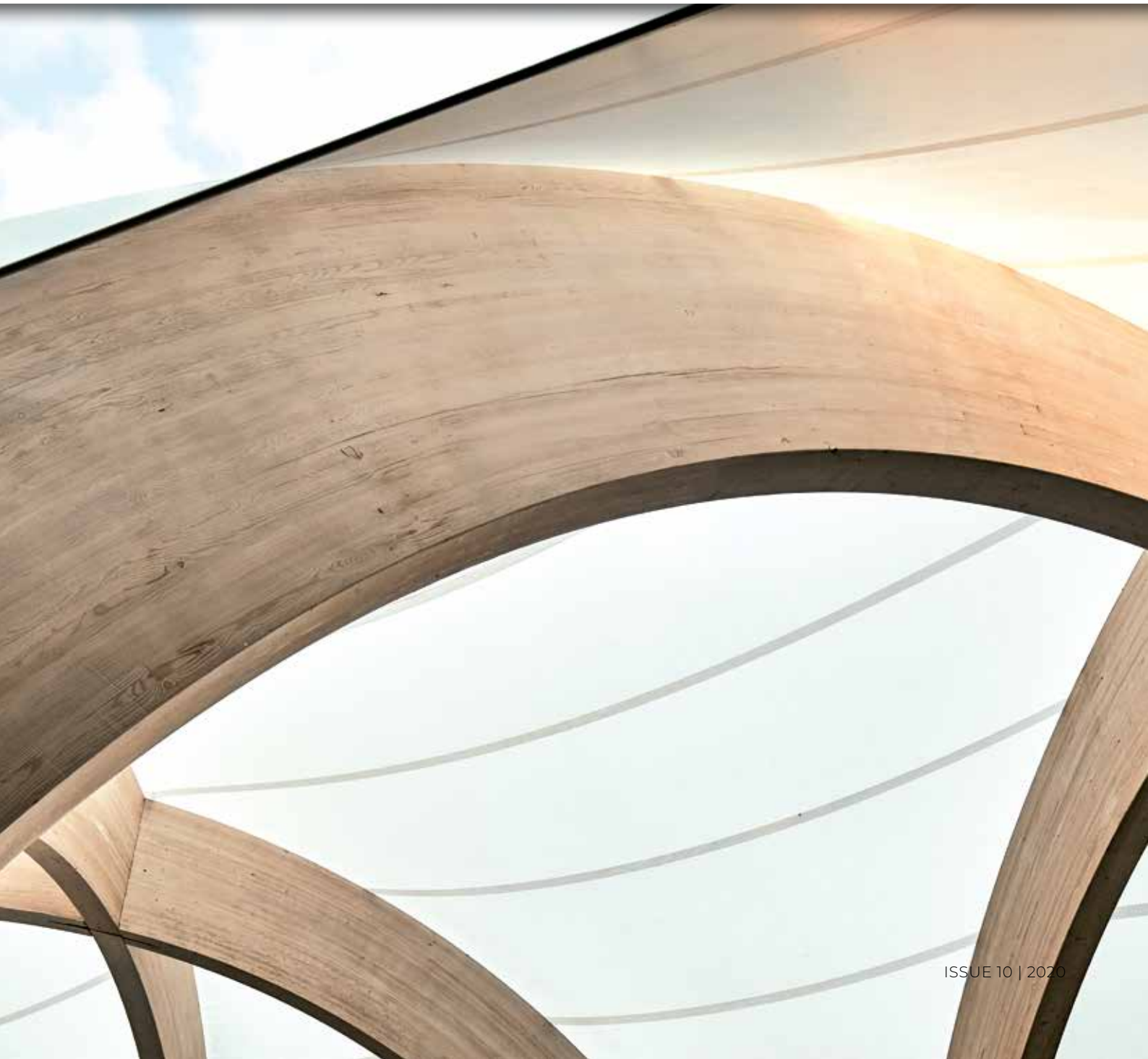


# WOOD CULTURE 21

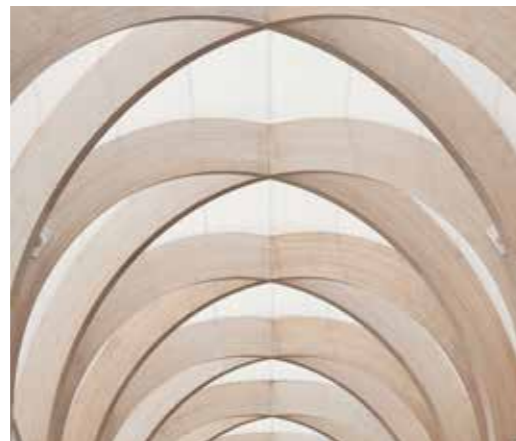
CONSTRUCTION EXPERTISE FOR ARCHITECTS, DESIGNERS AND BUILDING OWNERS



Chadstone Link in Australia	04
Six-Storey Solid Timber Construction Walden 48 in Berlin	10
Building Report Clark International Airport Philippines	16
ANOHA Children's Museum in the Jewish Museum of Berlin	18
Coop Grocery Store in Como	24
School Centre in Gloggnitz	30
Educational Buildings in Timber and Hybrid Construction	36
Preview	42

# EDITORIAL

## 21<sup>ST</sup> CENTURY CONSTRUCTION MATERIAL



amazing transformation in the recent past. Compared to conventional construction methods, which not long ago used to be standard practice, today we can freely choose among various timber construction systems and methods. One might even get the impression that timber as construction material must be scientifically developed in a high-tech laboratory to get all the beneficial properties, but it is exactly the opposite that is true. It is almost a natural miracle that a tree - under favourable climatic conditions - does not need much more resources to grow than sufficient soil, light, air, and water and that it is able at the same time to transform excessively contained and contaminating CO<sub>2</sub> in the atmosphere into valuable oxygen.

Wood as construction material is thus the most adequate response to the ever more urgent questions of our times starting with responsible use of diminishing natural resources on our planet and the impact on people's health up to questions relating to quality of life in our immediate surrounding. We sometimes tend to forget that wood - today as in the past - just is what it has always been: a renewable, thus sustainable resource, the only renewable construction material of all.

Unlike many other construction materials, however, timber not only scores with sensually perceivable, haptic properties but also with manufacturing benefits, such as reduced weight or easy processability. These properties,

which were discovered by the first timber engineers 7,000 years ago, are highly esteemed and appreciated by architects and designers today. Wood as natural construction material with its outstanding structural-physical properties provides a cosy and relaxing atmosphere, offers an excellent climate footprint, and can be ecologically recycled with no residues at all. Sound-insulating and fire-protection properties of timber are well-controllable parameters in structural engineering. As far as sustainability is concerned, wood is number one construction material. In terms of architectural requirements, timber is literally predestined to be used for urgently required infrastructure buildings of our times, such as residential and educational buildings, which are the main focus of the Rubner Holzbau company and which have been selected as key projects for this specific magazine.

Anyone who decides to build, assumes responsibility - not only for our future, but also for the future of our children. Wood - 21<sup>st</sup> century construction material.

Yours truly,

Peter Rubner  
President of the Rubner Group

Wood, being the most archaic construction material of all, and timber engineering have experienced an



CHADSTONE LINK

# INNOVATIVE LINK

A total of 15 cross-shaped timber vaults made of larch glulam provide the special and characteristic form to the Chadstone Link in Melbourne, Australia. This eco-friendly passageway that has been designed for pedestrians guides the visitors from the neighbouring office buildings, the adjacent hotel, and parking areas to Australia's largest Shopping Centre with its more than 530 shops and 20 million visitors per year.



Starting from the arched glass roof of the Shopping Centre, we have designed a 110-metre long, arched passageway, which is based on a diagrid structure made from Italian larch glulam and topped with a stretch-resistant, semi-translucent PTFE canopy. Despite the openings in the edges of the structure, provided for cross ventilation, the design is extremely robust", describe the architects of "Make Architects" their Chadstone Link.

The new point of attraction in this Chadstone Shopping Centre located in Melbourne, Australia is this eco-friendly passageway for pedestrians made of larch glulam. Despite the shopping hustle that is caused by 20 million visitors a year, this passageway offers a relaxing and natural environment, which has been designed as el-

egant and weatherproof promenade. With its height of up to 15 meters, the structure harmonically and seamlessly blends with the surrounding environment.

Walking through the Link creates a feeling of pacing through cathedral aisles. The main function of the 31 diagonally aligned timber arches is to lead the visitors - who either come from the neighbouring hotel and office buildings of the Vicinity Centres or from the surrounding, more than 9,300 available parking spaces - to the main entrance of this Shopping Paradise. In the night, the mixture of light show and breathtaking timber construction provides an impressive and monumental shopping setting. Bent (between the arches) and straight (to the floor) hollow steel profiles provide for the stiffening of the arches, which

pairwise form a portal unit. A total of 31, differently dimensioned and individually designed larch timber elements with measures ranging from 3 to 15 meters in height combine to 15 structure-supporting timber arcades. These elements intersect in their ridge point where they are covered with fabric. In its upper third, the larch glulam has been bent to a tight radius. However, despite this strong curvature, the timber elements can easily resist the acting mechanical stresses due to their technical properties.

Within a period of only 20 weeks, Rubner Holzbau supplied all timber elements for this timber-textile entrance area to the „Chaddy“, as Chadstone Shopping Centre is colloquially and affectionally called. After only 4 weeks, the first prototype had been concluded and after



additional 4 weeks all production drawings had been completed. The very tight schedule set between the signing of the contract, design, production and delivery of the prototype and actual assembly could only be met by constant interaction between architects, project owner, general contractor, certifiers and Rubner's

engineering team. The scope of works not only comprised execution design but also workshop and assembly planning, prototype design and fabrication of timber arches as well as transport and local project management.

**Completion:** 2019

**Project implementation:** Timber construction April 2019 to September 2019

**Total project implementation:** April 2019 to November 2019

**Building owner:** Vicinity Centres PM Pty Ltd, Chadstone (AU)

**General Contractor:** Hickory Chadstone PTY LTD., Richmond (AU)

**Architects:** Make Architects, London (UK) and Sydney (AU)

Cera Stribley Architects, Prahran (AU)

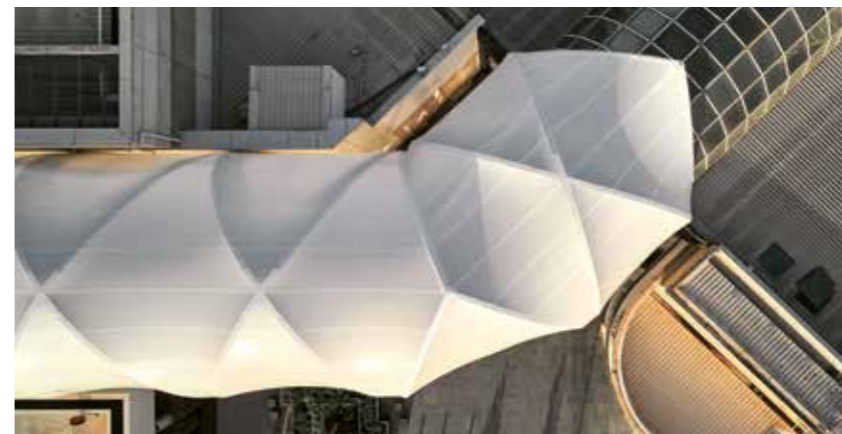
**Structural design:** Robert Bird Group, Melbourne (AU)

**Timber engineering:** Rubner Holzbau Brixen (IT)

**Details:** 160 m<sup>3</sup> of glued laminated timber (larch)

6.000 kg of steel elements (except for the stiffening)

**Photography:** Peter Bennetts





MULTI-STOREY TIMBER  
CONSTRUCTION WALDEN 48

# SOLID TIMBER CONSTRUCTION

Berlin is working to become a timber engineering capital - the Berlin Senate has therefore clearly advocated the promotion of urban timber engineering projects. The high demand for additional living space requires new structural solutions away from conventional construction methods. The joined housing development project "Walden 48" has demonstrated to be way ahead of the goals that the Berlin Senate has set itself. The housing project has just recently been concluded and some of the apartments have already been handed over to the members of this housing development association.

The housing development project "Walden 48" is a very successful example of inner-city consolidation. The role model effect of this project is to be seen in the high quality of architectural design. Conceived as a building with large visible timber surfaces and façades, it is exemplary for urban timber construction and clearly sets a milestone in the discourse on timber housing development projects, which has just recently been started in Berlin, explains the jury that has been composed for the German Sustainability Award 2020 for which this project has been nominated. Moreover, the project has also been nominated for the Berlin Architecture Award 2020.

Long before the announcement of the Berlin Senate to promote timber housing construction projects, the housing development association "Walden 48 GbR" started its initiative back in 2014 with a draft process of building owners. Building costs, however, were not considered to be the only selection criterion. Environmental and design criteria - specified according to the objectives of the individual building owners - were to play a key role in the selection process. Finally, the concept "Walden 48" was selected among numerous candidates. The project was

implemented as a joint venture project by Scharabi Architects and Anne Raupach. 15 years ago, these architects already recognised the signs of the times and decided to focus and specialize on timber as building material. Today, they count among the highest-ranking experts in multi-storey timber construction in urban environments.

The slightly increased project costs (5%) compared to conventional constructions were compensated by numerous benefits of timber structures, such as construction periods reduced by approximately 3 months and larger useable net floor areas with unchanged gross floor areas due to

*"Timber is the natural response to urban development requirements of the future. Today, this old and traditional building material proves to be more efficient than ever before."*

Manuel Eder, Project Manager  
Rubner Holzbau Ober-Grafendorf

reduced façade building depths, just to name a few of these advantages. The timber structure of the building façade not only provides high thermal insulation but also high sound insulation properties towards the highly trafficked Landsberger Allee. Moreover,

this construction scores with flexible floor plans. With ceiling spans of 7.20 m and room depths of up to 13 m, it was possible to execute apartments with spaciouly designed floor plans and no supporting columns at all thus complying with the ideas of building owners.

The properties of timber as construction material ensure natural regulation of humidity, almost 100% radiation absorption and - in combination with high rates of visible timber surfaces (slabs, walls) - healthy indoor climate. Yet timber as construction material achieves much more than mere healthy indoor climates - it is the best building material of all for our overall climate and the living environment of future generations. The building impressively underlines this feature by its CO<sub>2</sub>-reducing properties: it stores some 1,500 tons of CO<sub>2</sub>.

Situated right next to the Volkspark Friedrichshain - a large urban park in the heart of Berlin - the project includes on a gross floor area of some 7,000 m<sup>2</sup> a six-storey, 60-meters long solid timber residential building with 43 apartments that have been designed according to the individual demands of the housing development association.



The basement houses a bicycle parking garage with three additional E-carsharing parks. Collectively owned and jointly used areas as well as commercial premises are installed in the ground floor and on the roof of the building. These areas account for approximately one-seventh of the total surface. Duplex apartments have been installed joining ground and first floor.

The two-layered, cavity-insulated façade facing the street has been clad with slate, the ground floor and attic storey have been equipped with a larch wood cladding. Towards the park-like environment, the building captivates by open balconies and terraces on the top floor. The façade towards the garden side with its untreated larch wood cladding seems to literally flow into the apartment units.

Even the three lift cores, all flights of stairs and platforms have been executed in timber. Slabs have been built as wood concrete composite construction. Only the staircases and the basement have been made by using reinforced concrete.

The energy balance of the building is quite outstanding, too: thanks to the energy-efficient timber construction, which is paired with a sustainable energy concept, the building meets KfW 55 standard requirements.

In terms of fire protection, the building also sets an impressive milestone by relying on large, visible timber structures and by refraining from plaster cladding. The positive features of timber become perceptible in this building - they are literally visualized. In addition, this project has contrib-

uted to the simplification and cost reduction of timber constructions. Due to factory pre-fabrication of building elements, the shell was erected in only 31 weeks. With this project, the structural timber engineering sector of Rubner Holzbau impressively proves that timber constructions are appropriate and implementable not only for rural environments but also for central locations in larger cities.



**Completion:** 2020  
**Building owner:** Housing Development Association Walden 48, Berlin (GER)  
**Architects:** Scharabi Architekten in joint venture with Anne Raupach, Consortium Scharabi | Raupach, Berlin (GER)  
**Building dimensions:** 7,000 m<sup>2</sup> gross floor area, six storeys  
**Façade elements:** 2,700 m<sup>2</sup>  
**Partition walls:** 2,900 m<sup>2</sup> of cross laminated timber  
**Slabs:** 4,000 m<sup>2</sup> of wood-concrete composite construction with glued laminated boards  
**Glued laminated timber:** 922 m<sup>3</sup>  
**Cross laminated timber:** 711 m<sup>3</sup>  
**Photography:** Jan Bitter







SALES REGION ASIA

# NEW AIRPORT TERMINAL

The timber engineering works commissioned for the new Terminal of the Clark International Airport in the Pampanga Region on the Philippine island of Luzon have been concluded on schedule and acceptance by the client has already taken place. Works carried out under the responsibility of Rubner Holzbau were thus concluded according to schedule. Commissioning of the terminal is planned for 2021.

**T**he Terminal - based on a design from IDA Hong Kong - has been built to disburden the existing airport of the capital city of Manila in the long-run since Manila airport has almost no expansion possibilities whatsoever. With this new terminal, airport capacity will increase from 4.2 to 12,2 million passengers a year.

The architecturally outstanding roof construction with its unique design was developed in cooperation with the Manila-based office BUDJI+ROYAL Architecture+Design. The roof structure with three different, alternating heights of 12, 16 and 20 meters above upper concrete slab and with varying roof inclinations imitates the silhouette of the surrounding volcanic mountains, which are the characteristic feature of the adjacent landscape.

On behalf of the general contractor MGCJV Inc., Rubner Holzbau has produced, supplied, and assembled some 6,500 m<sup>3</sup> of glued laminated timber, with a total floor space of some 47,000 m<sup>2</sup>. In addition, Rubner Holzbau was commissioned to execute the structural design, structural engineering works, and the entire logistics services. The company had executed this type of services before in the scope of the project for the already inaugurated Mactan Cebu International Airport on the Philippines (which has Asia's first roof structure fully made from glued laminated timber elements).

All structural elements were shipped to the Philippines just-in-time in three delivery lots first via the Rhine-Main-Danube Canal and then from Antwerp to the Philippines by a deep-sea vessel. Assembly works were concluded

within the extremely tight time slot of only eight months.

In the last few years, Rubner Holzbau has executed several projects in Singapore and on the Philippines. The Asian market has become one of the primary sales regions for the company and projects are managed by an independent branch office. Presently, Rubner Holzbau is executing, among other projects, the Headquarters of the Building and Construction Authority in Singapore.

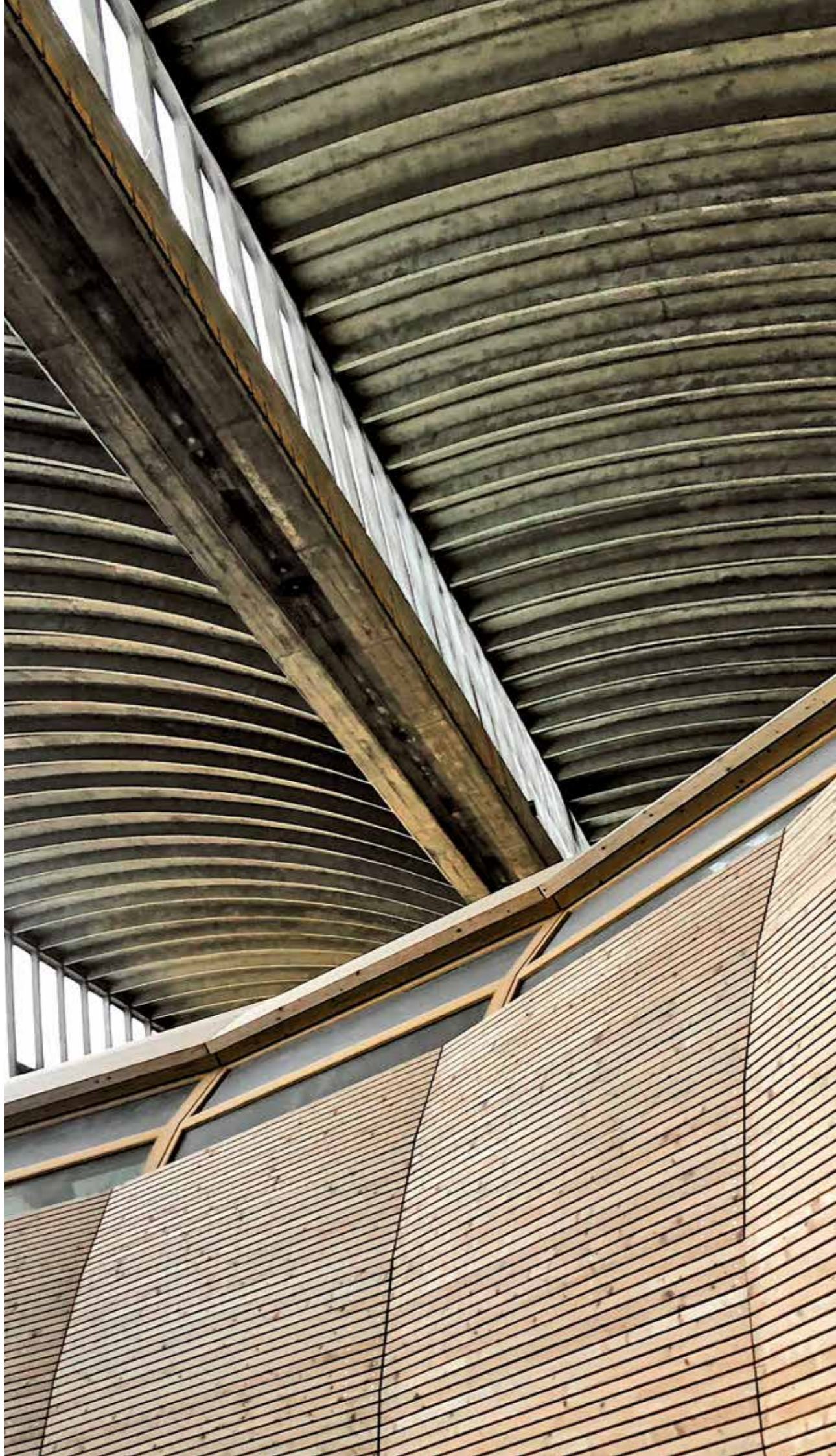


JEWISH MUSEUM IN BERLIN

# AN ARK IN THE HEART OF BERLIN

An impressive spruce timber construction with a height of 7 meters and a base diameter of 28 meters is the centre of the new Children's World within the Jewish Museum in Berlin. This new building, which looks like a huge spaceship, has been installed in the former wholesale flower market of the Berlin borough of Kreuzberg.





This circular, single-storey, CO<sub>2</sub>-neutral, free-standing building is the core building of the new Children's World and the modern interpretation of Noah's Ark - abbreviated to "ANOHA" from the Torah. Designed by the American design practice Olson Kundig, the project has then been implemented by the Berlin architect's office Engelbrecht. Instead of imitating the historical and biblical ark designs, ANOHA represents the modern type of ark, which is inspired by two apparently different sources: an old Sumerian text, which was discovered one decade ago and describes a circular ark, and the spaceship from Stanley Kubrick's movie "2001: A Space Odyssey".

According to the biblical legend, the ark was an impressive vessel, which Noah built and used to save his family and all animal species from the flood. The narrative design created by the Seattle Architects invites young visitors from the age of 3 to re-enact, to understand and to re-invent the legend of the flood, of the saving ark and of the new beginning by using the approach of contemporary interactions. In their exploration children are joined by 150 imaginative animal sculptures positioned at the work bench, the water path or in the section that is named „Tell us a story of a/ your better world“. The ark, designed as a timber construction, is meant

to be used as an interactive place to discover, explore and play. A place, where young visitors shall be inspired to think about the respectful co-existence of humans, animals and nature and encouraged to actively work for a diverse and better world. Even less attractive and less liked animals, like the naked mole rat, have their space and stand for respect, open-mindedness and tolerance towards anything and anyone that might seem strange at first sight. The mammoth - an extinct species - and the polar bear - a highly threatened species - focus the attention of children and adults to important topics, such as environmental problems and climate change pointing out, at the same time, which options each of us has to start rethinking and to actively implement proactive measures.

The animal sculptures have been designed by selected artists and are made from found items and recycled materials. These sculptures can be explored in a manifold way either as a monkey bar, a hammock, or a cosy cave. Treasures want to be discovered, sounds want to be heard, and thoughts and ideas want to be implemented. By the way, one crucial consulting service, which was indispensable to secure the success of the project, was rendered by the children themselves. A Children's Advisory Council, especially initiated for this project and made up of children aged

8 - 11, actively contributed to the implementation of the Children's World.

Sustainability was a major issue, too - not only in terms of contents but also in terms of project implementation. Locally grown spruce is the dominating material used for the supporting structure, walls, and ceilings. Even the floor is made from this renewable material. Durable beech wood is used for the interior. A total of 20 bent glued laminated timber beams with tight bending radiuses of 5.5 meters form the inner part of the ark and the supporting structure for the insulated, trapezoidal and rectangular timber roof elements and the factory pre-fabricated special wall elements. 140 secondary axes serve to fasten the lath cladding. Similar to ship construction methods, wall areas have been cladded with horizontally aligned board-type structures. The exhibition area, designed as timber-rib construction, is complemented by additional facilities, such as workshops, a foyer with wardrobe, staff rooms and lavatories. In terms of architecture, the circular ark - designed as house-in-house concept - offers a soft counterpoint to the straight-lined flower market hall that had been built back in 1963 and was designed as skeleton steel construction.



150 animal sculptures, which symbolize different topics, wait to be explored. All sculptures have been built by using second-hand everyday objects, found items and recycled materials. The smallest animal, a 7 cm large cockroach, is made from an old spoon and a round timber rod, six nails and two needles with coloured heads. The mammoth, with a height of 3 meters the largest animal of all, was made by assembling four ship rudders, one small rowboat, one fishing net, two bumper bars and mudguards from an old car and several wooden bowls and small drums.

Natural and ecologic systems dominate the lighting and ventilation concepts of the project. The available volume in the former wholesale flower market hall is used as main component for the required climate solution. It was therefore possible to refrain from installing mechanical and energy-intensive ventilation devices. A concept for natural ventilation was developed. Underfloor heating provides warmth, the hall serves as buffering area and these thermal buffering is beneficial to the climate footprint of the building. Plenty of natural daylight enters the building through the large, ring-shaped skylight, LED lights reduce electric energy consumption to a minimum.

Promoted by the "Heinz und Heide Dürr" Foundation, the concept of the museum and its different activities follow the approach of "Early Excel-

**Completion:** 2020  
**Project Owner:** JKM Gebäudemanagement, Berlin (GER)  
**Architects:** Olson Kundig, Seattle (USA)  
**Structural design:** Architekturbüro Engelbrecht, Berlin (GER)  
**Timber engineering:** Rubner Holzbau Augsburg (GER)  
**Roof elements:** Flat roof 1,015 m<sup>2</sup> (rectangular elements),  
 Radial roof: 600 m<sup>2</sup> (trapezoidal elements),  
 Transition section from flat roof to radial roof 115 m<sup>2</sup> (rectangular elements)  
**Glued laminated timber:** Arched beams ark 15 m<sup>3</sup>, supporting structure flat roof ark 18 m<sup>3</sup>, supporting structure flat roof museum 40 m<sup>3</sup>, columns 4 m<sup>3</sup>  
**Cladding and panels:** Panels in the inside yard 600 m<sup>2</sup> (13 m<sup>3</sup> spruce slats),  
 Cladding outside screen 440 m<sup>2</sup> (9 m<sup>3</sup> spruce slats)  
**Photography:** Hufton & Crow, Yves Sucksdorff

lence", which emphasizes the importance of promoting and educating children in pre-school age. The intention of the Children's Museum is to create an attractive proposal to families with young children within the city. One important aspect of the project was to open-up to the immediate neighbourhood of the museum's location. Cooperative partnerships and networking with other facilities and institutions shall help to create a family-friendly, open-minded, and culturally diverse environment of encounter.

Rubner Holzbau was charged with the overall range of timber engineering tasks for this special project including design, factory pre-fabrication of all elements, transport, and assembly.



# SHOPPING CENTRE FAÇADE GREENING

To keep the ecological footprint as little as possible, to search for a technologically advanced overall solution and to achieve the harmonious integration into the surrounding region - these were the key aspects of the architectonic concept for the project elaborated by the architects TP4 Associati in collaboration with Rubner Holzbau.

With the beginning of industrialisation, many people moved from the country to the cities - those who used to be self-supporting farmers now turned into urban factory workers. The money they earned very often was not enough to provide for their families. As a reaction to this situation of deprivation, in 1854, numerous workers allied in the Italian city of Turin to establish the first Italian consumers' cooperative (Cooperativa di Consumatori). They operated a grocery shop of their own to be able to purchase larger quantities for better prices. Today, Coop in Italy consists of more than 130 large-,

*„We could not have opted for any other material than timber to build the gallery. Rubner Holzbau with its sustainable production chain was clearly the right choice for the implementation of this project idea.“*

Giorgio Motta, Architect  
TP4 Associati

medium-, and small-sized cooperatives, which largely operate independently. The umbrella organisation of Coop Italia is based in Casalecchio di Reno near Bologna. The task of this umbrella organisation is to coordinate purchase activities for all distributors acting under the name of Coop, to create store brands, to carry out quality controls and to secure a standardised marketing strategy. In Italy, the Coop association is the largest

provider among Italian retail store chains and achieves turnover rates of some 13.1 billion Euros on the Italian food market.

Sustainability is one of the major goals of Coop and all relevant strategies are based on this important pillar. Focus is placed on the preservation of biological diversity, sustainable products, traceability of supply chains, environmental and climate protection, and social commitment for all employees. The new Coop market of the Lombardy Group located in the Via Cecilio in Como was also established in line with this basic philosophy and plans were designed by the architects TP4 Associati. For ecological reasons, this new supermarket was therefore exactly built on the available premises of a former car dealer without any additional building development.

The supermarket's commitment to sustainability is perfectly visible from the distance, when approaching this technologically and ecologically state-of-the-art supermarket from the two newly built roundabouts. With its green façades - covered by some 1,000 m<sup>2</sup> of vertically planted lichens, grass, and moss - the architects of Rubner Holzbau have reintroduced a part of the forest into the city. The visitor is guided to the 2,500 m<sup>2</sup> large sales areas through this greened entrance and via a spacious gallery, which is the architectonically dominating feature of this shopping centre.

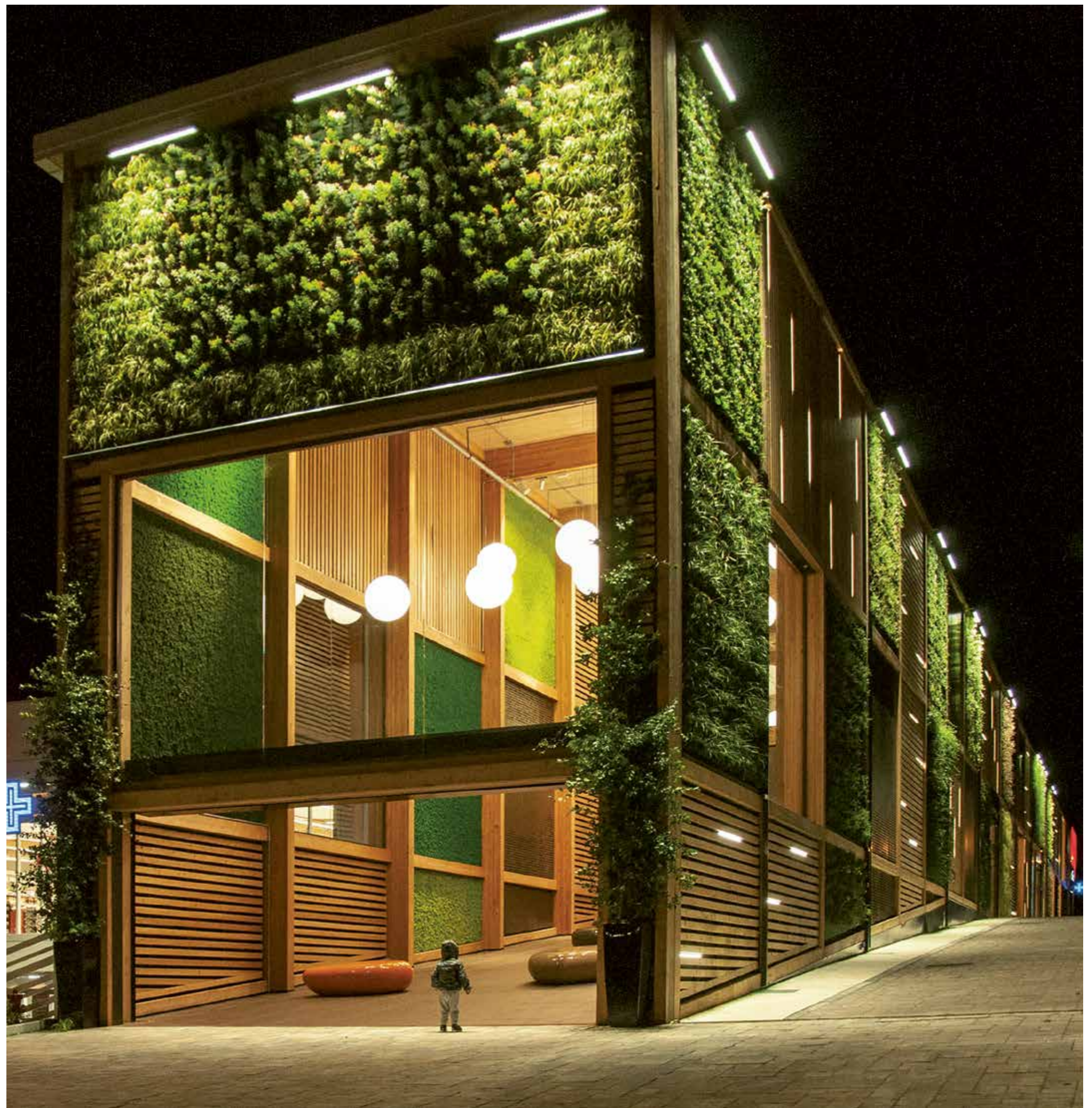
The entrance gallery is fully made of timber. The supporting structure is made of glued laminated timber in larch, roof and wall elements have been implemented by using universal panels. Timber as construction material remains therefore visible, both inside the gallery and outside. Thanks to the structural and technological solutions applied, the gallery may resist all weather impacts and handle the most different and adverse climatic conditions thus scoring with high stability.

The supermarket's green footprint appears to be the recurrent "leitmotif" and is evidenced in every section. Directly at the entrance, in the fruits and vegetables department, the baskets are made of 100 % recycled material, bags and labels are made of biodegradable material. A fish market with sushi corner, a butcher's shop, a bakery, an organic food section and a spacious catering sector complete the vast and rich choice of fresh products offered in the Coop supermarket in the Lombardy region. The supermarket's photovoltaic plant with a capacity of 190 kWp that has been installed on the saw-tooth roof made of larch glued laminated timber, produces 220,000 kWh of electric current per year and is able to avoid emissions of more than 78,980 kg CO<sub>2</sub> into the atmosphere. This equals average annual emissions produced by 81 families or a CO<sub>2</sub> fixation of a small forest area with more than 110 trees.

Compared to conventional lighting systems, the installed LED lighting system - which in the underground car park has been equipped with automatic devices for the adjustment of light intensity as needed - reduces required energy amount by 30 % or approximately 130,000 kWh. Charging stations for electric vehicles have been provided on the parking areas and air quality is continuously being monitored by means of sensors.

Based on the cooperative idea with its members as constituting elements, special importance has been attached to the direct surrounding of the supermarket and the quality of life of the neighbours. The overall concept therefore includes several measures to foster this cooperative idea. New green areas have been created for the community and a new bicycle path has been installed. Social commitment with regard to well-being and sports is mirrored in the promotion and support of the young generation. By using the customer card of the supermarket - which is the promotor of the local soccer club Como Calcio - 3 % of the total purchase amount is used to support the club's junior teams.

Rubner Holzbau was charged with the elaboration of the execution design, the fabrication and assembly concept, pre-fabrication of all timber elements as well as delivery and assembly of all construction elements including roof covering and sheet metal works.



Completion: 2020  
Building owner: COOP Lombardy, Milan (IT)  
Client: Redal Srl, Saronno (IT)  
Architects: Studio TP4 Associati, Cantù (IT)  
Timber engineering: Rubner Holzbau Brixen (IT)  
Roof elements: 1,300 m<sup>2</sup>, panel dimensions 2.5 x 12 m, R60  
Wall and façade elements: 1,500 m<sup>2</sup>, panel dimensions 2.0 x 8.2 m, R60  
Glued laminated timber: 200 m<sup>3</sup> in larch visual quality, 200 m<sup>3</sup> in larch  
Photography: TP4 Associati





SCHOOL COMPLEX IN GLOGGNITZ

# A PLACE OF ENCOUNTER

21<sup>st</sup> century educational institutions are places of a modern learning culture. The new, multifunctional school complex in Gloggnitz has been designed to serve multiple purposes: a working and learning environment, a place to stay, a place of encounter, a place where children and adolescents can grow together, experience beauty, develop community spirit and creativity and live democracy. Beyond its educational use, the school complex also serves as cultural meeting venue and as location for public events.





The quality of educational buildings - including kindergartens, schools, universities and even adult educational centres - mirrors the appreciation and esteem that a society is willing to give to education and is an indicator that determines how much a society respects its community of students and teachers. This new school complex built in the Austrian municipality of Gloggnitz clearly shows the importance that is attributed in this municipality to education and youth. The educational Leitmotiv of coexistence, exchange between students, teachers and parents, mutual support and assistance are underlined by this building.

Right in the city centre, the three formerly separated schools (primary school, new secondary school, and

the special education centre) have been merged under the roof of this new building. In addition, this new school complex is available for regional activities. Sports associations are invited to use the school installations, courses for adult education are offered in the building and numerous extracurricular events take place in the complex.

A large, cantilevered porch roof provides a weatherproof welcome to students and teachers and also guides event visitors to the prominent foyer of the ground floor - the public area of this complex. The bright and spaciouly designed foyer, with a fully glazed façade on one side provides for plenty of daylight even in the darker seasons of the year and underlines the architectonic statement of an open, transparent, and integra-

tive school. Three large sports areas and the multifunctional music and art rooms have been installed immediately next to the foyer. This huge sector is surrounded by wardrobes, lavatories, specialized technical education classrooms and special classes. These areas have been arranged in a circular way and are used for school internal purposes and external events. Seat grandstands installed on two sides of the sports areas transform the sports hall, the gymnastics halls, and the climbing wall into a stage.

The classrooms for the three school types - which are all installed on one common level on the first floor - are clearly and well structured. The upper floor is dominated by a large timber-made roof terrace, which assumes the function of a schoolyard. Plenty of daylight penetrates the beneath

**Completion:** 2019  
**Building Owner:** Municipality of Gloggnitz (AT)  
**Architects:** Dietmar Feichtinger Architectes, Vienna (AT)  
**Timber engineering:** Rubner Holzbau, Augsburg (GER)  
**Timber-glass façade:** 2,500 m<sup>2</sup> in larch,  
 profile cross-section 50-60/120-160-200 mm,  
 Glazing system RAICO, U<sub>cw</sub> = 0.9 W/m<sup>2</sup>K  
**Photography:** Rubner Holzbau/Michael Liebert



sports sector via skylights. The large terrace can be directly accessed from the spaciouly glazed classrooms.

These open spaces can be used as a type of open-air classroom or as an area for joint and multidisciplinary learning by mixing students of different ages and school types. The areas reserved for teachers are situated in the second floor. These rooms are accessed via a transparent corridor and offer - just as all the other sectors - a large variety of different use patterns.

The building structure installed on top of the ground floor has been designed as timber and/or timber-composite construction. Using timber for the primary supporting structure (ceilings and outside walls) and for interior fittings has considerably contributed to reduce CO<sub>2</sub> consump-

tion in the fabrication of the building and allows an easy adjustment or change of use of the building in the future. The building - designed as low-energy building - has been provided with a high thermal insulating envelope structure. A sequence of closed and transparent façade strips forms the socle zone of the building. The different degrees of permeability represent the different uses and their position and orientation in the building structure.

The façades of the upper floor, which look towards the yard, have been designed as glazed façades and are equipped with large sliding elements. Vertically arranged, rear-ventilated timber fins serve as cladding elements and protect the glazed elements from solar radiation thus avoiding overheating in the summer

months. External, movable venetian blinds provide additional protection.

Rubner Holzbau was responsible for design, static engineering, fabrication, delivery, and assembly of the large-scale timber-glass façade. Due to the dimensions of the fire-resistant glazing elements, this part required special approval and permits.



Primary and secondary school in Pfaffenhofen (GER). The large and jointless, front-mounted façade elements with heights of up to 10.5 m by Rubner Holzbau allow plenty of natural daylight in the school building. The central part of the building houses the large auditorium with full stage equipment and a capacity for more than 600 visitors.

## EDUCATIONAL BUILDINGS

# PREFABRICATION SETS STANDARDS

Today's educational buildings must fulfil several functions: towards the outside world, the building is expected to be a representative building and towards the inside, the structure must offer an adequate area for the learning and teaching community. The main challenge therefore is to manage the balancing act between architectural quality, energetic sustainability, outstanding climatic parameters, and relaxing atmosphere.

**E**ducational buildings considerably mark the landscape into which they are embedded. Even students and teachers, who spent large part of their days in these buildings, are strongly influenced by these buildings. The fact that physical and mental wellbeing of students and their learning behaviour strongly depend on the surrounding environment, the school, and the classroom, has been scientifically evidenced back in the 1980ies and is therefore undisputed.

Moreover, we live in a time where we are expected more than ever before to responsibly, and sparingly handle all available resources. When it comes to the refurbishment of existing buildings or to the construction of new buildings, dwindling fossil resources and the thus required conversion to regenerative resources play a role, which is as

important as cost-efficiency since the vast majority of educational buildings are financed by public funds. The main challenge is thus to keep the balance between the requirements of cost-efficient and resource-saving refurbishments or new constructions creating, at the same time, architectural quality, and occupational comfort. This challenge is brilliantly mastered by timber, which is the only renewable, thus sustainable, building material. In addition, timber is the perfect building material not only for new construction projects but also for refurbishment projects.

Germany alone has more than 25.000 educational buildings, many of which were built in the period comprised between 1950 and 1980 - a time when sustainability and energetic criteria were definitely not on the agenda. Despite their age, many of these buildings are still in good building

condition so that very often energetic refurbishment - even including the architectural re-modelling of the building - is less expensive than a new construction. Refurbishment of a building not only increases the value of the real estate, but it also guarantees a completely new quality in terms of thermal and visual comfort.

No matter which alternative is chosen - new construction or refurbishment - factory pre-fabrication of all construction elements bears numerous advantages and benefits and is considered today to be the most cost-effective solution. Production processes that are not influenced by weather conditions, reliable time schedules, just-in-time, on-site delivery of ready-to-install elements as well as high cost transparency are only some of these benefits.

1 New construction of primary school, two day-care centres and one sports hall in Poing (GER). Special attention was given to the perfect integration into the existing green corridor and to energetic building standards. In accordance with energy savings regulation, a value was achieved that is 30 % below the standard regulation value.

2 + 3 Energy-oriented refurbishment works at the Comprehensive School of Wetter (GER), Passive house standard. 3,315 m<sup>2</sup> of pre-fabricated elements, 2,330 m<sup>2</sup> of wall surface with fibre-cement panels and larch wood cladding.

4 Green Centre Kaufbeuren built according to passive house standard with two educational buildings and the Department for Food, Agriculture and Forestry (AELF).



5 The new building, which will house the vocational training centre in Sulingen (GER) is a true eye-catcher due to its 1,200 m<sup>2</sup> bright glass façade in post and beam construction.

The implementation of the project - on schedule, and compliant with all requirements - is therefore achieved and secured, on the one hand, by high pre-fabrication rates with high processing quality standards and, on the other hand, by previous, and detailed architectural planning and exact coordination with all technical experts of the trades involved in the project.

By the way, pre-fabricated wall and façade elements are real all-rounders. Modular construction, used in multi-storey timber and hybrid buildings, scores - not only in terms of urban but also in terms of architectural requirements and not only in new constructions but also in energetic refurbishment projects, façade designs, installation of additional storeys to an

already existing building and urban consolidation projects. Due to the rapid assembly of construction components, existing buildings can easily be extended, and vacant slots can rapidly be filled by new constructions, minimizing, at the same time, noise impacts and other nuisances for the neighbourhood. Besides, building envelopes made from pre-fabricated timber elements achieve - with identical constructional requirements - an additional room area of approximately 10 % compared to traditional construction methods.

In terms of infrastructure buildings, a highly positive trend can be observed today in urban development strategies of major cities, such as Vienna, Munich, Berlin, London, etc., which promote the use of timber for build-

ing construction. The market for timber construction has experienced a much faster development in Europe than in the rest of the world since the very stringent European building regulations favour the use of sustainable resources, of building materials with reduced carbon content, and of energy-efficient construction methods. Rubner Holzbau supports and assists all building owners, architects and building designers in the evaluation of, and compliance with the presently valid construction regulations and standards as well as in the optimisation of costs. Rubner's assistance, frequently offered in an early consulting or proposal phase, is backed by long-standing material expertise and numerous timber and hybrid construction projects executed all over the world.



6 Free University of Berlin (GER). Construction of a new building with a useable floor space of 12,650 m<sup>2</sup>, 5,000 m<sup>2</sup> of timber-glass façade and 6,000 m<sup>2</sup> of external wall elements. Entire building envelope with skylights, attics, extensive sheet metal works and sun protection systems.



1 + 5 Extension of the secondary school complex Wiener Neustadt (AT). Two new building elements with 654 linear meters of timber-glass façade and roof glazing.

2 + 4 + 6. Extension of the Margarete-Steiff school in Möhringen (GER). Complete service package for 2.300 linear meters of timber-glass façade: planning, material supply, pre-fabrication, transport, and assembly of façade including fix and movable sun protection systems.



3 + 7 Energy-oriented refurbishment works for the comprehensive school of Niederwalgern (GER). The entire building envelope - based on the two, four-storey concrete skeleton constructions built during the 1970ies - was refurbished with the school being fully operative. The new post-and-beam façade now complies with the strict thermal requirements set by passive house standards.

# UNDER CONSTRUCTION AND COMPLETED PREVIEW

## GERMANY

Based on a design developed by Auer Weber Architects, several school buildings have been built in the Munich city district of Obermenzing. Except for the main school building, which dates back to the year 1912, the remaining buildings on the plot that is located vis-à-vis- the Church "Leiden Christi" were demolished. The new school complex comprises - besides primary and secondary school - a triple purpose sports hall. The new buildings are connected to the existing building by an open hall, which grants access to other, adjacent areas, such as school canteen and schoolyards. For the construction phase of the secondary school "Realschule an der Blumenburg", Rubner Holzbau Augsburg has been charged with the execution of the factory prefabricated timber-glass façade with an overall surface of 3,610 m<sup>2</sup>.



## CZECH REPUBLIC

Just concluded and already awarded. Choosing from 250 designs in ten categories, the international CBRE Art of Space Awards confers design prizes to those industrial and commercial buildings that best combine unique architecture and environmental factors. The production hall built by Rubner Holzbau on behalf of the Czech solid timber processing company Kloboucká Lesní in Brumov-Bylnice (CZ) with a roof structure made from glued laminated timber elements (fish-bellied beams up to 29 m) was awarded the first prize in the Industrial Design Category.

## ITALY

The new San Michele market hall situated in the city center of Mestre - Venetia (IT) houses 36 shops and was opened to the public after a construction period of only five months. The architectonically distinctive and sophisticated timber roof construction with its rhomboid roof surfaces made from glued laminated timber elements not only allows the penetration of plenty of daylight into the market hall but also protects against direct sun radiation and provides optimum ventilation. Rubner Holzbau fabricated, supplied, and assembled some 480 m<sup>3</sup> of glued laminated timber elements and 130 m<sup>3</sup> of cross laminated timber elements (X-lam).



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