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TRÄ MEETS
Anna Ervast Öberg

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For a preschool in the heart of Lisbon, it was important to have close contact with nature. The design makes use of existing trees, and a playground with vegetable beds has been created on the roof.



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Access balconies solve tricky problem

The difficult site parameters guided the architecture in the district of Ljura in Norrköping. Here, access bridges connect the two buildings while also providing a great panoramic view. The soft and warm feel of the glulam and CLT structure creates a fine contrast with the rendered façade.

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 SVENSKT TRÄ

Swedish Wood represents the Swedish sawmill industry and is part of the **Swedish Forest Industries Federation**. The forest industry is one of Sweden's most important business sectors. It provides employment throughout the country. Thanks to its natural raw materials and products, the forest industry has a key role in the development towards a sustainable, biobased society.

Trä magazine is aimed at architects, structural engineers and everyone else interested in architecture and construction.

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Mathias Fridholm Director, Swedish Wood

Optimising value with new technology

HUDIKSVALL, SWEDEN «Bloody fools,» he shouted and then he rang off. A while ago, I received a rather unpleasant phone call from someone with very strong views on the Swedish forest industry. The person asserted, amongst other things, that sawmills are committing violent acts against the nation's forest raw material. When, in the same breath, he discredited all politicians, media, companies and researchers, I realised that the chances of a reasoned discussion were non-existent. I felt myself being rapidly and unwillingly drawn into the quagmire of social media commentators who actually have no interest in a fact-based exchange of views.

The conversation was not nice, but it did get me thinking about the question at the heart of this: How much knowledge is there about how we work with the forest raw material that comes in to our Swedish sawmills?

The sawmill industry in Sweden is incredibly diverse, with everything from small family sawmills to the major plants of our listed companies. Small sawmills specialise in specific product segments and more complex products. The larger sawmills, like every other industry, have to maintain a strict emphasis on productivity if they are to have any chance of competing in the global market.

The focus on timber yields is high. In the future we want to be able to build more from the same number of trees. But *value optimisation* is at least as important. Each plank has unique properties and they should be used where they are most useful and generate most value. New technology has brought significant advances in value optimisation over the past few years.

Let me give a concrete example of how we are combining old timber know-how with modern tech: It is well-known that pine heartwood has high natural durability. Today, we can use x-ray technology to select logs with a large proportion of heartwood and supply the products from those logs to customers that need them, such as the window industry. In other contexts, we pick out logs that we know will yield high-strength timber for delivery to the glulam industry.

And x-ray technology is going to see further developments in the future. At a new research centre in Skellefteå, the most modern x-ray technology in the health sector is going to be applied to the logs that enter our sawmills. Our goal is to ensure that every log is put to the best possible use – from the perspective of both volume and value. The right log – for the right application – with the highest value!

It's good for the climate, society, the economy, the export industry, prosperity and well-being ... Only a fool would argue with that!


Mathias Fridholm

Editorial



Jeremie Léon

Old flaws shaped new roof

OBJECT L'onde
ARCHITECT Arba

MURAT, FRANCE Concave on one side and convex on the other. The home's modern roof is a playful take on the slate roofs of old that could buckle unevenly, perhaps because all that stone was too heavy for the structure beneath or the rafters weren't straight.

The bulge in this roof, however, is intentional: open to the south to benefit from the winter sun and warmth, and closed to the north to protect the house from the region's forceful winds. This idea is also reflected in the rest of the larch

The wavy roof is both a play on old traditions and a way to ensure a good indoor climate.

exterior, with the doors and larger windows on the southerly aspect.

The interior in pale birch plywood and the larch roof structure are visible everywhere – but not entirely visible as it was important to give the rooms some privacy. In a drive to showcase the craftsmanship of the building, nothing has been hidden away: the concrete floors are untreated, and even the work of the electrician has been acknowledged by leaving the cables exposed. « [w| arba.pro](http://www.arba.pro)



Javier Callejas

Timber frame defines facade

CABOURG, FRANCE Dormandy is awash with traditional old half-timbered buildings, as any tourist will know, and that is what came to mind

OBJECT Club house
ARCHITECT Lemoal Lemoal
STRUCTURAL ENGINEER IBATEC

when the architects at Lemoal Lemoal were asked to design new changing facilities for the tennis club in the coastal resort of Cabourg. The result was a modern interpretation of the area's architectural vernacular, built with local materials and by craftspeople with knowledge of the area.

The simple volume comprises a shell of exposed wooden beams and studs, applying the half-timbered principle but with a modern twist that suits the purpose of the building. A key difference is that the spaces between the timber have not been filled in. Instead, the exterior wall sits just inside the wooden structure and is made from light, insulating and opaque polycarbonate. The material fulfils two vital functions: inside it lets in enough light for the tennis players to make use of natural daylight, and from the outside it prevents anyone from seeing in. The tiled roof is terracotta. «

[w| lemoal-lemoal.com](http://www.lemoal-lemoal.com)

Tonariuh Ambrosetti

Recreation with repetitive module

OBJECT Ski Centre
ARCHITECT Durisch+Nolli
STRUCTURAL ENGINEER Reali e Guscetti Studio d'Ingegneria

[w| durischnolli.ch](http://www.durischnolli.ch)



The upper section houses a spa, guest rooms and two restaurants. The whole layout is based on a modular 4.6 metre measurement.

OLIVONE, SWITZERLAND In the Swiss Alps, 1,400 metres above sea level, stands a cross-country skiing centre that attracts families and elite skiers with its well-prepared trails in a stunning environment. Since the centre was created in the 1970s, it has been sympathetically expanded. The latest addition is a building with social facilities and accommodation, carefully inserted between existing buildings so as not to pull focus from the surrounding landscape, which remains the star of the show.

The concrete basement level contains the changing rooms and services. Above that everything is wood, most of which has been left exposed. The ground floor has restaurants and other public spaces, with moveable walls so the rooms can easily be reconfigured for larger gatherings. The upper floor houses guest bedrooms and a spa. The structure in CLT and glulam is based on a 4.6 metre wide modular measurement, which rationalised the construction process so the skiers could quickly begin using the new facilities. «

[w| durischnolli.ch](http://www.durischnolli.ch)



Vincent Lemaux

The coffered larch ceiling is a striking reflection of the okoume flooring. Both comprise 136 elements.

Unbroken roof creates space

SOULAC-SUR-MER, FRANCE A family home sits like an oasis in the middle of the pine forest, sited subtly on the sandy plot. With no steps or high thresholds, the wooden terraces become a link between land and house, providing access to any of the rooms – all of which have contact with the great outdoors.

The coffered ceiling comprises 136 larch panels and the floor has the same number of panels in okoume (a West African wood), creating a symbiosis between up and down. Neither

OBJECT The Wooden Villa
ARCHITECT Nicolas Dahan
STRUCTURAL ENGINEER Cesma, Nicolas Dogniaux
[w| nicolasdahan.fr](http://www.nicolasdahan.fr)

the ceiling or the walls feature any screws, and the number of steel components has been kept to a minimum by using shadow joints instead. The roof is supported by a 16 metre glulam beam. Complementing the wood are glazed sliding doors standing three metres tall. However, the site is exposed to harsh weather and to make sure the roof and glass remain intact, the architects have reinforced parts of the structure with concrete, concealing it inside the wood walls. The surrounding forest also protects against strong winds, while still admitting the gentle sound of the waves from the nearby Bay of Biscay. «



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Oliver Kern

New thinking leads to multiple functions

BLEIBACH, GERMANY The new church steeple in the German town of Bleibach is not just a Christian symbol – it fulfils many other functions. The tower is an important landmark in the Black Forest region, and also has a viewing gallery that visitors can access via a long staircase. Here the walls can be opened on three sides to reveal magnificent views.

The façade and roof are clad in acetylated wood, which provides lasting protection against moisture and insect attack. The window frames use the same material and are integrated into the façade. The top of the tower, shaped like an equilateral triangle to symbolise the Christian trinity, also provides a refuge for rare birds and bats.

The part housing the church bells features silver spruce CLT on the stairs, ceiling and walls. This is partly because the wood meets the stiffness level required for this design, and partly because silver spruce is the classic conifer of the Black Forest and therefore embodies the sustainable and readily accessible material that the client requested. «

OBJECT Church tower
ARCHITECT Architekturg
STRUCTURAL ENGINEER Ingenieurbüro Wirth Haker

w|architektur3.de

Inspired meeting of materials

EDINBURGH, SCOTLAND When Scottish architect Alexander Hunter Crawford designed Fitch House in the late 19th century, he was influenced by the ideas of the Arts and Crafts movement that advocated genuine craftsmanship over industrial production.

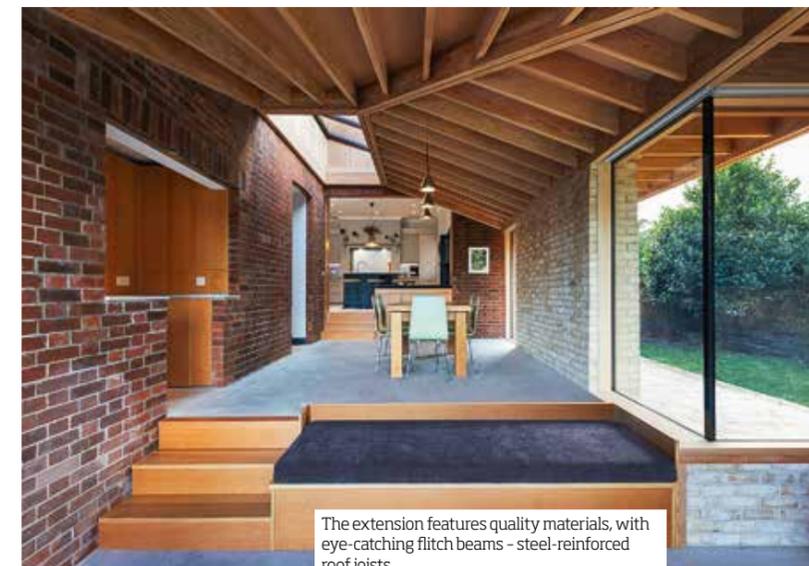
With its red bricks and thick timbers, the style represented an English suburb more than the Scottish sandstone buildings of the local area. Now the house

has gained an extension that sees today's architects invoke the same theme: pale brick meets Douglas fir and oxidised copper.

Externally, the new, lighter bricks and larger expanses of glass are mainly what mark out the new part of the building, but inside the eye-catching feature is the roof structure, exposed to show off both its beauty and its function. Steel-reinforced wooden beams allow for a longer and stronger span and combine with construction timber to allow for a lower structural height and a better view. «

OBJECT Fitch house
ARCHITECT Oliver Chapman Architect
STRUCTURAL ENGINEER David Narro Associates

w|ocarch.co.uk



Angus Bremner

The extension features quality materials, with eye-catching fitch beams – steel-reinforced roof joists.

There are more photos of the objects at woodarchitecture.se

Floats above the rice farms

KOSHIGAYA, JAPAN Bordering one of Japan's rice farms stands a home that at first sight appears to float, with the ground

OBJECT Wooden Box Floating
ARCHITECT Atelier N

floor's glazed structure and narrow shape reminiscent of a greenhouse. The architects wanted to

create anything but the usual wooden design supported by posts and load-bearing walls. The result was a shingled wooden structure in pine, supported by diagonal glulam posts positioned inside the glazed sections.

The materials and design were chosen in response to the local climate. In summer, the wooden box protects the house from heat, and the cooling effect of the paddy fields means the building has no need for air conditioning. In winter, when the sun is lower, the glass admits its warmth into the room to ensure a pleasant indoor climate. The house has also helped to connect the neighbours with the paddy field. The owner, who grew up in the area, can sit and watch the rice being grown in the field, and the people working there can easily pass by, wave and stop for a chat. «

w|nakamurahiroshi-archi.com

Shigeo Ogawa



Arkitekten berättar

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Pilvi Vanamo, Lönnqvist & Vanamo Architects.

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The modules are made from locally produced timber and raised on plinths to protect the Chilean landscape.

Hotel in local wood that can survive extreme weather

OBJECT AKA Patagonia Hotel
ARCHITECT Pablo Larroulet
STRUCTURAL ENGINEER Braco

PATAGONIEN, CHILE People come to Patagonia from all over the world to experience the mountains, glaciers, water and rural life. And it is these contrasts in the natural attractions of the region that have been seized on by the new Puerto Natales hotel, sitting at the top of a slope with panoramic views of volcanoes, mountain ranges and glaciers.

The hotel is made up of six modules, all of which contain guest rooms and bathrooms, plus a building with a kitchen and communal facilities. The form of the building reflects the silhouette on the horizon, and the natural world is present inside and out. The walls and roofs of the prefabricated modules are made of lenga (*Nothofagus pumilio*), a local tree species that thrives in locations with poor soil, a cold climate and harsh winds. This has made the wood tolerant of extreme weather, and as it ages it will merge even more into the landscape. For as small a footprint as possible, the structure is raised on plinths. «

wjlarrou.com

Open guesthouse

CHARENTE-MARITIME, FRANCE

A suitable distance from the main house, bounded by the surrounding fields, the owners wanted to build a small guesthouse using materials with as small a climate footprint as possible. The chosen design was a simple structure created from panels of locally grown Douglas fir. The building stands on large concrete blocks, which means that it can easily be disassembled and recycled without leaving any major traces behind.

The 36 square metre guesthouse is made up of four square modules, one of which has no



The guesthouse has four parts, one of which serves as an outdoor room. The building and the furniture are made from Douglas fir.

OBJECT La Petite Maison
ARCHITECT 2m26

roof and is used as an outdoor space. In addition, there is a bedroom and a living room, plus another module containing both the bathroom and a small, built-in kitchen. To make the

most of the expansive views and to increase the volume of the modest building, many of the walls are moveable, allowing guests to let in sun, light and air as they wish. The furniture is also Douglas fir, creating a cohesive overall feel. «
wjl2m26.com

Fernanda Del Villar

Anneli Kouthoofd, CEO Byggmaterialindustrierna

Hållbarhet viktigt även digitalt

STOCKHOLM, SWEDEN Sustainability in the construction materials industry naturally focuses on the function, robustness, durability and design of the material. But these days sustainability is just as much about zeros and ones, digital data and the rules and conditions that encourage innovation. Climate and sustainability goals drive the whole construction industry, and the construction materials industry is putting a great deal of money and energy into research and development. Globally, within the EU and nationally, the ultimate aim is for a green and circular transition, and this will demand innovations not only in the field of construction materials, but also sustainable digital information.



We need a circular strategy. The Swedish government's national strategy has been set out in principle, but it requires concrete action plans to back it up, as well as good synchronisation within the EU. This in turn requires close collaboration with all of us in the business world. The construction materials industry and other industries are developing strategies that allow us to combine a non-toxic environment with the ability to recycle more.

Sustainable information, documentation of relevant data that can be shared while ensuring the continued security and development of the building materials companies, is essential for the future of innovation. Construction material manufacturers are working to establish an industry-wide system/platform with a standardised language, which makes it possible for companies to share product and environmental data securely and efficiently, and draw on the expertise of the different companies.

This digitalisation work is progressing within a number of joint industry projects. Swedish Wood, for example, is conducting particularly pragmatic and forward-thinking work on the production of digital data. We need to agree on identifiers (GTIN, GMN) so the data can be used across borders, and we need to standardise the steps in the construction process. Essentially, we need to jointly meet everyone's needs, including the construction materials industry's need for systems to register and produce relevant product and environmental data, and the property owner's needs regarding management and renovation.

An attitude of trust between the various actors in the construction process, the right regulatory system, the right approach to relevant data and digitalised platforms for the sustainable exchange of information are key factors for the exciting and intensive work moving forward.

wjlbyggmaterialindustrierna.se/byggmaterial/innovationer/ (Swedish only)



MICROLIBRARY AS PLAYFUL SOCIAL SPACE

PHOTOGRAPHER
KIE & team
OBJECT
Mikrobibliotek
ARCHITECT
Shau
STRUCTURAL
ENGINEER Joko Agus
Catur Wibowo

JAVA, INDONESIA IA project is under way in Indonesia aimed at encouraging more people to read books. Five locations across the country have been given a micro-library that also serves as a social space. The latest of these is in Semarang, where the design displays influences from the nation's traditional stilt houses – »ruma panggang«. The ground floor has been left open on all sides and is used for workshops and social gatherings. The upper floor housing the actual library is finished in a repeated diamond pattern, based on the German construction system »Zollinger Bauweise«. A similar pattern appears on the dragon that legend says

lives in the area, which makes the design easy to understand while also helping to create an exciting visitor attraction. The structure uses meranti (shorea) plywood in various thicknesses and performs an important function in preventing direct sunlight from flooding the space and thus maintaining a pleasant climate within...«

- The whole building is made of wood, with the exception of the foundations, fixings and roofing material. All the wood is fsc certified and the elements were prefabricated just 20 km from the site..
- The structure's finger-jointed components involved taking waste wood and then sawing and adapting it to make it fit, significantly reducing the amount of overall waste.

w| shau.nl

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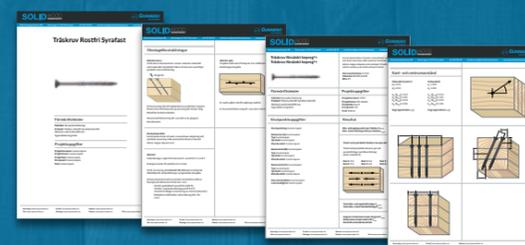
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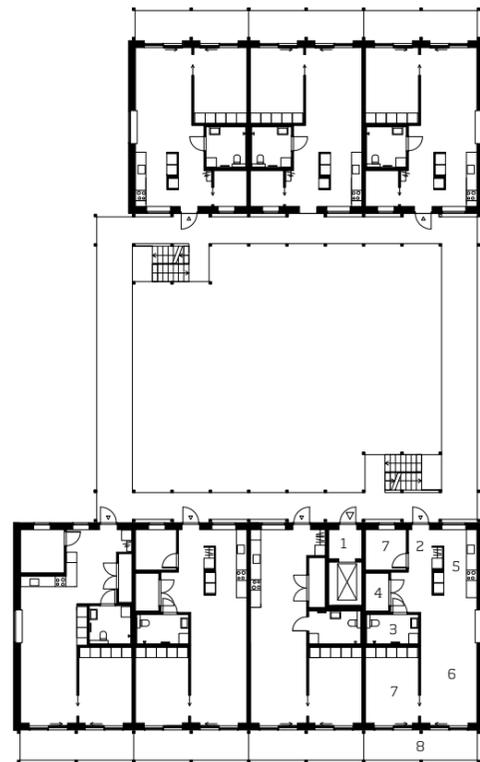
BRING

UNITY

The Svavelstikkan development in Norrköping has both a carcass and exposed details in wood. The two apartment blocks are linked by wooden access balconies, making the most of the site's tricky conditions and creating a distinctive look. »

TEXT Sara Bergqvist PHOTO Johan Fowellin

In Sweden, access balconies often call to mind the blocks built during the huge housebuilding drive of the 60s and 70s. But by creating small-scale buildings and working with a warm and living material, the development has been given a modern feel.



Plan 1:400
 1. Stairwell
 2. Hall
 3. Bathroom
 4. Wardrobe
 5. Kitchen
 6. Living room
 7. Bedroom
 8. Terrace

The 1950s saw the emergence of Ljura as a new, green district of Norrköping, just south of the city centre. The area featured buildings in brick and render with surrounding green gardens and proximity to Ljuraparken with all its great recreational facilities. Denser development has taken place in recent years, and the plot where Svavelstickan now stands is the latest to be built on.

»Initially the focus was on making the most of the plot's difficult conditions. Central conduits for electricity and district heating ran right through the middle of the plot and would have been far too expensive to move. We were therefore restricted to building without digging up the actual middle section. Our solution was to have two freestanding blocks and connect them with access bridges,« explains Erik Hökby, chief architect on the project at Marge Arkitekter.

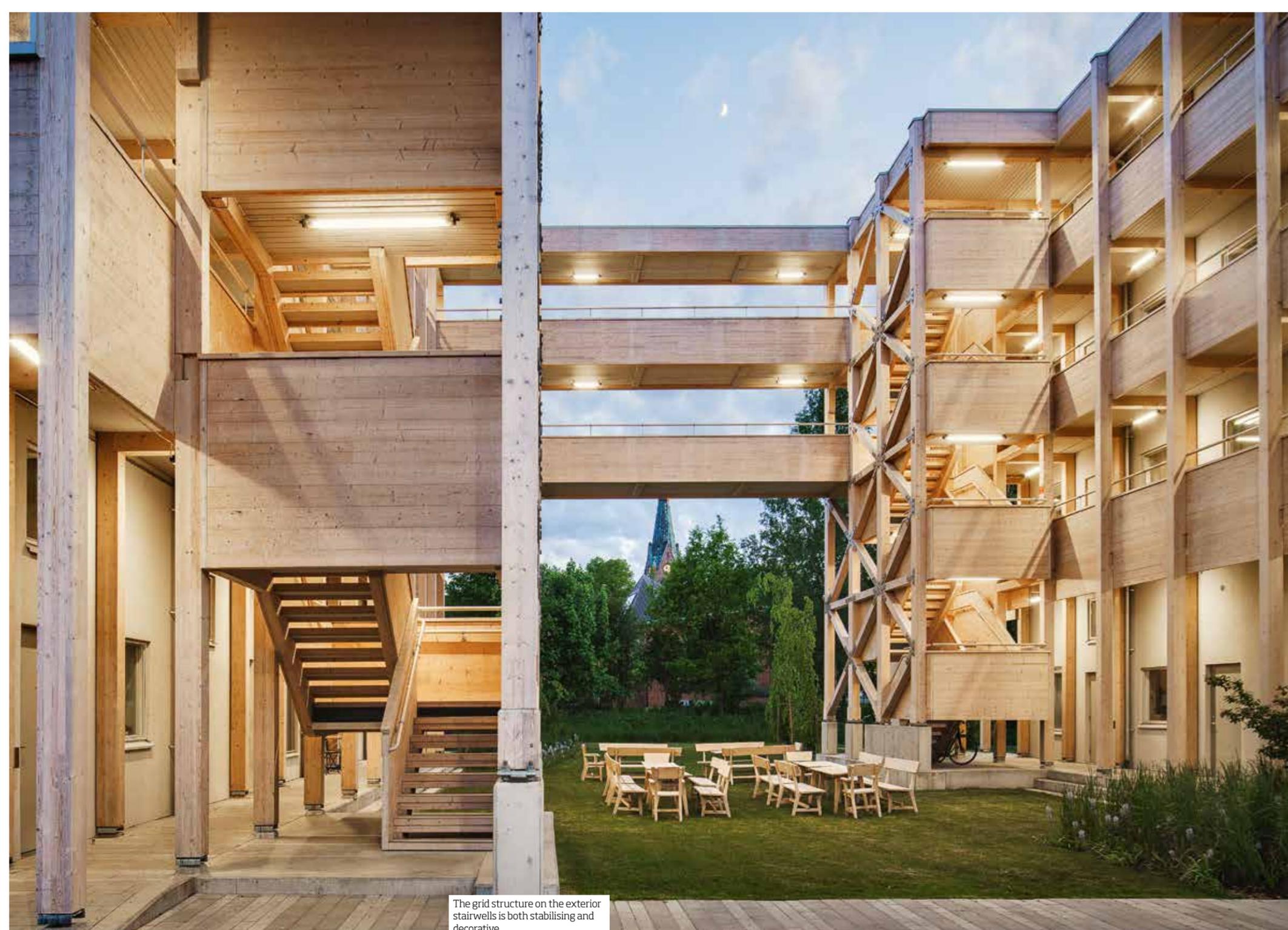
Another key condition was that the property developer and client Conlega wanted as open a solution as possible with regard to the carcass and structural principles.

»With a rendered façade, we could have given the structural engineer considerable freedom while at the same time tying in with the existing 1950s architecture in terms of scale and material. However, we wanted to root the buildings firmly in the present via balconies, access balconies and stairwells in CLT that bring something new to the area,« says Erik.

His idea of having CLT details all over the façade also appealed to Conlega. The decision to use wood for the structural frame as well came later.

»The main contractor simply decided it was the most economical option. I found that very interesting,« he adds.

Together, the two blocks contain 27 apartments, with



The grid structure on the exterior stairwells is both stabilising and decorative.

maisonettes on the ground floor. The wood makes an instant impression, with balconies in CLT running along the entire outer façade. The courtyard façades then feature corresponding CLT access balconies for all the entrances. Raising the lower level slightly off the ground creates a private space around the entrances here. The others are reached via access balconies off the external stairwells at each end.

»It has been exciting to work on buildings with access balconies, which maybe have a certain reputation for mass production in Sweden. Here we've worked with warmer and more tactile materials, and on a much smaller scale. To get to your apartment, you need to pass no more than three other apartments. This makes everything much more personal and

familiar, and creates social zones where you can get to know your neighbours, rather than just a thoroughfare,« says Erik.

Together, the access balconies and the bridges form a square with great views of the courtyard from the two upper levels. At ground level the courtyard is open, connecting its green spaces with the surrounding parkland.

»When designing the blocks, we didn't actually consider that we would end up with a viewing gallery. From here you get panoramic views that are unmatched anywhere in Ljura.«

All the wooden elements were supplied by Martinsons, with the exception of the prefabricated glulam carcass, which was delivered by Estonian company Timbeco. In

principle, all the posts and beams are made of glulam and the other components of the balconies, access balconies and stairwells are CLT. This also applies to the floors, except for the stairs in the stairwells, which are glulam. Erik Hökby is pleased with the soft acoustics that the wood creates on the stairs and access balconies.

»The mass timber absorbs the sound in a way that keeps it very subdued. Steel would have given us a much tinier sound. When designing the interiors, we employed an acoustician to develop an advanced solution for handling the sound transmitted via the wooden structure between the apartments.«

One of the challenges of opting for a wooden floor »



Architect **Erik Hökby**

» **THE MASS TIMBER ABSORBS THE SOUND IN A WAY THAT KEEPS IT VERY SUBDUED.** «

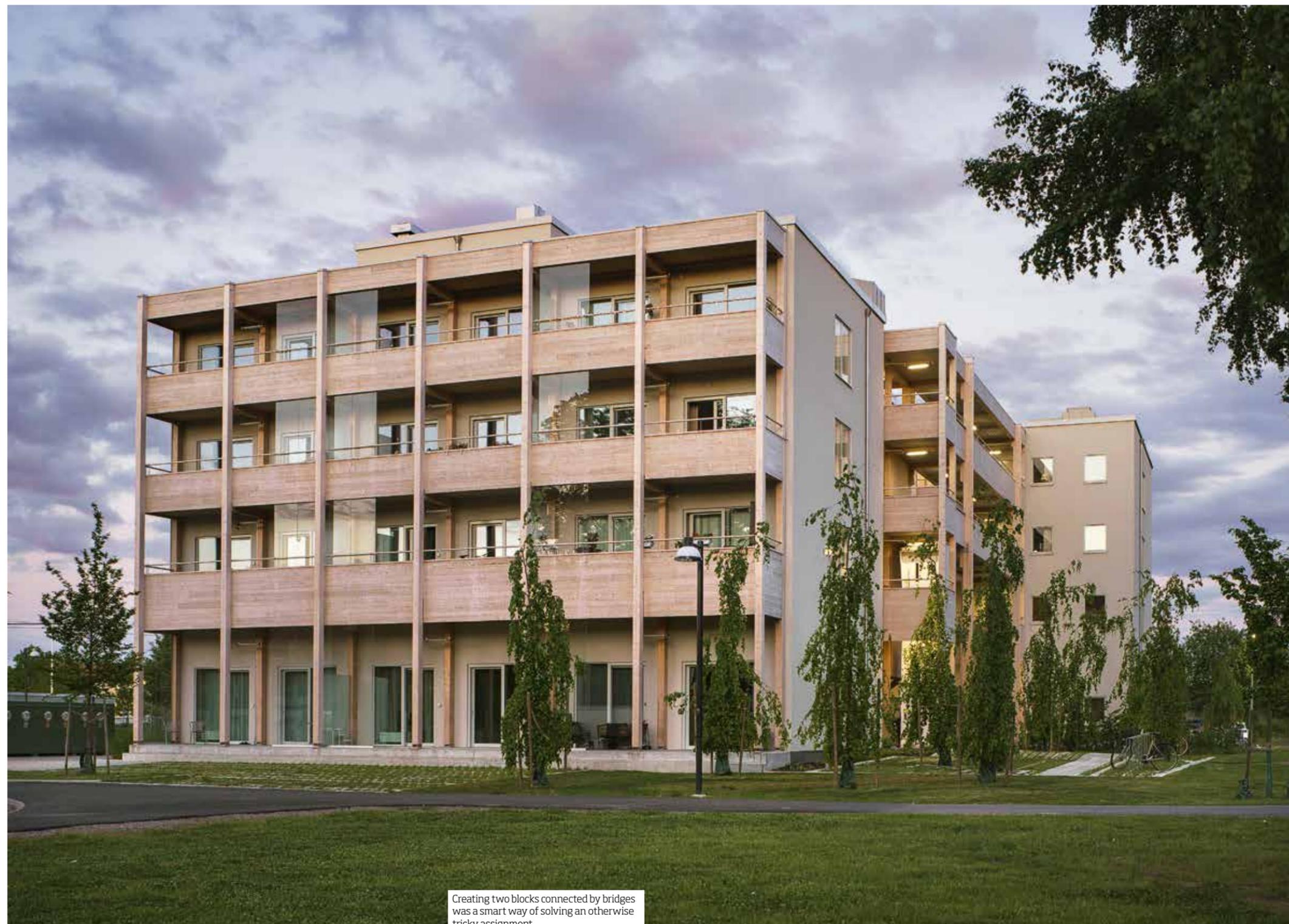
» outdoors, however, was the question of anti-slip protection. With no existing solutions available, the architects turned to a supplier of industrial anti-slip strips. These strips also solved the issue of how to deliver the necessary contrast markings on the stairs.

For better moisture resistance, all the exterior wooden details have been finished with a silicon-based treatment that will still allow the wood to silver naturally over time. On the fire safety front, various technical solutions have been employed, including expanding fire seals and fireproofed cladding nailed up in the roofs.

»It's relatively easy to specify dimensions that will enable wood to resist fire for 30 or 60 minutes. However, all the steel

fixings are much more sensitive and have to be protected. Many of the fixings are countersunk screws that are protected by the wood. In the stairwells, we've added small battens in certain places. The fixing plates in the structure there were also painted on site with a fireproofing product,« explains Mathias Kihlstrand, the structural engineer at Structor who was responsible for the access balconies, apartment balconies and stairwells.

Together with the architect, he also developed the stabilising grid structure for the stairwells. The initial plan was to use concealed fixings at the intersections between the posts and braces. However, since no suitable self-tapping dowels could



Creating two blocks connected by bridges was a smart way of solving an otherwise tricky assignment.

Svavelsticken

LJURA, NORRKÖPING, SWEDEN

ARCHITECT: Marge Arkitekter.

CLIENT: Conlega.

STRUCTURAL ENGINEERS: Timbeco, Martinsons and Structor.

AREA: 2,200 square metres.

www.marge.se

be found for outdoor use, it would have been too much work to pre-drill all the holes and hammer dowels in place.

»Instead, we opted for external plates with through-bolts, which became a decorative element in themselves,« says Mathias Kihlstrand.

There is also some reinforcement in the wooden frame behind the render, to provide extra stability. The posts were then fixed in place at these points using 250 mm screws. Similar reinforcement measures were taken on the other side of the façade to carry the weight of the balconies.

Both Mathias Kihlstrand and Erik Hökby are happy with the end result and the many custom solutions that have combined to create the project's unique feel.

»This is a fairly small project on the outskirts of Norrköping, in a market that is quite pressurised. Under these conditions, it feels fantastic to have been able to pull off a feat like this,« concludes Erik Hökby. ☺



The ice rink, the first of its kind to be built using Passive House technology, has a welcoming feel with its 40 metre long glulam roof trusses, reinforced with steel ties.

Climate-smart choices for sports and culture

Knivsta grew up around its station when the rail line between Stockholm and Uppsala opened in 1866, and over the years it has evolved into a modern community. Recently plans were made for a new sports hall with an outdoor ice rink. Instead, the project developed into a full-blown activity centre. At over 15,000 square metres, the newly built Centre for Sports and Culture (Centrum för idrott och kultur, CIK) is one of Sweden's largest wooden buildings and the country's biggest Passive House. »

text Katarina Brandt foto Jansin & Hammarling

The guiding idea behind CIK has been to combine facilities for both sport and culture in a single building, in order to create the conditions for new encounters between people and interests. The nine metre long artwork Halvlek outside the entrance, made up of a dripping paintbrush lying opposite a bandy stick on a bandy ball, clearly embodies this intention – how important it is for visitors to be able to move seamlessly between brushstrokes and slap shots.

At the root of CIK's design lie Knivsta municipality's strict requirements for climate-smart building. For several years now, all new properties have been built to Passive House standards. This is the municipal housing company's way of turning the political decision to be a sustainability pioneer into practical action.

»For its size, Knivsta has more Passive House buildings than any other Swedish local authority, according to the international definition of the term. This has resulted in significantly lower operating costs for the municipality's public buildings, compared with traditional construction techniques,« states Tomas Lindgren, project manager at the municipal company Kommunfastigheter in Knivsta.

Opened in December 2019, CIK has two full-size sports halls, a divisible martial arts hall, a performing arts theatre and an ice rink, all connected by public corridors and spaces, plus three floors of rental offices. This partnering project had HMB as the main contractor and Norconsult as the client's architect.

»We began creating designs back in 2012, and what we see today is a product that has gradually grown over time. The initial order was for a sports hall with an outdoor ice rink. Since then, we've collaborated in a way that has allowed us to constantly develop and make improvements. This is a procurement model that I'd like to see on more projects,« says Dan Johansson, lead architect at Norconsult.

The original idea was to use as much wood as possible, with concrete only in the foundation slab. However various circumstances, including vibrations from the nearby railway and the need for high standards of sound insulation, resulted in concrete also being used for the walls on the ground floor and the floor structure beneath the performing arts theatre.

»We make our choices based on the best material for the job, while also applying the principle of prioritising wood-based solutions wherever possible,« says Julia Hjortmyr Grabe, supervising architect at Norconsult.

As well as ensuring high energy efficiency and minimal carbon emissions, the Passive House technology and the choice of wood contribute to an indoor climate that feels pleasant all year round. Concrete is used in the foundations



The glulam benches in the grandstands are supported by armrests that are fixed to the wall behind – an attractive and functional solution.

and entrance level where CIK meets the ground, and in the dense acoustically insulating floor structure beneath the performing arts theatre. The wooden structural frame in glulam and the CLT walls have been erected on top of the concrete, with everything crowned by the spectacular glulam roof trusses, whose long spans are most prominent in the ice rink.

The maintenance-free façade comprises clinker-built wooden cladding (vertical boards with an overlap) in heat-treated and fireproofed pine that over time will change colour from light brown to grey. The roof is finished with a surface layer that neutralises air pollution in the form of hazardous nitrogen oxide particles from vehicles and industry. The surface of the roof tiles has a mineral-based coating

containing titanium dioxide which functions like a catalytic converter. With the help of UV light from the sun, the pollution is converted into nitrates, which rain then washes off the roof to be absorbed by plants and trees. The roof is expected to break down air pollution for the entire 50 years of its estimated service life. Since the titanium dioxide is in the tiles, it doesn't dry out or get washed away over time. The only thing that can reduce the roof's capacity to break down particles is a lack of sunlight or leaves, for example, preventing the particles from landing on the roof.

Great emphasis has been placed on creating a natural flow within the centre that facilitates both spontaneous and planned meetings between visitors. The entrance draws you into the building, past the martial arts hall – with its large viewing windows – and on up to the foyer via a theatrical glulam staircase. The foyer is an impressive space and a central meeting place for everyone who visits CIK. The terrazzo floor is part of the building's artistic design, as is the artwork Moves that winds overhead. The foyer also offers a view of the southern wall's plywood relief, which runs on an axis through the whole building. The relief serves as both a piece of art and an acoustic wall, shifting between 70 different

Architect **Julia Hjortmyr Grabe**

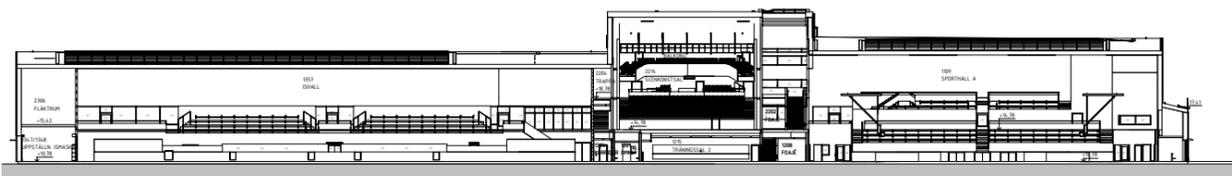
» **WE WORK TO PRIORITISE WOOD-BASED SOLUTIONS.** «

shades of colour that reflect the shifting functions of the building – from the light wood of the sports halls to the black interior of the performing arts theatre.

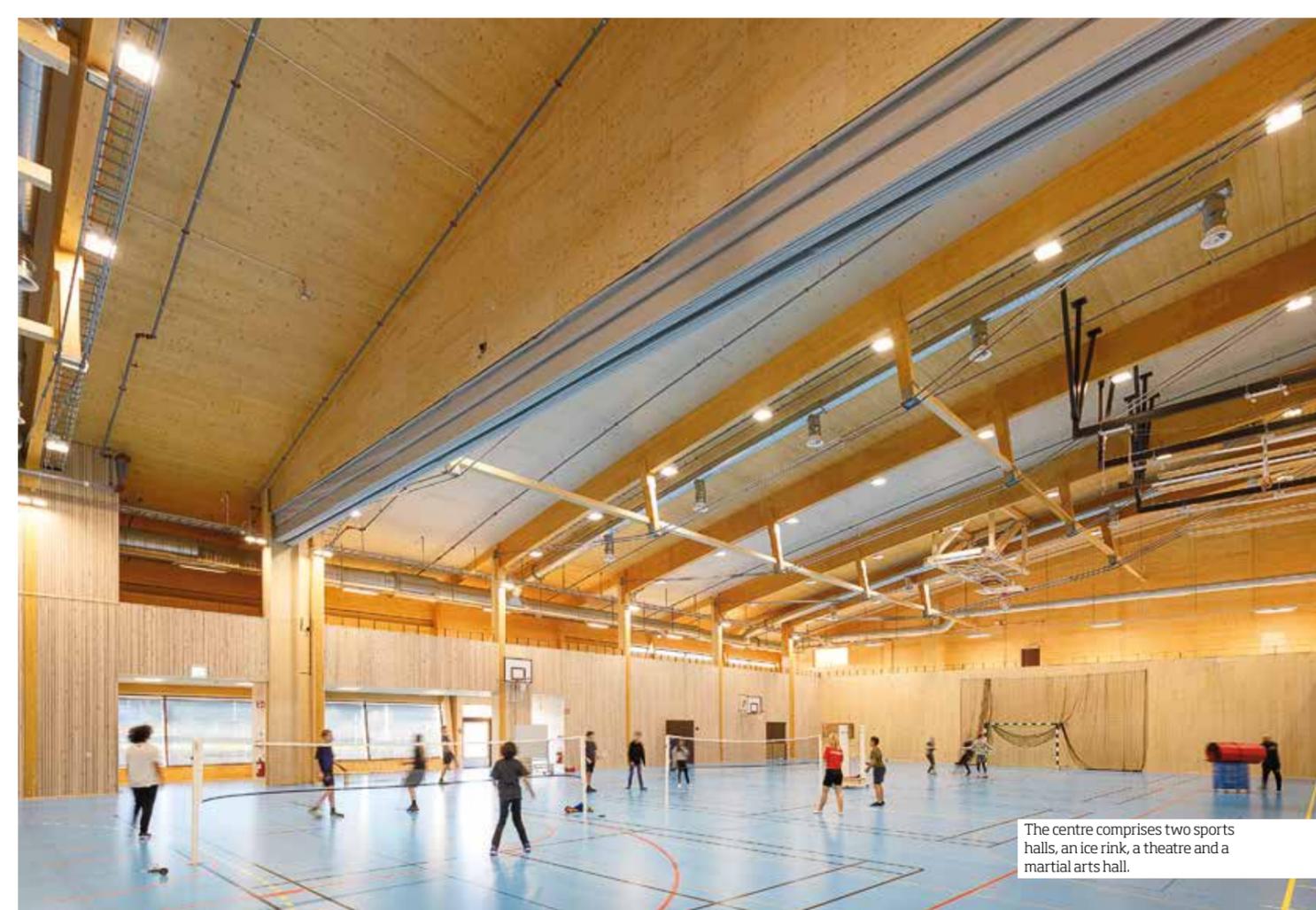
»In the foyer you can see all the construction techniques on display. The supporting posts in glulam with stabilising CLT elements from Martinsons and the attractive studio cladding from Moelven. It's an interesting space where you can read how the centre is constructed,« says Dan Johansson.

CIK's ice rink is probably the first in the world to be built to Passive House standards. A key factor in this is the surplus heat that is generated when the ice is cooled, which in turn is used to heat the building. The dew point in ice rinks means that there are major advantages in having solid walls of wood that have good hygroscopic properties and can serve as a moisture buffer.

»We often say we have solar ice, because the chillers that »



Section



The centre comprises two sports halls, an ice rink, a theatre and a martial arts hall.



The theatre has an inner wall lined with acoustic cladding. The reverberation in the space is adjustable.



The surface layer of the roof should be able to neutralise nitrogen oxide particles equivalent to 175,000 km of motorway each year.

» produce the ice are partially powered by the centre's 1,500 square metres of solar panels,« says Tomas Lindgren.

In the ice rink, the roof trusses, which stretch over 40 metres, are supported from beneath by steel ties. This smart solution was developed by TK Botnia's structural engineers and allowed for much narrower rafters.

«In many ways, the fantastic structural engineers expanded our wood expertise. Although they focused on material optimisation, they were always very open to our wishes,» says Julia Hjortmyr Grabe.

Next to the ice rink lies the performing arts theatre, which was designed as a close partnership between Norconsult's architects and acousticians. The architects designed this space around the requirement for a controllable auditorium acoustic that works for all kinds of staged event – music, theatre, speeches and conferences.

»The acoustic challenges in CIK have often related to the interaction between the different functions of the building. Sound insulation needs to be particularly good when an ice rink and a theatre share a wall. In CIK we've been helped by the ceiling design, which delivers wonderful acoustics. We also discovered an unexpected benefit of CLT walls. They are much denser and absorb sound to a lesser degree than a light-weight wooden wall,« explains Gunilla Sundin, senior acoustic consultant at Norconsult.

The wall concealing the services in the performing arts theatre has been clad in a transparent acoustic surface layer. The wall provides useful diffusion, since both the structural frame and the installations in the wall serve as diffusers. Reverberation can also be adjusted, depending on the production, with the help of the acoustic curtains that are hidden in the wall. In addition, the proscenium arch framing the stage is made entirely of fabric, with an openable fabric section above, which also allows for changes to the reverberation. The stage itself has a depth of 9.2 metres and a width of

Centre for Sports and Culture

KNIVSTA, SWEDEN

ARCHITECT: Norconsult.

CLIENT: Knivsta kommunfastigheter.

STRUCTURAL ENGINEER: TK Botnia.

COST: SEK 410 million.

AREA: Approx. 15,000 square metres.

www.norconsult.se

18 metres and is categorised as a »Blue stage+«, which is the Swedish National Touring Theatre's technical assessment of the auditorium as a venue for professional touring productions.

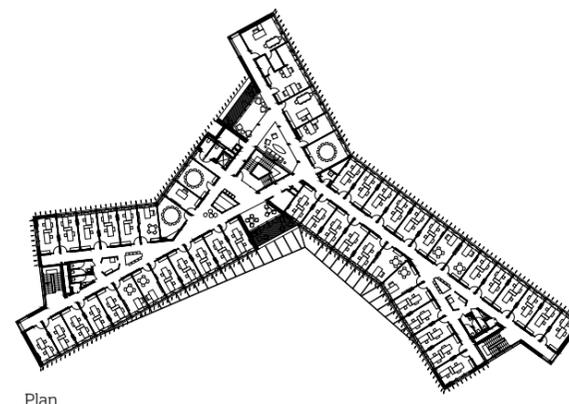
»I like the fact that the acoustics change in the different spaces around CIK. Take the foyer, for instance, which is richly resonant. This creates the grand and solemn feel that I think you should have in a building as impressive as CIK,« says Gunilla.

CIK displays many good examples of informed design, which involves working actively to include multiple perspectives when choosing solutions. The solutions are produced through interdisciplinary collaboration, where the different perspectives lead to a built end-result that resolves several requirements and problems at once. One example is the diffusing artwork in the foyer. Another is the grandstands in the sports halls, where the armrests support the glulam benches by also being fixed to the wooden bench or wall behind. A third good example is the double CLT walls of the grandstand, where the outer wall extends upwards to become a handrail. The same wall also functions as a sounding board, acoustic insulation, a fire compartment boundary, a supporting structure and fall protection.

»Working on such a wide-ranging project has been a real inspiration, and we hope it will be treasured by the people of Knivsta,« says Dan Johansson. ☺



A façade of larch shingles behind a sunscreen in the form of vertical, roughly hewn planks is at once a beautiful and a practical solution.



Plan

PUBLIC HEALTH AGENCY GETS NEW OFFICES WITH VERTICAL LARCH PLANKS REGULATING LIGHT AND TEMPERATURE

TEXT Ellinor Thunberg PHOTO Takuji Shimmura

The expansive Bois de Vincennes, a public park in the east of Paris, is home to both an arboretum (trees planted for the purposes of study) and a botanical garden. But it is also the site of the new headquarters for the French public health agency Santé Publique France. The architectural practice Atelier du Pont is responsible for a design that embraces the tree-filled location inside and out – and building in wood was a given.

»The new office block is an extension of an existing wooden building from 2012, so it was only natural to continue with the same material. The building is located amongst the woodland of the Bois de Vincennes and merges perfectly into its surroundings. Using wood also enabled us to optimise the construction phase and reduce the impact on the beautiful site, which remained in use,« says Anne-Cécile Comar, founding partner and architect at Atelier du Pont.

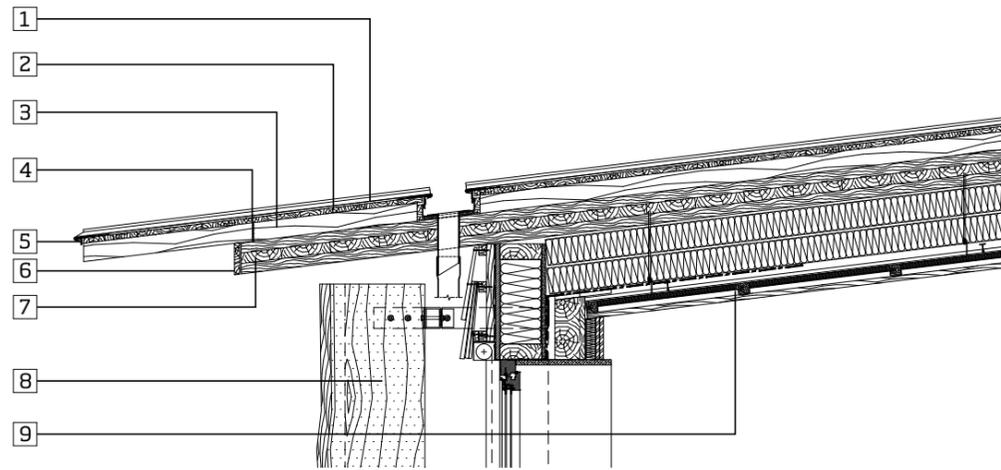
The fact that wood also stores carbon dioxide and has a low climate footprint was another reason for choosing it. Woods of various kinds – larch, spruce, oak and chestnut – run throughout the building as a common thread in everything from the façade, inwards to the structural frame and down to

the level of the furniture. The initial assignment was to design just the building, but that soon expanded. Atelier du Pont was ultimately tasked with creating a complete workplace for the agency, a challenge that the firm was happy to take on.

»After a couple of months together, the client decided to commission us to design the interior as well. This doubled the challenge, but it also felt like a major vote of confidence.«

Anne-Cécile explains that they always strive to use the right material in the right place. Few buildings can match the ability of this office block to merge so well into its surroundings. The façade demonstrates a perfect balance of beauty and function. Attractive, hand-cut larch shingles sit below the windows, and on the long sides roughly hewn planks line almost the entire elevation, rising vertically like tree trunks.

»Larch is a lovely wood to work with, and the heartwood offers good durability and weather resistance. We also chose to keep the planks a little uneven to create a sense of a lumberjack's cabin, reflecting the location in the Bois de Vincennes. The planks have »



- Detail, roof:
1. Zinc plate with standing seams
 2. Ventilated underlay
 3. Battens
 4. Bird netting
 5. Zinc edge sheet
 6. Larch fascia board
 7. Load-bearing CLT layer
 8. Larch plank with bark
 9. Suspended acoustic ceiling

Architect **Anne-Cécile Comar**

» **ALL THE MATERIALS HAVE BEEN CHOSEN TO BE ECOFRIENDLY.** «

» been left untreated and we even kept on the bark.«

However, the vertical planks are not just an aesthetic feature, but also a sunscreening solution that in French is called a brise-soleil. The biggest challenge was finding larch trees that were long and straight enough. With their wide spacing around half a metre apart, they let in light without restricting the woodland views. Yet from a side angle they provide shade for the building. This regulates the indoor temperature without the need for air conditioning, so only one room in the whole building has it.

Projecting a metre beyond the outer edge of the planks, the eaves also help to shade the building and protect façade. The

zinc-clad roof is able to be so slim because the primary load-bearing structure uses sheets of CLT. From above, the building looks almost like a pile of sticks laid on the ground. The different parts shoot out in all directions and are meant to symbolise the way the agency works on public health and health-care provision.

With its ambition to embrace the forest and wood in every which way, the project was soon named Woody. Behind the larch façade sits a glulam post and beam structure with CLT walls and floor structures, all in spruce. Mineral wool provides the insulation. The intermediate floor comprises CLT topped with site-cast concrete.

Inside the building, the communal spaces have been designed to encourage informal meetings. The cafe and the restaurant make use of wooden structures to create a mix of different seating for groups of various sizes, as well as smaller rooms within a room. The floors are partly solid oak and partly natural rubber, while the walls are lined with acoustic wood wool tiles in the project's interior colour palette: muted pink, natural white and pigeon blue. Cork is used in lamps, and the staircases are made from CLT, glulam and concrete. The stairs are centrally located, generously proportioned and light to encourage employees to exercise instead of taking the lift. With large furnished outdoor terraces, they are also encouraged to sit and eat outside in the fresh air. The material used in this context is chestnut. All the wood used comes from forests with either FSC or PEFC certification, and the architects have made informed decisions about materials, adhesives and surface treatments.

»All the materials, not just the woods, have been chosen to be ecofriendly. The choices we've made also create a very refined

Santé Publique France HQ
PARIS, FRANCE

ARCHITECT: Atelier du Pont - Anne-Cécile Comar and Philippe Croisier.
CLIENT: Santé Publique France.
STRUCTURAL ENGINEER: Quadriplus Groupe.
AREA: 4,270 square metres.
COST: EUR 10.9 million.
www.atelierdupont.fr

and relaxed working environment that contributes to the overall atmosphere.«

With its strong focus on health, it was important for the agency to have a workplace that was as toxin-free as possible, but the people who work here are likely to also enjoy a calm and pleasant working environment thanks to the soft values and feel of the wood.

France may not have the same traditional love of wooden buildings as Sweden, but things are starting to move in a positive direction. Seeing a client like the public health agency opting to build in wood obviously has an impact. At the start of the year French President Emmanuel Macron also announced a policy that the nation's publicly funded new buildings should be at least 50 percent wood or other organic material. This initiative is to be implemented by 2022. There is considerable interest in building in wood, and Anne-Cécile Comar is cautiously optimistic. She says that wood construction is raising its profile and the industry is becoming more structured. She has also noticed the winds of change blowing in the local authorities across France.

»In the previous election, several cities began to head in a green direction. We're starting to see hints of change, and we're waiting for the effects to feed through. We're seeing fragments, and that's very positive.«



The projecting eaves combine with the vertical larch planks to shade the building, reducing the need for cooling.



The central staircase seeks to encourage the employees of the public health agency to walk around the building.

» I CARE ABOUT THE SAME THINGS, BUT NOW I'M BETTER INFORMED. «

One of the most interesting projects in Sweden right now is Cederhusen. Work is at fever pitch in Hagastaden, Stockholm, preparing for the first delivery of CLT. A total of four buildings are being constructed, each between seven and 12 storeys high. Like a spider in a web, at the heart of the project sits Anna Ervast Öberg, project development manager at Folkhem.

TEXT & PHOTO David Valldeby

How have you ended up here?

It has been a long but focused journey. I trained at the School of Architecture at KTH Royal Institute of Technology in Stockholm, and also had an exchange year in Tokyo. I worked in various places after that, including at Sandellsandberg Arkitekter, an incredibly design-driven company with high ambitions. I also taught at KTH for a while. In 2015 I applied for a job as a project developer at Folkhem. I wanted to learn more and broaden my horizons. What really attracted me was their clear stance on the climate and the chance to develop projects in wood.

Was it difficult to go from architect to project developer?

The attitude and approach are very similar, but you need to be able to absorb all sorts of knowledge in order to work as a product developer. You follow the project in a very different way and through multiple phases. This means having to navigate politics, commercial decisions and implementation issues such as procurement and contract costs. I care about the same things in the project as I always did, but now I'm better informed, I see the bigger picture and I have a new understanding of how to keep the good ideas and jettison the bad ones. I always have to negotiate with myself and others to get all the pieces to fall into place.

What do you mean by negotiating with yourself?

Sticking with a vision that involves tying together the site, the requirements, the finances and the architectural design and refining it all, identifying the core qualities that create personality. Things are becoming much more complex, but if we always seek out sound and accurate information, we can be more confident about our decisions. I feel calmer once the project is up and running, as I can be involved in determining which qualities we really want to focus on.

What are the parameters that you focus on?

Conventionally, you would look at the key figures and the finances, but it has been really important for me that we flex our muscles and also value other aspects such as climate impact and architecture.

Is it difficult to get people on board with this internally?

There is no established way of measuring climate impact, which makes it difficult. It is more of an attitude, which can create some uncertainty as you constantly need to keep an eye on the costs. With Cederhusen we have pushed hard on the design elements, and when we ask the buyers why they chose an apartment here, their number one reason is the architecture, followed by the climate profile – the fact that it is a wooden building.

What sustainability considerations have you taking into account?

The main one is carbon emissions, which is the whole philosophy behind building in wood. Society needs to rein in emissions now. That is the parameter we talk about all the time.

There is a large amount of concrete in the foundations. How has that affected things?

The concrete is needed because of the nature of the site, which is part of the overbuilt North Link ring road. The low weight of wood means that we can build on top and get in all the floors stated in the detailed development plan.

What have been some of the challenges?

One has been maintaining control of the loads all the way down through the buildings. The apartment blocks stand on what are essentially bridge beams that channel the loads down through the walls of the three tunnels running diagonally beneath the development. To stabilise the buildings, we have cast concrete layers on the floor structure. We needed to achieve an extremely even weight distribution.

How important has the wood façade been?

Incredibly important. We want to send the message that this is a wooden building. The fire service has mostly wanted to discuss façade fires, since the blocks are over 40 metres tall. The façade has therefore been fireproofed with a two-component solution that will not leach out. With the cedar wood and the fireproofing, the façade requires less maintenance than many other solutions.

How have you developed your knowledge?

We have visited several different projects, mainly in the Nordic region, and we closely followed Veidekke Eiendom's project in Trondheim in Norway, where they built two identical blocks, but one with a concrete carcass and one with a carcass in wood. We looked carefully at both the working environment and the economics of that project. It is all about learning as much as possible and then applying that knowledge to future projects. For one thing, having switched to wooden structural frames, we have realised that the plasterboard we use accounts for almost 20 percent of the climate footprint. How can we reduce that for new buildings?

The fact that we worked digitally and developed everything in BIM made it easier for us to see where we could optimise the building, for example with slimmer walls higher up and thicker ones at the base – a unique option that comes from building in wood. Together with Bjerking, we also conducted an initial life cycle analysis that formed the basis for procurement of the structural frame supplier. A key consideration that led our main contractor Veidekke Entreprenad to choose Setra was the short transport distance, since transport is one of the factors that most affects the life cycle.

The City of Stockholm has its own logistics system, all deliveries have to be booked. We will only be using just-in-time deliveries and we can demonstrate the difference that comes with using wood – we are not having to book nearly as many deliveries for the size of the building. People have also moved into the area already, so having fewer trucks rumbling by is positive for the whole local environment. ☺

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Preserving trees creates a playful preschool

In the heart of Lisbon's popular residential district, a pine preschool has sneaked its way into the cityscape. The building is adapted to the unusual plot and designed to preserve the existing trees.

TEXT Johanna Lundeberg PHOTO Fernando & Sérgio Guerra

With its red pigmented zinc exterior, the new preschool blends in with the rendered façades in central Lisbon. The cladding was chosen to protect the building against the occasionally intense UV rays that occur at Portugal's latitude. But behind it, practically all the components are made of wood. This is not particularly common in Portugal, so when the architects came up with the idea, the client was immediately enthusiastic.

There were two main reasons for using wood, according to Nuna Mateus, chief architect at ARX.

»First was the educational aspect: in order to create wooden buildings, we first have to plant trees, and trees absorb carbon dioxide from the atmosphere and release oxygen. Explaining this ecocycle and how buildings need to minimise their ecological footprint is an extremely important message for young children.«

The other reason was the need for speed: they only had one year to complete the preschool, and choosing wood shortened the process significantly.

»The extensive, visible presence of wood creates a special atmosphere and a particular energy, and that was exactly the feeling we were looking for. We wanted the preschool «

1. With no steps or high thresholds, the boundary between inside and out is blurred. Contact with the outdoors was extra important for a preschool in the middle of the city.



» to feel like a stimulating, friendly and home-like place, a place that the children could enjoy and that created wonderful memories.«

The structural frame comprises exposed glulam posts and beams, with CLT wall panels, all made of pine. The floor is a mix of hardwood chips, an industrial flooring that increases durability while also keeping costs down. The surface is treated with a matt varnish that protects the wood against surface damage, but preserves the natural appearance.

With generous windows, a pleasant light illuminates the bright interior and the exposed wood, and having the building's entrance at ground level, with no steps, blurs the boundary between inside and out.

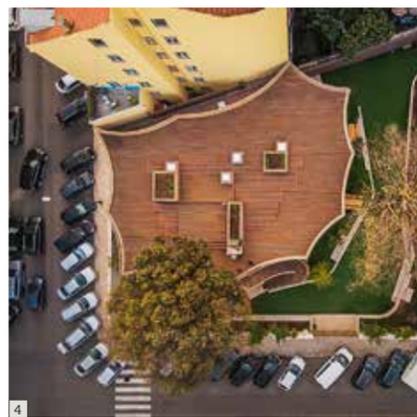
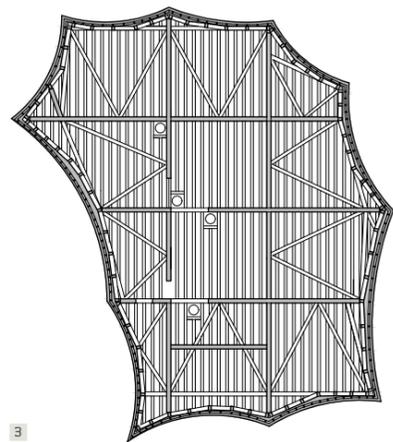
»We wanted to create an environment in which the inside and the outside are intimately linked to each other and moving between them is easy. Close contact with the outdoors was particularly important because the school is in central Lisbon, where nature is by no means an everyday presence,« says Nuno Mateus.

The outdoor space and the exterior posed challenges all of their own and had to be adapted to the unusual plot. There was already a villa

Redbridge School LISBON, PORTUGAL

ARCHITECT: ARX Arquitectos.
CLIENT: Redbridge School.
STRUCTURAL ENGINEER: Safre Engineers.
COST: Approx. EUR570,000.
AREA: 400 square metres.
wj| arx.pt

- The interior's exposed glulam and CLT combine with the hardwood chip floor to create a homely and welcoming atmosphere.
- Plan of roof structure.
- To make maximum use of the space, the architects have created a playground on the preschool's roof, along with some small vegetable beds.



in the middle of it, which had to be kept, and the north and south sections of the plot were joined only by a narrow strip along the villa's fence. The preschool is located in one section, and the four-storey school that was built at the same time is in the other. The two buildings are harmonised through use of the same materials and construction, but while the school rises up to meet the city, the more low-key preschool faces the garden.

The preschool's playful geometry is visually exciting, but in fact it is mainly designed to preserve the well-established trees, which have now been joined by various new plants to bring more nature into the small space.

»Children need lots of space to run around and play, so the small plot is not perfect, but we kept the existing trees and adapted the building accordingly. It was also a symbolic statement that city children should also have access to nature.«

The architects have even used the preschool's roof to partially extend the playground.

»In addition to an extra play area up there and a little amphitheatre for the preschool's activities, there is also a vegetable garden that the children and teachers plant up and look after,« explains Nuno Mateus. ©

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Konstruktör: TK Botnia

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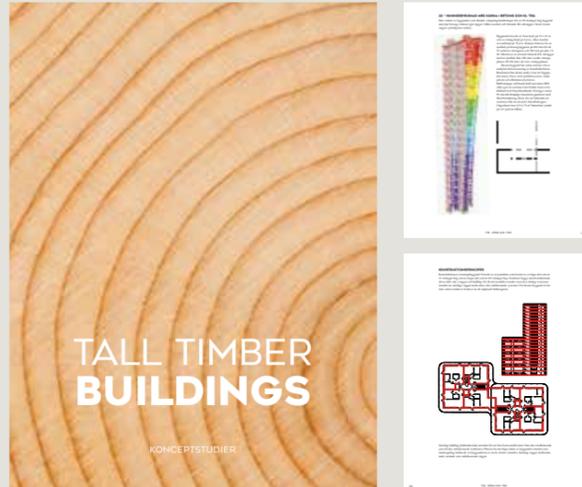
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TALL TIMBER BUILDINGS

KONCEPTSTUDIER

Tall Timber Buildings – concept studier Project manager Marie Johansson, RISE

Linnaeus University, Moelven Töreboda, Fristad bygg, White arkitekter, Berg CF Möller, Bjerking, БТВ, HSB, Briab, Brandskyddslaget

In recent decades, sustainability has become an increasingly important issue within the construction industry. Following success in cutting energy use in the finished building through better installation solutions and building envelopes, interest has turned to materials and energy consumption during the construction phase, with several studies showing the clear benefits of wood.

The project involved two concept studies of buildings with 20+ floors constructed using a post and beam system in glulam on the one hand, and a system based on CLT panels and lightweight mass timber beams on the other. The key areas of the design phase were fire safety, LCA and structural calculations relating to both static and dynamic loads, such as vertical and horizontal deformations caused by static load and wind load.

Within the project, a number of actors with different expertise collaborated on the design of two concept buildings and working out the structural dimensions.

It is well known that knowledge about certain structural aspects is lacking and more detailed experiments and models are needed in order to facilitate the design process. The project developed models that may be of use to practising engineers.

www.ri.se/sv/vad-vi-gor/projekt/hoga-hus-i-tra-konceptstudier

Swedish Wood Award gala STOCKHOLM, SWEDEN 2 december 2020

The 13th Swedish Wood Award gala will be held on 2 December 2020. The gala, broadcast live online from Berns in Stockholm, will include presentations of all the nominated projects, as well as announcing the winner of the Swedish Wood Award 2020. Pictured are the winners of the Swedish Wood Award 2016, Råå Preschool designed by Dorte Mandrup.

www.trapriset2020.se



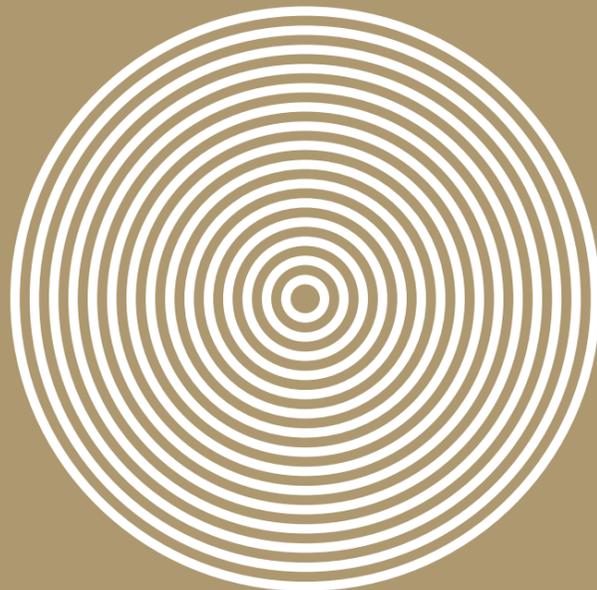
9 december 2020 | Trä! issue 4

A new issue of Trä! The Nordic region's biggest architecture magazine is dedicated to spreading the word about building in wood. Would you like to be inspired, and informed about sustainable and innovative architecture?

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Träprisgalan 2020

Miss inte vår direktsända digitala gala – 2 december



Fira Sveriges hållbara arkitekturpris med oss direkt från Berns den 2 december 2020

Datum är satt och snart öppnar registreringen till den digitala galan. Träpriset 2020 blir i år någonting helt nytt. Det blir en direktsänd digital gala där vi äntligen kan offentliggöra vem som vinner Träpriset 2020. Vi utlovar en kväll med underhållning och full galakänsla direkt till ditt vardagsrum.

Håll utkik på www.trapriset2020.se

och skriv upp dig för vårt nyhetsbrev för att inte missa information om galan.



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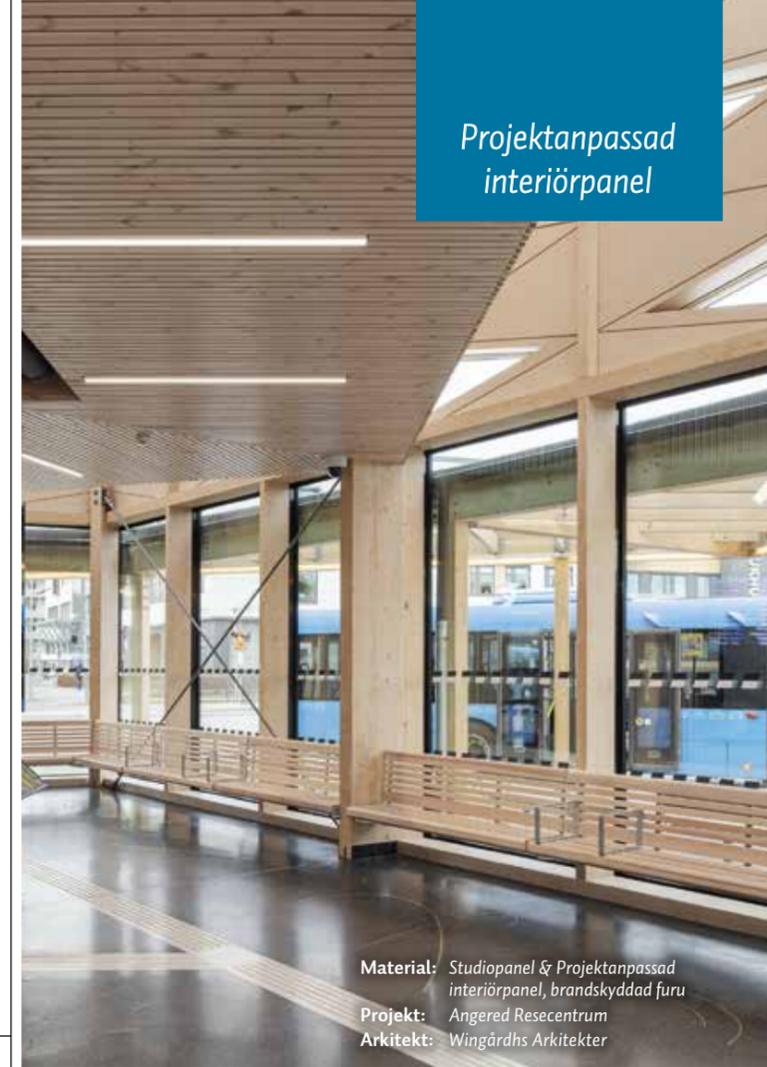
Vårt specialiserade team erbjuder mer än 50 års erfarenhet inom branschen och leder utvecklingen av mät- och beräkningsverktyg för att säkerställa rätt kvalitet på rätt plats.



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Projektanpassad
interiörpanel



Material: Studiopanel & Projektanpassad interiörpanel, brandskyddad furu
Projekt: Angered Resecentrum
Arkitekt: Wingårdhs Arkitekter

Vi kan interiörpanel i trä

Moelven har under många år fått förtroendet att leverera materialet till flera stora projekt. Med vår långa erfarenhet, gedigna träkunskap och väletablerade projektavdelning är vi den naturliga träleverantören för många arkitekter och entreprenörer. Vilket projekt behöver du hjälp med?

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Vi startar vår KL-träfabrik i Långshyttan första halvåret 2020. Där kan vi producera de största KL-träelementen på marknaden och fräsa fram urtag för dörrar, fönster och installationer direkt i modulerna. Det gör både logistik och byggande smidigare och snabbare. Och all råvara kommer från ansvarsfullt brukade skogar i vårt närområde.

Läs mer om vårt KL-trä och hur vi kan hjälpa dig att bygga grönsammare på setragroup.com/kl-tra

