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1 Urban context and the Garden of Art

Additional building land was necessary to create sufficient space for the substantial expansion of the museum Kunsthaus Zurich. With the assurance of the Canton of Zurich to provide a plot of land the old cantonal school site to the north of the square Heimplatz, an international architecture competition was announced. In 2008 the Berlin office of David Chipperfield Architects won the competition with their design.

Central to the design was the integration of the new building into the urban context: the geometric volume of the extension building gives the square Heimplatz a new clear urban edge and brings together the existing heterogeneous architecture. Its clear form sets a strong accent and serves as a starting point to a series of large public buildings that stretch northwards via the cantonal school to the existing and planned university buildings along the street, Rämistrasse. Through its position, the extension plays a vital connecting role between Heimplatz and the public Garden of Art, which is situated four metres higher - as well as into the university area. The continuation of a path through the former cantonal school area strengthens the diverse relationships between the museum and Heimplatz with the education and culture mile and corresponds to the masterplan for the university area aiming to improve this pedestrian connection.

The spacious Garden of Art, as envisaged in the masterplan, functions as a new hub and reinforces the connecting character of the extension building. Its soft and organic design, by Wirtz International Landscape Architects, contrasts the orthogonality of the extension building. The garden atmosphere is characterised by its old beech and maple tree population. They continue the garden identity of the place and, in contrast to the urban Heimplatz, support a clear horticultural spatial definition with red beech cut like clouds, fresh lawns and organically paved areas. Individual groups of lime trees and red beeches are arranged to create a large, coherent inner area, which protectively surrounds the garden facing Rämistrasse and Kantonsschulstrasse. This quiet and sheltered space extends the exhibition space for art beyond the interior into the open air. An embedded garden architecture, the Rondell, allows for events with catering in the Garden of Art.

2 Architectural concept

The central entrance hall, with its space-defining open staircase, is the spatial and conceptual focus of the new extension building. In addition to its function connecting the building to the city with permeable public areas on the ground floor, it provides a place of orientation, leading to the more intimate exhibition areas on the upper floors. The clarity of the internal organization is supported by its materiality and the use of light.

Vertical fins protruding in a consistent grid give rhythm to the large façades of the extension building. They are crafted from a Swiss Jura limestone whose colour nuances give the façades a vivid effect of depth and were built up solidly with an exquisite level of craftsmanship. With its choice of material, the extension references the historical buildings in the area, in particular the existing Kunsthau building. Around the window areas, the material of the vertical fins changes from natural stone to cast stone. This alternation gives expression to the structural requirements of the openings behind the vertical fins, which they span in full. Horizontal ledges, also made of cast stone, relate to the inner floor heights of the building and give the building scale.

The visible supporting structure is the connecting element within the building. The structure of walls and ceilings made of reinforced concrete appears in the interior as exposed concrete and, where functionally necessary, is clad, but rarely covered up. Marble, wood and brass complete the small range of key materials. The striking marble floor in the public entrance area of the Moser building continues across Heimplatz and into the central hall of the new building. It marks the freely accessible areas of the house – the central hall, museum education, shop and bar – and connects them in their public character. Oak is used as parquet in the exhibition rooms. Contrasting the hard-stone paving of the public areas, it creates a warmer, more intimate atmosphere in those spaces where the art is presented. Brass is used for handrails and doors as well as for wall coverings, behind which soundproofing elements. Its characteristic to change over time through use is deliberate in that the brass elements are merely waxed. In this way a patina slowly develops in which the life of the building gradually inscribes itself.

The interplay of architecture with natural light lends atmosphere to all areas of the rooms. The natural light qualities, which change over day, bring the awareness of nature into the formal museum environment. The light-flooded central hall receives ample daylight through generous glass skylights and floor-to-ceiling windows. The exhibition halls are also primarily illuminated by sunlight while meeting the highest museum and conservation requirements.

The bar, with its wall covering of green velvet, represents a conscious creative counterpoint to the restrained rooms of the museum. The integrated mural 'Pétales et Jardin de la Nympe Ancolie' by Max Ernst, was initially created by the artist in 1934 for the Corso Bar, also in Zurich.

3 Sustainability

Text provided by City of Zurich, Building Surveyor's Office, www.stadt-zuerich.ch/hochbau

Goal

The goals of the 2,000-watt society were incorporated in the municipal code of the City of Zurich in 2008. The architectural competition for the art museum extension, which already integrated this political goal, was held in the same year. According to the City of Zurich intermediate goal for the 2,000-watt society, the primary energy demand per person should be reduced to 2,500 watts of continuous power and an annual equivalent of 1 ton of CO₂ per head by 2050. What this meant for a museum building first had to be clarified, because standards for this kind of building category did not exist at that time. The energy goal for the building extension was defined in accordance with the methodology of the SIA 2040 Energy Efficiency Path technical specification. This includes the entire energy requirements of a building. The requirement for its creation (grey energy of the building materials), operation (heating, cooling, electricity) and mobility induced by the building. The latter was eliminated for the art museum expansion, since it is barely influenceable due to the pre-existing limiting conditions. The 'operation' target value was determined on the basis of an analysis of similar art museums at home and abroad. The energy requirement of an average art museum served as a starting point (status 2005). The 'creation' target value was extrapolated based on the provisions of SIA technical specification 2040. The expansion of Zurich art museum aimed to reduce the primary energy requirement by a factor of 1.8 and greenhouse gas emissions by a factor of 4.3 compared with this starting position.

Implementation

One sees at first glance that the art museum expansion building consists primarily of concrete; a construction material that is not known for being particularly ecological. Nevertheless, two factors helped to achieve the ambitious targets. One is the compact building form. The advantageous relationship between building shell and volume enabled optimised use of material and thus a reduction in the installed grey energy. Secondly, more than 90% of recycled concrete with reduced greenhouse-gas cement was used. This is anything but self-evident in view of the large areas of fair-faced concrete. But the concrete also brings energy advantages for operations. Thanks to the solid construction and the outstanding thermal insulation, the building as such ensures a balanced internal climate. Very little heating or cooling is therefore necessary. This is done using thermoactive component systems (TABS), pipe networks inserted in the walls and slabs, that allow heat to be supplied or withdrawn from the rooms as needed. Highly efficient heat pumps use the building subsoil as seasonal heating and cooling storage via an array of ground probes. With this concept, the air-conditioning systems are barely required to accept heating and cooling loads and were therefore able to be sized substantially slimmer than with conventional museum buildings. Furthermore, sensitive sensors in every room ensure that only as much ventilation and air-conditioning takes place as compliance with the defined conditions requires.

Since the lighting is one of the greatest 'energy guzzlers' in most art museums, the new building is designed for maximum use of daylight. On the lower floors, daylight is let into the interior through generously-dimensioned facade windows. On the top floor, the exhibition rooms are supplied with natural light through large skylights; carefully controlled, of course, to protect the art works. When the daylight is inadequate, the artificial illumination turns on automatically and illuminates the exhibition areas appropriately. Energy-saving LED technology is used throughout the building, which increases the quality of colour reproduction at the same time. Photovoltaic systems were installed on those roof surfaces that are not occupied by skylights or technical systems. Thus, the building produces approximately 10% of its own power consumption. The other 90% comes exclusively from Swiss hydro-electric plants. The energy needs of the art museum expansion are therefore completely covered by renewable sources.

Target Review

Whether the goals defined at the beginning could be satisfied was reviewed several times in the course of the twelve years of planning and construction. This required a comprehensive balance sheet of all materials used in the construction and a detailed forecast of the energy requirements for operation of the building. A review at the end of the building project phase resulted in greenhouse gas emissions exceeding the target value. It was decided to use greenhouse-gas-reduced cement, equip the illumination with LED technology and install the photovoltaic systems on the roof as corrective measures. The actual materials used for the construction of the building could be used in the final balance sheet at the end of the construction phase, while the operating energy continued to be entered at plan values, because there were still no measurements. It emerges that the overall target with respect to primary energy is readily complied with, while greater efforts are required with greenhouse-gas emissions. This is consistent with experiences from other building projects. The greatest challenges are the greenhouse gas emissions from the manufacture of building components and materials. Greenhouse gas-optimised products are still largely unavailable. With regard to operating energy, the art museum expansion shows that, with a well thought out energy concept and avoidance of fossil fuels, the targets of the 2,000-watt society are easy to reach.

4 The Kunsthhaus Zürich

Text provided by Kunsthhaus Zürich

The museum's first home was built in 1910 on Heimplatz. Its distinctive characteristic of providing both a venue for temporary exhibitions and a home for its own collection, is reflected in its name: Kunsthhaus. It is neither merely a museum nor an exhibition hall, but both at once. Since its foundation, the Kunsthhaus has undergone multiple extensions, to host a broad range of exhibitions, house its growing collection, and meet the public's evolving demands.

The Kunsthhaus owes its reputation to the fact that it boasts an exemplary cross section of Swiss and western art. From the Middle Ages to the present day, works from six centuries of Swiss art, Dutch painting and Italian Baroque art are abundantly represented in its collection galleries, along with the most extensive Edvard Munch collection outside Norway. More than half of the Kunsthhaus' collection was brought together in the form of donations and it is also home to the collections of leading foundations, foremost among them the Alberto Giacometti Foundation. The Kunsthhaus collection has always focused on the contemporary at the time and has also hosted major Zurich premieres of a number of artists such as Picasso and Baselitz.

Currently, only ten per cent of the Kunsthhaus collection is on display: Impressionism, Classical Modernism and contemporary art, including photography and video art, have limited or inadequate presentation. The institution's pioneering commitment to contemporary art and broader education has been re-affirmed with the extension building. The new building will showcase four core elements: the art of the 1960s and later, the E.G. Bührle Collection, medium-sized temporary exhibitions, and a central public entrance hall as an innovative and open place to experience art. Art from the 1960s onwards, its richness of meaning and relationships, is increasingly being brought to the fore. The new building also provides space for performances, installations and works from non-European cultures. The concept allows a comparison of techniques within individual epochs of art production and shows how the genres of painting, graphics, sculpture, photography and new media relate to one another. Furthermore, galleries with a classical format have been established for paintings of the 19th century and classical modernism.

5 Facts and data

User	Kunsthaus Zürich / Zürcher Kunstgesellschaft
Address	Heimplatz 1, 8001 Zurich, Switzerland
Facilities	<i>Public spaces on the ground floor:</i> Central hall Events hall Museum education services Museum shop Café / bar Administration <i>Upper floors:</i> Exhibition spaces <i>Lower ground floors:</i> Cloakroom and lockers Restrooms Passageway to existing building Workshop spaces and storage
Outdoor facilities	Garden of Art Rondell (Garden architecture for events)
Floors	3 above ground, 2 below ground
Height	21 m (Heimplatz façade), 17 m (Garden façade)
Length x width	60 x 60 m Length of underground passageway 64 m
Gross floor area	23.300 m ²
Floor areas	Entrance hall, 1.600 m ² Exhibition spaces, 5.000 m ² Events hall, 800 m ² , 500 Personen Museum shop, 120 m ² Café / bar, 120 m ²
Accessibility	Barrier-free access to all areas
Sustainability	Planned according to the goals of the 2000-watt society concept

6 Contractors and suppliers

Façade	Staudcarrera AG, Zwingen, Switzerland (Liesberg jurassic limestone, Cast stone) Sottas AG, Bulle, Switzerland (Windows) AGC Glass Europe, Louvain-La-Neuve, Belgium (Glass)
Exposed concrete	Marti AG, Zürich, Switzerland
Flooring	Lauster Steinbau GmbH, Stuttgart, Germany (Krastal marble) Wimmer GmbH, Töging am Inn, Germany (Oak parquet) GDM Parkette, Uster, Switzerland (Parquet laying)
Fittings	Baur Metallbau AG, Mettmenstetten, Switzerland (Brass wall claddings, handrails)
Built-in furniture	Bau- & Holzwerker AG, Zürich, Switzerland (Information counter) Teamplan Josef Meyer GmbH, Nordhorn, Germany (Carpentry work cloakrooms) Glaeser Wogg AG, Baden, Switzerland (Carpentry work, bar) Pfister Ladenbau AG, Worb, Switzerland (Carpentry work, shop)
Luminaires	BEGA, Menden, Germany (Entrance hall) Viabizzuno srl, Bentivoglio, Italy (Bar, shop)
Furniture	Minotti, Meda, Italy (Benches, exhibition spaces) Horgenglarus, Glarus, Switzerland (Chairs, bar) Fritz Hansen, Allerød, Denmark (Chairs, events hall)
Textiles	Kvadrat, Ebeltoft, Denmark