



WOOD CULTURE 21

CONSTRUCTION EXPERTISE FOR
ARCHITECTS, DESIGNERS AND
BUILDING OWNERS

ISSUE 12/16

The Future of Timber Engineering
Children's Embassy
Earthquake-Proof Construction
Hotel Enlargement
Carnitalia – Race against Time
Glue- and Metal-Free Construction
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WOOD CULTURE 21

21ST CENTURY CONSTRUCTION MATERIAL



From time immemorial, wood has been a highly sought-after construction material. This applies to the lake dwelling settlements at Lake Constance, which were built 5,500 years ago, but also to many Roman bridges and Middle Age houses. Whenever the walls of these houses were built of stone, at least the ceilings and roof structures were provided in timber. No longer than 50 years ago, timber was being used only for low-quality works – it was just good enough for hayricks and sheds.

Today, however, timber is being used and processed for high-quality works. Whereas in the recent past the materials to rely on for larger buildings were steel and concrete, today timber is being used to build even skyscrapers. This change of perception is largely owed to the timber products that have been developed in the last few decades - a development in which the family-owned company Rubner has been passionately involved for more than 80 years now.

Today, timber is a synonym of an ultra-modern, high-quality building material. This is due to the material's properties, its optical features, its comfortable haptics as well as its cosiness and warmth. Wood is a renewable resource and the energy input that is required for production and processing is considerably lower than in the case of steel or concrete – yet with comparable efficiency and much lower tare weight. High prefabrication rates provide for short implementation periods.

In the event of fire, timber behaves in a more predictable and controllable manner compared to other competing and incombustible materials. Some of the most recent events clearly show the advantages of timber buildings in earthquake-endangered regions. If we additionally take into account that trees are able to bound CO₂, timber clearly scores in terms of climate footprint compared to any other building material.

For numerous research teams, however, as for the one working at the University of Cambridge, this development does not go far enough. If it were up to these researchers, they would like to assist the erection of timber skyscrapers with 70 or even more storeys. We know, however, that this is not yet possible with presently available means. Nonetheless, today's knowledge is no reason at all – neither for researchers nor for us, the Rubner company, – to be in doubt about the basic vision. Our aim rather is to process timber in a way that it can stand and deal with all types of loads.

Visions need to be put into practice, and boundaries of the possible need to be challenged and overcome. Wood, the 21st century construction material.

Yours truly,

Peter Rubner
Peter Rubner
President of the Rubner Group





SKY CENTRAL

ACOUSTIC RESISTANCE – TOP PRIORITY ISSUE

The Sky Campus located in Osterley, West London is currently undergoing an extensive redevelopment. Once completed, the site will consolidate the company's operations and create up to 12,000 jobs within the Hounslow borough. As already made in the first construction phase – the implementation of the "BskyB - Believe in Better Building" – Rubner Holzbau and its British partner B + K Structures have played a key role in the execution of timber engineering works in this second phase, too. The second phase of this development, Sky Central, is a mixed-use building with a total of approximately 41,000 m², encompassing office areas, studios, production facilities together with research and development zones.

The main structure is a reinforced concrete frame with columns and cores, which support the long spanning of the rooftop structure. Glulam beams spanning up to 21 m are part of the

main supporting structure. These are fitted to the steel construction by bearing plates to accommodate the different tolerances. In between, 3 m wide glulam dummy purlins are provided to improve the aesthetics of the structure and to create an interesting structural roof form when viewed from below.

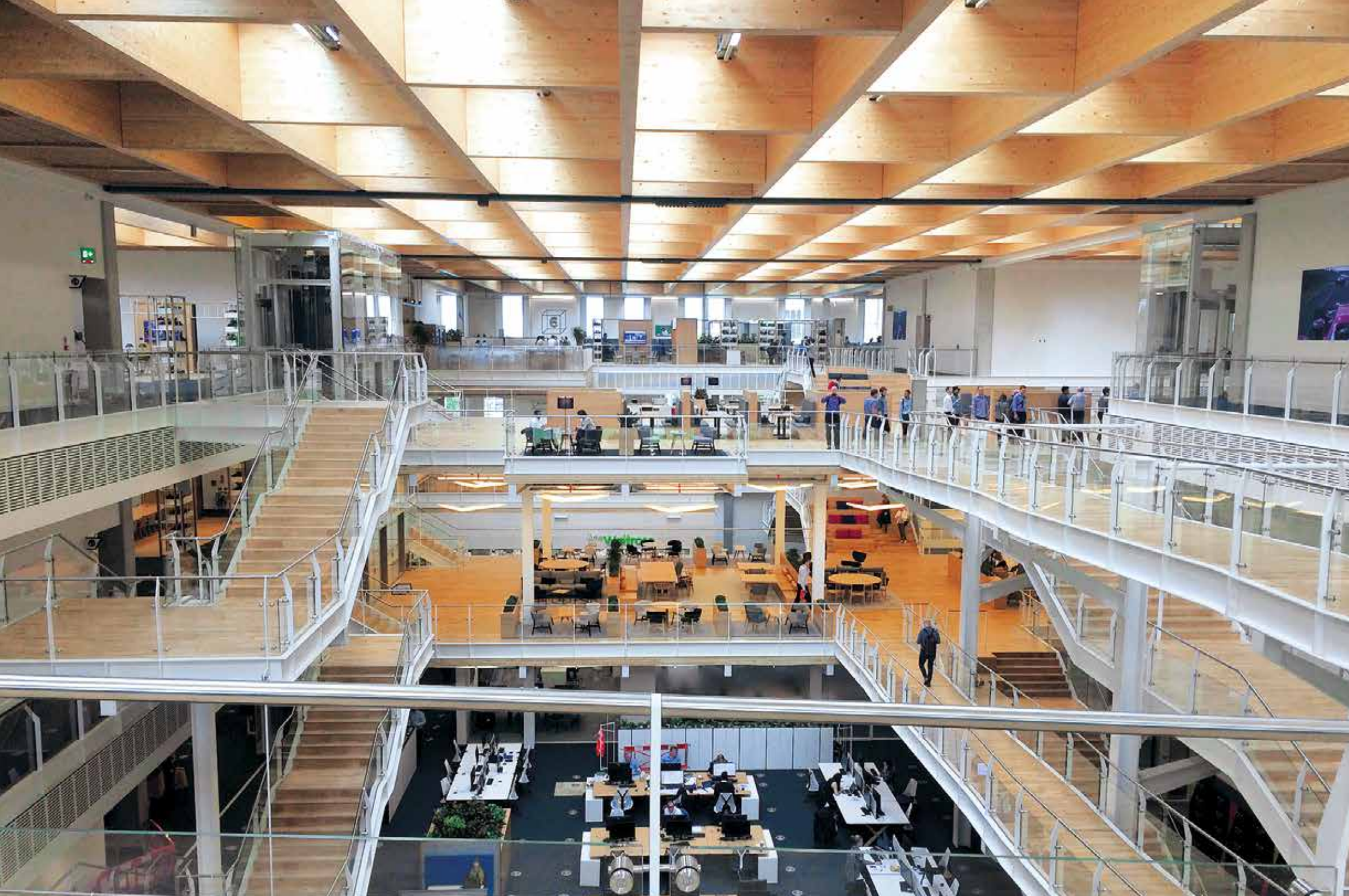
LARGEST TIMBER ROOF CASSETTE PROJECT IN THE UK

More than 7,500 linear meters of glulam beams and 16,000 m² of roof cassettes have been produced by Rubner Holzbau with millimetric accuracy under controlled factory conditions in Ober-Grafendorf (AT). In addition, Rubner Holzbau has been charged with the execution of construction design for the roof cassettes. Sky Central is the largest timber roof cassette project in the UK.

ACOUSTIC RESISTANCE

As the building is located within the Heathrow flight path, acoustic resistance was an essential project component. The use of timber elements provides for excellent airborne sound insulation. The underside incorporates a combination of acoustic fleece and mineral wool covered by a perforated metal liner thus achieving best sound absorption properties.





Pre-fabrication of elements in the factory has remarkably speeded assembly works thus allowing the installation of up to 600 m² of roof elements per day. In addition, this lead to a considerable reduction of on-site waste. Expensive disposal costs could be avoided and excess materials were recycled. Despite adverse weather conditions, works were concluded according to schedule.



Completion: 2016
 Building owner: BSKYB, London (GB)
 General contractor: Mace, London (GB)
 Client: B & K Structures, Derby (GB)
 Architect: PLP Architecture, London (GB)
 Structural engineering: Arup Associates, London (GB)
 Timber elements: Rubner Holzbau, Ober-Grafendorf (AT)
 Roof cassettes: 16,000 m²
 Glued laminated timber: 260 m³
 Pictures: B+K Structures



With the “Children’s Embassy”, the Berlin district of Moabit has established an educational training and social community centre of the SOS-Children’s Village. The building will not only house all programmes and events that had been hitherto offered in the SOS vocational training and conference centre for the vocational orientation and qualification of young persons with special coaching needs, but it will also be the home of new social projects particularly designed for disabled persons. From spring 2017 onwards, some 70 highly experienced community workers will take care of children, adolescents, parents and adults assisting and supporting them in their individual needs and offering specially-adjusted training programmes. A family-friendly café and a day-care centre as well as 28 guest rooms complete the range of services offered.

The idea of this new children’s embassy is that of an open house for everyone and this idea is mirrored in the architects’ design. They opted for a filigree, even delicate, timber-glass façade, so that as much daylight as possible is allowed to penetrate the foyer, which is used for the most various events.

BUILDING SHELL

Rubner Holzbau was responsible for façade construction and for all pre-fabricated wall elements of the 4 upper building storeys (from a total of 6 storeys). The façade of the two lower storeys has been designed as 800 m² post and beam façade in laminated spruce timber. The two upper storeys are made out of 1,407 m² of pre-fabricated wall elements with robinia cladding. This wood is considered to be Europe’s strongest and most durable timber.

Working with 3.90 x 10.60 m pre-fabricated wall elements, the building shell could be rapidly concluded.

TEXTILE FAÇADE

The wooden building façade is literally wrapped by an aesthetic membrane façade, which includes both fix and movable elements. The lower building storeys are equipped with large awnings to protect the building from sun radiation but also to provide for colour accents. By using wooden, textile and glass materials, the building transmits very interesting and, at the same time, fascinating contrasts thus resulting in a very successful hybrid construction.

SOS CHILDREN’S EMBASSY INDIVIDUAL & TRANSPARENT FAÇADE



Completion: 2016
Building owner: SOS-Kinderdorf e.V., Munich (GER)
Architect: ludloff + ludloff Architekten BDA, Berlin (GER)
Engineering office: ARUP GmbH, Berlin (GER)
Façade: Rubner Holzbau, Augsburg (GER)
Wall elements: 1,407 m² in robinia with membrane façade
Post and beam façade: 800 m² in grey glazed spruce including awnings
Pictures: Marc Winkel-Blackmore





RETAIL PARK

CLIMATE PROTECTION IS EMPHASIZED

IN THE KITZBÜHEL RETAIL PARK

Following a total construction period of only six and a half months, the new retail park built in the traditional tourism resort of Kitzbühel (AT) opened its doors. The retail park is installed on a surface of 4,750 m² and the shops are distributed on two floors.

The building, a mixed construction of timber and reinforced concrete materials, has been elevated to the road level to take as much advantage as possible of existing landscape topography.

roof section are favoured by this buckled form.

95 % MADE OF TIMBER

Some 95 % of the retail park's basement and upper floors were executed in timber. The cosy roof structure is composed of exposed, uniformly dimensioned glued laminated timber girder grids as well as cross laminated timber and plank ceiling. Timber frame and cross laminated timber elements were chosen for wall construction (fire resistance

Apart from production, construction site logistics and assembly, Rubner Holzbau was also responsible for the building's structural design, taking into account numerous stiffening and supporting elements as well as different structures and materials.

100 DIFFERENT DETAIL SOLUTIONS

The elaborate, multi-angled and completely "asymmetric" geometry of the building as well as the different construction



Depending on the angle the building is viewed from, the dynamic buckling lines of the structure provide for different effects of the building's appearance. The front view of the building is that of a monolith, an elongated, almost rectangular cuboid block. As soon as the observer changes his position, however, the structure seems less massive than before. This changed appearance is caused by the chamfered façade since large parts of the building simply disappear behind the buckled structure. Large cantilever structures in the projecting

class up to REI 90). Exterior planking of the building was executed by means of aluminium composite panels and vertical, grey glazed spruce boards. White glazed spruce boards were used for projecting roof soffits and partially for indoor spaces as well. The Eurospar supermarket is the first market, which is fully dedicated to climate protection. Among other features, the supermarket is equipped with 100 % LED-lighting, a heat recovery system and a photovoltaic plant.

materials that were used, required a building catalogue with almost 100 different detail solutions. The pre-fabricated elements made in the company's production facilities were delivered to the construction site just-in-time to be immediately assembled. All timber construction works and all measures for the erection of supporting steel columns and steel façade supports were concluded by Rubner Holzbau within the set schedule of only three months.



Completion: 2016
Client: FMZ Kitzbühel GmbH, (AT)
Architect: Feuersinger Planung und
Projektmanagement GmbH, (AT)
Timber construction: Rubner Holzbau,
Ober-Grafendorf (AT) and Brixen (IT)
Glued laminated timber: 1,105 m³
Wall elements: 1,020 m²
Cross laminated timber: 70 m²



Based on the working principle of "saddle notching and dovetail joining", all walls and ceilings are made totally free from any kind of glued or metal joints.

SOLIGNO BECOMES HOLZIUS

LIVING IN TUNE WITH NATURE



holzius
VOLLHOLZHAUS

The South-Tyrol based solid wood constructor was founded in 2005 under the company name of Reinverbund GmbH representing the brand soligno. The company's credo was to implement healthy living within an ecological environment in perfect harmony with nature. In October 2016, the company was renamed to holzius GmbH.

FREE FROM GLUED OR METAL JOINTS

This new brand identity has caused the emergence of a new business strategy. The company, which initially start-

ed as provider of patented solid timber elements, free from glued or metal joints, has now largely expanded its range of services. The company's new portfolio now also includes finished building shells made of solid wood in accordance with building biology and ecology. All partner companies involved in project implementation are holzius-certified thus securing constant quality. However, no matter how many companies are involved in the construction process, holzius will remain the client's single and direct

contact company until the building shell has been fully completed.

"Our aim is to create healthy residential spaces, and preserve intact living environments. This is how we try to bring Man and Nature together", says Herbert Niederfriniger, the Managing Director of the company. The objective is to prepare the ground so that solid timber constructions are brought to the cities thus allowing to live in tune with nature in urban environments as well.





Outside- and inside view of a holzius solid timber house. The appearance of the construction does not necessarily need to be that of a classical wood look. Even loam walls or lime plaster walls can be combined with solid timber structures. Responsible for architectural design: Daniel Dolder and Sandra Dolder, Darmstadt (GER).



SOLIGNO BECOMES HOLZIUS LIVING IN TUNE WITH NATURE

HOLZIUS

The company name holzius is composed of the words "Holz" (the German word for wood) and the Latin superlative form "ius". holzius is therefore making his way with greater, i.e. increased determination and resolution. The Latin word "ius" also means law: figuratively speaking, we could also say that the company works on the basis of the laws, i.e. "the principles" of wood and that these principles

are being observed in the fabrication of its products. The company name "holzius" symbolises that wood purity is appreciated and valued as construction material and loyally preserved.

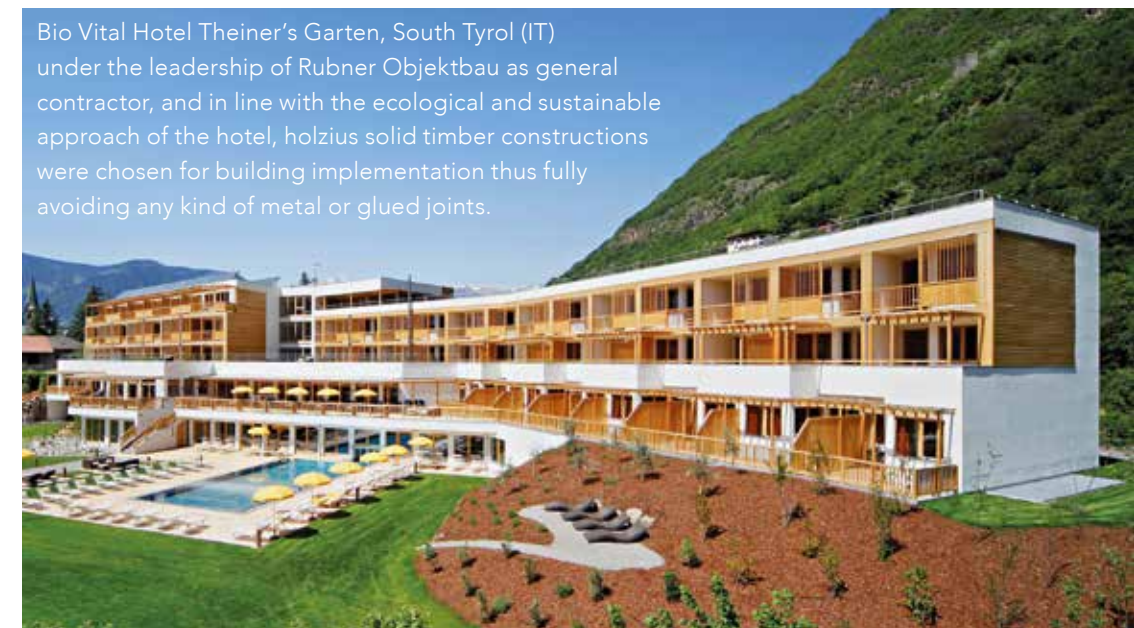
CONSISTENTLY ECOLOGICAL

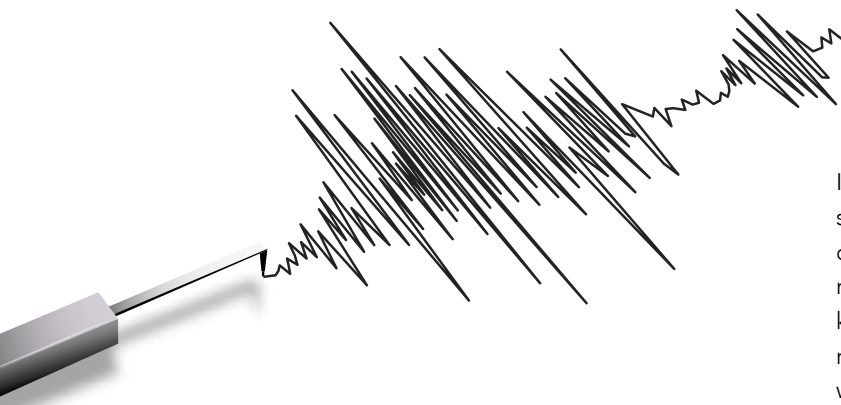
Working on the premises of consistently ecological, sustainable and healthy construction solutions at highest technical level,

holzius GmbH is at home in international markets – among others Italy, Austria, Germany and Switzerland. By now, the company, which is part of the Rubner Group, has already built solid timber construction elements in accordance with healthy living standards for more than 300 single-family homes as well as large public and industrial buildings. In 2015, in the tenth year of company existence, production volume could be increased by 43 %.



Bio Vital Hotel Theiner's Garten, South Tyrol (IT) under the leadership of Rubner Objektbau as general contractor, and in line with the ecological and sustainable approach of the hotel, holzius solid timber constructions were chosen for building implementation thus fully avoiding any kind of metal or glued joints.





In 2009, an earthquake of magnitude 6.3 on the Richter scale severely damaged thousands of buildings in the Italian village of L'Aquila. The Rubner Group has collaborated in the rapid reconstruction of the village with the new construction of two kindergartens and one students' residence (picture on the right). In addition, Rubner designed accommodation units, which were ready to be occupied by needy families only six months after construction had been started.

When reconstruction works started in 2012, following an earthquake that had stricken the Italian Province of Reggio Emilia, Rubner Holzbau was responsible to build a new kindergarten in the little village of Guastalla (picture below). Apart from the reinforced concrete foundation, the entire building is made of glued laminated timber elements. Even in case of very strong seismic forces, this construction provides for high stability and safety.



EARTHQUAKE PROOF CONSTRUCTION

TIMBER – AN EFFICIENT BUILDING MATERIAL

There is nothing man can do against the elements: the forces of nature strike mankind at unexpected times and with unpredictable intensity leaving behind devastation and destruction. Especially earthquakes, which have recently stricken the central part of Italy again and again, destroy the basic building structures of entire cities and villages. The pictures of destruction clearly reveal that the stress that is exerted on these buildings is not caused by "normal" forces. How could we otherwise explain that centuries-old cities and villages simply collapse?

Immense forces act on buildings when seismic events occur, but it is not only caused by the recent incidents of the last few years that earthquake-proof building has become a top-priority issue. It has always been, and still is an important challenge for engineers and architects. Being one of the leading European timber engineering companies, Rubner executes many technically demanding and complex projects – even

in earthquake affected regions. In these regions, the positive properties of timber as construction material clearly outbalance traditional constructions, which are frequently made of stones.

6.3 ON THE RICHTER SCALE

In 2009, some 15,000 buildings were damaged in the little Italian village of L'Aquila: the ancient, stone-based building stock had only little possibilities to stand these earth tremors. Today, more than seven years later, the city centre of L'Aquila slowly seems to be recovering a new city identity. Many of the newly constructed buildings have been executed as timber engineering structures. Apart from high pre-fabrication degree, and therefore rapid assembly of the buildings, timber engineering entails an additional important advantage compared to

solid constructions or stone buildings. In contrast to other construction materials, the here used timber is much lighter, yet with the same bearing capacity.

LOW TARE WEIGHT OF TIMBER

Having this aspect in mind, it must be considered that the major forces, which act during an earthquake are horizontal forces. The magnitude of the force thus depends on the moved building mass. For this reason, the low tare weight of timber elements compared to solid constructions clearly scores in favour of timber as building material. Timber structures are therefore almost predestined for earthquake affected regions.



Among other programmes, Rubner has executed extensive research works at the University of Trient and has participated in the inter-university research project "Series", which comprised vibration table tests in real-life scale. This extensive research work allowed to develop and test company-specific construction details, which have provided the basis for complex and architectonically demanding timber constructions in earthquake-endangered regions.

Top picture: The Mactan Cebu International Airport on the Philippines must stand extreme wind loads and earthquakes.



EARTHQUAKE PROOF TIMBER – AN EFFICIENT BUILDING MATERIAL

Modern timber engineering is, first of all, a question of building a structure in such a way that it can stand an earthquake without collapsing. In this context, exactly designed joints are particularly important. It is a frequent practice in the field of timber engineering to precisely design articulated, thus flexible building parts and to purposefully benefit from the joints' ductility, i.e. its tensile properties. In a best-case scenario, an earthquake will then only cause repairable damages to the supporting structure.

To achieve this, the supporting structure must be able to absorb the dynamic kinetic energy, which is released in the event of an earthquake, and this is largely achieved by the building's joints, which only deform without breaking. Although this is a very common and everyday practice with other construction materials as well, it is however, a more critical issue when it comes to implementation. This applies, for example, in the case of concrete that

has material properties, which are more difficult to predict.

The technical properties of the mostly beam-shaped timber elements entail an additional advantage in the case of an earthquake. Stiffening of the structure always must be planned in detail due to the frequently occurring horizontal forces caused by wind loads. It is therefore much easier to take care of earthquake loads as well.

PIONEER IN ASIA

Rubner Holzbau is presently executing a highly demanding project in the Philippines. An entire airport terminal is being built of glued laminated timber – the first fully laminated timber building on the Asian market. This is a huge challenge, which has caused world-wide attention since the building, which is sited in South-East Asia, is being executed in an earthquake and hurricane-prone region. The region bordering both the Philippine and the Pacific Plate is frequently

stricken by seismic shocks. Moreover, the structure must stand immense wind loads. The ductile properties of timber engineering structures, i.e. the elastic or plastic deformation under load before its breakdown, has therefore been the major reason to opt for a timber construction. Earthquake resistance of timber structures is proven by numerous buildings that are installed in seismically active regions, such as for example, centuries-old wooden houses in Istanbul or timber engineering structures in Japan.

All these positive features of timber engineering structures under earthquake loads are the result of many years of investigation and scientific research work. Rubner has heavily invested in comprehensive test programmes to assert and enhance its leading technological position

Completion: 2016
 Building owner: ARI - Association Régionale pour l'Insertion, Marseille (FR)
 Architect: ACTOM Architecture à Sophia Antipolis - France BALLIOT
 Timber engineering: TECKICEA, Pontarlier (FR)
 Glued laminated timber for supporting frame structure: 20 m³
 Cross laminated timber for floors and ceilings KLH: 3,400 m²
 Cross laminated timber for inside walls KLH: 1,372 m²
 Timber frame construction for outside walls: 1,780m²
 Composite panel for wall covering: 405 m²
 Pierced wall covering in prematurely greyed larch: 1,100m²
 Pictures: Caroline Hérard
 Rendering: Asylum



ASSISTED LIVING PERFECT INTEGRATION

The new Assisted Living Project of the French "Association Régionale pour l'Intégration" (an association dedicated to the integration of handicapped persons) has been planned to provide housing accommodation for 42 handicapped adolescents and adults. The construction project is sited in Sainte Marthe, a new city quarter installed in the 14th arrondissement of Marseille.

On a total of 2,700 m² the building includes the residential areas for the permanent accommodation of handicapped residents as well as common areas, one official residence and all common administrative, paramedical and general services.

The architects' decision to execute the building's supporting structure in timber was advocated by a vast majority of the administrative board that is composed of the parents of the home residents.

The main focus of attention in the execution of this project was:

- 1) To create a symbiotic relation between the built structure and the surrounding landscape.
- 2) To implement a building of high ecological quality in accordance with the basic concept of the new city quarter, Sainte Marthe.
- 3) By opting for timber as construction material, to create for the home residents a reassuring living environment of manageable size, i.e. to convey a "cosy home feeling" thus avoiding the very austere, even impersonal atmosphere of a health centre or hospital.

OPTIMISED TIMBER STRUCTURE

The Rubner Team has secured the optimum implementation of this building

assignment by using three different timber engineering elements:

- A) A laminated timber supporting frame, a lightweight and fire-resistant construction, which remains visible in the finished structure.
- B) A timber frame construction for outside walls – this being the best combination of stability and thermal insulation and also allowing high pre-fabrication degrees.
- C) Exposed, i.e. uncovered ceilings and supporting inside walls in solid cross laminated timber with visible timber structure. These exposed solid timber elements provide for a warm and cosy atmosphere. Due to factory prefabrication of the elements, highest precision during assembly works could be achieved.





Affordable apartments are not easy to find in Zürich (CH). For this reason, the Swiss University of Applied Sciences (ETH) Hönggerberg decided to build student accommodations. At the beginning of September 2016, some 900 students were able to move into their new homes – the newly constructed buildings HWW and HWO – located in the immediate vicinity of their lecture halls and laboratories.

LEARNING, LIVING AND RELAXING

The three visually interlinked HWO buildings offer 498 rooms, 12 of them conceived as single-room apartments, and 64 units designed to house flat-sharing communities with 6 to 10 rooms. A greened patio and several recreational rooms provide for high housing quality and create sufficient space to come together for common activities. The ground floor houses work areas for the

students and a day-care facility for children. The archive of history and theory of architecture of the ETH are installed in the building basement. In addition, the buildings offer retail spaces for different shops.

PRE-FABRICATED WALL ELEMENTS WITH WINDOWS

Rubner Holzbau was charged with the fabrication and assembly of some 7,770 m² of outside timber wall elements that were required for the reinforced concrete skeleton structure. The 410 pre-fabricated elements, which are bent in different radii, measure up to 12 m in length and weigh up to 3 t. All elements comprise factory-installed triple-glazed floor to ceiling windows (750 units). The major challenges that had to be faced when it came to static dimensioning of the building shell were the high

wind loads and the weight of the curtain cladding made of extruded ceramics (90 kg/m²).

ENERGY-EFFICIENT AND CERTIFIED

One special feature of these buildings that has to be pointed out in particular is the MINERGIE- P-ECO® certification and the GI GUTES INNENRAUMKLIMA® certification. These labels combine energy-efficient construction methods and health protection aspects. Focus of attention is placed on avoiding harmful building materials, securing good indoor climate and adhering to ecologic aspects, such as recyclability of materials. Thermal energy is obtained by means of the University's energy network and by approximately 230 geothermal probes with an overall length of some 11 km.

SCIENCE CITY ZÜRICH LIVING ON THE CAMPUS





Completion: 2016
Building owner: Swiss Life AG, Zurich (CH)
General contractor: BAM Swiss AG, Basel (CH)
Architect: Architektick Tina Arndt & Daniel Fleischmann, Zurich (CH)
Timber construction: Rubner Holzbau, Augsburg (GER)
Building volume: 73,800 m³
Façade elements: 7,770 m² including 750 window units
Glazing: 2,250 m²
Glued laminated timber & solid structural timber: 463 m³
Pictures: Achim Birnbaum,
ETH Zurich/Alessandro Della Bella



RUBNER'S HOTEL RUDOLF

TRADITION AND ALPINE ELEGANCE

The Rubner's Hotel Rudolf is set in the exclusive holiday resort of Reischach near Bruneck in Southern Tyrol (IT). The 4-star hotel located in the well-known skiing area Kronplatz proudly looks back on a traditional past. For this reason, the hosts paid special attention to the hotel's redesign to maintain its characteristic and traditional charm - the distinctive feature of the building - while focussing on modern design and comfort. Having this special objective in mind, the hotel that had been built back in 1979 was renewed and enlarged to finally host 62 rooms with 120 beds.

Highly valued and invitingly calm areas, such as the wood-paneled "Stuben" as well as lovingly created details, such as the art pieces from the Rubner's family private art collection but also the quotes, which decorate the walls, have been conserved. The newly built areas comprise 21 feel-good suites and rooms and an enlarged restaurant area. The wellness area was expanded by a new swimming pool, external

whirlpools, new sauna sections and relaxing areas.

NATURAL MATERIALS

The newly designed façades with front-mounted timber fins provide a uniform and very characteristic look to the hotel. Apart from design purposes, the timber fins also serve as filters and sun protection elements additionally increasing the privacy of the areas located behind. Wood and stone have been selected as natural and shaping materials. The flat roofs of the extension buildings have been extensively greened. The load-bearing structure of the newly built upper floor, including the roof structure, have been executed as lightweight timber construction.

FROM ONE SINGLE SOURCE

The project, which has been executed under the lead of Rubner Objektbau, clearly shows the efficiency and synergy effects that are achieved within the Rubner Group.

Starting with the raw material up to the finished building, all work processes and steps are carried out in one complete, i.e. gapless vertical value added chain. Sawn timber is obtained from the company's sawmill Rubner Holzindustrie (RHI), laminated timber and roof elements are provided by Rubner Holzbau, natural wood panels are provided by Nordpan, the wall elements by holzius and the doors and pre-fabricated inside and outside walls are made by Rubner Türen and Rubner Haus respectively.

The high portion of company-internal labour leads to an attractive economic overall solution and offers very important advantages to architects, planners and building owners: one single person to contact for all issues as well as time- and cost-efficient project implementation. High-quality, task-specific solutions with clearly defined and centralised responsibilities are thus guaranteed.



Completion: 2016
Client: Rubner's Hotel Rudolf, Bruneck/Reischach (IT)
Architect: Comfort Architekten, Bruneck (IT)
Cubage: 11,440 m³
Pictures: Rubner's Hotel Rudolf, Andreas Pollok

Rubner Objektbau: General contractor

Rubner Haus: 1,060 m² of inside walls, 775 m² of outside walls
Nordpan: 35 m² of natural wood panels
holzius: 96 m² of wall elements
Rubner Fenster: 61 windows
Rubner Türen: 130 doors

Rubner Holzbau:
Laminated timber: 49 m³
Steel: 9,000 kg





Carnitalia is one of the largest meat-processing industries in Northern Italy. At the beginning of 2015, a large fire destroyed the entire production plant located in the Lodi Province (IT) with its more than 7,000 m² of storage halls, production surfaces, cooling rooms and office areas. Rubner Holzbau was awarded the contract to rebuild production areas and to roof the office building.

RACE AGAINST TIME

The client's requirements placed on Rubner Holzbau were extremely stringent since production should be resumed as quickly as possible. Within the shortest time possible, Rubner Holzbau was expected to build a safe and, at the same time, environmentally compatible and aesthetically appealing building. This highly challenging project in terms of planning and implementation became even more demanding since already existing founda-

tions were to be reused and integrated in the structure. The ground surface of the new building, a 190 x 55 m surface, is the only element which still represents the former, but destroyed building, all other elements have been newly developed.

OPTIMUM FIRE RESISTANCE

The most important innovation is the use of glued laminated timber instead of steel for the entire roof construction. From the architects' and client's point of view, laminated timber was the best choice in terms of construction material considering the above-mentioned requirements and the tight time schedule. This decision was based, on the one hand, on the high pre-fabrication degrees, which secures very rapid and accurate completion of the elements. On the other hand, the decision was further backed by prevailing fire protection requirements since in the event of a fire,

timber constructions are more predictable, i.e. calculable in their behaviour and no spontaneous breakdown of the supporting structure has to be expected as it is the case with steel constructions.

The structural frame designed for the production areas is composed of supports with an axial spacing of 7.2 m. The main, laminated timber girders, which are bent in the form of a barrel-shaped roof and have a span width of 36 m, rest on these supports. The largest girders have a length of 43 m and a cross-section of 32/222 cm. Two wooden ceilings installed in a cantilevered section are designed as suspended ceilings in the roof structure. The roof structure is finally complemented by a secondary roof beam construction, installed at distances of 2 m, and by laminated timber panels.

CARNITALIA SAFETY BY LAMINATED TIMBER



VERSATILE LAMINATED TIMBER

A three-layer panel cladding covers the façades that are installed on a laminated timber frame. The office section is supported by an arched beam construction with maximum span widths of 36 m. These arched beams rest on the already existing cement pillars and on a parallel girder with a span width of 30 m.



Completion: 2015
Client: Carnitalia s.r.l., Ospedaletto Lodigiano (IT)
Architect: Studio Castiglioni & Nardi Architetti Associati, Varese (IT)
Timber construction: Rubner Holzbau, Brixen (IT)
Laminated timber: 2,650 m³
Timber façade: 3,500 m²
Roof surface: 10,200 m²
Steel: 42 t

Apart from fabrication and assembly, Rubner Holzbau was also in charge of planning and just-in-time delivery of construction elements.



In the Alpine region alone, one cubic metre of wood is being regenerated every second. On a daily basis, this figure represents a wood quantity, which would be sufficient to build approximately 2,160 houses and a total of some 788,400 houses per year.



On average, every tree removes 6 kg of CO₂ from the atmosphere. By using timber products, the atmosphere in Germany alone will be relieved by more than 120 million tons of CO₂. For comparative purposes – this quantity corresponds to more than 10 % of German greenhouse gas emissions.



THE FUTURE OF TIMBER ENGINEERING

21ST CENTURY CONSTRUCTION MATERIAL

FOREST AREAS ON THE RISE

Wood as construction material is becoming increasingly popular. The material scores with many advantages in terms of ecology, economic efficiency and well-being, and is considered “the” material of the future. The most important reason why the balance is very much in favour of wood as construction material for high-quality building engineering is due to its sustainability. Wood production is not linked to high energy input: it constantly regenerates itself. Today, woodland areas in Europe’s forests are increasing since more wood is regenerated than harvested.

CLIMATE PROTECTION

Using domestic woods and thus avoiding long-distances, i.e. energy-intense transport routes, is an enormous contribution to climate protection – especially in terms of reducing greenhouse effects. CO₂, which is considered one of the most important greenhouse

gases, is bound in the forests. Once the wood has been used for construction purposes, not only carbon is stored in it. Wood stands for its excellent energy values. Insulating properties of wood apply both to heat and cold, and due to the material’s low thermal conductivity and its perfect insulating properties, it is particularly well-suited for the construction of low-energy and passive houses. In addition, wood has a regulatory impact on indoor climate thus positively influencing our immune system.

PROTECTIVE TIMBER

Even in terms of structural requirements such as sound-, heat- and fire protection, timber structures provide for safety. Timber is characterised by very high natural fire resistance, which is a quite important safety feature in the design of timber constructions since burning properties of wood are much more predictable with no spontaneous breakdowns.

URBAN TIMBER CONSTRUCTION

Ever since, wood has been used for building purposes. Wherever available on earth, people have used this material and worked with it. Today, it is no longer the question whether or not to use timber in construction engineering. It is rather the question of how to optimally use it.

For more than 80 years now, Rubner – a family-owned company – has been focusing on wood and natural habitats as being the core issue of its company vision. However, it is not only within the Rubner-Group companies that urban timber engineering is occupying an increasingly important position. To create healthy living areas in urban environments – this is one of the major challenges faced by architects and investors in times of progressing urbanisation. To do so, experts are increasingly relying on timber in their project designs.





The 73 metres high timber building "HAUT" will be installed in the new Amsterdam borough of Amstelskwartier and house 55 apartments on a total surface of 14,500 m². The timber material that has been used in this building will store 3,000 t of CO₂. In addition, the building will be equipped with a 1,250 m³ photovoltaic surface and a wastewater treatment plant on the greened roof area. Construction works are scheduled to start in 2017.

THE FUTURE OF TIMBER ENGINEERING

FROM VISION TO REALITY

OPTIMUM SPACE UTILISATION

No wonder! Apart from its positive and healthy impacts on our living environments, timber can also boast with numerous technical advantages compared to other materials, which are usually used for construction purposes. Vacant spaces in public and private areas can be easily and quickly filled with the help of timber constructions. Adding additional storeys to buildings is also much easier with timber since it is considerably lighter than steel or concrete. Expensive or limited building areas available can thus be optimally used. The almost revolutionary technical progress has been decisively shaped by Rubner Holzbau and has been successfully applied in many different projects, such as in the world's highest timber viewing tower at the Pyramidenkogel (AT).

While Rubner participated in the construction and erection of the BSKYB, the highest timber office building in Great Britain, timber engineering projects in other countries are reaching almost meteoric, previously unimaginable heights. Either in Vienna or Amsterdam, Zürich or London – everywhere in the world, extravagantly built timber skyscrapers seem to open new horizons. In Austria's capital, for example, on a building area of some 4,000 m², the first 24-storey skyscraper is being built as hybrid construction. Once concluded, the building will measure some 84 m in height.

NO LIMITS TO TIMBER ENGINEERING

Can we get even higher? According to the designs of architectural office Perkins + Will's, an 80-storey timber

tower will be built, which at the end shall have a height of almost 280 m. The presently existing timber skyscrapers have "only" 30 - 40 storeys. We are talking about unimaginable dimensions – although in the case of the Chicago Tower it is more a matter of exploring the limits of what is possible. The main objective of the architect is to analyse, in cooperation with engineers and researchers, how large timber constructions shall be planned in general. However, it merely seems to be a matter of time until timber projects of this size will be implemented.

From vision to reality: With 100 m, the world's highest timber viewing tower at the Pyramidenkogel .





PHILIPPINES

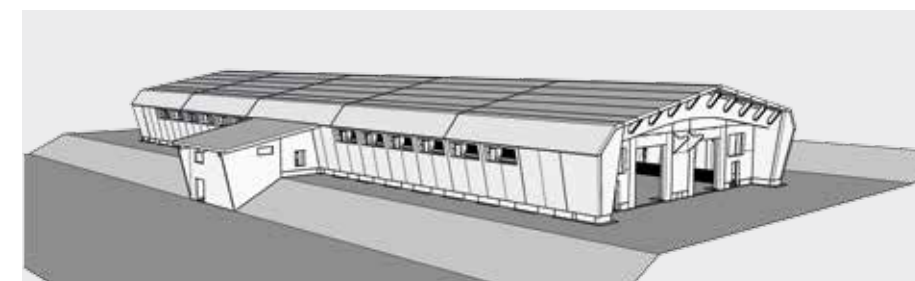
Rubner Holzbau fabricates, ships and assembles 4,500 m³ of glued laminated timber for the new Mactan Cebu International Airport, which covers a terminal surface of 65,000 m². In the entire history of Rubner Holzbau, this contract is the largest order ever awarded for a glued laminated timber construction. In addition, this airport building is the only construction in Asia that is entirely made out of glued laminated timber. Timber engineering works are scheduled to be completed by the month of March 2017. The terminal will be put into operation in 2018.

QATAR

A new luxury restaurant is being built in the recently established luxury quarter of "Katara" located in the capital city of Doha. This restaurant will comprise bungalows, an access bridge and a trafficable jetty: "The Jetty Dining – The Marine Restaurant". Apart from conceptual design and shipment, the project that is being executed under the lead of Rubner Holzbau Sud also comprises on-site assembly of construction elements. The fact that the choice finally fell on timber as construction material is due, on the one hand, to the various design options that are offered by this material but also to prevailing climatic conditions in the region, which are dominated by humid and extremely salty air. This project is considered to be the foundation for the further development of timber engineering projects in Qatar and in the Gulf region. Rubner Holzbau Sud cooperates with the local Al Jaber Group, Qatar's leading company for building and environmental projects.



PREVIEW PROJECTS UNDER CONSTRUCTION AND PROJECT COMPLETIONS



GERMANY

The small village of Oberjettenberg in Bavaria is presently witnessing the construction of a new hall designed for the testing of electronic equipment. The special requirement, which is made on the project as to the later use of the building, is that the entire construction has to be made of materials or structural elements that are metal-free, not magnetisable, or electrically conductive. Timber construction works executed by Rubner Holzbau Augsburg will be concluded by November 2016.



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