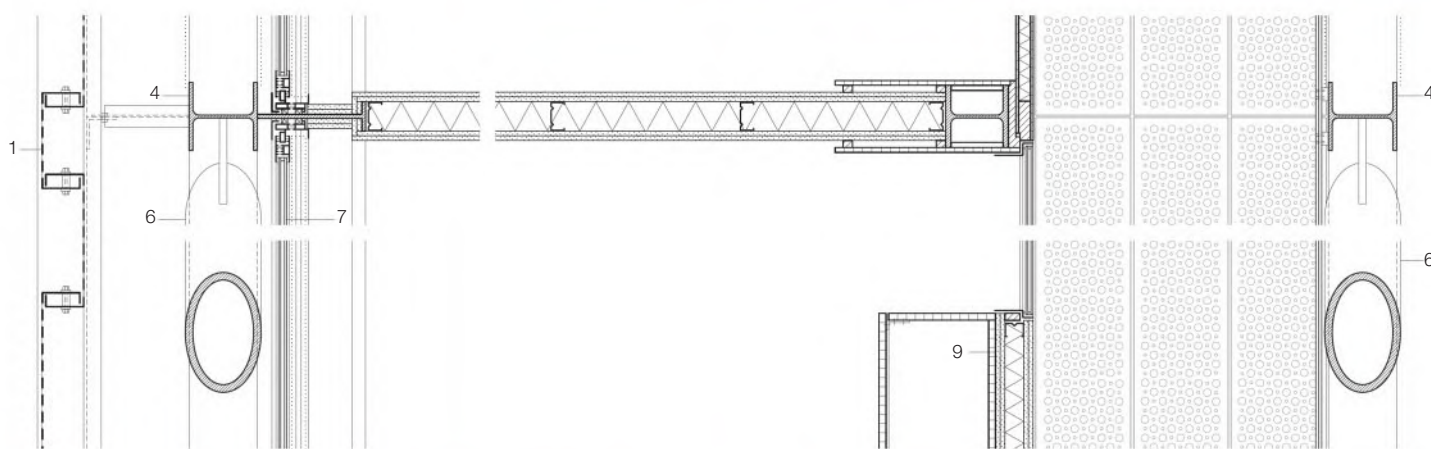




Sections
Floor plans
scale 1:750

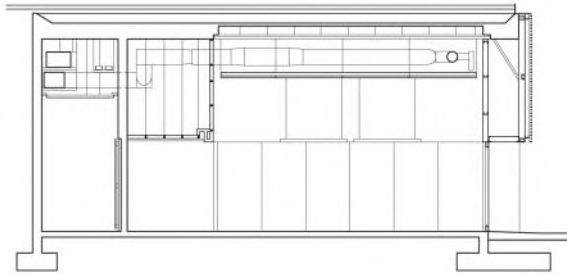
- 1 Entrance
- 2 Kitchen
- 3 Restaurant
- 4 Atrium
- 5 Reception
- 6 Assembly room/
Multipurpose
space
- 7 Shop
- 8 Data centre
- 9 Store
- 10 Office
- 11 Fabrication lab
- 12 Administration
- 13 Recreation area
- 14 Mechanical
services

Horizontal section
Vertical section
First floor ring girders
scale 1:20



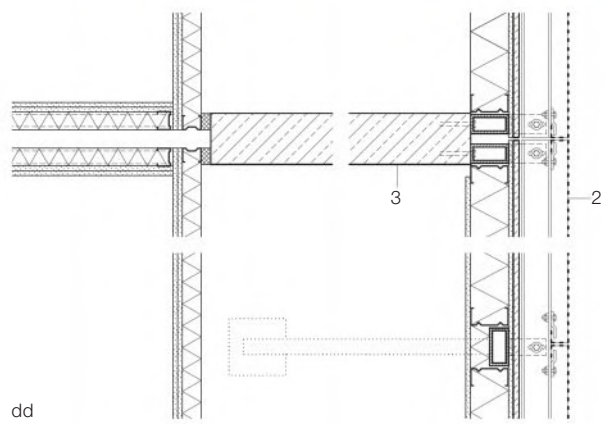
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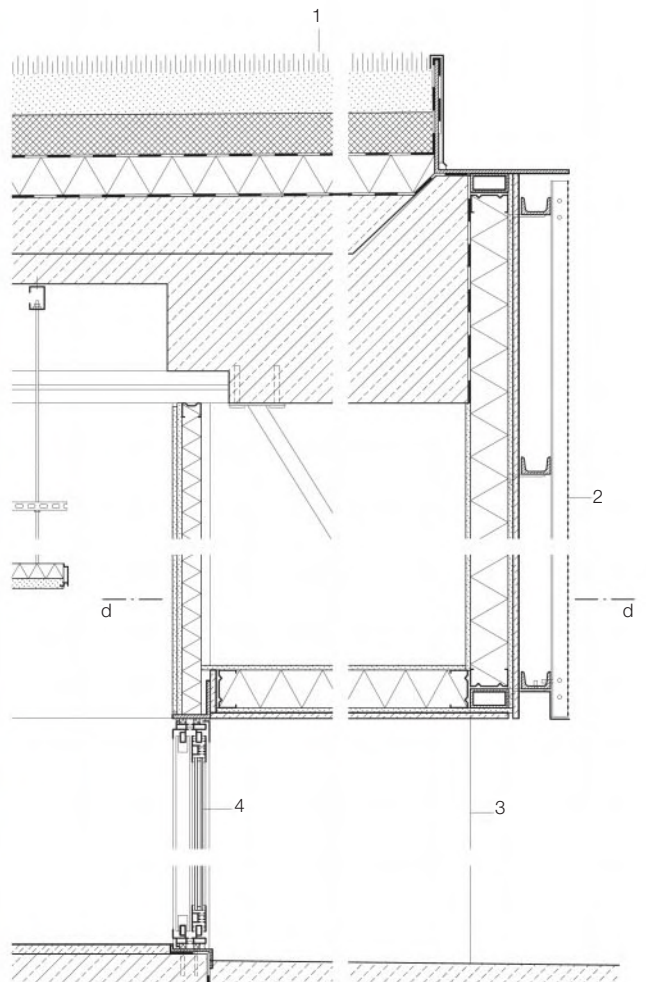


Vertical section scale 1:200
Horizontal and vertical sections
scale 1:20

- | | | |
|---|--|--|
| 1 | 100 mm vegetation layer
100 mm topsoil
geotextile drainage layer
100 mm thermal insulation
vapour barrier
150 mm concrete topping to falls
360 mm reinforced concrete roof | 12.5 mm gypsum plasterboard
100 mm polystyrene
rigid-foam thermal
insulation between
100/50 mm steel RHSs
12.5 mm gypsum plasterboard |
| 2 | 2,855/475/50/3 mm preoxidized
sheet steel with
embossed perforations
80/45/6 mm steel channels
15 mm cement board | 3 700/465 mm reinforced
concrete division |
| | | 4 sliding door with glazing in
aluminium frame:
2x 6 mm toughened glass +
12 mm cavity |



dd



Micro-Apartment Block in Seoul

Architects:

SsD, New York

Jinhee Park, John Hong

Team:

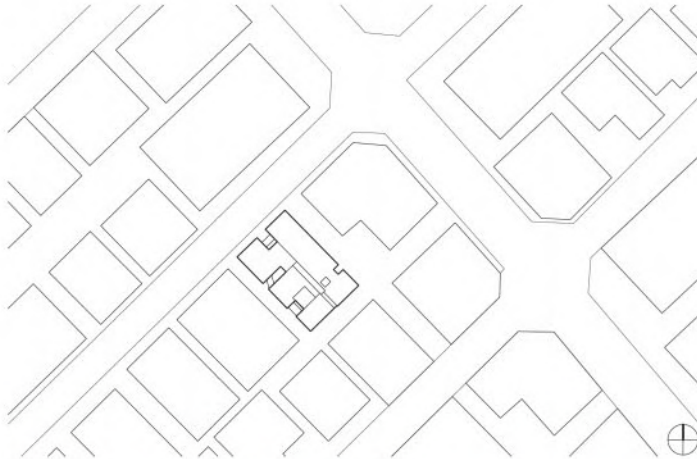
Seung-hoon Hyun (project architect),
Taylor Harper, Allison Austin, Evan Cerilli,
Mark Pomarico, Yufeng Zheng,
Victor Michel, Virginia Fernandez Alonso

Structural engineers:

Mirae Structural Design Group,
Rochester MN

Others involved in the project: see page 645

 www.detail.de



Site plan
scale 1:1000

In South Korea, most young adults live at home with their parents until they get married, at which point, many look for flats with a number of rooms in the cities. South Korean society is changing, however, and the demand for micro-apartments is growing, especially in Seoul. Large construction concerns in particular profit from marketing this kind of housing. As an alternative, architects Jinhee Park and John Hong succeeded in convincing the private clients Songpa Micro-Housing with an especially flexible concept for a target group that has an affinity to art. Housing cubes only 11 square metres in area were stacked on top of each other up to six storeys high, pushed into a skeleton structure consisting of steel girders of various cross-sections. This form of construction is extremely flexible and suited to different loading situations. The units were slid like boxes, seemingly arbitrarily, into the steel framework, offset to each other in part at the sides, front and back. As a result of this irregular layout, various intermediate and open zones were created. Together with the wide corridors, these afford space for social encounters and events.

The cubes, consisting of lightweight concrete, insulation and grey cement slabs, are masked by an outer weather skin of twisted stainless-steel strips, which envelop the volume homogeneously and create the requisite privacy. Within the apartments, peripheral, top-light strips open up the spatial confines, and Jinhee Park has contributed her experience as an industrial designer in the form of tailor-made folding and sliding inbuilt furnishings. The enthusiastic client changed many of his plans in the course of the construction and reserved an entire storey at short notice for his daughter. On the first floor, he created an art gallery that attracts passers-by into the building from the plaza. The latter was really foreseen as an obligatory parking area, but it also provides a venue for various events. From here, a broad staircase leads down to a cafe and auditorium – also newly conceived. In this way, the structure had to demonstrate its flexibility before it had even opened.





Sections
Floor plans
scale 1:400

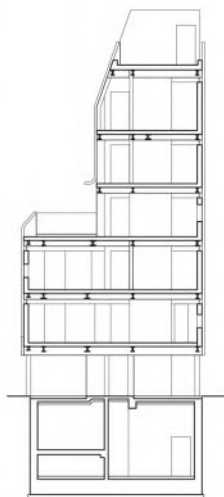
1 Parking deck/Events

2 Seating tiers/Stairs
to cafe and
auditorium
3 Bicycle stands
4 Roof light over cafe

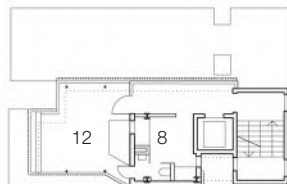
5 Access to gallery
and apartments
6 Gallery
7 Void
8 Apartment

9 Communal area/
Corridor
10 Balcony
11 Bridge
12 Terrace

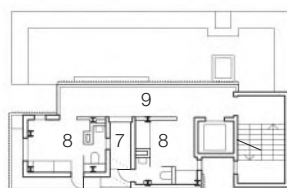
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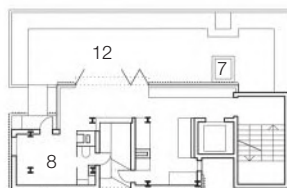
Fifth floor



Fourth floor



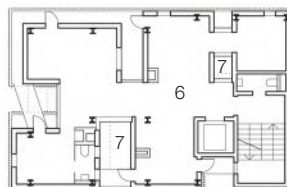
Third floor



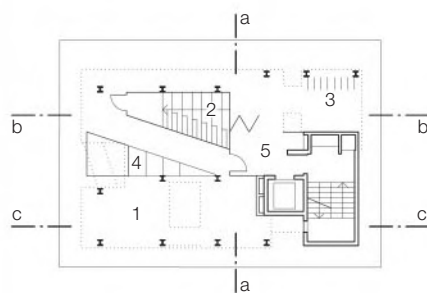
Second floor



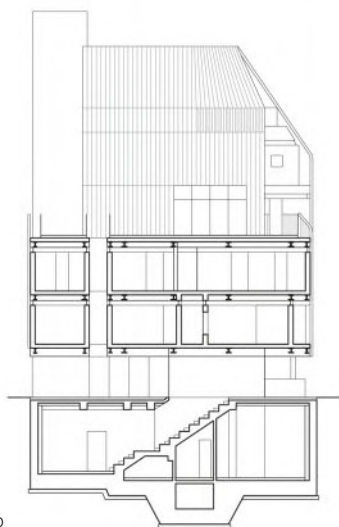
First floor



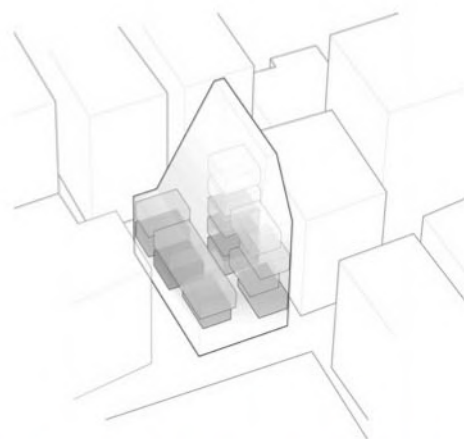
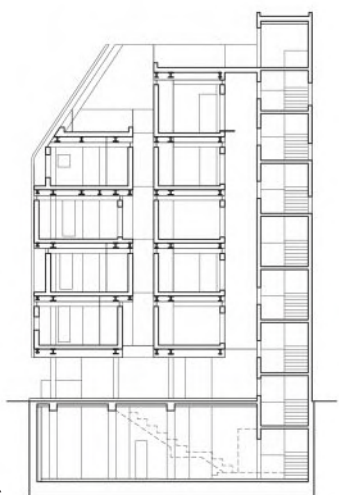
Ground floor

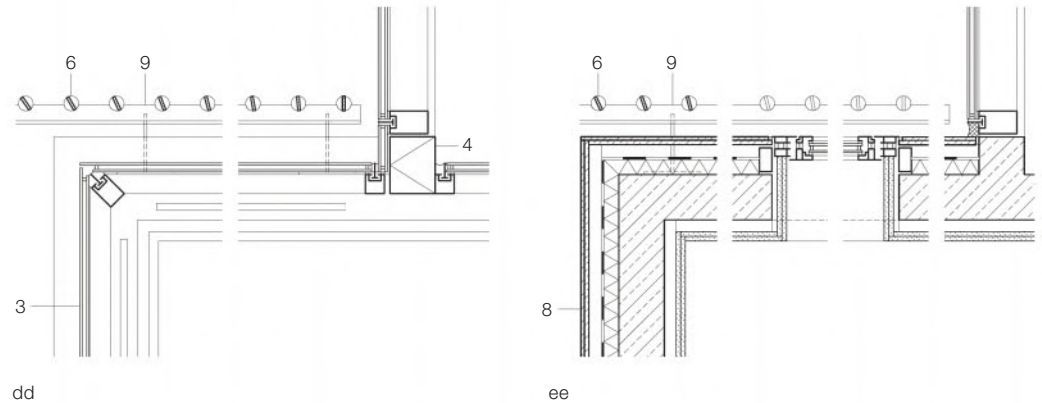


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cc





Horizontal sections
Vertical section
scale 1:20

- 1 roof construction:
20 mm mahogany boarding
20 mm battens
waterproof membrane,
adhesive fixed
100 mm thermal insulation
liquid membrane
150 mm reinforced
concrete roof
160 mm permeable thermal
insulation
120/250 mm steel I-beams
80 mm aluminium channel
sections
2x 12.5 mm gypsum
plasterboard
- 2 facade screen:
3 mm sheet aluminium
2x 20/20 and
50/50 mm
aluminium SHSs
sealing layer,
adhesive fixed
40 mm thermal insulation
- 3 window:
low-E double glazing:
2x 6 mm toughened glass +
12 mm cavity in 50/50 mm
aluminium frame
- 4 120/140 mm aluminium
insulating panel
- 5 floor construction:
12 mm hardwood parquet
35 mm underfloor heating
layer
150 mm reinforced
concrete floor
30 mm impact-sound
insulation
- 6 38/5 mm sheet stainless-steel
twisted strips
- 7 light fitting:
LED
- 8 facade construction:
9 + 12 mm fibre-cement sheeting
40 mm cavity/battens
sealing layer, adhesive fixed
40 mm rigid-foam insulation
between
60/40 mm steel RHSs
110 mm aerated concrete
20 mm battens
2x 12.5 mm gypsum
plasterboard
- 9 removable stainless-steel
supports
- 10 150/150 mm steel
I-beam
- 11 supporting structure:
50/50 mm steel SHSs
- 12 250/250 mm steel
I-beam





EU Council Headquarters in Brussels

Architects and engineers:
Philippe Samyn + Partners,
Brussels,
lead and design partners,
in collaboration with
Studio Valle Progettazioni
BuroHappold
Others involved in the project: see page 645



The building reveals itself to full effect at dawn and dusk, when the ellipsoid form becomes evident that is otherwise concealed behind the open facade. As the centrepiece of the development, this free-standing volume with a total of 13 storeys was the design response to the spatial programme, which required core elements of various sizes. On the first level, for instance, there is a small press room, on the fifth, a conference hall for 250 persons and on the eleventh floor, a restaurant for 50 guests. The elliptical floor plans, with axial lengths of up to 25 metres, are supported by radial steel beams flexibly fixed to vertical girders. Connected to this construction are the

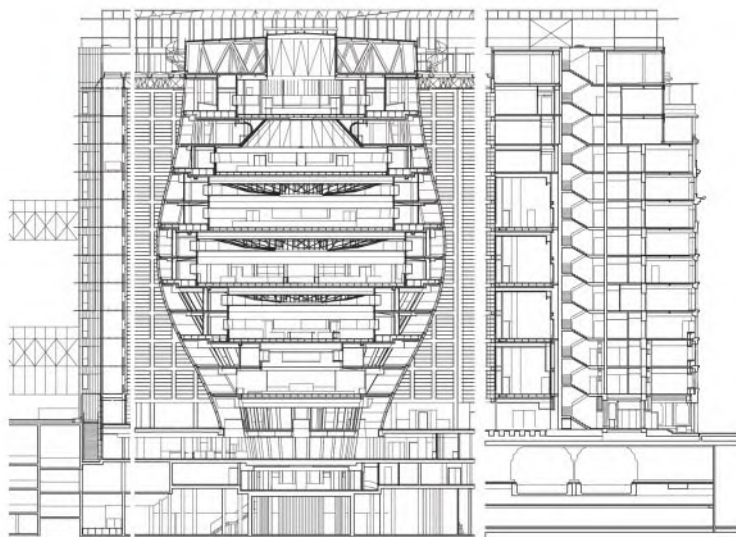
large-scale printed panes of glass that form the closing skin around the conference halls where they overlook the atrium. This glazed "lantern" is enclosed within an outer facade consisting of 3,000 reused oak windows from energy renewal schemes all over the European Union. Assembled in a kind of patchwork arrangement, they cover an area of 4,000 m². At a distance of 2.70 m from this, a second facade layer was created with a rhomboid structure of steel beams. Incorporated at the south-west corner of the development is an L-shaped former housing block dating from the 1920s. Refurbished and increased in height by two storeys, this now contains offices of the EU Council.



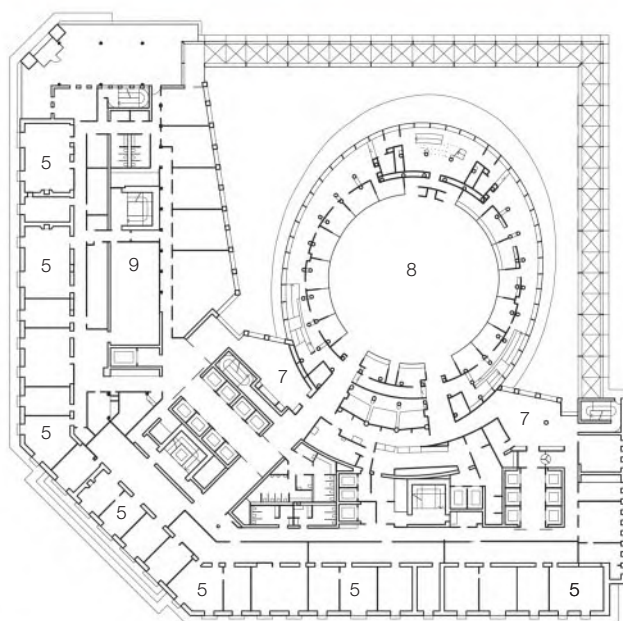
Site plan
scale 1:10,000
Section
Floor plans
scale 1:1000

1 Main entrance
2 Visitors' entrance

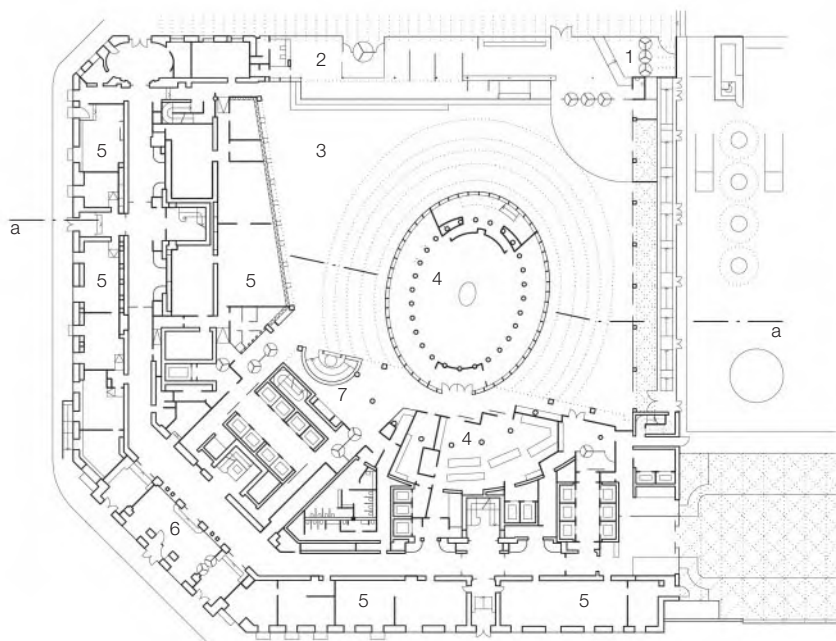
3 Atrium
4 Cafeteria
5 Office
6 Press access
7 Foyer
8 Conference hall
9 Discussion space



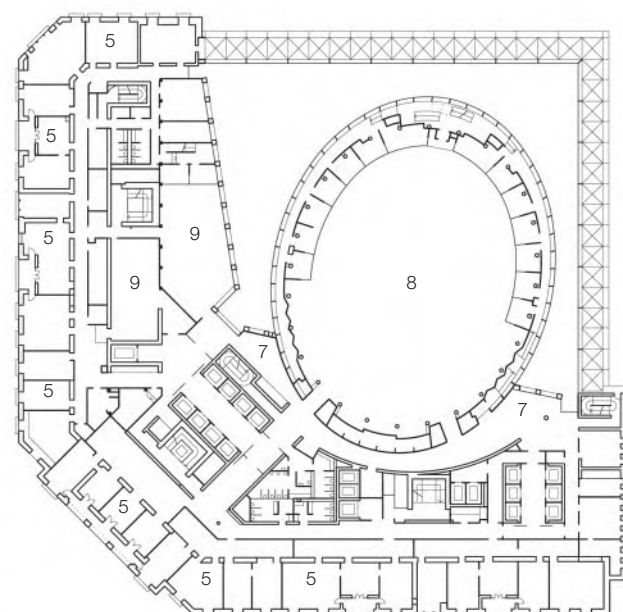
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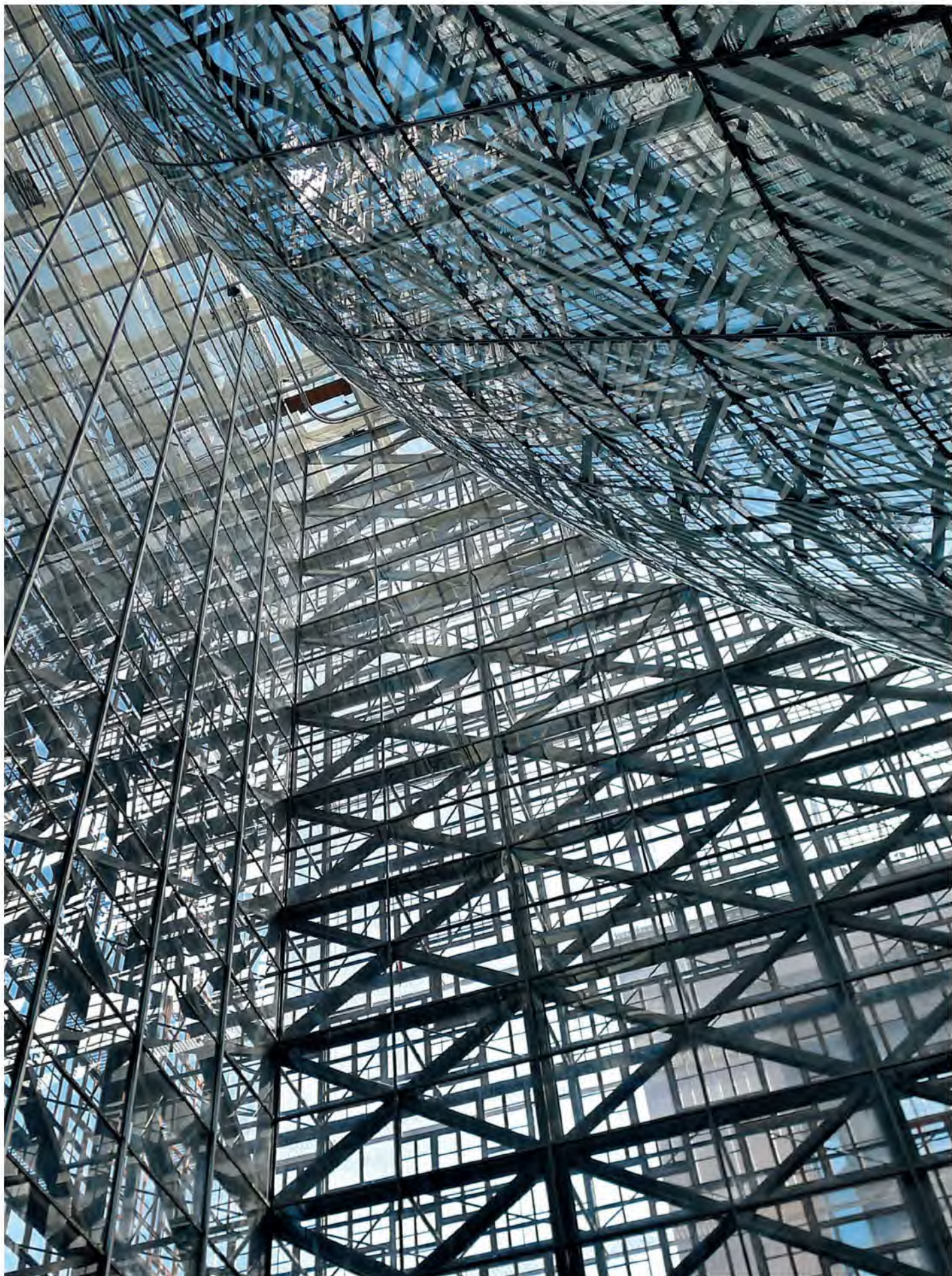
Ninth floor

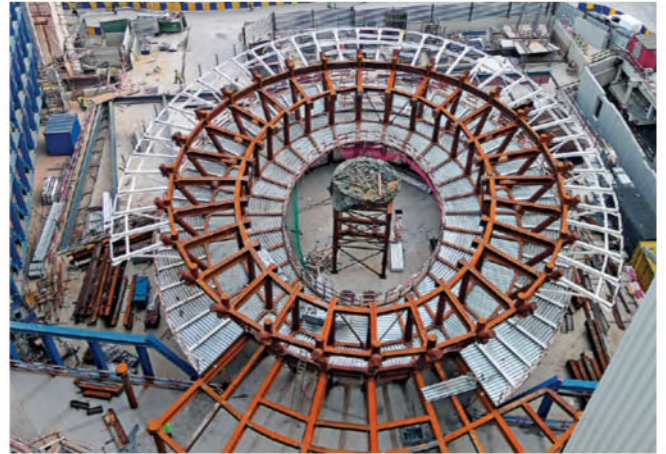
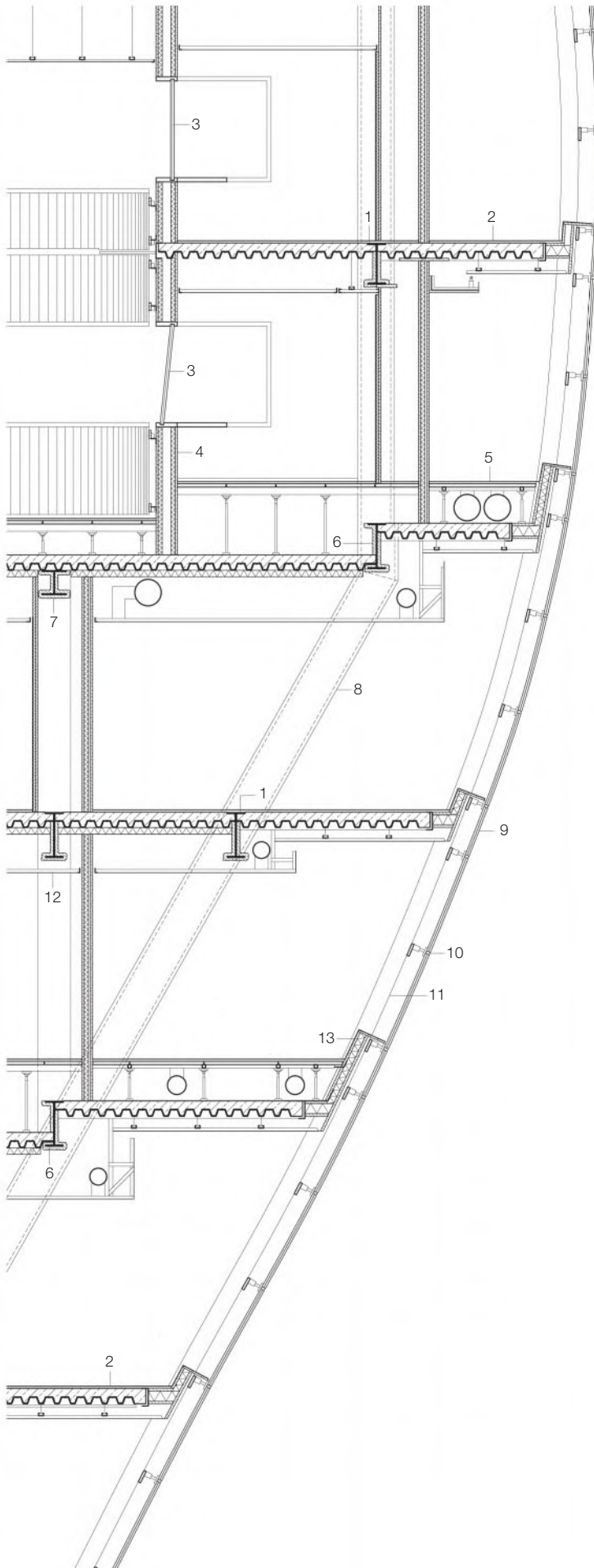


Ground floor



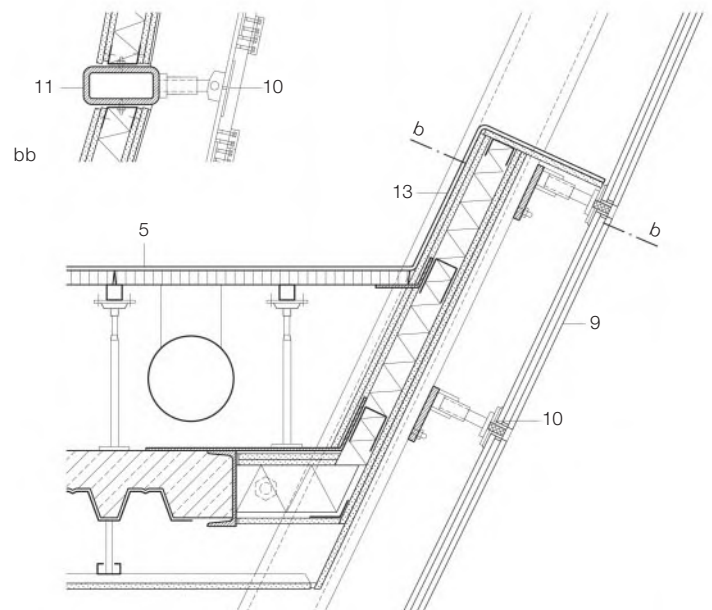
Fifth floor

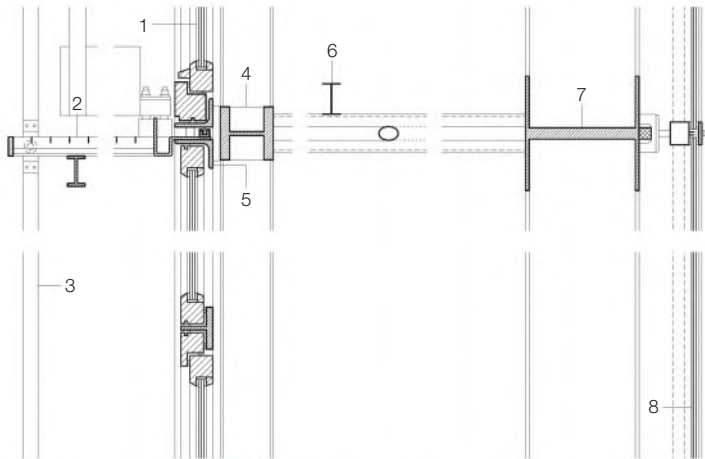




Sections
scale 1:75
scale 1:20

- 1 peripheral steel I-beam 500 mm deep with fire-resisting sheathing
- 2 10 mm carpet
- 185 mm reinforced concrete composite floor on supporting construction
- suspended plasterboard soffit
- 3 laminated safety glass to interpreter's cabin: 8 + 12 + 10 + 10 mm
- 4 metal stud partition with 50 mm insulation
- 2x 12.5 mm gypsum plasterboard on both faces
- 5 double floor: 10 mm carpet
- 40 mm fibre-reinforced calcium-sulphate sheeting
- steel struts adjustable in height
- 185 mm reinforced concrete composite floor on supporting construction
- suspended plasterboard soffit
- 6 peripheral steel I-beam 600 mm deep
- 7 peripheral steel I-beam 300 mm deep
- 8 Ø 419 mm tubular steel strut with gypsum plasterboard sheathing
- 9 printed laminated safety glass 8 + 6 mm and 6 + 8 mm with 16 mm cavity
- 10 adjustable facade fixing
- 11 facade mounting: 200/100/16 mm steel RHS
- 12 suspended sound-absorbing soffit
- 13 10 mm carpet
- 2x 15 mm gypsum plasterboard
- 80 mm mineral-wool insulation
- 2x 15 mm gypsum plasterboard



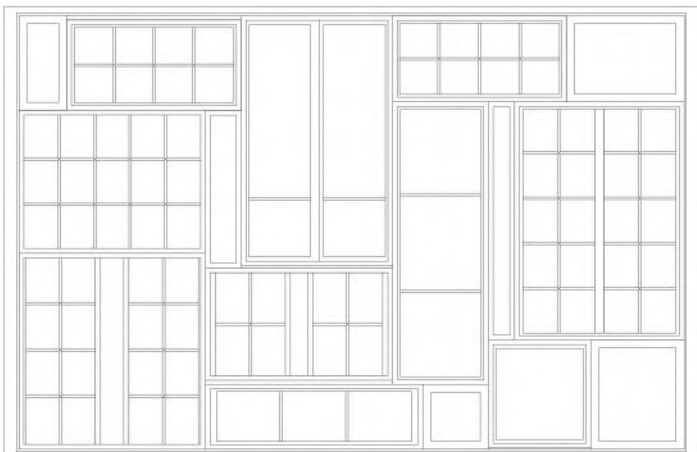
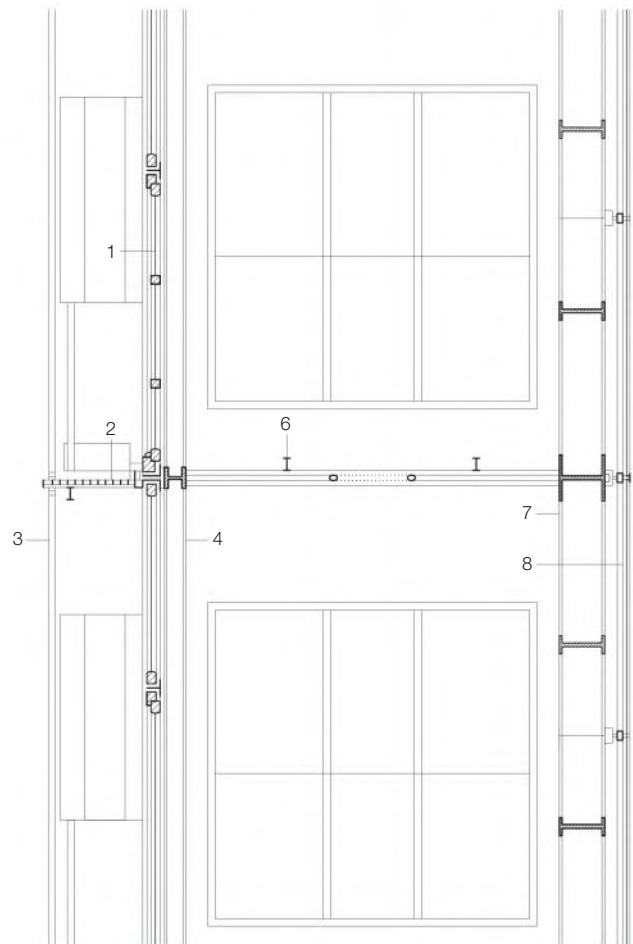


Vertical section,
detail of window element
scale 1:20

Elevation: window element
(not to scale)

Vertical section
scale 1:50

- | | |
|--|---|
| 1 laminated safety glass in recycled wood frame | 5 100/75/10 mm stainless-steel angle frame to oak casements |
| 2 service walkway grating steel I-beam 180 mm deep | 6 steel I-section 80 mm deep Ø 102 mm steel tube Ø 36 mm steel rods |
| 3 40/20 mm stainless-steel flat, shot-peened | 7 steel I-sections 300 mm deep, 90–450 mm wide |
| 4 steel I-section 140 mm deep | 8 3x3 mm laminated safety glass, bullet resistant |



Museum in Cracow

Architects:

Wizja, Cracow

Stanisław Deńko

nsMoonStudio, Cracow

Piotr Nawara, Agnieszka Szultk

Structural engineers:

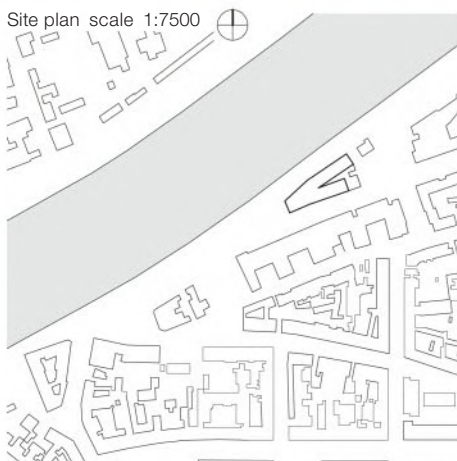
Pracownia Inżynierska Czesław Hodurek,

Cracow

Others involved in the project: see page 646

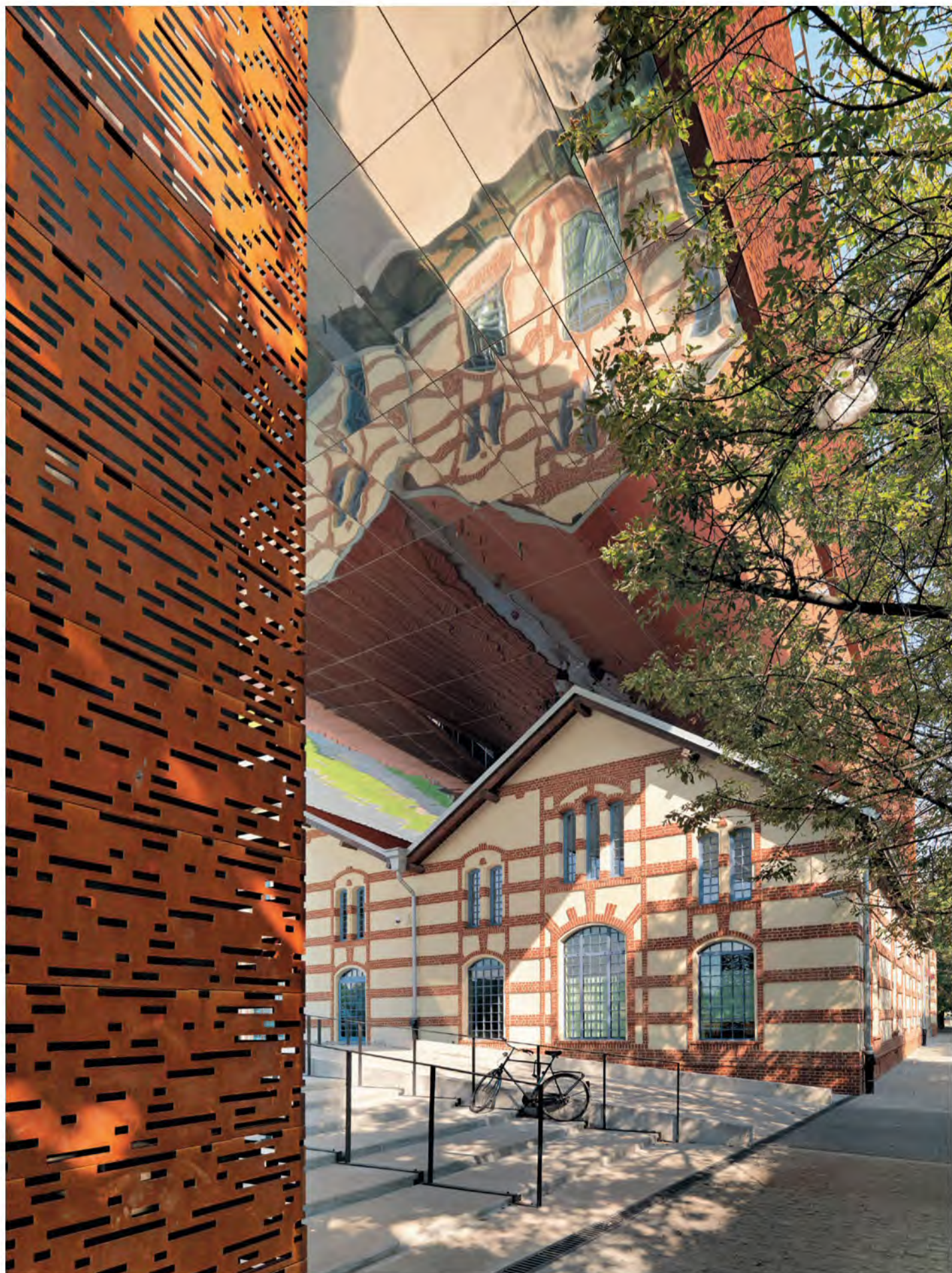


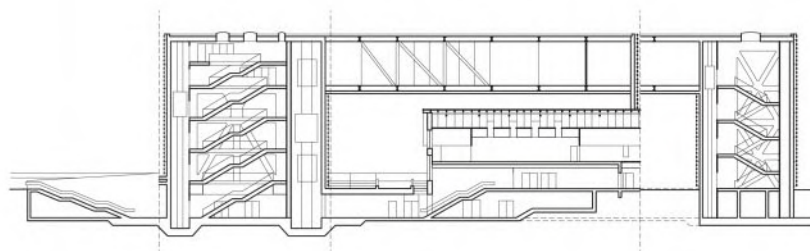
www.detail.de



Standing on the banks of the River Vistula in the industrial district of Podgórze, this new museum, with its perforated CORTEN steel outer skin, may seem out of place from a distance, but it is subtly structured in detail. Erected specifically to document the work of theatre director and artist Tadeusz Kantor, it has already become an urban landmark only shortly after its completion. The building straddles a former power station that now houses the archive and a theatre auditorium commemorating Kantor. The main entrance and foyer are at lower floor level, while the exhibition areas are housed in the bridge section with a steel-frame construction that extends between two solid stair-

case cores. The structure is also borne by a third support of steel that stands, scarcely visible, between the existing buildings. Horizontal and vertical loads are conducted into the reinforced concrete cores via special anchors and a number of pot bearings typical of bridge construction. In view of its location on the banks of the river, the entire structure is supported by 160 pile foundations 11 metres deep. Beneath the elevated bridge-like section, a 600 m² area was created as an open-air stage. Reflections in the polished stainless-steel soffit of events that take place below seem to keep the huge volume in a state of movement – visible even from the promenade along the river.

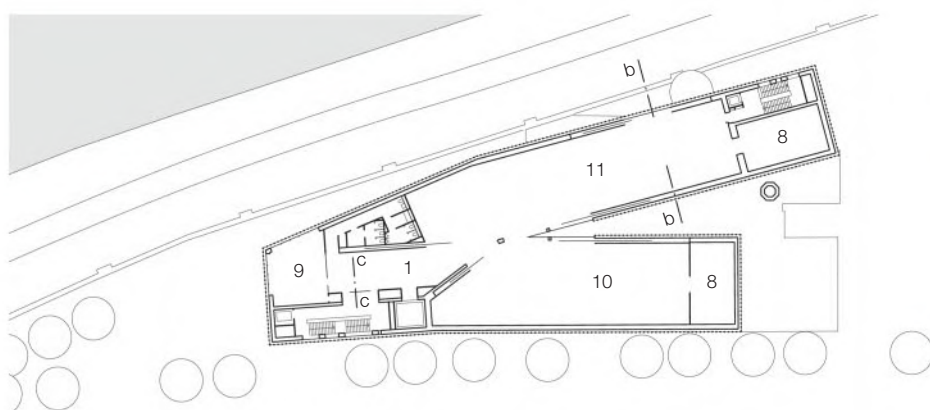




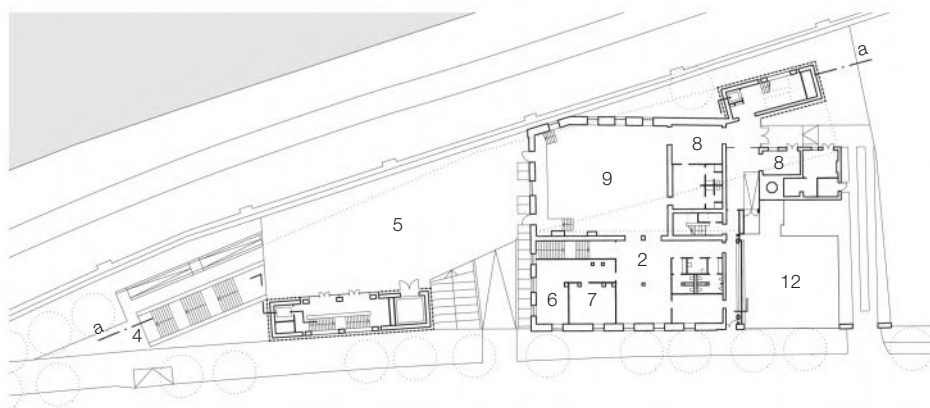
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Section • Floor plans
scale 1:1000

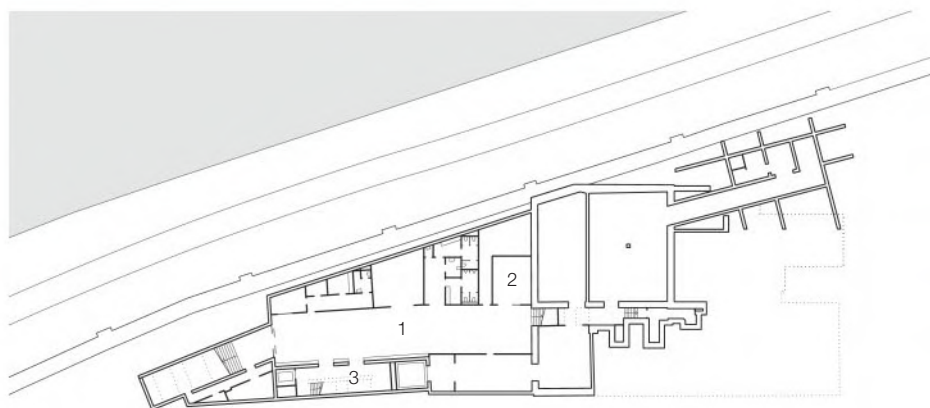
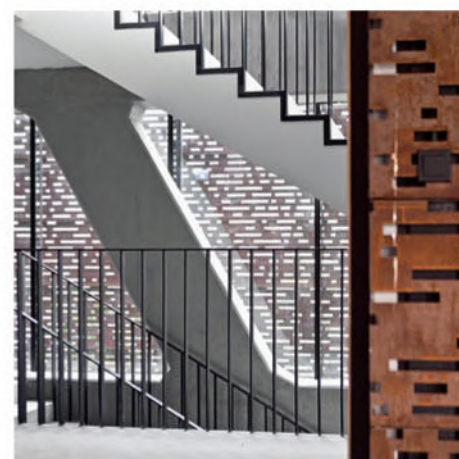
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|------------------------------|--------------------------------|
| 1 Foyer | 6 Reading room |
| 2 Bookshop | 7 Office |
| 3 Access to exhibition areas | 8 Store |
| 4 Main entrance | 9 Multipurpose hall |
| 5 Open-air stage | 10 Permanent Kantor exhibition |
| | 11 Temporary exhibitions |
| | 12 Existing building |



Third floor

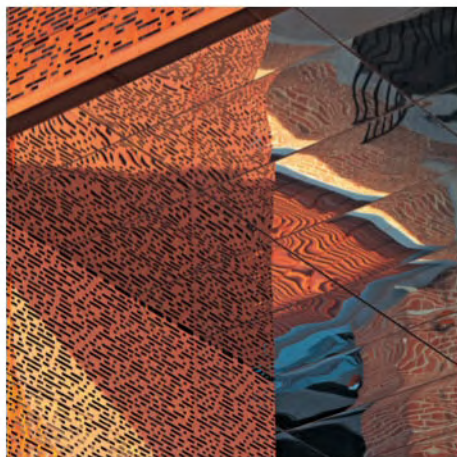


Ground floor



Lower ground floor



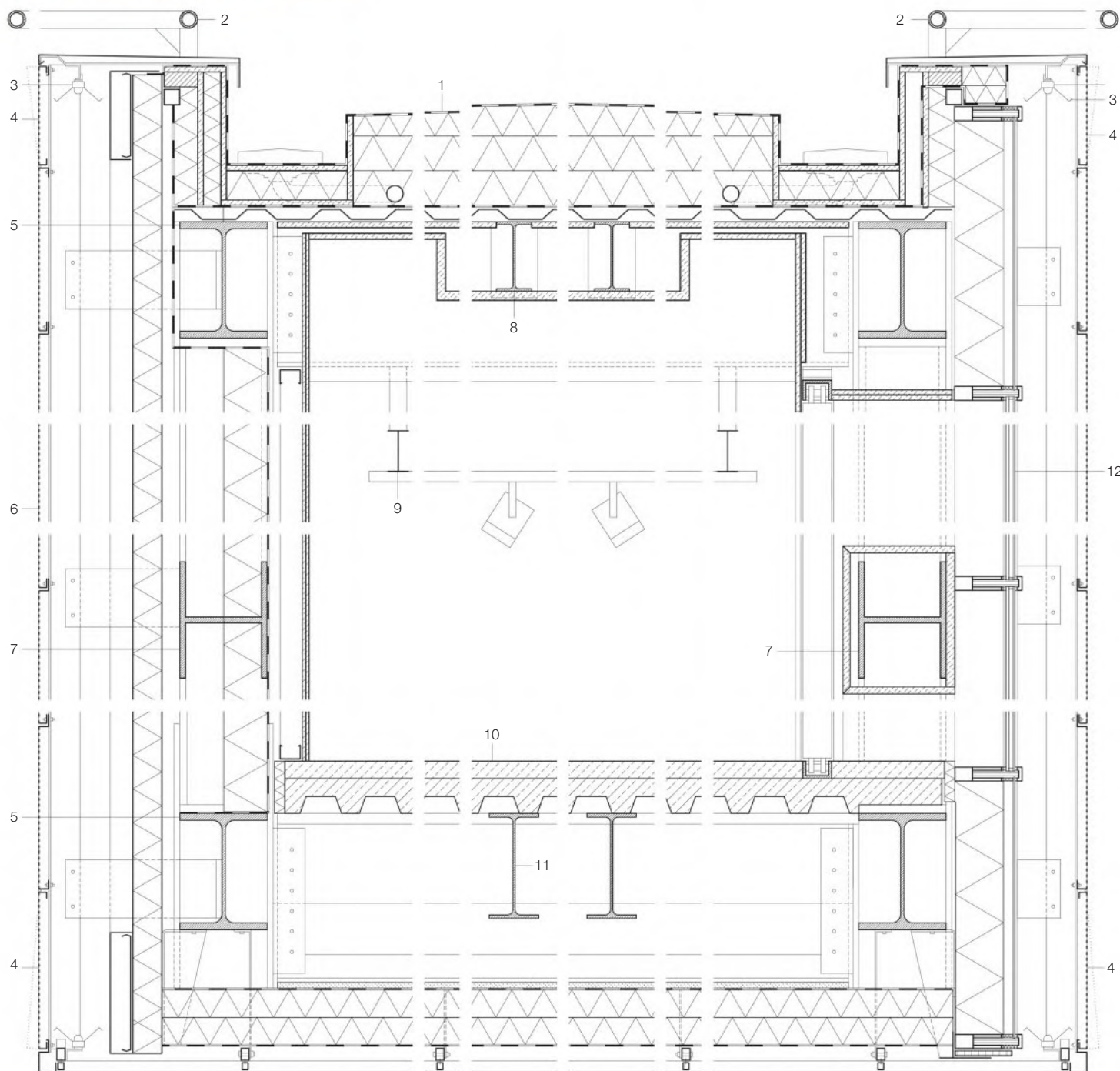


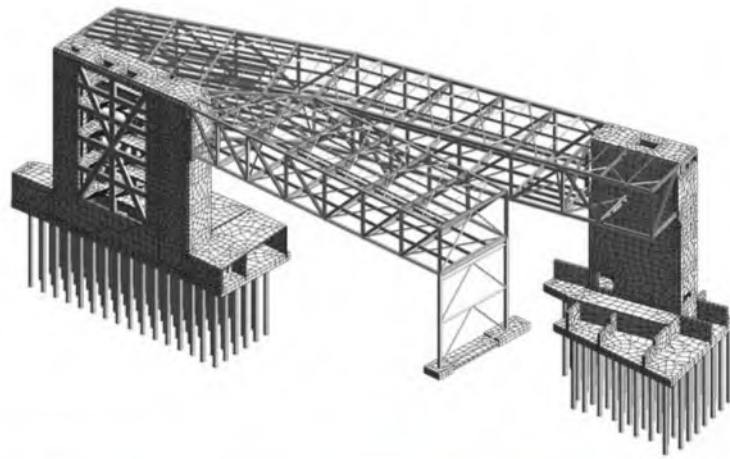
In the competition "Living in Architecture 2015" organized by the journal "Architektura-Murator", the main prize in the category "The Best Public Building" was won by the Tadeusz Kantor Museum in Cracow.

Section
scale 1:20

- 1 EPDM roof sealing layer
- 40–100 mm rock-wool thermal insulation
- 2x 120 mm rock-wool thermal insulation vapour barrier
- 50 mm trapezoidal-section metal sheeting
- 20 mm fibre-cement sheeting between steel I-section cross-beams 500 mm deep
- 2 Ø 60 mm tubular steel mountings for facade maintenance
- 3 light fitting
- 4 facade element, pivotable 180°
- 5 steel I-section chords 400 mm deep
- 6 1.5 mm CORTEN sheeting,

- perforated 22–75%, 570 mm high, up to 2,700 mm long bent to shape 80/100 mm T-bearers; 180 mm cavity
- 100 mm insulated sandwich panel
- 300 mm steel structure with 150 mm mineral wool between; vapour barrier
- 100 mm gypsum fibreboard with bearers
- 7 steel I-section diagonal beam 300 mm deep
- 8 steel I-beams 240 mm deep
- 9 steel I-sections 120 mm deep
- 10 60 mm fibrated concrete, polished
- 120 mm reinforced concrete composite floor
- steel I-section cross-beam 700 mm deep
- 20 mm gypsum fibreboard; vapour barrier
- 2x 100 mm mineral-wool insulation
- sealing layer
- 50 mm cavity; 40 mm aluminium bearers
- 1.5 mm sheet stainless steel with high-gloss finish
- 11 steel I-beam 360 mm deep
- 12 glazed facade in alum. frame ($U_g = 1.1 \text{ W/m}^2\text{K}$)



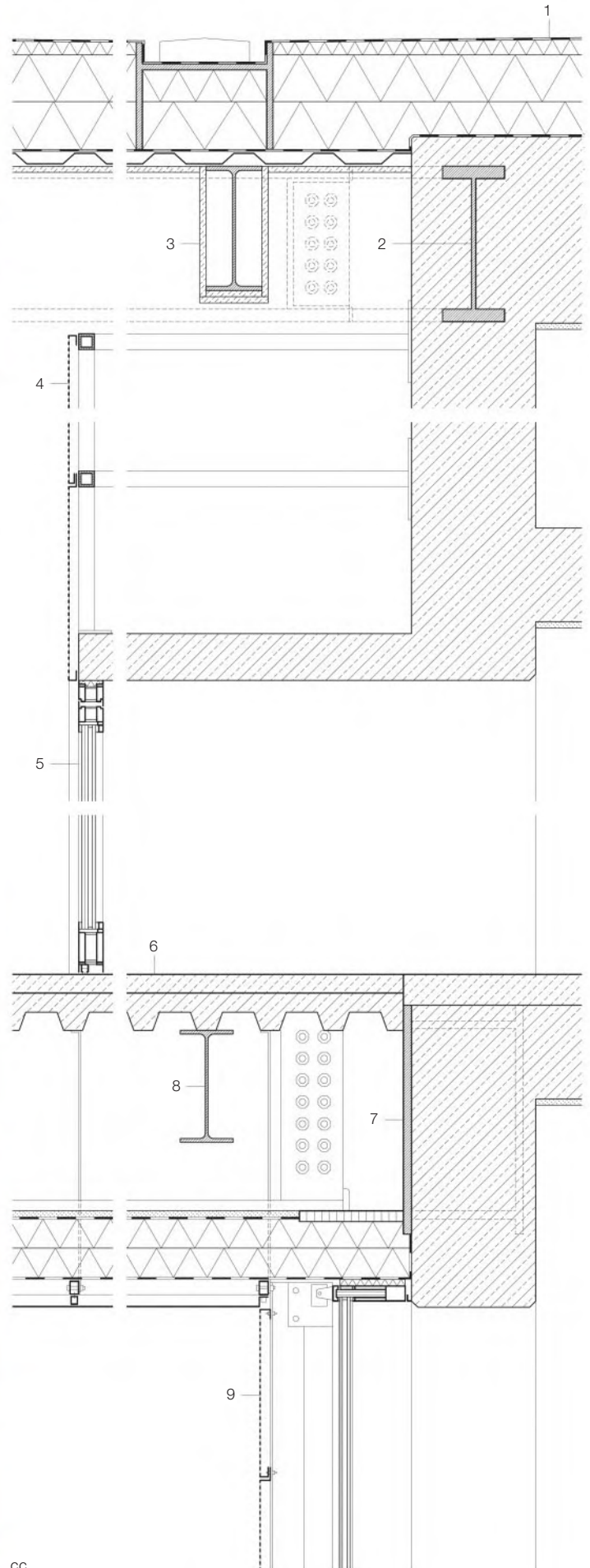




Vertical section
scale 1:20

- 1 EPDM roof sealing layer
40–100 mm rock-wool
thermal insulation
2× 120 rock-wool
thermal insulation
vapour barrier
600 mm reinforced concrete
15 mm gypsum plaster
- 2 steel I-beam 500 mm deep
welded to concrete
reinforcement
- 3 steel I-beam 400 mm deep
encased in fibre-cement sheeting
- 4 1.5 mm CORTEN sheeting,
perforated 22–75 %
50/50/5 mm steel SHS supporting
structure
1,170 mm duct space
400 mm reinforced concrete
fireproof aluminium door
- 5 60 mm fibrated concrete,
polished

- 120 mm reinforced concrete
composite floor
steel I-section cross-beam
700 mm deep
20 mm gypsum fibreboard
vapour barrier
2× 100 mm mineral-wool
insulation
sealing layer
50 mm cavity
40 mm aluminium bearers
1.5 mm sheet stainless-steel
panels 2,500 × 110 mm with
high-gloss finish
- 7 750/20 mm steel inlay welded
to concrete reinforcement
- 8 steel I-beam 360 mm deep
- 9 1.5 mm CORTEN sheeting,
perforated 22–75 %
bent to shape
80/100 mm T-section supports
100 mm cavity
glazed facade in
aluminium frame
($U_g = 1.1 \text{ W/m}^2\text{K}$)





Technology

Metal Monocoques – Moving Buildings Welded like Ships

Frank Kaltenbach

- 1 Aluminium semi-monocoque: Lord's cricket ground media centre, London, 1999; architects: Future Systems
- 2 Aluminium monocoque: "Wings" multimedia sculpture, EXPO 2015, Milan architects: Studio Libeskind
- 3 Coated-steel monocoque: Martin Luther Church, Hainburg, 2011; architects: Coop Himmelblau
- 4,5 Sandblasted stainless-steel monocoque: Porsche Pavilion, Autostadt Wolfsburg, 2012; architects: Henn Architects



Steel buildings traditionally consist of standard linear sections that form the structure together with a non-load-bearing outer and/or inner envelope.

This division into the skin and bones makes sense economically and technically, but from a purely structural point of view, it is not efficient, because each non-load-bearing element represents a form of ballast that demands larger dimensions for the structural members.

Monocoques, in contrast, are a type of building in which an internal framework, consisting of linear members, enters into a composite structural whole with a load-bearing skin.

Crustacea instead of skin and bones

This highly efficient lightweight form of construction has established itself in space travel, in aircraft and vehicle manufacture and above all in shipbuilding. The materials used are the plastics GRP and CFRP or metals. The analogy to the outer shell of insects and crustacea can be seen in the etymology: the Greek word "mónos" meaning single or alone, and the French word "coque", which refers to a shell, such as the outer casing of a nut or shellfish. In the case of mobile, flying or floating structures, complexly formed elements can ultimately be economical, like the technically optimized, streamlined "nose" at the bow of a ship,



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which results in a smaller consumption of energy. What advantages do curved forms have in architecture, though? When building on land, the challenges posed by freely shaped surfaces are often self-made: an expression of the pure design preferences of individual architects, of the ambition of eager clients, or a fashionable expression of the zeitgeist. Nevertheless, people are moved in a special way by buildings of this kind – by virtue of their poetry, or because they radiate a sense of confidence in a future in which high technology harmonizes with nature.

Pioneering structure from a shipyard

Jan Kaplicky and Amanda Levete were among the first architects to be convinced that buildings meant to radiate a sense of movement should be constructed like helicopters, landing modules or ships. Completed in 1999 by their Future Systems practice, the media centre at Lord's cricket ground in London is the first building in the world to be implemented as a monocoque entirely in aluminium and may be seen as a forerunner of present-day applications of monocoque ideas in architecture (ill. 1). The architects themselves speak of a "semi-monocoque", since the main forces of the load-bearing structure are borne not by the skin, but by vertical and horizontal frame members, and the jointless aluminium casing is penetrated by two reinforced concrete lift towers on which the media centre is supported 15 metres above the spectators' stand of the cricket ground. The internal doors cut out of the framing are like the watertight hatches of a ship, with curved corners at top and bottom. This pioneering structure was implemented not by construction firms but by shipbuilders – the British shipyard Pendennis and the Dutch concern Centraalstaal.

BIM as an innovative factor

Things that are propagated today as the latest trend in construction under the heading BIM (building information modelling) have been practised by shipbuilders for the past



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40 years. In 1973, local firms in the Groningen area joined forces to create a network, seeking to survive in this way in the face of growing competition from low-wage countries. Through the acquisition of what was the most powerful computer of its day, they built up one of the most important data centres in the region. Today, Centraalstaal forms part of the Central Industry Group (CIG), which, using the Nupas CADmatic program, is able to depict the entire production chain in the form of a 3D model – down to the machine data for plasma-cutting and the fully automatic bending of thick sheets of steel. The company specialized in wind-power plants, water turbines and ships

and became the leading supplier of geometrically complex shipbuilding components for superyachts. In 2007, in order to have a second leg to stand on in the construction realm for critical times in the volatile shipbuilding industry, Centraalstaal developed as a pilot project – together with the architect Kas Oosterhuis and the artist Ilona Lénárd – the complex FZUID relief facade, using 6 mm cold-formed aluminium. This was designed for a housing scheme in Amsterdam. Since then, most monocoques throughout the world have come from Groningen or the partner works in Stralsund. One of the few exceptions was the Danish pavilion for the

Expo Shanghai 2010, which was created by the team about Bjarke Ingels, structural engineer Cecil Balmond and Arup Advanced Geometry Unit from London, together with the construction department of the Danish oil-tanker and container concern Maersk.

From steel plate to ship

Based on an architect's 3D model, depicting the geometry of the outer skin, the Nupas program calculates the thickness of metal sheeting in relation to the material parameters. One reason why so few concerns offer high-quality monocoques on the world market can be seen in the material characteristics of steel. It is not sufficient to create



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a 3D model depicting the geometry of the end product and to project this on to two-dimensional surfaces. Throughout the production chain, thick steel sheeting in particular is subject to dimensional changes, and this has a far-reaching effect on the accuracy of the parts. Deformation specific to the material and occurring in the later stages of production as a result of plasma-cutting, bending or welding has to be coordinated with the specific metal from the outset and must be taken into account in the dimensions of the flat constructional members. Only cold-forming can guarantee dimensional accuracy. Metal subject to heating in the shaping process undergoes subsequent dimensional changes.

The standard dimensions of steel sheeting from supply firms are 3 × 12 m, whereas aluminium sheets are 2 × 6 m as a rule. The workpieces are distributed by a computer program over the unprocessed semi-

finished products in such a way that as little loss of material as possible occurs through cutting. This process is known as “nesting”. All cross-members that have to be subsequently welded to other elements should now be marked with precise details of the quality of the welding seams. A fully automatic plasma-cutter separates the sheets from the raw material (ill. 10). The technology behind high-definition dry plasma-cutting does not achieve the precision of lasers, but that is not necessary in view of the thick welding seams. Plasma-cutting, on the other hand, is fast and can cope with metal thicknesses of up to 30 mm. Metal sheeting up to 120 mm thick can be cut in an oxyacetylene process. The greatest thickness of sheeting ever worked by CIG – part of a sculpture by Anish Kapoor – was 80 mm.

For the creation of monocoques, it is necessary to work linear sections for the struts as well as sheets for cross-struts and the outer



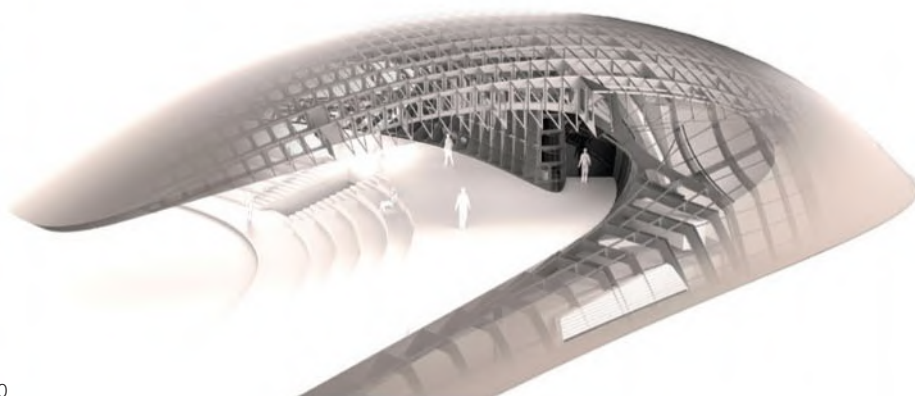
skin, shaping them freely in two directions. The Dutch shipbuilding concern developed the machinery itself that it required for working both types of raw material, repeatedly optimizing it. Computer controlled in this way and laser monitored, even large I-girders can be curved or turned to virtually any form. More spectacular still is the fully automatic two-directional shaping of thick steel plates: crane claws fixed to chains hold the plate at the ends and slide it between a high-performance press and die. While the steel is processed with a pressure of up to 6,000 kN by a repeated up-and-down movement like that of an automatic sledgehammer, but in a much more controlled form, the claws move the metal element synchronously along the programmed route (ill. 6). It is important in this respect to unhook the sheets in order to relax the material. The problem here lies not in the large dimensions. Limitations exist only in the



- 6 Computer-controlled shaping of thick steel sheets with high-performance presses. The three crane claws move the sheet synchronously. The press, with interchangeable stamps, is fixed in position. The curvature is subsequently checked against the wooden templates by technicians
- 7, 8 Steel monocoque with high-gloss painted finish: elevated seminar space with viewing platform above in the atrium of Southampton Solent University; architect: Scott Brownrigg
- 7 Mock-up with high-gloss painted surface and artificial joint
- 9, 10 Principle of monocoque shell, consisting of load-bearing grid and sheet-metal covering as a single structural entity: Porsche Pavilion, Autostadt Wolfsburg, 2012; architects: Henn Architects
- 9 Individually shaped frame members and 25 mm stainless-steel covering sheets are automatically laid out in a cutting optimization program (nesting) and removed with computer-controlled plasma-cutters. Individual frame members are also cut from composite wood boarding as templates.
- 11 Steel monocoque with prefabricated columns prior to welding on the covering sheets to form the roof skin: Münchner Freiheit tram station, Munich, 2009; architects: RPM.



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case of parts that are too small. Bending diameters from 29 cm upwards are possible. By using special rollers, the steel sheets can be extended in area like dough with a rolling pin. Soft stamps are appropriate for processing aluminium, hard stamps for steel. Sheet thicknesses of 8 to 10 mm are the norm where stronger shaping is required. Sheets as much as 10 cm thick could be worked where the deformation is correspondingly small.

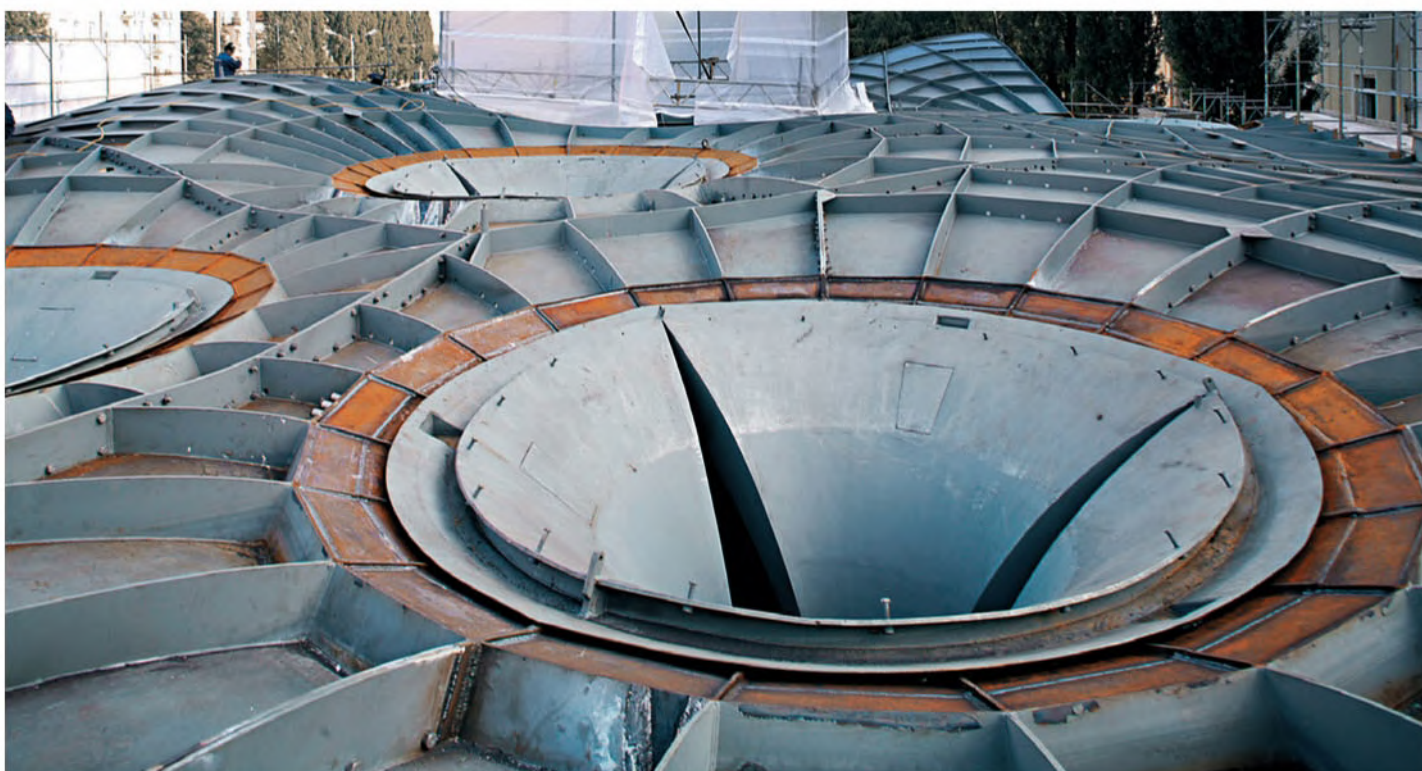
The perfect execution of the shaping process is supervised by specially trained technicians, using templates made of composite wood boarding. These are subsequently handed over to the clients, together with the products, so that a quality control can be carried out. At works, the shaped steel plates are welded together to form the constructional components. These should be as large as possible in order to minimize the number of assembly joints and the welding

work on site. Often transport dimensions, such as the 4 x 24-metre loading area of a heavy-duty truck, impose maximum sizes, but in most cases, these are determined by conditions on site.

Individual objects of art and architecture

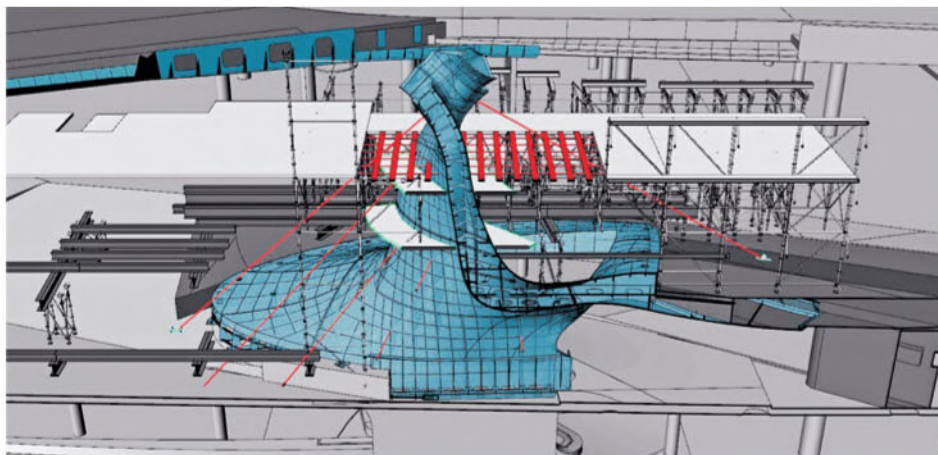
Metal monocoques will inevitably be individual objects that catch the eye. At the EXPO 2015 in Milan, the four sweeping multimedia stelae "Wings" by Daniel Libeskind, with their artistic design, lend the intersection of the main axes Cardo and Decumanus a special note. These monocoque sculptures are made entirely of aluminium, and the surfaces were smoothed with grinding discs until the desired lustre was achieved and they seemed to gleam from within (ill. 2). Anish Kapoor's CORTEN steel sculptures are world famous; for example, the bell-like funnel that hangs in the plinth of the 114-metre-high observation tower Arcelor-

Mittal Orbit, dating from 2012, in the Olympia Park, London. Originally planned in GRP, its execution as a monocoque consisting of 117 individually shaped steel sheets weighing 84 tonnes resulted in a considerably greater load, but also in an appreciable reduction of costs. The bright red, high-gloss skin of the elevated seminar space in the atrium of Southampton Solent University also possesses a sculptural character. In this case, the monocoque form of construction with its rigid shell allows only few bearing points for the filigree columns, so that the lecture hall with a viewing deck above seems to float like a bubble in the large hall. Architect Scott Brownrigg wanted to create a surface resembling the glossy finish of a car. Because the perfect application and polishing of epoxy lacquer on a multiply curved, jointless monocoque surface is extremely difficult, the outer face was divided by deep artificial joints into a number of



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- 12–16 Steel monocoque as integral construction element for column, ramp and roof light: “Twist” in the transit hall of Arnhem Station, 2015; architects: UNStudio
- 12 Three-dimensional model of “Twist” at assembly stage with auxiliary structures as temporary supports and working platforms
- 13 Prefabricated element of monocoque construction with temporary eyes for crane during unloading on site
- 14, 16 The welded and coated monocoque structure constantly changes its appearance according to the position of the viewer – from a slender column to a spatially articulating wall slab.
- 15 Visualization



12

working sections that can be treated as individual units (ills. 7, 8).

Monocoques are increasingly establishing themselves in sculptural engineering, too. The undulating roof over a Munich tram station by OX2 Architects, for example, a prize-winning design in plastic in the competition, was ultimately implemented by RPM in 2009 as a metal structure with prefabricated curved columns of thick steel sheeting (ill. 11). In London's Olympia Park, Wilkinson Eyre conduct the loads from the 84-metre-high cable-car masts into open cylinders welded together from helically curved steel sheets. The two-storey tubular bridge that links the two sections of the Yas Viceroy

Hotel in Abu Dhabi is an integral part of the architecture. Designed by the architects Asymptote in the aesthetic of the yachts in the surrounding marina (ill. 19), the glazed network skin spans a Formula One race-course. The special challenge here lay not only in the structural and formal aspects, but in the extremely ambitious time schedule: the construction had to be finished before the deadline for the first race, which could not be postponed. Only 45 weeks after the award of the contract, the entire bridge had been assembled on site. In view of its location immediately next to the sea, it was possible to deliver the upper half by ship as a single prefabricated element.

Stainless-steel monocoque

In the case of the Porsche Pavilion in the Autostadt Wolfsburg by Henn Architects and the building engineers schlaich bergermann and partners, the constraints lay not only in a tight schedule – only seven months for the planning and erection of a structure with a perfect surface quality. In addition to an optimum form, the planners adopted the target of the chairman of the supervisory board of the Volkswagen company at that time, Ferdinand Piëch, who always insisted on the thinnest possible joints and smallest clearances and was known by the nickname “jointing Ferdi”. For that reason, the initial structural concepts for a gridshell and panelled cladding were replaced by a jointless form of construction. For the design that was deemed suitable for execution – a variant form with a jointless CFRP outer skin – there were great reservations that the time remaining until the completion deadline was too tight. Under the circumstances, a monocoque structure in stainless steel proved to be the best solution (ills. 4, 5). The pavilion is divided into two user areas that are reflected in two different forms of construction. Spanned over the internal showroom is a quarter dome, consisting of longitudinal and cross-struts with a closed sheet-steel external surface. As a visible closure to the internal space, a separate three-dimensional inner shell was inserted in a dry form of con-

struction. The showroom is separated from the utility and service spaces by a concrete slab. In front of this wall, the monocoque becomes a canopy roof visible from all sides and additionally lined on the underside with metal sheeting. In other words, the monocoque corresponds structurally to a curved single-span girder that is anchored in the ground at one end and that bears in the middle on the concrete wall. From here, it cantilevers out over a pool of water. Spatially, parts of the monocoque correspond to a membrane-like shell, while other parts form a plate structure. The short planning period was also made possible by the expertise of the test engineer who gave his approval within a short time. The structural optimization, using steel between 10 mm and a maximum of 25 mm thick, made it possible to cold-form the sheeting to implement the architects' design. A decisive factor in meeting the deadline, despite the difficult assembly conditions, was the high degree of prefabrication. The construction period occurred during the winter months. In addition, site work was confined to the night-time: the canal leading to the Autostadt was frozen, so that the 51 prefabricated elements had to be delivered by road. Executing the monocoque entirely in stainless steel meant a price increase of approximately 15 per cent, but ultimately proved to be of distinct advantage. All maintenance in terms of corrosion protection was obviated – not only for the outer skin, but also internally. If the longitudinal and cross-bracing members had been executed in untreated or “black” steel, it would have been necessary to dimension the internal spaces more amply to provide access, so that the surfaces could be coated or retreated, or for paint to be removed. What is more, the “tip of the tongue” at the end of the roof could not have been designed so elegantly. In the internal exhibition area, a circulation of air occurs between the inner spatial skin and the load-bearing monocoque shell, warming the metal structure in winter. As a result, it was unnecessary to attach ungainly snow guards externally. The exceptional smoothness of the



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surface for a monocoque construction consisting of 620 metal covering sheets was possible only with minimum tolerances and filigree working joints, with quality control at every stage of the work, with comprehensive inspection and the coordination of all welding processes. The stainless-steel sheeting was cut and shaped at the works in Groningen, then welded to create the construction elements in Stralsund in a hall that is completely separate from the normal steel construction department. This was done to avoid impurities and chemical corrosion. Working with stainless steel also calls for the utmost care, since scratches cannot be subsequently painted over.

Integration into an overall design concept
Monocoques are suited not only for isolated structures. They can be design objects that serve an overall spatial concept, whereby the distinction between monocoque and surrounding environment may become blurred to the point where it is no longer recognizable. What is probably the most complex constructional element in the world of building was assembled last year in the transit hall of Arnhem Station by UNStudio. After 20 years of planning and a step-by-step process of completion, the hall forms the closing piece to the development, creating a link between the railway and bus stations, an underground garage and a bicycle

parking area. The complexity and dynamics of the scheme culminated in an integral load-bearing building component. Situated in the middle of the transit hall, it accommodates the most diverse functions – ramp, column support and roof light – lending them, in an almost playful manner, an organic sense of movement.

This “Twist” monocoque, consisting of the largest possible prefabricated parts, to which the steel roof structure was to be connected quite simply, provided a realizable solution after the original concept for a reinforced concrete form of construction had proved abortive. Admittedly, a further year was to pass before the test engineers



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were able to approve the structural planning. The hall will be opened in November 2015 (ills. 12–16).

Monocoque as non-load-bearing cladding

The largest monocoque shell created to date is the 30,000 m² cavernous underside of the National Kaohsiung Centre for the Arts in Taiwan, which is due to open in 2016. Here, a concert hall, an opera house, a theatre and a library hover above the ground in an undulating planar structure that is broadly cantilevered at the corners and consists of a rectangular steel space frame. From this, the underside of the monocoque is suspended by powerful steel springs designed to absorb movement from wind, earthquakes, etc.

Thermally insulated structures

If monocoques are built as thermally insulated enclosed spaces that can be heated and/or cooled, particular attention has to be paid to the constructional physics and the whole subject of thermal bridges and condensation. Fire protection, too, plays a decisive role. Completed a year ago, the so-

called “Infoversum” by Archiview in Groningen was erected in just six months – a scientific planetarium cinema with seating for 260 people. The welded 65-tonne spherical cap over the lecture hall was set on its plinth by a mobile crane and forms a single constructional element. It stands on an enclosure of CORTEN that houses a foyer and circulation area (ill. 17).

The dome inside with the 360° screen was suspended subsequently. The monocoque shell is lined internally with insulation. At certain points that were regarded as thermally unproblematic, the shell was left exposed to underline the technical character of the overall concept (ill. 18).

Wolf Prix exploited the formal potential of the monocoque to the full for the three top-light domes of the Martin Luther Church in Hainburg. The form was inspired by baroque onion-dome towers. Here, the silvery lustre of the prefabricated steel elements was achieved with the application of paint (ill. 3). An interesting feature within the church is the underside of the roof, which is also curved. It consists not of continuous steel sheeting, but of steel flanges sheathed in

17, 18 CORTEN/coated-steel monocoque with internal insulation: Infoversum 3D cinema in Groningen, 2014; architects: Archiview

19 Coated-steel monocoque as prefabricated two-storey linking bridge: Yas Viceroy Hotel, Abu Dhabi, 2009; architects: Asymptote

wire netting and plastered by stucco craftsmen in accordance with traditional techniques. With his Crab Studio, Peter Cook is implementing a building in the gardens of the Arts University Bournemouth that contains a drawing studio and has organically shaped roof lights.

Outlook for the future

Monocoques of metal have hitherto been particularly favoured for works of art, object-like architecture and complexly curved single-space buildings. Early examples, however, show that structures more demanding in terms of their building physics can also function in this form of construction. While outer shells in fibre-reinforced plastic are still in a pilot stage, metal shells now comply with established standards of technology. Monocoque structures score in comparison with reinforced concrete forms of construction because no extra costs for formwork are incurred in creating the curved surfaces, and subsequent cosmetic treatment is unnecessary. In contrast to steel-frame structures with an outer panel skin, load-bearing monocoques obviate the need for elaborate supports and adjustments when fixing the panels.

For many structural engineers, architects and clients, thinking in terms of thick, load-bearing, curved steel plates is something entirely new. Building construction is still a discipline characterized by craft processes, and it is difficult to imagine that steel sheets up to 10 cm thick can be freely formed with industrial precision by means of computer. In the realm of luxury yachts, high-end surfaces of monocoques are being created with elaborate painted finishes to horrendous prices. To obtain a level of quality in architecture that would be even comparable, a clear definition of the standard is required. With normal quality levels, the character of the internal bracing will always be evident to some extent on the outer surface. Architects who find this congenial aspect of shipbuilding too rough should subject every individual stage of the process – particularly the welding – to a precise investigation.



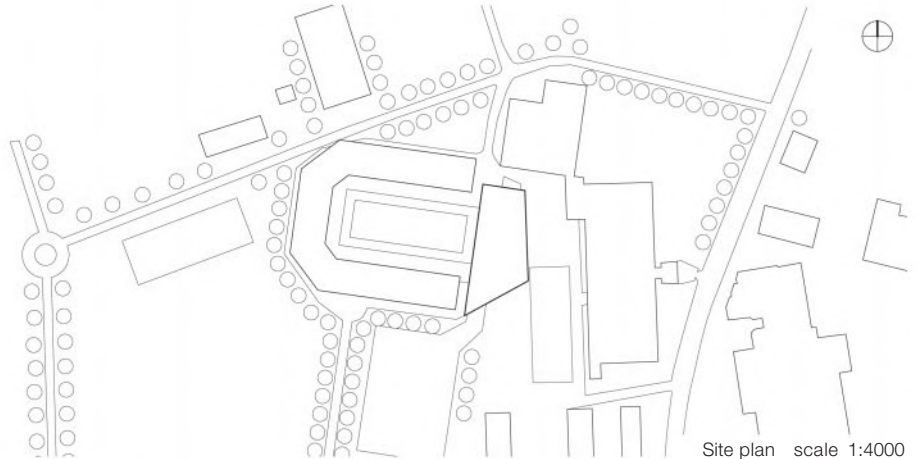
19



Products

Property+Product

Grandstand – Dressage Stadium, Aachen



The site in Aachens Soers district has specific facilities for all equestrian disciplines and is internationally renowned. Here, glamour in the form of celebrities meets tough sporting competition. A good example of this is dressage, where the graceful elegance of each performance hides the hard work and discipline that goes into it. Dressage fascinates spectators – so much so that tickets for events even at the world's largest dressage stadium are generally sold out a year in advance. For this reason the Aachen-Laurensberger Rennverein riding association, which runs the site, decided to expand its facilities with another grandstand capable of holding 1200 spectators.

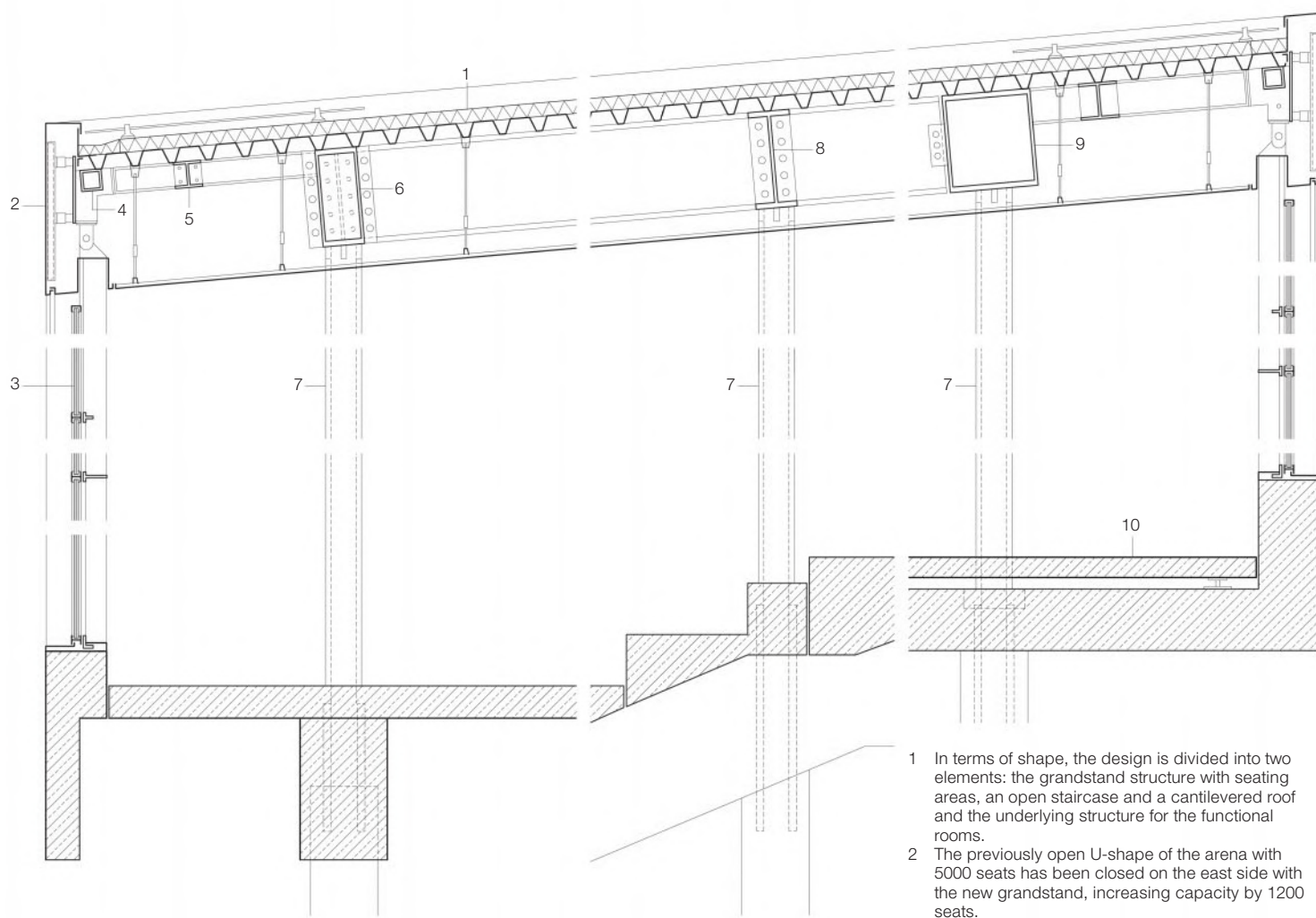
An architectural competition was organised, which was won by Aachen-based architects kadawittfeldarchitektur with a design that can be seen as an analogy to dressage. It combines formal severity with visual light-

ness. Towards the dressage area, the new grandstand concludes vertically and rises to the rear. It is designed as a stepped structure made of reinforced concrete onto which a projecting steel roof construction has been positioned. The supporting structure of the roof consists of a girder grid of welded steel profiles with a trapezoidal steel sheet that functions as a flat roof and stiffening element. In the rear grandstand area, the structure rests on a reinforced concrete beam that encompasses the grandstand slab. The roof loads are transferred to the ground level and from there via reinforced concrete circular columns to the foundations using just four slender steel supports in the front area. The grandstand is founded on bored piles that are connected to each other via centring beams. The underlying grandstand structure is a solid construction with a high percentage of prefabricated components. The seating steps in the grandstand's spectator area are made of precast concrete. They are placed on

Section Scale 1:50

- 1 Film geomembrane roll white
Separating layer glass matting
Thermal insulation mineral fibre crush-resistant 100 mm
Baffle plate polyethylene
Trapezoidal sheet 100 mm
Beam HEM 700
Metal hangers
Suspended ceiling metal panels painted white
- 2 Edge trim metal sheet painted white
Substructure
Facade mullions T-welding profile 200 mm
- 3 ESG 50 mm in steel post and beam facade
- 4 Edge profile $\square$ 160/160/6.3 mm
- 5 Cantilever HEA 200
- 6 Roof beam HEM 700
- 7 Column $\varnothing$ 273/40 mm
- 8 Crossbeam HEM 700
- 9 Roof beam hollow box section 650/716 mm
- 10 Precast concrete components on supports 150 mm
Air layer 65–150 mm
Sealing – bitumen
In-situ concrete surface with a gradient

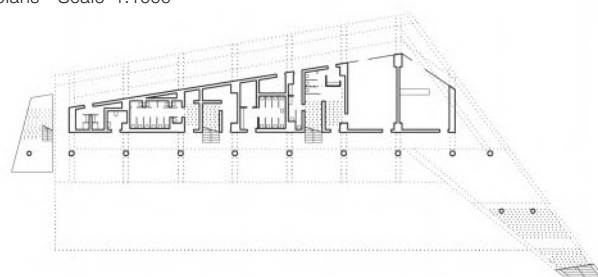




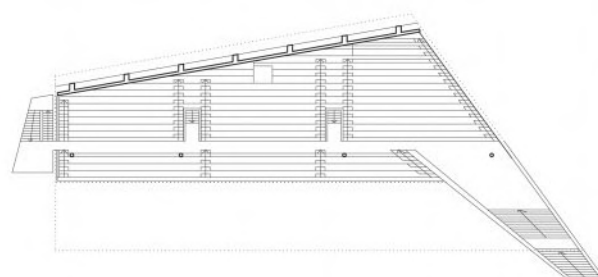
- 1 In terms of shape, the design is divided into two elements: the grandstand structure with seating areas, an open staircase and a cantilevered roof and the underlying structure for the functional rooms.
- 2 The previously open U-shape of the arena with 5000 seats has been closed on the east side with the new grandstand, increasing capacity by 1200 seats.
- 3 The representative staircase brings a touch of glamour to the building: long and sweeping, it transforms the simple act of climbing the stairs into a public appearance.



Floor plans Scale 1:1000



Ground floor



Grandstand



4



5



6

- 4 The glass walls on both sides are designed as a post and beam construction with mutually offset beams, with a ventilation joint fitted above and below, and are suitable for retrofitting with textile sun protection.
- 5 The functional rooms beneath the grandstand are clad with an aluminium edge-case system facade that has a high-quality anthracite-coloured coating.

- 6 The glass wall below the lower tier separates the arena from the spectator walkway on the ground level, and during competitions protects riders and horses from noise from the reporting and tournament management offices. In order to provide visual protection, this all-glass structure is film-printed with equestrian sported motifs.

reinforced concrete beams that transfer their loads via cross-walls and round pillars, made of reinforced concrete, to the foundations. Glass on both sides provide protection against wind and the elements. The functional areas such as the sanitary facilities, storage and service areas, reporting office, tournament management office and a meeting room are located on the ground level below.

The three-dimensional design is highly innovative. The grandstand thus does not end to the rear with a line that is parallel to the front but instead at an angle. As a result, the seating rows rise up to their highest point in the south-east corner. The southern side similarly does not conclude orthogonally, but instead opens up to form a representative staircase. This effect is enhanced by an up-to-18-m projecting roof structure that seems to float above. The grandstand's asymmetrical rise means that it too is inclined and has its highest point directly above the staircase. This open and inviting effect is enhanced by the purely white appearance. The surfaces of the seating areas, the stairway and the sweeping roof are all in a uniform shade of white, so as to give the grandstand structure a clear definition. An encircling aluminium sheet and the white-painted reinforced concrete parapet bring together the roof line, the grandstand and the rear outer wall.

The underside of the roof also contributes to this effect, and is the primary focal point for visitors. It is created by a paneled ceiling made of 184-mm-wide aluminium panels with a recessed covered joint. For increased safety, the paneled ceiling has been screwed to the supporting rail. This creates a

longitudinal structure that strengthens the roof and at the same time bestows it with a visual lightness.

KR

Project participants

Client: Aachen-Laurensberger Rennverein e.V. (ALRV), D-Aachen
 Architects: kadawittfeldarchitektur, D-Aachen
 Project manager: Burkhard Floors
 Assistants: Christoph Katzer, David Baros, Mathias Garanin, Dorothee Korr, Hagen Urban, Jonas Kröber
 Statics (new grandstand): Hegger+Partner, H+P Ingenieure GmbH & Co. KG, D-Aachen;
 (Conversion - existing structures): Kempen & Krause Ingenieurgesellschaft, D-Aachen
 Space planners: Winterscheid-Weidenhaupt Landschaftsarchitekten, D-Stolberg
 Fire protection: BFT-Cognos GmbH, D-Aachen
 Constructional physics: Tohr Bauphysik, D-Bergisch Gladbach
 Building engineering: PGS-Aachen (Planungsgesellschaft Sergis), D-Aachen
 Electrical engineering: Ingenieurbüro Walter Sturm, D-Krefeld

Products and manufacturers

Grandstand: steel structure, trapezoidal sheet, Unger Stahlbau Ges.m.b.H., D-Oberwart, www.ungersteel.com
 Precast reinforced concrete floor slabs (functional rooms – ground level): Dennert Baustoffwelt GmbH & Co. KG, D-Schlüssel-feld, www.dennert-baustoffe.de
 Floor construction: reinforced concrete

structure in situ concrete, Arge Derichs und Konertz GmbH & Co. KG and Florack Bauunternehmung GmbH, D-Aachern

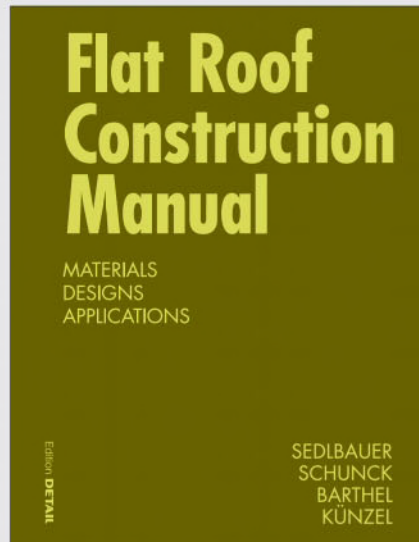
Wall structure: steel construction, steel cases: Unger Stahlbau Ges.m.b.H., D-Oberwart, www.ungersteel.com
 Steel/glass facade: Metallbau Hülser, D-Alsdorf, www.huelser.de

Interior wall panelling grandstand area: Metal case facade, Hoesch Bausysteme GmbH, D-Kreuztal, www.hoesch-bau.com
 Facades: Side grandstand facade: Steel facade as a post and beam construction MSH sections with a Schüco add-on construction: Metallbau Hülser, D-Alsdorf, www.huelser.de

Post and beam facade – functional rooms: Schüco International KG, D-Bielefeld, www.schueco.com

Panel facade – functional rooms: Christian Pohl GmbH, D-Köln, www.pohl.net
 Suspended ceiling – grandstand roof: NE-Paneele, Nagelstutz und Eichler GmbH & Co. KG, D-Oer-Erkenschwick, www.ne-paneeledecken.de

Lighting: »LED Leuchte 2272« (stairways), »6624« (grandstand roof), »7714« (entrance), Bega, D-Menden, www.bega.com; Lichtkanal (passage beneath grandstand), »LKIP 54.180.20 AG« (grandstand roof), LTS – Licht & Leuchten GmbH, D-Tettnang, www.lts-licht.de; »Lunis E« (stairway – side), Siteco Beleuchtungstechnik GmbH, D-Traunreut, www.siteco.de; Downlights (WCs, user spaces): Frisch-Licht GmbH & Co. KG, D-Arnberg, www.frisch-licht.de; Light switches/electrical installations: Busch-Jaeger Elektro GmbH, D-Lüdenscheid, www.busch-jaeger.de
 External structures: concrete paving/seating blocks e.g. »MultiTec-Aqua«, Kann GmbH Baustoffwerke, D-Bendorf, www.kann.de



Flat Roof Construction Manual

2010. Klaus Sedlbauer, Eberhard Schunck, Rainer Barthel, Hartwig Künzel.

208 pages with numerous drawings and photos.

Format 23 × 29,7 cm.

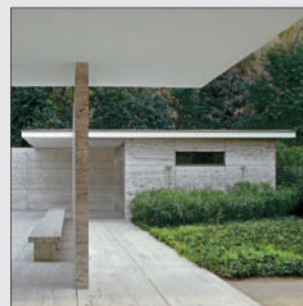
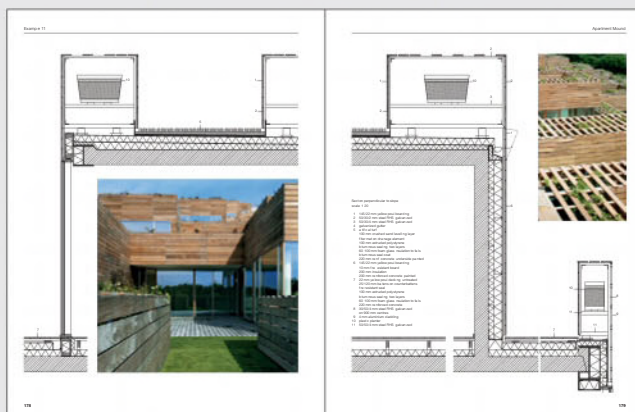
Paperback: € 79.90 / £ 66.50 / US\$ 106.–
+ postage/packing + VAT if applicable

DETAIL Construction Manuals

An indispensable aid for constructing flat roofs

The flat roof, beloved by architects and often described as 'the fifth facade', is designed mainly to protect the space beneath it from the weather. Integrating a flat roof, whether as a green roof terrace, publicly-accessible area or even as a profitable solar panel roof, optimises the profits and benefits derived from the building. Because professional im-

plementation of such roofs is in practice not always as simple as it sounds, this publication provides planners with the basic rules of construction and an overview of the kinds of uses and constructions and standards for flat roofs. In addition to the most important norms, rules and standards, construction plans of the main connection points round out this publication.



Planning-related basics on the construction, materials and building physics of flat roofs

Detailed presentation of individual layers of construction and roof types

Flat roofs as accessible areas

Renovating flat roofs

The most important details on building flat roofs and connection points as a basis for planning

Clear descriptions of construction solutions showing built examples

Flooring and Surfaces



Off-site floor options

The Portakabin Group has expanded its flooring types for Yorkon off-site solutions, offering precision-engineered products to accommodate standard and heavy loadings as well as increased floor stiffness and enhanced acoustics. They include: a base specification using an 18 mm particle board suspended floor on steel joists, for single and multi-storey applications with standard load-bearing requirements; a more sophisticated beam construction with added points of support, increased particle board thickness of 36 mm and steel sheeting for increased floor performance and load capabilities; and the use of a plywood deck for factory-installed terrazzo tiling.

Another option is the factory-installed 50 mm concrete floor, used in the health, education and commercial sectors: described as ideal for high traffic areas and to accommodate heavy point loadings and sensitive equipment, it is suited to both ground and upper floors. Finally, a site-poured concrete slab can be specified to suit floor loading and performance requirements.

□ Yorkon
United Kingdom
☎ +44 (0)845 2000 123
www.yorkon.info

New school makes the running in the design stakes

A new primary school in Munich, Germany applies a modern educational concept that is reflected in the layout of the building, with four separate study groups: each group has children of different ages and forms a manageable unit with three classrooms, one or two daycare rooms, toilets and a separate roof terrace. The architects Hess Talhof Kusmierz restricted the construction materials to exposed concrete, wood and glass, thus leaving the children plenty of scope for creativity rather than overwhelming them with a dominant design.

All the rooms intended for communal use are on the ground floor: the break hall, kitchen, a multi-purpose room, music, art and craft rooms and a sunken sports hall are accessible via an enclosed walkway alongside the 50 m outdoor running track, which is thermally separated from this indoor area by a high span of uninterrupted glazing. The upper storey extends over the track to provide a covered area for breaks and sports. External, single-flight staircases lead up to the study group areas.

The only coloured features, apart from the sports pitch fencing and facade elements in pale pink, are the all-weather pitch itself and the running track, both with pea-green sur-

faces from Polytan. This fresh, bright shade was chosen in preference to the red traditionally used for school sports facilities – it helps reflect daylight into the building and comes into its own when lit up.

The company manufactures and fits a wide range of synthetic sports surfaces, ranging from shock-absorbing soft-impact surfaces and multi-functional, all-weather pitches to high-speed surfaces for international athletics events. All are said to offer low maintenance costs and high wear resistance, and are available in numerous UV-resistant standard colours.

For this Munich primary school, Polytan S was specified: the two-layer, synthetic surface system consists of compressed granules with a depth of 13 mm in the case of the running track and 20 mm for the sports pitch. It is water permeable so dries quickly, and the smooth, non-slip wear layer is designed to provide for good ball bounce behaviour on the all-weather pitch and safe sprinting on the track.

□ Polytan GmbH
Germany
☎ +49 (0)8432 87 0
www.polytan.com



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History underfoot

Milliken's Clerkenwell collection is named for the area of London that inspired the five designs, which are made up of bold geometric shapes softened by gentle colour gradations. Each is influenced by a different aspect of the area. Three Corners, above, draws on a triangular structure seen at Smithfield Market, whilst Circle Top View uses another architectural detail, in the form of the half-circle top windows that characterise the district. A third design is Time Piece, inspired by the clock- and watch-making history of Clerkenwell.

The Dissident 2.0 collection is designed to challenge the conventional way of creating a floor plane. Along with its companion pattern tile Dissident 2.0 Transition, spaces can be defined subtly or dramatically, moving from one colour or tone to the next. Colours range from urban slate greys through fresh greens and sky blues to plummy pinks and rich purples. It is available within 10 days to meet tight deadlines via the Quick Ship programme. All these 45 cm square carpet tiles have a high recycled content.

□ Milliken
United Kingdom
☎ +44 (0)1942 612777
www.millikencarpet.com

Vinyl ranges provide flexibility in design

Luxury interiors showroom Altfield, in London's Chelsea Harbour Design Centre, has selected vinyl flooring from Karndean to complete its recent refurbishment, top centre and right. The rustic finish of Van Gogh Distressed Oak is used as the background to the main showroom space because the distinctive grain and detailed knots add an element of interest to the floor whilst creating a versatile backdrop. "Our brief required a clean, contemporary look that kept the essence of Altfield. It was also vital to consider the aesthetics, ensuring that you couldn't see any colour reflections from the floor when clients were looking at our products," said marketing manager Emma Boden.

The mottled dark slate look of Texas and the cool mid-brown tones of Country Oak, both from the LooseLay collection, were chosen for the window display areas. This can be fitted over most existing hard floors with little or no adhesive in most applications. For the showroom this means the tiles and planks can be easily lifted to change window sets as and when required.

Invicta Grammar School in Kent specified Karndean's Art Select Blond Oak parquet-effect vinyl flooring for its newly built library, for its durability coupled with the warmth

and texture created by the grains, knots and lifelike embosses. It has been laid in a traditional herringbone design complemented by a brick-lay border and a tramline to frame the space. Said ICT manager Mary Harris, "The library is the heart of the school, where we encourage learning in a variety of ways. It is therefore vital that this space feels welcoming and warm. We recognised the benefits of Karndean and, as a team, chose luxury vinyl flooring over natural products for its ease of maintenance."

The company's product selector app, for iPad and Android devices, showcases more than 150 wood and stone designs and includes full technical specifications. Introduced as an additional tool for architects and designers, each product can be viewed up close, giving the flexibility to select and demonstrate floor designs both on-site and in the office. The app can be downloaded from the App Store and Google Play Store. Karndean has also launched BIM objects with bimstore, featuring over 80 of its most popular products.

□ Karndean Designflooring
United Kingdom
☎ +44 (0)1386 820185
www.karndean.com





Warm and welcoming environment for the young

The Pietra Porzia kindergarten, above, in the town of Frascati, near Rome, has been designed according to advanced educational criteria to provide an environment which arouses the children's curiosity and stimulates them to be active. Featuring three 'laboratories' as well as common areas to play and meet, the kindergarten is built around an open space with a patio overlooking the garden. The colours are arranged in a minimal way to define the spaces without oversaturating them.

For this simple albeit varied concept the architects specified rubber flooring to create continuous surfaces that are warm and non-slip, and chose Kayar from Artigo. The natural fibres interspersed in it give a hint of intrinsic material character, and the neutral colour used in the common areas acts as a background to the strong colours brought into the picture by the children, by their drawings, games and equipment. In the laboratories for special activities a warm grey shade was used.

Kayar is Greenguard Gold certified for improved indoor air quality, and has a certified EPD: the Environmental Product Declaration, which encourages the use of products and materials for which life-cycle information

is available and that have environmentally, economically and socially preferable life-cycle impacts.

Artigo has also been specified for the Forlì University campus in Italy, below, which was converted from an early 20th century hospital and inaugurated in 2007. The second phase comprises four new elements – the three teaching bodies and the connecting architectonic system known as the trefolo (the strand), the pedestrian path that serves the three blocks and which is the backbone of the new university.

With environmental and sustainable issues in mind, a mix of Granito 2 mm and Granito Elastic 4 mm flooring was chosen for traffic areas, study rooms, lecture halls and stairways. The choice of an 'acoustic' product, in the form of Granito Elastic, is said to be of particular benefit in this application where it was decided to mix the transit areas of the building with open study areas. The product is claimed to contribute to a reduction in impact noise of up to 20 dB.

□ Artigo S.p.A.
Italy
☎ +39 02907 86 415
www.artigo.com



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Blue is the colour

The sports centre at St Andrews University in Scotland provides a facility for students and visitors to take part in classes, train, or play sport at any level. When looking for the best all-round solution for a new sports floor, in terms of durability, ease of installation and performance, the university chose a flooring solution from specialists Gerflor.

Said assistant director of sport Ian Gaunt, "We chose Taraflex™ Sport M Comfort as it came with a good reputation, both from colleagues in the higher education sector and the London 2012 Olympics. The colour was chosen to brighten up our previously dull sports hall: the London Light Blue floor from Gerflor has helped make the sports hall an attractive place to play sport."

Taraflex™ is said to have been used in every summer Olympics since 1976 and is described as an affordable option for all multi-specialist applications, both for new projects and refurbishments. Some 600 m² was laid directly over the existing flooring, bringing it up to the new European standards for shock absorption. "Students and members of our sports centre are very happy with the product especially in relation to the 'give' the floor has, making it easier on the body and safer for children's activities," commented Ian Gaunt.

Available in 17 colours and two wood-effect designs, the flooring is treated with Protec-sol® which contributes to easy maintenance, with no polish required, and is anti-friction burn and slide/grip. The double-density foam backing has anti-bacterial properties and is environmentally friendly. Gerflor offers a number of installation solutions including the Eco-Fit System that allows for fast, free-floating installation.

□ Gerflor
United Kingdom
☎ +44 (0)1926 622600
www.gerflor.co.uk



Pale and interesting choices reflect the trend

Junckers offers solid pre-finished hardwood floors for a wide range of residential and commercial uses including retail, offices, hotels and public buildings. Grey-toned wood floors continue to be popular, so the company has recently launched a collection based on the success of its finishing product Driftwood Grey Oil, available on the full range of solid oak floors, wide-board planks, two-strip and textured oak floors.

The new finish, top and below, centre, has a distinctive 'worn' look, offering the patina of a rustic, aged wooden floor with the benefits of solid hardwood flooring. It is pre-finished with the grey stain and factory-sealed with UltraMatt lacquer giving an optimum effect, and also means the floor can be walked on as soon as it is installed.

Also new is a pale parquet floor seen above and below, right in a basket-weave pattern:



the Single Stave Blocks floor has been given a contemporary, Scandinavian update with Rustic White Oil. The solid oak blocks in two sizes can be laid in other patterns, including herringbone and ladder. More shades, like grey, black, walnut, cherry and mahogany, can be achieved with the oil, and floors can be over-coated with lacquer for durability.

Junckers also supplies portable and permanent sports floors tested and approved to EN 14904 and suitable for all types of indoor event. The broad product range of 22 mm solid hardwood boards covers a variety of species suited to sports and dance and, as with all the floors, is guaranteed for use with underfloor heating systems.

□ Junckers
United Kingdom
☎ +44 (0)1376 534700
www.junckers.co.uk





Contemporary twist on traditional flatweave makes a statement on the stairs

Roger Oates offers a bespoke colour service whereby any of the existing designs in its wool flatweave collection can be customised by choosing from the exclusive palette of fresh, modern colours developed for the company's own use or, if a particular colour is required, it can be specially dyed. Flatweave was a relatively humble style of narrow, woven runner from earlier centuries and has inspired textile designers Roger and Fay Oates to focus on reinventing, designing and producing this very specific type of floor covering to create a timeless look that is suited to both classic and contemporary interiors.

With its robust, durable construction and finished selvedge edge making it a good choice for stairs, flatweave can also be joined to create distinctive rugs and fitted landings. Its flexible, supple nature enables it to be fitted and sculptured around almost any winders with the stripes perfectly aligned, says the company.

The rugs and runners are woven on vintage looms using British wool which is spun and dyed in Yorkshire, and designed and hand-finished in Herefordshire. Unlike pile carpet that has an even, uniform feel, flatweave has a texture that lends a unique character and personality to a floor.

For bespoke projects the design team works closely with clients to create the right colour balance then, once the design is approved, a 35 x 35 cm sample is woven on a hand loom. The service is priced individually and varies according to the length, design and colours chosen. The runners are also available in customised widths for wider or narrower staircases. A minimum order length applies to all bespoke work.

Pictured above is Cluny, a minimal symmetrical stripe design inspired by old French linen, and currently available in denim, raspberry and smoke, as shown on the console

in the centre of the left-hand image. For a recent bespoke project in a family home it was recoloured in two ways, both of them asymmetrical, giving the design a new balance when fitted on the stairs.

The result offers a riot of pink with fine lines of vibrant colour on the upper flight, and a restrained sophistication in yellow and grey on the lower flight, as seen top, centre. The design in pink was also made up into a rug

(above, right). The Roger Oates range now comprises the 100 % wool runners, rugs in 100 % wool and Tapis D'Avignon wool felt for living rooms, halls and bedrooms, wall-to-wall 100 % wool fitted floor coverings and stair rods and brackets.

□ Roger Oates
United Kingdom
☎ +44 (0)20 7351 2288
www.rogeroates.com



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Hardwood selection

Baltic Wood says its flooring solutions are amongst the widest in Europe, due to the multitude of wood species, surface refining methods and aesthetic effects the company offers. Solid and layered hardwood floors come in a large variety of woods including oak, ash, American walnut and European walnut, wenge, beech, Canadian maple and European maple, the majority of which can be laid over underfloor heating.

Above is shown the Desire floor, from the Miracles Collection of three-layer wooden floors, which has received a Red Dot Design Award this year – said to be one of only three wood floors that have been given this award. The heat-treated oak floor has a surface characterised by oak-typical sapwood and knots. The structure is markedly highlighted in the brushing process and it has a high shade variation. Below, from the Noble solid wooden floors' Sélection du Sommelier collection, is Pinot Grigio, refined with white and grey eco oil. It also features a brushed surface with a high shade variation and the hollows are stained white.

□ Baltic Wood
Poland
☎ +48 (0)12 639 8690
www.balticwood.pl



Crafted by hand

Jennifer Manners Bespoke Rugs is a boutique studio specialising in distinctive wool rugs, and drawing inspiration for its designs from around the world. These hand-knotted, hand-woven and hand-tufted rugs are made to order from New Zealand or Himalayan wool, and clients can choose from an extensive library of designs offering a wide range of standard styles and colours or custom-designed pieces, for both commercial and residential projects.

Eastern influences feature strongly in the collection, as well as abstract, graphic and geometric designs, such as those pictured here. Hex, seen above, offers a series of hexagon shapes arranged in a honeycomb grid to create a dramatic, contemporary look, whilst Gate II is taken from the company's classic Gate design, which was inspired by a communal garden in a London park – in this version an extra colour has been added for more depth and interest. All these rugs are available in other colour combinations, and they can be made to any dimensions required.

□ Jennifer Manners
United Kingdom
☎ +44 (0)20 7351 2584
www.jennifermanners.co.uk

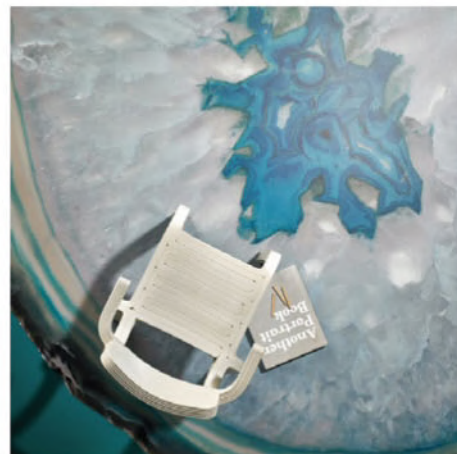


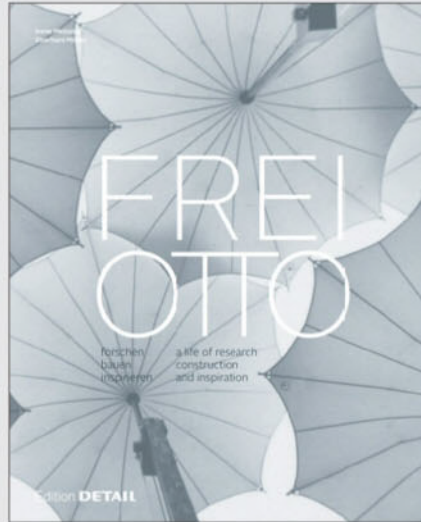
Purple patch

Forbo flooring was specified throughout the new Edinburgh premises of the Royal Institution of Chartered Surveyors. Allura Wood luxury vinyl tiles in Oyster Seagrass were installed in the breakout areas and walkways, chosen for their durability and high Light Reflectance Value. For the kitchen zones within the office areas, ease of maintenance was a necessity and, along with the Allura tiles, Marmoleum Real was chosen for its performance characteristics. The Topshield2 finish, combined with natural antibacterial properties, makes it hygienic and easier to clean. The Purple colourway was a good match to the institute's brand colour seen here used as a wall and ceiling feature.

The Eternal general-purpose sheet vinyl collection has been updated and a key element is the digital print section, where there are said to be no limits to what can be created. Designs range from giant 'gemstones', such as the cross-section view of a crystalline rock below, to a petrified bark effect and a rainbow design with a spectrum of colour gradients over a 10 m length.

□ Forbo Flooring Systems
United Kingdom
☎ +44 (0)800 093 5258
www.forbo-flooring.co.uk





Frei Otto – a life of research, construction and inspiration

2015. Irene Meissner, Eberhard Möller.
128 pages with numerous photos.
Format 19 × 23.5 cm.
Bilingual English/German.
ISBN 978-3-95553-252-9
Hardcover: € 34.– / £ 27.– / US\$ 48.–
+ postage/packing
+ VAT, if applicable

“He is an inspiration.” (Norman Foster)

No other architect provided as many ideas and inspiration to construction in the second half of the 20th century as Frei Otto.

Lord Norman Foster described this great pioneer of lightweight construction simply as “an inspiration”. Frei Otto explored the foundations of resource and energy-efficient building well before these issues received the attention of the wider public. By including users in construction planning and taking into account local and climatic conditions, he was able to open new avenues for the

building industry. The publication provides insights on the key aspects of his work.

At its heart was the search for natural designs and an exploration of form-finding and self-development processes. As such he created a whole universe of ideas using membrane, net and convertible roofs with umbrellas, gridshells, and pneumatic structures. The book introduces his key works and highlights how his ideas were adopted and continued throughout the world.



A depiction of some of his most important works: from the pavilion in Montreal to the Munich Olympic roovescape and the Berlin eco-houses

New forms of lightweight and natural, adaptable and modifiable construction

Insight into interdisciplinary research projects

Frei Otto's work as a source of inspiration for architects and engineers worldwide

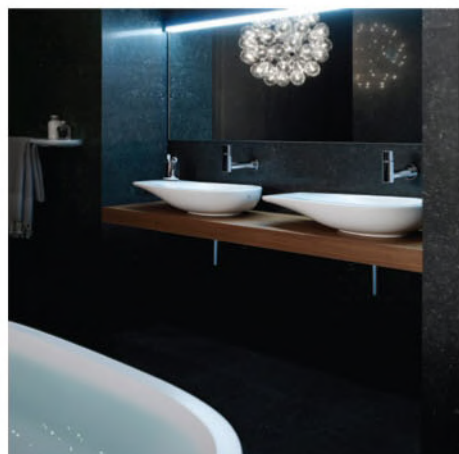
Health and Leisure

Added luxury

Laufen's IIBagnoAlessi One collection has been expanded with the addition of several new products featuring the elegant styling and timeless design of the existing range by Stefano Giovannoni and designed to integrate seamlessly into the contemporary bathroom. The Tuna countertop washbasin is now available in the smaller sizes of 900 and 1,200 mm widths, making them suited to any bathroom space. The sculptural bowl is combined with an easy-clean countertop shelf, whilst its gentle curves and soft lines can be complemented with furniture from the same range, in a choice of Canaletto walnut or white lacquer finish and now available in a new 2,400 mm-wide unit to accommodate double washbasins.

Also introduced is a luxurious, solid-surface bathtub, available as either a free-standing or built-in version and with an optional air-massage system to bring spa-style features into the domestic setting. This is joined by a new siphonic WC, crafted from one piece for a seamless, hygienic finish that offers a powerful flushing performance.

□ Laufen
United Kingdom
☎ +44 (0)1530 510007
www.uk.laufen.com



Natural stone cladding adorns Italian-style spa

Golden Mile, an exclusive spa in the heart of Moscow, is located on the ground floor and basement of the Park Palace, a luxury residential complex. What was a former car park has now become home to two private spas, a swimming pool with separate whirlpool area, a generously proportioned wellness zone, a gym, two children's areas and a lounge bar and restaurant, hairstylist and medical facilities.

A 'Made in Italy' theme runs throughout the whole project: the general contractor was the Italian company Wellness Today by Happy Sauna, which appointed spa specialists Studio D73 to design the interiors. One of the manufacturers selected to represent the excellence of all things made in Italy was Lithos Design, with the Lembo and Seta natural stone claddings from its Le Pietre Incise collection. These have been used in selected areas of the leisure complex to help create a relaxing atmosphere, their soft silhouettes promoting the feeling of well-being created by water.

Lembo clads the whole of the back wall of the swimming pool, where it acts as the background to the large Golden Mile logo, whilst Seta decorates the whirlpool area. All the surfaces in this collection, which are

available in several stone materials, are modular for increased flexibility in design. Lembo's undulating pattern comes in a 60 x 60 x 2 cm module.

The company describes the appearance of Seta cladding as echoing the fall of silk drapes, and this style is also available in Curve and Curve Luce versions – the Curve sinuous curved stone slabs lend an air of movement and 3D design, whilst the light points of Curve Luce make it possible to achieve genuine luminous feature walls. The modules measure 60 x 60 x 2 cm (or 60 x 60 x 14 cm for Curve and Curve Luce).

Lithos states that stone is also one of the best insulating and sound-absorbent materials and is therefore perfect to achieve excellent levels of indoor sound quality. In addition, natural stone contributes towards the setting's health and safety since it is non-flammable, does not build up any electrostatic charge and does not encourage the development of bacterial micro-organisms, moulds and mildew.

□ Lithos Design srl
Italy
☎ +39 (0)444 687 301
www.lithosdesign.com



NEW



best of DETAIL:
Refurbishment

NEW September 2015.

Christian Schittich (Ed).

200 pages with numerous drawings
and photos. Format 21 × 29.7 cm.

Bilingual English/German.

ISBN 978-3-95553-255-0

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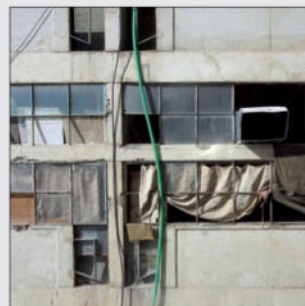
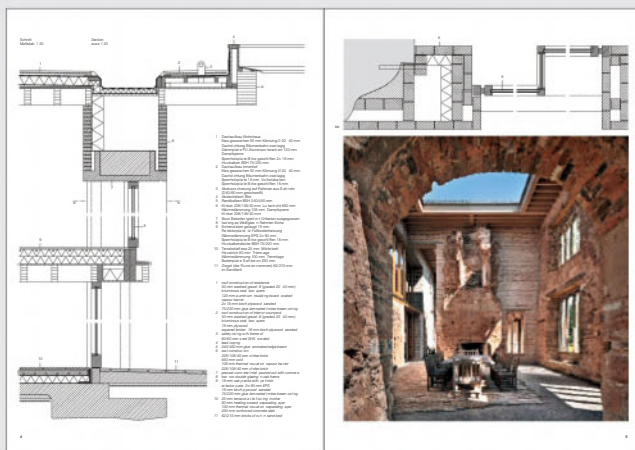
best of **DETAIL** series

From old to new – recognising and maintaining value

For architects, the amount of work to be done on existing buildings is steadily increasing. This is partially a reflection of the advancing age of buildings, but it is also due to constant changes in building and social requirements. The desired or necessary measures, however, are always personalised and vary considerably.

As a result, there is no standardised or widely understood term that can be used to describe the range of construction activities related to existing buildings. Reflecting this,

“best of DETAIL: Refurbishment” presents a comprehensive range of highlights from DETAIL on the topics of renovation, extension, restoration, refurbishment and conversion. In addition to specialised theoretical contributions, the publication features an extensive section with examples of projects. From small-scale measures, such as the re-decoration of single rooms or apartments, to the supersized category at the urban renewal level, it offers abundant inspiration as well as a variety of approaches to solving problems.

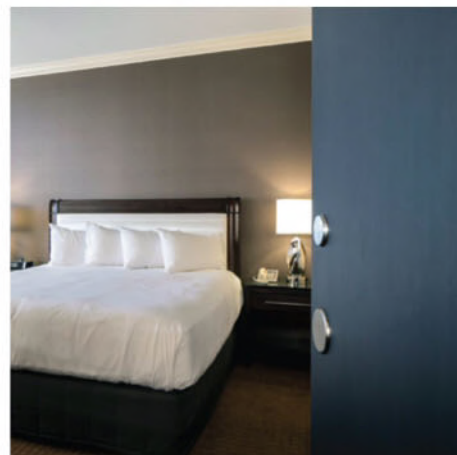
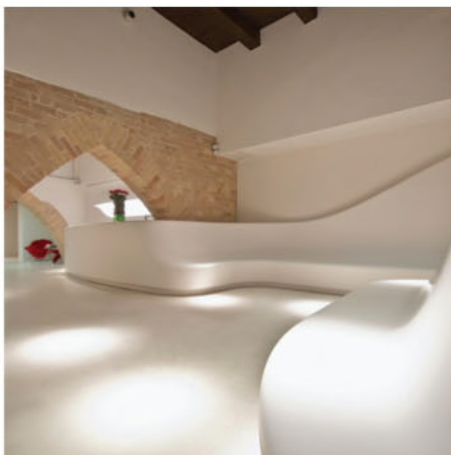


*Renovation, extension, maintenance,
modernisation and conversion*

Methods and planning approaches

Design aids and sources of inspiration

*Specialised articles and examples
of projects*



Sculptural seating forms a dramatic centrepiece

Developed from an idea by architect and designer Yasmine Mahmoudieh, and from the conversion of the historic rooms in Palazzo Spina in the heart of Rimini, Italy, the Augeo Art Space is described as a unique concept which blends contemporary art with the world of wellness. The Latin term *augeo* means 'to increase' and 'to grow' but also 'to strengthen' and 'to fill with goods'. Correspondingly, this space is dedicated to personal enrichment, inner growth and meditation, and is designed to welcome guests from all over the world for exclusive events.

It is divided into two spaces, an art gallery and a spa, and visitors' first sight is of a 'functional sculpture' made of Hi-Macs® solid surface material from LG Hausys. Beginning on the right-hand side of the entrance, the structure then transforms into a seating area which continues along the perimeter of the room and winds its way through the arched spaces, finally becoming a reception area and bar.

Its thermoplastic capability means the structure creates the illusion of a single, continuous form, giving the sinuous appearance envisaged by the designer, who has exploited curved lines in many of her installations. The smooth, non-porous surface is

said to be highly stain-resistant and easy to clean, maintain and repair. The white surfaces will also be used as screens for digital art projects.

The floor has been deliberately 'dirtied' by the shades in the cement, which is designed to echo the colours found in a typical Italian courtyard, and the lighting is mainly indirect for a gentle effect, with strip lighting at the foot of some walls making them appear to 'float'. Behind the reception a staircase leads down to the massage, treatment, fitness and spa areas.

Here darker shades have been used, inviting guests to relax and meditate. Large slabs of black stone, high-end urban finishes and precious mosaics give a luxurious, contemporary look, which is enhanced by top-of-the-range taps, fittings and an electronic rain shower system. In contrast, the fitness room, equipped with the latest generation machines, is a surprise of simple, coloured lights to give the room more depth and movement.

□ LG Hausys
United Kingdom
☎ +44 (0)1892 704074
www.himacs.eu

Quick-change act

At the Hilton Hotel in the US city of Minneapolis, DI-NOC Architectural Finishes from 3M have been used to refresh 2,200 internal doors and 1,600 closet shelves, at an estimated saving over replacement of around \$1,000,000. When renewing selected furniture in guest rooms the self-adhesive vinyl film, chosen to complement existing finishes, was used to update the doors and, at 60-90 minutes per door, this created minimum disruption and downtime. It is durable enough to handle guest room traffic and the work can be done without removing the doors, which were major factors.

At the other end of the scale, finishes from the DI-NOC range were used to create new interior wall signage in a refurb project at healthcare and life insurance provider PruHealth following its rebranding as Vitality (below). Developed as a cost-effective design solution for interior and exterior new build and/or refurbishment projects, the finishes comprise over 700 self-adhesive vinyl films designed to replicate the appearance and feel of traditional materials.

□ 3M Commercial Graphics
United Kingdom
☎ +44 (0)800 121 4739
www.3m.co.uk





Asian Flavours

Creating Architecture for Culinary Culture

NEW September 2015.

Christian Schittich (Ed.),

144 pages. Format 25 × 23.5 cm.

ISBN 978-3-95553-267-3

Hardcover: € 39.- / £ 31.- / US\$ 55.-

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+ VAT, if applicable

A restaurant and travel guide for Asian food enthusiasts

Ceremonies, rituals und traditions – as well as the fascinating combinations of flavours and unusual ingredients, the culinary customs of Asian countries also arouse great interest in Western cultures. But how are spaces for Asian eating and cooking traditions and processes designed? What kind of surroundings are these kinds of food and drinks consumed in?

This book presents the projects of Asian and European architects on both continents,

ranging from tea houses and sake bars through to entire restaurants. How are architects adapting and interpreting this cuisine in »our« latitudes? How do they respond to the conditions and cultures in these spaces without simply simulating an »Asian decor«? Enhanced with selected recipes from individual restaurants and essays on various Asian cuisines and culinary cultures, the book is also a travel guide to Europe's many special Asiatic spaces.



30 projects in Asian and European cities

Background information and history behind the restaurant concepts

Things worth knowing about Asian dishes and traditions



Boards for boarders

SmartPly OSB3 was specified for the build and fit-out of an indoor skate park for the young community of Gorey in County Wexford, Ireland. The Wreckless skate park and shop is a 600 sq.m facility offering a diverse skating area within a large warehouse that can be used all year round. It also acts as a digital hub, allowing skaters to edit digital photos or videos, which plays a large part in the publicity of the sport worldwide.

The 18 and 11 mm sheets were used to construct the uprights and sub-structures for the mini ramps and quarter pipes. In addition, uncut OSB boards were laid across joists and rafters to form the deck structures for the transition areas of the park. The equipment was then sheeted in birch ply to form the smooth skating surface.

The 11 mm sheets were also used to build the structural dividing walls between the skating areas and the shop selling skateboards, longboards, BMXs, scooters, footwear and accessories. Manufactured in Waterford from locally sourced timber from FSC-certified Irish forests, which are owned by SmartPly's parent company Coillte, the fully certified, sustainable OSB product is made and tested to EN 13986 and is approved for use in both structural and non-structural applications.

The initiative was launched by founder of Wreckless, Grant Masterson, who commented: "We worked closely with the skate park builders, Four One Four, during the design stage of our project. Since we opened the park in April, we have held a number of competitions and events at the arena and the ramps are holding up brilliantly, even when pitched against some of the best skateboarders in Ireland."

□ SmartPly
United Kingdom
☎ +44 (0)1322 424900
www.smartply.com



Baths and spas design

Inspired by the current approach to health, wellbeing, relaxation and fitness, the third volume in JOI-Design's 101 series of interior design books is 101 Hotel Baths & Spas, which explores a variety of bathrooms and spas drawn from the vast portfolio created by the studio over the last 30 years, from international luxury resorts with expansive facilities to boutique hotels fitted with small, exquisite wellness areas. The 232 pages illustrate numerous possibilities for designing relaxing retreats, with photographs, renderings, floor plans and perspective drawings throughout. This English-language work is published by Braun and can be ordered from book stores, direct from JOI-Design or online at Amazon.

□ JOI-Design GmbH
Germany
☎ +49 (0)40 68 94 21 0
www.joi-design.com



Safety and privacy

Balustrading Solutions' nylon, stainless-steel and structural glass balustrading was specified for the £34 million redevelopment of the Musgrove Hospital in Taunton. The products chosen needed to be durable and easy to clean as well as contribute to the sense of light and space integral to the building's design. Other considerations included making sure the balustrading on the upper course gave patients passing through on trolleys and beds privacy by obscuring the view from lower levels, and resolving possible loading issues created by the use of glass on upper floors.

Director David Hough said the company was able to adapt its products to meet these requirements because of its knowledge of the sector and early involvement in the project. "We work with architects during specification so we can tailor our products to their specific requirements and factor in anything that affects how we install them. We can then produce drawings to make sure everything we supply is fit for purpose, before manufacturing the product."

The nylon range was specified for two sets of stairs. It offers fracture resistance, high strength and thermal stability along with a smooth, easy-to-clean surface that doesn't attract dust. Its 4 mm nylon sleeve comes in a range of colours and provides protection against chips and scratches. The stainless-steel range was used in areas where a sleek design, mechanical strength and resistance to chemical corrosion were relevant. Finally, the structural glass range was specified for a structural glass ramp with glass manifestations; this brings light into the open spaces, and the glass acts as the structural element, supporting the top rail without the need for separate uprights and panels.

□ Balustrading Solutions
United Kingdom
☎ +44 (0)1902 600421
www.balustradingsolutions.com



Clean and fresh

Winner of a Red Dot Design Award in 2015, Geberit's AquaClean Mera (top) has an array of intelligent functions within its smooth lines: WhirlSpray technology for a targeted clean with water at body temperature, via an aerated shower spray; a remote control with four storable user profiles for individual comfort; and seat warming, night light and odour extraction. For open-plan and wet-room-style showering areas, the CleanLine shower channel, in three designs and two lengths, offers simple, hygienic wetroom drainage in a stainless-steel strip that can be cut to length on site. Placed along the wall or in the floor, it acts as an open profile for water to collect and flow to the drain, and a removable insert aids easy cleaning.

□ Geberit
United Kingdom
☎ +44 (0)800 077 8365
www.geberit.co.uk



Energy-saving, sustainable healthcare solutions

Armstrong Ceilings' CoolZone passive energy-saving tiles were used alongside the Ultima+ range, with a Tegular edge detail on a 24 mm suspension grid, throughout the Surgical Admissions Suite and Pre-Operative Assessment Department at Bristol Royal Infirmary, above. The £2 million modular building by CMS Architects, located on the roof of the hospital's King Edward Building, replaces a derelict structure and provides consulting rooms, changing cubicles, reception, waiting areas and associated clinical support services.

Said senior architect Paul Rogers, "The design embraced sustainable thinking from the outset, with the use of prefabrication construction methods, natural ventilation, maximising daylight with external louvres, and innovative Phase Change Material (PCM) ceiling tiles. These are used throughout the building to absorb daytime solar gains and level any peaks, releasing their stored energy by night-time purge ventilation working with the natural ventilation system. This works particularly well as the building is only occupied during the day.

"All materials specified were Green Guide A rated as a minimum standard. The PCM tiles enabled the project to achieve Part L requirements without the need for cooling and thus additional renewables/photovoltaics to offset this increased energy usage."

The company has undertaken its largest project to date featuring elements from its service and systems portfolio – not just tiles for acoustic and healthcare purposes but also a variety of suspension and Dry Wall Grid systems with bespoke Axiom perimeter solutions – for a new Glasgow hospital complex. The Queen Elizabeth University Hospital and the Royal Hospital for Children in Glasgow, designed by specialist healthcare architects IBI Group (formerly Nightingale Associates) is colourful and innovative in its use of internal 'floating' cantilevered pods,

among other elements. The 140,000 m² of wall-to-wall ceiling systems include pre-engineered aluminium perimeter solutions, Axiom transitions, profiles and accessories. In addition, in the cantilevered pods a 100 mm Axiom profile was coupled with a bespoke 225 mm Axiom profile and riveted together to create a 325 mm bulkhead/upstand at a custom length of 3.6 m. This is said to have taken a quarter of the installation time compared to traditional plastering methods.

This was also its largest off-cut recycling project, diverting more than 35 tonnes of ceiling tile off-cuts from landfill; Armstrong says its commitment to recycling was a key factor in its selection for the project.

□ Armstrong Ceilings
United Kingdom
☎ +44 (0)1895 251122
www.armstrong-ceilings.co.uk





Cladding panel options

The distinctive atrium at the entrance to the Women & Children's Unit at the Princess Royal Hospital in Telford, Shropshire features Creanova gypsum panels from Knauf. The product was specified because the design continues the theme of the external cladding into the atrium and the panel system enables a laminate to be applied to the gypsum base. The feature cladding, together with a projecting bay on the southern side of the new building, identifies the entrance to the new unit, so visitors then come into the heart of the building via a full-height glazed facade.

The fire-resistant properties also recommended its use in the two-storey entrance, meeting the Health Technical Memorandum as it is Class 0 for surface spread of flame. Finished surfaces can be a digital print, continuous pressure laminate (CPL) or high-pressure laminate (HPL) coating, real wood veneer, lacquer or paint. The high-density, high-impact resistant panels can be curved, perforated or micro-perforated to achieve any acoustic performance.

□ Knauf
United Kingdom
☎ +44 (0)1795 424499
www.knauf.co.uk



Customised entry doors

Southern General Hospital, which serves the south west of Glasgow, has installed a bespoke entrance solution from Boon Edam to offer patients, staff and visitors a welcoming and reassuring entry to the hospital. The overall structure and door arrangement was specifically designed by the company's designers in the UK and the Netherlands to meet the intricate requirements for the new entrance system, which has enabled a faster, smoother flow through this mobility hotspot. The Duotour revolving door with integrated curved corridors serves as a multi-functional entrance to the building and includes four auto-swing pass doors for the use of disabled users.

The company worked closely with the NHS Greater Glasgow and Clyde and Southern General Hospital from the start of the project to create a fully customised entry solution for this large teaching hospital, which has an acute operational bed complement of approximately 900 beds and provides a comprehensive range of acute and related clinical services to local residents.

□ Boon Edam Ltd
United Kingdom
☎ +44 (0)1233 505900
www.boonedam.co.uk



Push-fit flexibility

The design team at Rotterdam's Maasstad Hospital worked alongside Wavin to minimise the risk of water-borne bacteria during the specification of a high-performance hot and cold water system. Tigris K1, a multi-layer press-fit system for potable water, sanitary and heating applications, was chosen for the 620-bed hospital, which covers 100,000 m² and includes shops, cafes and walkways as well as the wards, operating theatres and administrative offices.

Consulting engineers Royal HaskoningDHV said Tigris gave both the 70 °C temperature resistance of the original copper pipe specification and the speed, convenience and reliability of push-fit fittings, and also made it possible to pre-configure many system components off-site. As well as health and hygiene applications such as operating theatres or food preparation facilities, the system is said to be proven in continuously operated recirculating systems where material selection is key.

These water-replenished systems, comprising multilayer composite pipe with high-performance plastic polyphenylsulphone (PPSU) fittings, will deliver a constant supply of hot water and help prevent the spread of infection in apartment buildings, care homes and hotels. The aluminium layer reduces thermal expansion, and the flexibility of the composite pipes results in the need for fewer connectors, to simplify installation and significantly reduce costs.

Additionally, Wavin's QuickStream siphonic roof drainage system was chosen for the extensive green roof areas, to control dispersal of rainwater even in the heaviest downpour and help minimise the width and number of downpipes required.

□ Wavin UK
United Kingdom
☎ +44 (0)844 856 5165
www.wavin.co.uk





Modular solution

Portakabin Hire was awarded a £13.5 million contract – the largest in the division's 52-year history – to expand ward and theatre accommodation for orthopaedic services at Royal Stoke University Hospital. The 4,000 sq.m, two-storey building was completed in less than four months, and purpose-designed facilities include 56 in-patient beds, two operating theatres, recovery room, 'dirty' and 'clean' utilities, single rooms with en-suite bathrooms, staff changing rooms, reception, kitchenette, offices and an integral plant room.

Said John Simpson of the University Hospitals of North Midlands NHS Trust, "We appointed Portakabin for their capabilities to deliver this challenging scheme on time and on cost. The company's manufacturing centre in York is an impressive operation which maximises off-site working. This is important to help us minimise disruption to patient care on a fully operational and highly constrained hospital site. Seeing the building in manufacture also gave us the reassurance of the resources, the quality of the Portakabin approach and their commitment to delivery on programme and on budget."

The hiring of modular accommodation is described as a fast, flexible and cost-effective way for healthcare providers to expand ward and consulting facilities, particularly on restricted sites. The building was craned into position as 124 steel-framed modules in a complex operation which involved a 350 tonne crane, in a confined area that was immediately adjacent to fully occupied wards and close to a busy road. It was delivered complete with wall finishes, internal partitioning, M&E services and flooring already in place, so further reducing work and disruption on site.

□ Portakabin
United Kingdom
☎ +44 (0)845 401 0010
www.portakabin.co.uk



M&E project provides for future expansion

Building services specialist LJJ is undertaking a mechanical and electrical (M&E) design and install project for a containment level 2 (CL2) facility at the Pirbright Institute in Surrey, a national centre for preventing and controlling viral diseases of farm animals and those that can spread to humans. Adjacent to the existing campus, the new BREEAM 'Excellent' rated building will provide purpose-built research laboratory facilities for 90 scientists as well as office and meeting spaces and social, amenity and building support facilities.

In addition to the full M&E fit-out, the project includes developing the M&E infrastructure for the campus to facilitate further buildings in the future. The institute has its own high-voltage power supply and LJJ will extend this with the addition of four new transformers. The team will also install a 500 m medium-pressure gas main and new water supply networks and data cabling infrastructure for use by this scheme and subsequent developments.

Class A, B & C ductwork, appropriate to the low-risk, CL2 status, will be installed and a dedicated ventilation system for the offices and laboratories, linked to the building management system and delivering a detailed

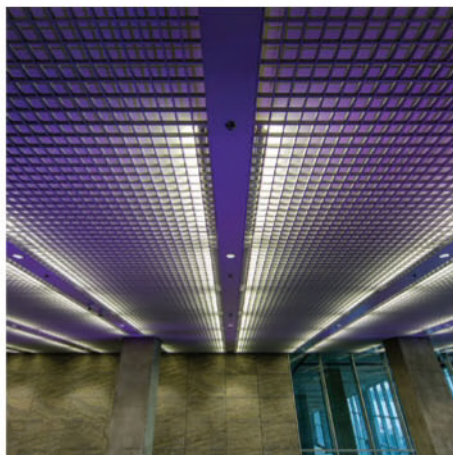
ventilation strategy to address the specific needs of the building and provide future flexibility. LJJ commented that, whilst the scheme involves a relatively low containment level classification, it is a complex programme with very specific requirements. A roof-top plant room will include extraction plant with heat recovery, chillers and gas boilers; in addition, a rainwater harvesting system is being installed, along with a PV array to cover the lower and upper roof.

The company is also installing the infrastructure for a planned district heating system, and flexibility is designed into the electrical installation, with underfloor busbar and desk management power systems in the offices and dado trunking in the lab areas. A dedicated low-voltage switchroom has dual distribution boards for the building's two levels and separate boards for the autoclave and cryogenics systems. A DALI lighting system with manual 'on' and absence detection 'off' functionality, CCTV, access control and intruder and fire alarms will be integrated into the site-wide systems.

□ LJJ Contractors
United Kingdom
☎ +44 (0)1494 472323
www.ljjcontractors.com



Lights and Lighting



Bespoke system illuminates the whole ceiling

Hunter Douglas has designed and installed a custom-made 2,500 sq.m ceiling for the ground floor of The Netherlands' largest multi-functional building. Designed by architects OMA, and named after the former flagship of the Holland American Line, De Rotterdam is based on the concept of a 'vertical city', its three interconnected mixed-use towers accommodating different functions, including a hotel, offices, apartments, shops and restaurants.

The specially designed ceiling, which had to meet tough acoustic requirements, comprises two layers: a panel ceiling with a high Light Reflectance Value and an open-cell grid ceiling beneath. In between are luminaires with fluorescent tubes, which allow light to bounce off the reflective surface and spread into the interior of the building.

The ceiling stretches from the outside to the inside of the building, with only a glass facade to separate the two. Whilst they look identical, the exterior section of the ceiling had to withstand wind velocities of up to 150 km/hr due to the building's location on the banks of the River Meuse, as well as providing corrosion resistance. The company developed a special storm-proof construction to support the whole system and,

rather than using steel grids for the exterior, applied aluminium grids with a corrosion-resistant coating.

Project architect Kees van Casteren said: "The whole building is defined by the uniform appearance of the facades. The same uniformity was desired for the ground floor ceiling: we wanted it to look the same outdoors as it did indoors. It was not a system readily available on the market. Hunter Douglas took up the challenge to create a ceiling that matched our ideas."

To ensure compliance with high interior acoustic requirements, Hunter Douglas specified perforated panels with an acoustic fabric that absorbs sound and minimises reverberation. As a result, the ceiling's aW value is 0.85. The ceilings, grids and other components have existed separately for some time; however, by combining the unique properties of each one, a new ceiling system has been created that reflects both the interior and exterior requirements of the building's future occupants and users.

□ Hunter Douglas
United Kingdom
☎ +44 (0)1604 766251
www.hunterdouglas.co.uk

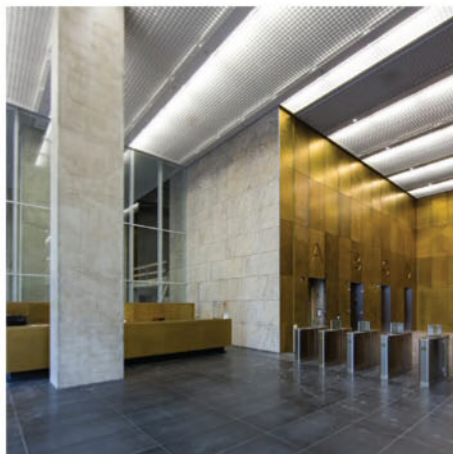
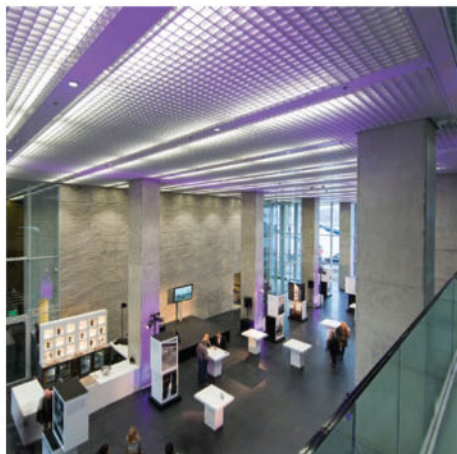
Key design elements

Folio, from Italian lighting brand Plexiform, is a lightweight rectangular or square LED fitting with 16 points of light, in a slim, minimal design. Made of 2.5 mm steel sheet with an epoxy powder coating in matt black, white or grey or in a chrome finish, it is available in ceiling and suspension versions, with DALI or dimmable electronic ballast and special colours on request.

Dinamica, seen below, is characterised by a rectangular, light-emitting structure, created not only to illuminate but also to emphasise the architecture of a space. This LED device comes in ceiling, recessed and suspended versions. With the recessed version, the frameless light becomes an architectural element in its own right.

The suspended version is designed to give maximum visual comfort due to the anti-reflective lens. Suspension can be single or double (bodies joined horizontally or vertically, in double- or mono-emission versions) and a continuous row can be configured with linear or angular joints.

□ Plexiform srl
Italy
☎ +39 (0)2 663 00 740
www.plexiform.it



NEW

SOM Structural Engineering



DETAIL engineering

4

DETAIL engineering 4: SOM Structural Engineering

NEW July 2015

Christian Schittich (Ed.), diverse authors.

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DETAIL engineering series

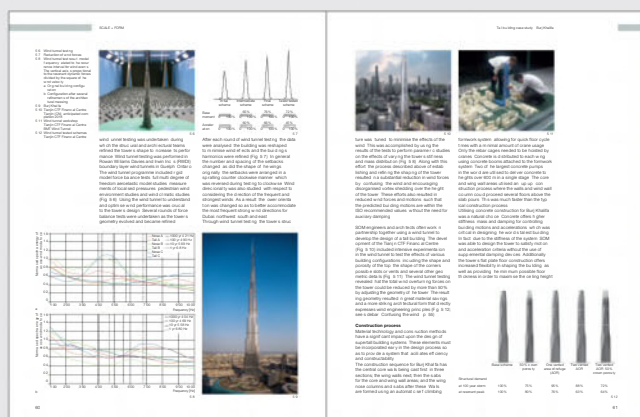
How to design supertalls

With nearly 80 years of experience in integrating architecture and engineering, Skidmore, Owings & Merrill's (SOM) work remains groundbreaking, especially when it comes to designing supertalls.

Besides addressing the question of "how high can you go", as well as the issues of efficiency and economy, this fourth volume of the DETAIL engineering series presents the theoretical background of SOM's structural group. On the basis of a variety of projects with their general structural concept or their specific details, the book explains the

process of finding corresponding solutions. These solutions illustrate the company's core values: simplicity, clarity, hierarchy, efficiency and continuous research.

In addition, the projects – from James Turrel Skyspace to Burj Khalifa – are also placed in the context of SOM's work as a whole using anecdotes from a number of other well-known SOM projects as John Hancock or Sears Tower. This volume considers how to find new structural solutions, as well as how materials can be used innovatively to create "next generation" buildings.



Iconic architecture as a result of structural solutions: From Sears Tower to Burj Khalifa

New structural solutions: Form-finding of tall buildings

The process of simplifying: Showing the essence of the structure

Tall and economic: Key issues for efficient design of high-rises

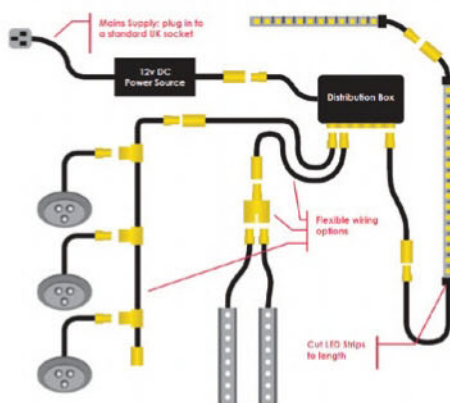


A different angle

From Nyta, the Tilt range is designed to emanate an open and soft light, and direct it exactly where it is needed. Intuitive handling allows the turning and swivelling of the shade along its oblong opening in every direction. It works like a cupped reflector that can be freely moved around the light source, thus gathering the light and directing it towards the space or object to be illuminated. The matt finish of the metal shade, the guiding peg made from stainless steel and the cloth-covered cord make for a high-quality appearance, suitable for use in commercial, retail and domestic environments, says the company.

A self-fastening hanging mechanism provides solid purchase and cleanly holds the lamp in position. For use singly or in groups, and also available as a wall light, the fitting comes in eight colours including the grey shown top, and is also available in brass. A variation on this is the Tilt Globe below, a globe-shaped version of the fitting. All types are suitable for use with halogen, LED and fluorescent lamps.

□ Nyta
Germany
☎ +49 (0)721 4704 4707
www.nyta.eu



Flexible approach

Greenstock's innovative U-Connect system is described as a plug-and-play system with huge versatility for all types of lighting schemes, comprising U-connect cables, extension leads, splitters, power supplies and lighting components that connect together to create a full LED scheme. The system is pre-wired with mains plug and connectors to run on 12V DC, for a variety of applications, ranging from lighting in the home through to professional shopfitting and commercial installations.

There is a wide choice of lighting options from strip kits to downlighters. The strips can bend to follow the contours of rooms and spaces for special lighting effects and are available in 5 m reels with either 60 or 120 LEDs per metre, in a range of 3,000, 4,000 and 6,000 K. For weatherproof applications, the strip kits can be specified as IP65 if required. Where they need to be enclosed, two styles of aluminium profile are offered, which not only protects the LEDs from damage but also increases their life as the aluminium acts as a heat sink.

These profiles are capped with a diffuser to soften the light and reduce spotting. The diffusers come in clear, frosted and opal, with a variety of accessories available, such as mounting brackets and end caps. There is also an extensive range of drivers starting from as little as 6 W for very small installations through to 350 W drivers for the more professional application.

RGB and single-colour controllers are available to create different lighting effects and to enable dimming of the LED strips. With an ultra-slim design, these are said to be easy to operate and automatically memorise the last setting before 'power off'.

□ Greenstock Lamp Company
United Kingdom
☎ +44 (0)845 2570 444
www.greenstock.co.uk



Sculptural metals

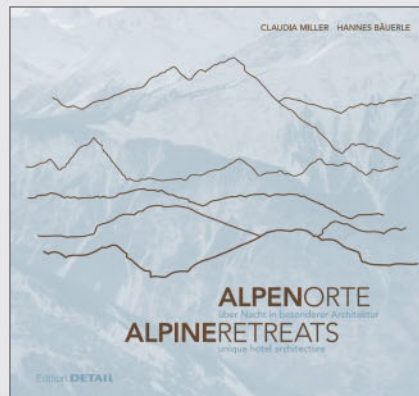
Minimalism with an attitude is how the Danish brand Normann Copenhagen describes its style. The design company aims to create original, eye-catching products that stand the test of time, including a versatile furniture range and sculptural lighting such as the pendants shown here.

Ikono has a cone-shaped glass cylinder and two coloured steel shades in matching tones which rest on the clear glass, together making up a classic pendant lamp. The light is directed by the top shade whilst the lower shade ensures anti-dazzle. It is available in mint, white, grey and red, with a 4 m matching cord.

The Bell has an industrial look suited to both home and commercial environments and is made of aluminium, although its round, even surface gives the impression of having been cast. It comes in a range of sizes, in sand and grey, with 4 m of contrasting textile cord, making a contemporary feature. Low-energy 9 W bulbs are recommended for both lamps.

□ Normann Copenhagen
Denmark
☎ +45 (0)35 55 44 59
www.normann-copenhagen.com





AlpenOrte / AlpineRetreats

2014. Hannes Bäuerle, Claudia Miller.
192 pages with numerous
drawings and photos.
Format 25 x 23.5 cm.
Bilingual German/English.
ISBN 978-3-95553-181-2
Hardcover: € 49.- / £ 40.- / US\$ 69.-
+ postage/packing
+ VAT, if applicable

A travel guide to unique places and accommodation throughout the Alps

Fascinated by the Alps, the authors spend most of their free time in the mountains. Always searching for new and special places, ranging from stop-offs on a trip, through to final destinations for a peaceful stay, they have now compiled a wide variety of different kinds of accommodation.

Buildings in the book range from houses that have been owned by one family for generations and been shaped by its various characters, through to chalets renovated to the most modern standards and solitary huts. The authors have chosen projects built using materials and sustainable construction methods in

keeping with the Alpine environment that also represent successful spatial and atmospheric concepts. But this book is not only about architecture; the authors also tell stories of the houses' owners and the buildings' development and management over the years, as well as tales of Alpine life and people.

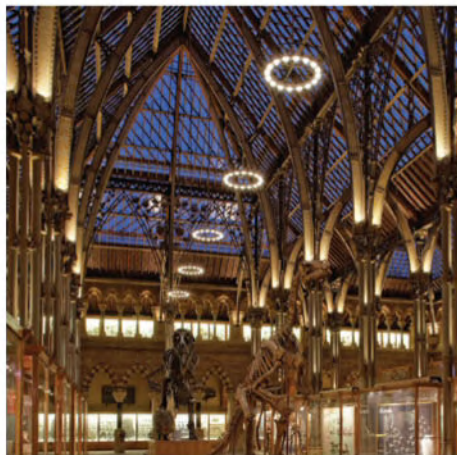
Background information on construction and tips on travelling in the Alps, general maps, a range of different projects presented in brief portraits, and a list of addresses make this book an outstanding travel guide for readers interested in architecture and for anyone who loves the Alps.



*Exemplary architecture both in
and beyond tourist spots*

*Essays on living, travelling and building
(incl. conversion/renovation) in the Alps*

*On the fascination of the Alps,
»family histories« and traditions*



Light on the past

An LED scheme from Zumtobel has improved the overall lighting of Oxford University's Museum of Natural History, as well as illuminating the architectural features and providing an energy-efficient solution. As a Grade I listed building, the design and installation process was challenging; only limited drawings existed so the designers had to manually measure and digitally model the building and create a series of mock-ups to select appropriate luminaires, positions and beam angles, to avoid unnecessary issues on installation.

To prevent damage to the building, the luminaires and cabling were attached by magnetic brackets. The result is discreet, with black cabling against a black background and grey against grey, and no fixings directly installed to the structure. The dimmable luminaires are networked to a Zumtobel lighting control system, with an integrated central battery for emergency. For events, a choice of lighting scenes, including RGB colour change, can be accessed wirelessly via an iPad.

□ Zumtobel Lighting
Austria
☎ +43 (0)5572 390-0
www.zumtobel.com



Built-in adaptability to meet changing needs

Standing at 525 ft tall, the building nicknamed the Walkie Talkie has a top-heavy design that bucks the trend of the traditional tapering skyscraper. The office building at 20 Fenchurch Street in the City of London was completed last year and the SkyGarden with its cafe, restaurant and terrace opened to the public earlier this year. Hilson Moran specified a number of Legrand products to deliver a power distribution system that acts as the power and communications backbone for the lighting infrastructure.

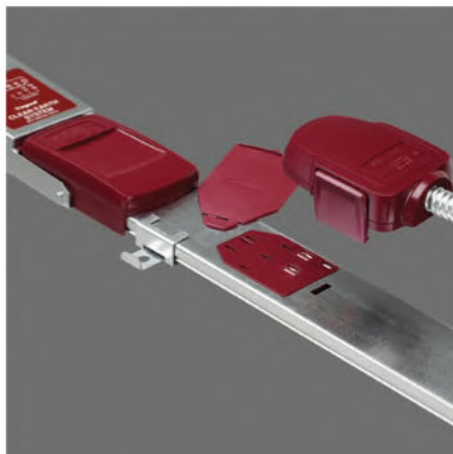
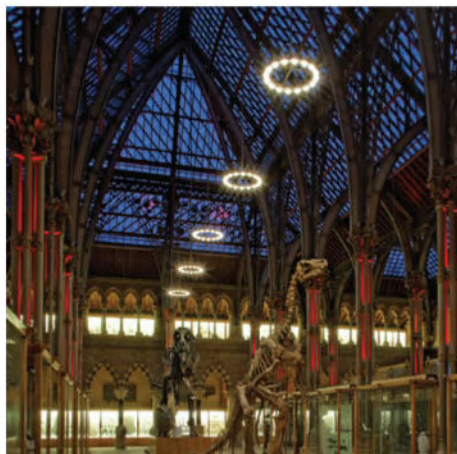
This included over 4 km of Electrak Buscom trunking system, the busbar that carries power and communications, which was installed as part of the Category A fit-out throughout the building's 34 floors. Said Legrand regional sales manager Mark Ellis, "Adaptability was a key factor in the specification process, and Electrak Buscom allows the lighting control or the lights themselves to be plugged directly into the power system, along with anything else which needs to access power."

"Whilst our system provided a sound basis for the Category A installation, it came into its own once the specific floor space had been leased to individual companies. The flexibility of the system enables the specifi-

ers and designers working for the new tenants to treat the initial installation as a blank canvas which they can then customise to suit their clients' own individual needs. For example, if a client wanted to move away from the basic lighting installation supplied as part of the Category A install, they could do so with ease. If they needed more lights in a certain part of the office, or if they wanted cellular offices in a particular area, which would warrant a different lighting set-up compared to the rest of an open-plan office, it could all be facilitated, due to the plug-and-play nature of the system." Also, lighting controls can be moved, upgraded or extended to accommodate a change in either office design or tenant.

Subsequently, interest from the new tenants' respective specifiers and electrical contractors led to the company working with the Category B designers to extend the installation to include over 6 km of power track, and over 4,000 Intersoc-R modular desk power systems, which are plugged directly into the power track via an Electrak grommet.

□ Legrand Electric
United Kingdom
☎ +44 (0)870 608 9000
www.legrand.co.uk





Glass shades with a choice of decorative finishes

The 929Milano brand was introduced last year, and its name reflects the company that created it – Rossini Illuminazione was founded in Milan in 1929. Part of the Rossini Group, the new brand unites the craftsmanship and artistry of Venetian glassmakers with precious materials, technology and design to produce this collection of lighting fixtures. Modern and traditional styling combine with LED technology for energy-saving performance with low ecological impact.

Cenacolo, seen above, offers a series of suspended, wall and table lamps in blown glass with a metallic effect. When the light is off, the shade appears to be of solid metal, but when turned on it reveals the transparency of the glass that creates contrasts and effects of light and shade. It comes with an amber-coloured or crystal inner finish.

Gioia, shown below, is available as a single pendant or with three, six, nine or twelve light points. The refined oval shape is made of pyrex glass, transparent outside and sanded inside. Gioia plays with unusual, striking colours and style combinations. The glass bodies are available in transparent crystal or with a chrome or polished bronze finish and are matched with clear, red or military green cables. The lights are

mounted on a circular white rose with a diameter of 50 cm for the version with up to nine lamps and 70 cm for the version with up to twelve lamps.

These can be placed at different heights, creating cascades of light for added impact. With the use of an alternative rose, the preferred number of lamps and positions can be selected as desired. The light source of each lamp can be a G9 halogen (max 25 W) or a 6 W LED COB lamp in low voltage with the driver integrated in the rose.

The third new fitting pictured here is Turati, below, centre, which comes in suspension and wall versions. It is designed to furnish and give personality to the chosen environment, and is characterised by its overlapping glass plates in a shiny white glass or decorated with gold and silver leaf. These glass plates which enclose the light source are fixed to a chromed metal structure in the silver and white design and in the case of the gold leaf version they are fixed to a gold-coloured metal structure.

□ Rossini Illuminazione srl
Italy
☎ +39 (0)2 216 9501
www.929milano.com



All-round savings

As the second phase of a major street lighting upgrade by Bristol City Council drew to a close, figures showed that the energy-efficient solutions supplied by GE Lighting have resulted in savings of over £1 million per year. The initial project saw the replacement of around 8,000 high-pressure sodium lamps with CMH StreetWise™ ceramic metal halide lamps over a one-year period, with Phase Two replacing a further 12,000 lamps in Bristol's residential areas.

The lamps have been replaced in conjunction with dimmable ballasts for greater energy savings and to provide flexibility for dimming the lighting overnight as and when required. The upgraded white light has improved visibility on the streets at night, and makes pedestrians and drivers feel more secure, says the council, which states that the funding investment has been paid back a year earlier than expected and, in addition, CO₂ emissions have been reduced by more than 4,000 tonnes a year, making a substantial contribution towards its long-term carbon goals.

□ GE Lighting
United Kingdom
☎ +44 (0)800 169 8290
www.gelighting.com



Office



Precast cladding installed after curtain walling

The recently completed office building at 2 Pancras Square was designed by international architects Allies and Morrison, with BAM as main contractor. This island building offers 130,000 ft² over nine floors and is part of a major development of 12 office buildings south of Regent's Canal, and situated around the new Pancras Square. The design of the square, at the gateway to London's King's Cross, was inspired by the atmosphere of a continental town square, and facilities in the area include a leisure centre and a public library, as well as shops, restaurants and pavement cafes.

With a BREEAM 'Outstanding' rating, the 2 Pancras Square building is linked to the district heating network, which will provide all heating and hot water needs. It has been designed to maximise the environmental benefits of its location, with orientation, solar shading, the use of thermal mass for cooling and passive ventilation systems all contributing to energy efficiency.

The focus for energy efficiency and sustainability at King's Cross is the on-site Energy Centre with its Combined Heat and Power plant (CHP). This low-carbon energy supply, combined with energy-efficient buildings, is said to help make this one of the most sustainable developments in the UK. Other renewable technologies such as solar panels, ground-source heat pumps and solar thermal systems are also being used to reduce carbon emissions by at least 50% relative to 2005 levels.

For Techrete, who supplied and installed the precast concrete panels, the unusual feature was that, rather than forming the waterproof facade, most of the panels were applied as a rainscreen, which meant the company had to work from mast climbers. On the plus side, however, this allowed the facade to be closed off with curtain walling as the structure went up for a faster build programme, and led to close integration with

the facade contractor and tighter tolerances than would normally be found in precast works. Architecturally, the immediate impression is of mullions and spandrels but a closer inspection reveals that the mullions get narrower as they go up the building and at the same time windows are set back further, creating deeper reveals and greater solar shading.

The concrete mix includes Spanish dolomite aggregate for a sparkle to complement the gold window reveals. To minimise staining on the face, the top surface of the spandrels falls back to the window where a channel guides water to a hidden gully in the mullions to collect rainwater for recycling.

□ Techrete (UK) Ltd
United Kingdom
☎ +44 (0)1162 865965
www.techrete.com



Changing spaces

Partitioning walls specialist Style has won a record seventh FIS (formerly AIS) Gold Contractors Award, this time for their moveable wall solution installed at the London offices of TIAA Henderson Real Estate (TH Real Estate), a division of Henderson Global Investors. The awards are presented annually to companies which demonstrate the highest levels of craftsmanship, with on-site visits by the judging panel to examine the quality of each installation.

Style worked closely on the winning project with architects Pringle Brandon Perkins + Will and TH Real Estate's own in-house design team, on what was the first installation of the new Skyfold STC60 since its launch onto the UK market, utilising three of these systems to sub-divide space within the presentation suites.

The vertical-rising, fully automatic, acoustic moveable wall boasts a 59 dB Rw acoustic rating, delivering a level of soundproofing claimed to be unrivalled by any other moveable wall of this type. Finished with eye-catching graphics, the units complement the dramatic interior design on this project. "We have worked with Skyfold partitions in a number of high-status offices and we were really pleased with the quality of the installation throughout the whole of this project," commented Rob Price, lead designer for Pringle Brandon Perkins + Will.

"Henderson Global Investors led the way in corporate interiors back in 2009 when we installed seven Skyfold partitions in our new London headquarters," said facilities director Fred Kinahan. "Since then, we've been impressed by the acoustic privacy they achieve between the divided areas and their ease of use as well as excellent reliability."

□ Style
United Kingdom
☎ +44 (0)1202 874044
www.style-partitions.co.uk



Wine and Space

Architectural design for vinotheques, wine bars and shops

2015. Heinz-Gert Woschek (Ed.),
Denis Duhme, Katrin Friederichs.
144 pages with numerous drawings
and photos. Format 25 × 23.5 cm.
ISBN 978-3-95553-241-3
Paperback: € 39,- / £ 32,- / US\$ 55,-
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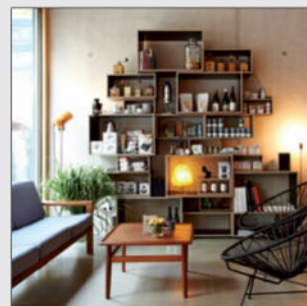
Inspiring examples from European metropolises

When we take our time to truly experience a wine, we rely on our senses to explore its smell, taste, texture and structure. Yet what role is played by the room in which we find ourselves? How are our senses influenced by this space?

This publication takes a look at the rooms where wine is tasted and enjoyed. It highlights a variety of projects, ranging from winemakers' tasting rooms and sales-rooms to more unusual shop concepts and successful examples taken from the gastronomy sector. To provide a glimpse into

the development of a design, the authors engage intensively with the architects and contractors to explore the following questions: How did those involved contribute and combine their ideas? What story is told by the project as it begins to take shape? What kind of customers does it appeal to and how should they react to it?

A number of additional essays illustrate how designs are influenced by functional factors, as well as the role played by materials, colour, light, and indeed the spatial concept as a whole in the process of wine tasting.



Valuable information on appropriate
planning and about perceiving wines

A guide to wine and architecture featuring
rooms where the spirit of wine can be
experienced

An overview of the history and evolution
of wine presentation



Club colours

Thonet has been making chairs since the early part of the 19th century, and is well known for its iconic Vienna coffee house chair and for the production of the tubular steel furniture designed by members of the Bauhaus, which has proved timeless. The company continues to collaborate with national and international designers – and, in addition, some of the furniture is designed by the in-house design team.

With the S 830, Thonet has developed a club chair that can stand alone as a high-light or work together in a larger grouping, in environments from waiting areas to public lounges. The fully upholstered chair can be specified in various combinations of leathers or fabrics for the inner and outer shells to complement the room design or other pieces of furniture. Its curved backrest merges into the padded yet angular armrests, which in turn cradle the seat cushion. It comes in two versions, and both the base plate panel with pedestal and the tubular steel frame are reduced to a minimum, underlining the contour of the seat.

□ Crest Contracts
United Kingdom
☎ +44 (0)8452 993491
www.thonet.de



Contemporary furniture offers streamlined appeal

Rimadesio's elegant furniture is at home in the executive office or boardroom as well as in domestic situations. The pieces come in a variety of materials, colours and sizes and the company emphasises its environmental credentials, which include the fact that its production plants are entirely powered by solar energy. All aluminium elements are composed of 95 % recycled aluminium. No heavy metals or solvents are used in the lacquer coatings, whilst the new Ecoloursystem, which includes 54 lacquered glass choices in matt or glossy finish, and five shades in the reflex finish with its shimmery metallic effect, is made with non-polluting, next-generation water-based paints.

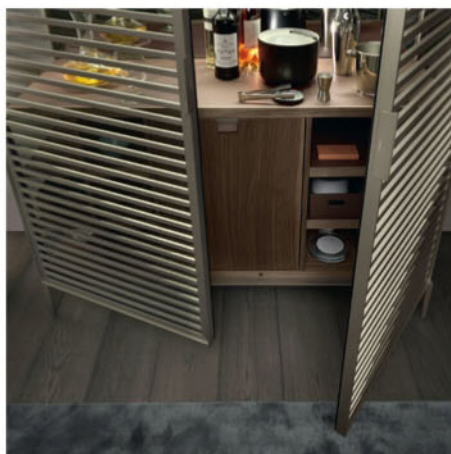
The Alambra system of cabinets, above and below, left, give a contemporary reinterpretation of classic furniture like sideboards, glass cabinets and drawer units. Doors are available without horizontal crosspieces, to minimise the aluminium structural thickness and make the most of the clear glass and the LED lighting system, which is built into the shelves. The interiors can be equipped with drawers, trays or the fridge cabinet seen here. With or without legs and with two, four or six doors, it comes in a number of sizes. The aluminium is available in black, brown and the new Palladio finish, matching

all the lacquered, glossy or matt, transparent, frosted and reflex glasses. Accessories are in nut, oak and black oak.

Lightness and formal elegance are the main characteristics of the Manta modular system table, below, with a structure of high pressure, die-cast aluminium. Round, rectangular and boat-shaped tops are available in materials from heat-treated oak to lacquered glass and acrylic, in over 30 colours of the Ecoloursystem, and white calacatta, emperador or black marquina marble.

Seen here with the table are Velaria sliding doors. Again, the structural profile is of minimum thickness aluminium, designed to make the most of the aesthetic features of the glass panels. This bespoke door system is claimed to offer exceptional reliability, along with ease of installation. As with the rest of the range, there is a choice of frame colours and glasses, including the new golden mesh glass shown, which is composed of two sheets of extra-clear glass enclosing the metal mesh.

□ Rimadesio S.p.A.
Italy
☎ +39 0362 3171
www.rimadesio.it



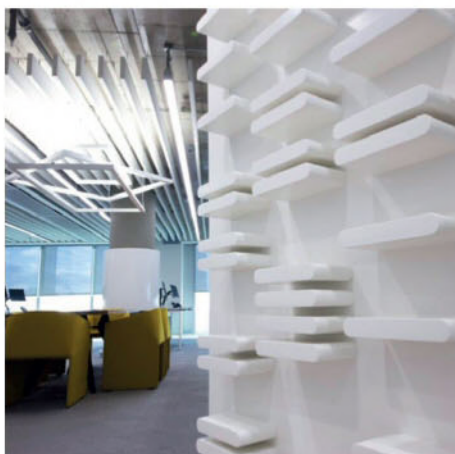


Special effects

Meditate Premier MDF has been used to create innovative 3D feature wall designs at the corporate headquarters of international media company UBM, in Blackfriars, London. Architectural sign specialist Signbox was commissioned by UBM to design and install the decorative walls, positioned at the main entrance to each floor. Various thicknesses of the MDF were routed and painted to create a different effect for each of the three floors of the new office building.

Signbox says it has used the material for numerous signage and interior design projects as its smooth surface offers a good base for painted surface finishes or the application of even the thinnest laminates. "Meditate Premier was ideal for this application as the quality and remarkable consistency of the panel means that it offers great design freedom and provides the high-quality result required by our clients," said md Mark Bartlett. "The material is easy to machine, even easier to paint and performs better than other MDF products as the edges are strong even when routed, meaning they do not fray."

□ Coillte Panel Products
United Kingdom
☎ +44 (0)1322 424900
www.meditate-europe.com



Product Information Index

Property+Product

Grandstand – Dressage Stadium, Aachen

(Arge Derichs und Konertz, Bega, Busch-Jaeger, Dennert, Florack, Frisch-Licht, Hoesch Bausysteme, Kann, LTS, Metallbau Hülser, MSH-Profile, Nagelstutz und Eichler, Pohl, Schüco, Siteco, Unger Stahlbau)

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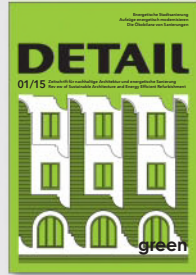
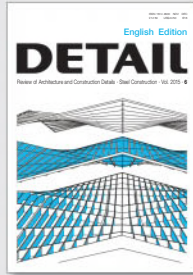
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- 2 March Timber Construction
- 3 May Concept: Visitor and Community
+ DETAIL green 1/16
- 4 July Lighting and Interiors
- 5 Sept. Simple Forms of Construction
- 6 Nov. Roofs
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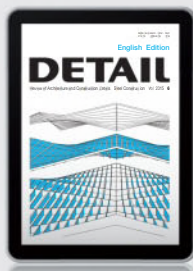


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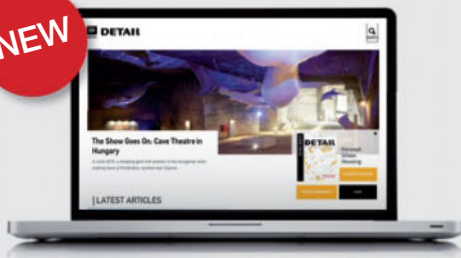
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| ☐ 3/14 Higher-Density Housing | ☐ 6/11 Roofs | ☐ 2/09 Roofs |
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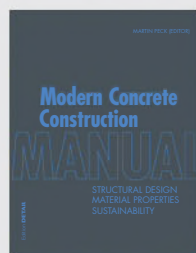
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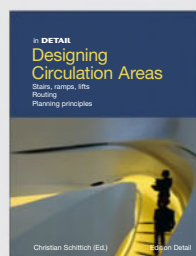


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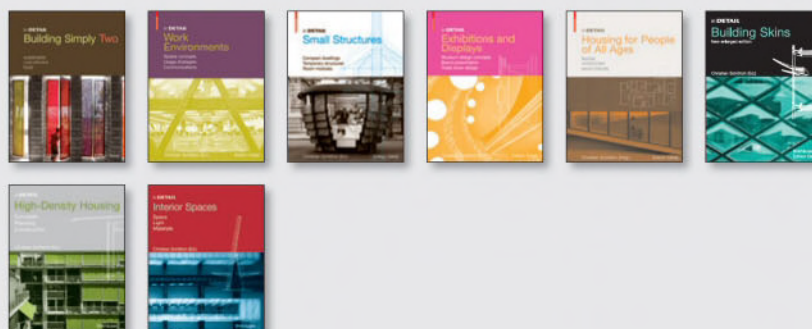


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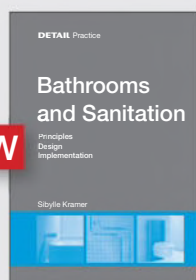


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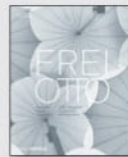
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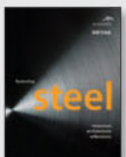
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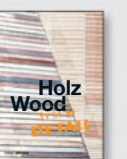
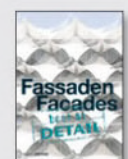
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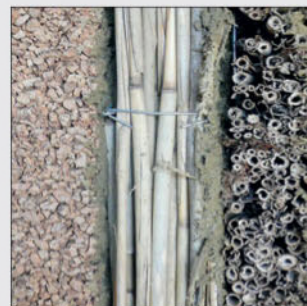
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Building with Recycled Plastic Waste**

Green Point Park, Cape Town Stadium,
8051 Cape Town, South Africa

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Munich, Germany
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Treetop Walk in Cape Town

Kirstenbosch National Botanical Garden
Rhodes Drive, 7735, Cape Town, South
Africa

- Client:
SANBI South African National
Biodiversity Institute, 0184 Pretoria,
South Africa
- Architects:
Mark Thomas Architects
Cape Town, South Africa
www.markthomasarchitects.co.za

- Project architect:
Christopher Bisset
Cape Town, South Africa
- Structural engineers:
Henry Fagan & Partners
Cape Town, South Africa
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Cape Town, South Africa
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- Main contractor:
Slingsby & Gaidien Construction
Cape Town, South Africa
www.sgconstruction.co.za



page 564
Roof over Theatre in Mexico City

Miguel de Cervantes Saavedra
Granada, Miguel Hidalgo
11529 Mexiko City, Mexico

- Client:
SGAE – GRUPO CARSO
- Architects:
Ensamble Studio
Antón García-Abril
Madrid, Spain
with:
Elena Pérez, Débora Mesa
(associate architects)
Alba Cortés (construction architect)
- Team:
Joaquín Gallegos, Alba Beroiz, Jaime
Alcayde, Cristina Moya, Juan Ruiz
Antón, Tomaso Boano, Federico Letizia
- Structural engineers:
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page 568
Pumping Station in Bochum

An der Jahrhunderthalle 1
44793 Bochum, Germany

- Client:
NRW.URBAN, Dortmund,
Germany
- Architects:
Heinrich Böll
Essen, Germany
www.architekt-boell.de
- Team:
Hans-Dieter Dressler,
Frank Günther,
Birgit Lemmen
- Project architects:
Achim Pfeiffer,
Wojciech Trompeta
- Structural engineers:
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Germany
www.nowicki-metallbau.de



page 572
Garden Pavilion in Berlin

Am Sandwerder 17–19, 14109 Berlin,
Germany

- Client:
American Academy, Berlin, Germany
- Architects:
Barkow Leibinger architects
Berlin, Germany
www.barkowleibinger.com
- Project architect:
Tobias Wenz
- Team:
Gustav Düsing, Ulrich Fuchs, Annette
Wagner
- Structural engineers:
Hörnische-Hock-Thieroff (HHT)
Berlin, Germany
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Berlin, Germany
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- Electrical planning:
HDH Ingenieurgesellschaft für
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Schneegattern, Austria
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www.vitra.com



page 578
**Main Building in Óbidos Technology
Park**

Rua da Criatividade
2510-216 Óbidos, Portugal

- Client:
OBITEC, Óbidos, Portugal
- Architect:
Jorge Mealha
Carcavelos, Portugal
www.jorgemealha.com
- Team:
Andreia Batista, Carlos Paulo,
Diogo Oliveira Rosa, Filipa Ferreira
da Silva, Filipa Collot, Gonçalo Freitas
da Silva, Inês Novais
- Structural engineers:
JFA Engenharia
Oporto, Portugal
www.jfaengenharia.pt
- Project architect:
Sousa Santos Arquitectos
Jorge Sousa Santos,
Vyernu Patel
Lisbon, Portugal
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- Air conditioning:
Luis Graça
- Fire-protection planning:
Joaquim Viseu
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Segurinis, Jorge Miranda
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Portugal
www.seg.pt
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- General contractor:
MRG Engenharia e Construção S.A.
Coimbra, Portugal,
www.mrg.pt



page 583
Micro-Apartment Block in Seoul

9–17 Songpa-dong, Songpa-gu
Seoul, South Korea

- Client:
Chanill Lee, Seoul, South Korea
- Architects:
SsD, New York, US
Jinhee Park, John Hong
www.ssdarchitecture.com
- Dyne Architecture (associate architects)
- Project architect:
Seung-hoon Hyun
- Team:
Taylor Harper, Allison Austin, Evan
Cerilli, Mark Pomarico, Yufeng Zheng,
Victor Michel, Virginia Fernandez Alonso
- Structural engineers:
Mirae Structural Design Group,
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Wetstraat 155, 1040 Brussels, Belgium

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Philippe Samyn and Partners, architects
and engineers, lead and design partner
Brussels, Belgium
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Museum in Cracow

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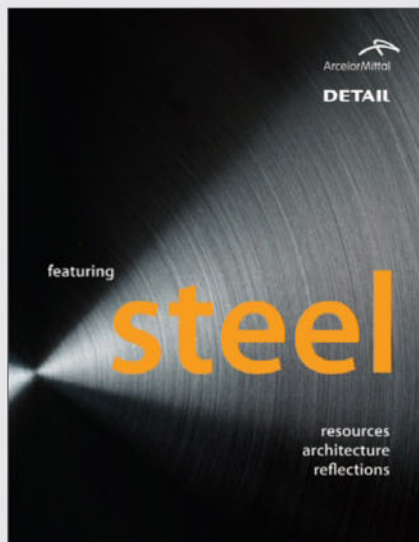
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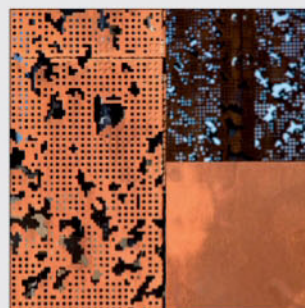
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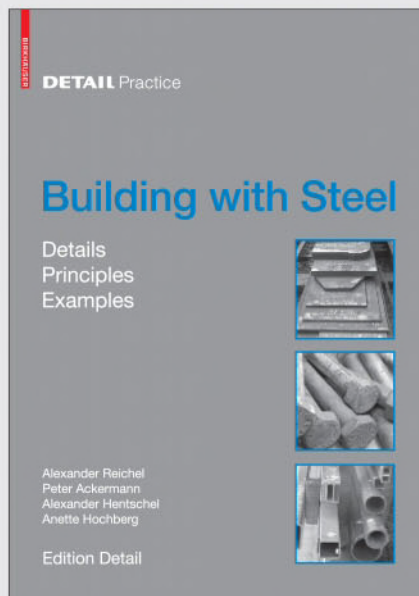
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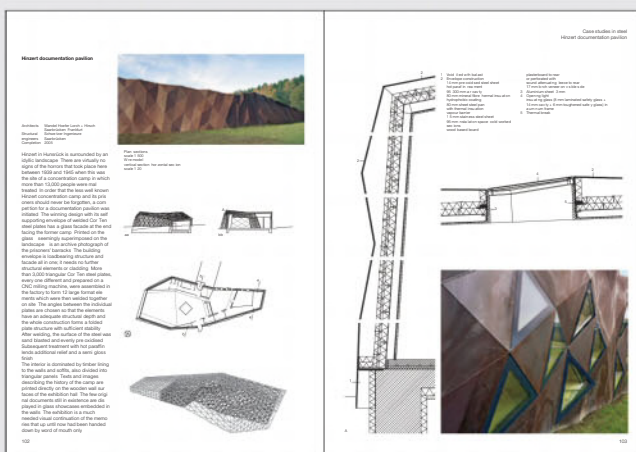
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