

# trä!

A MAGAZINE OF INSPIRING ARCHITECTURE  
FROM SWEDISH WOOD » ISSUE 2 » 2020

**MEDICAL CENTRE  
SHAPED BY COURTYARD  
SUSTAINABLE DENSIFICATION  
WITH LIGHT FRAME  
AESTHETICALLY CREATED  
FROM PURE DESIGN**

**TRÄ MEETS**  
Gerhard Schickhofer

**KNOWLEDGE**  
Right light  
lifts room

**SHOWCASE AND OFFICE IN ONE**

## Formulated for fixings

# NET ZERO 2050?

## Use more wood...



Anderston Regeneration, Glasgow. Closed panel timber frame construction by CCG. Photography, Andrew Lee.

**According to the Committee on Climate Change “Increasing the number of new homes built in the UK each year using timber frame construction systems... could triple the amount of carbon stored in UK homes to 3 million tonnes every year.”<sup>1</sup>**

**Furthermore it recognizes that: “costs of using wood as a construction material are essentially negligible.”<sup>2</sup>**

Using wood from sustainably-managed forests instead of other materials is a good way to reduce CO<sub>2</sub> emissions.

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<sup>1</sup> Committee on Climate Change, UK Housing; Fit for the future? February 2019

<sup>2</sup> Committee on Climate Change, Net Zero. The UK's contribution to stopping global warming, May 2019

**Wood  
CO<sub>2</sub>ts  
less**

# trä!

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VOL. 33 » CONTENTS

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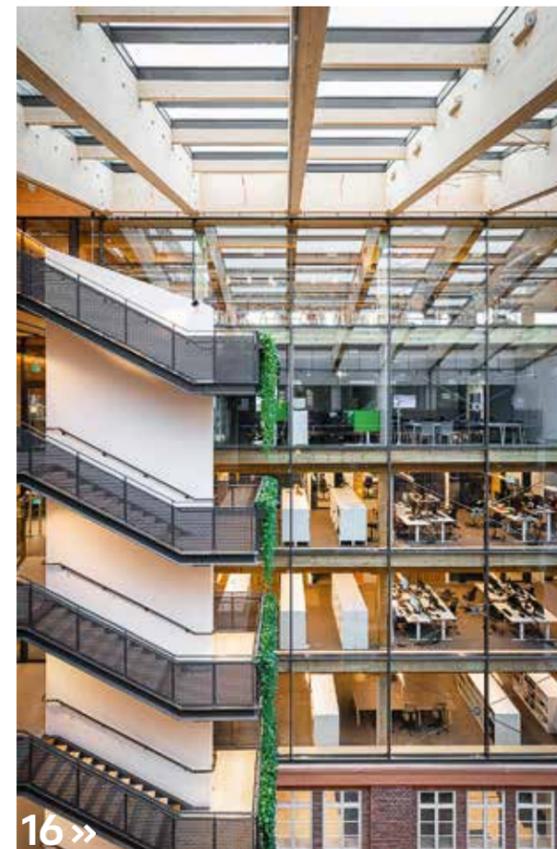
Douglas fir adds an extra dimension of wellness to the medical centre in Taverny, France. The light and comforting atmosphere helps people with their recovery. Plus local material is a key feature.

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Advanced architecture where the building's roof curves down so it can be touched. This was the result of a Japanese screw manufacturer wanting to demonstrate what can be achieved with wood.

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With their pure, simple forms, exposed roof trusses and plywood walls lend a distinctive aesthetic. The architectural concept for the house on Vaddö is easy to understand.



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Cities are not just expanding; they also need to become denser. One way is to build with wood on top of an existing building. Four different projects embracing wellbeing and environmental sustainability show how, with a light frame material like wood, the sky's the limit.

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**SWEDISH WOOD**

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

## Every time has its place to meet

**HUDIKSVALL, SWEDEN** In the previous issue of Trä! I wrote about health in the editorial. Little did I know how topical that subject would become just a month or so later. We now live in a world of restrictions that few could have imagined we would experience in our lifetime. Not being able to travel how and where we want is something most people can deal with, at least for a while. Working from home also works well for those who are able to do so. But quite quickly, most of us found that what we missed most was being able to meet and have contact with people, and that became the hardest thing to handle.

For generations, people have gathered at various meeting places to exchange ideas, have fun or simply socialise. Markets, dance halls, churches, arenas, conference facilities and many other places have served this purpose, and the need to meet appears not to have diminished in this digital age – quite the reverse in fact.

In these current times, the home becomes the natural meeting place, where our sphere of human contact shrinks to those nearest to us. We are seeing people put more energy and money into making their home more pleasant. For me, this means building a new terrace this summer, and obviously it is going to be in wood. In addition to being attractive and natural, wood also stores carbon dioxide, as most of you know. For talk about a green recovery for our communities to have any credibility, we need to champion the sustainable materials we have. Sweden has a fantastic resource in its forests and an industrial structure that puts every wood fibre to use in the best possible way. This means that every time we build in wood, we also get toilet paper, textiles, newspapers, books, toiletries, packaging and fuel into the bargain.

Life will eventually return to normal, but for summer 2020 my new wooden terrace will be the perfect meeting place, where close family and friends can sit and barbecue on hopefully light and warm summer evenings. There will surely be a lot of talk about the little things in life, but also about the huge potential for greater use of wood. I wish you all a really great summer!



Mathias Fridholm



Sindre Ellingsen

With its pine façade, the new three-storey home in Stavanger blends in with the existing buildings.

## Sympathetic infill

**OBJECT** ABC Street House  
**ARCHITECT** Austigard Arkitektur  
**STRUCTURAL ENGINEER** Haga Bolig

**STAVANGER, NORWAY** The Nordic coastal city has a long tradition of dense urban planning, with the buildings sheltering each other from the harsh weather and improving energy efficiency. However, suburban homes were gradually given larger plots and so longer distances between them. Going back to the original idea, five years ago Austigard Arkitektur squeezed a new house into a tiny gap between two others in Stavanger. The infill was made possible due to ingenious

architecture with large windows. This marked the start of a continuing move to increase the density of the city, and now the same firm has filled in another previously empty plot in a similar way. Once again, the 90 square metre home is all wood, with the pine façade having three different looks, one for each floor. A roof terrace tops it all off.

Inside, the wood is widely exposed, with birch walls and oak flooring. «  
**w|** [austigard.no](http://austigard.no)



Adam Mark

## Soft values unify

**COPENHAGEN, DENMARK** An open atmosphere where all are welcome. This was a key part of the brief in the architectural

**OBJECT** The Parish Centre  
**ARCHITECT** Nord Architects  
**STRUCTURAL ENGINEER** Norconsult

competition to build a new assembly hall for the church in Brønshøj outside Copenhagen. The hall would be a cultural centre – a place that welcomes and unifies people and is able to host all sorts of activities. Nord Architects won the competition with a design that breathed both sustainability and community.

With entry from multiple directions, the new building has now become a link that connects the town square with the church and its cemetery and gardens. To get away from an institutional feel, the walls have a gentle curve to them and the CLT has been left exposed in the interior. The material was chosen not just to give a soft and open feel, but also for its excellent capacity to give a stable indoor climate, which is important for the atmosphere in the church. The façade is clad in ash, the warmth of which signals that everyone is welcome here. «

**w|** [nordarchitects.dk](http://nordarchitects.dk)



Joe Fletcher

The building's windows and roof are designed to let in as little heat as possible, with everything framed by redwood cladding.

## Home designed for the climate

**GLEN ELLEN, USA** North of San Francisco lies Glen Ellen, a less visited part of the Napa Valley wine district. Farming has long been the main occupation around here, and this is reflected in the local architecture. When a family recently swapped city living for country life, the 1950s farm they took over needed modernising.

The result was a simple two-storey building with an asymmetrical gabled roof. The building has been positioned so as not to interrupt the view of rolling hills on the horizon, and above all it has been designed for as pleasant an indoor climate as possible. The shorter side of the roof therefore faces south-west, helping to reduce the heat from the sun. The windows on this side are also designed with the hottest season in mind.

**OBJECT** Big Barn  
**ARCHITECT** Faulkner Architects  
**STRUCTURAL ENGINEER** CFBR Structural Group

The façade is clad in recycled California redwood, with details picked out in materials including corten steel. The prominence of wood also continues inside, with California oak on the walls and floor. «

**w|** [faulknerarchitects.com](http://faulknerarchitects.com)



Jannick Borchert

The new interior furnishings are created from a single Douglas fir tree. The centrepiece is the long table, suspended from the rafters.

## Furnished with one tree and Japanese influences

**COPENHAGEN, DENMARK** What could you do with the timber from a whole Douglas fir? Well, you could follow the lead of the architects at Danish firm Vermland and turn it into an interior for one of Copenhagen's restaurants. Inspired by Japanese architecture and design, they have created a dining room that is both simple and light. All the furnishings – from tables and chairs to the bar – were made from a single tree and adapted to harmonise with the room's original post-and-beam

structure in mass timber. The long table in the middle of the room is the heart of the design, with the room divided into different zones around it. These include group tables and a line of seats in the window for smaller parties.

The long table has no legs, with the tabletop instead suspended on struts fixed to the roof beams. The connections use wooden plugs, meaning that no metal was needed to assemble the structure. It all fits in with the Japanese notion that minimalism and beauty go hand in hand. «

**OBJECT** Hverdagen  
**ARCHITECT** Vermland

**w|** [vermland.dk](http://vermland.dk)



Stefan Mueller

## Preschool with a taste for wood

**OBJECT** Kindergarten Trumpf  
**ARCHITECT** Barkow Leibinger  
**STRUCTURAL ENGINEER** Breinlinger Ingenieure

**DITZINGEN, GERMANY** With just a single storey and a green, planted roof, a new preschool has been discreetly sneaked into Ditzingen. The low building is made from prefabricated elements based around two 60 millimetre thick layers of solid spruce structural timber joined by dovetail connectors. The cladding on both sides consists of a 27 millimetre thick top layer of silver spruce arranged horizontally – insulated in between with wood fibre. The building was created so that it could easily be taken down and recycled, and even the securely screwed pitched roof is easy to dismantle. The roof overhangs on all sides of the building, protecting the terraces from both strong sunlight and rain.

The interior comprises eight volumes, connected by a meandering corridor which in some places also widens enough to create small niches for play or peace and quiet. These also have a direct connection to the external space. «  
[w|barkowleibinger.com](http://w|barkowleibinger.com)

The eaves of the preschool encourage use of the outside space even during rain. The façade is clad in silver spruce.



French+Tye

## Extra attic room slipped in

**LONDON, UNITED KINGDOM** How can you create more space in a home while still respecting the local planning restrictions on building an additional floor? In London, Bradley van der Straeten resolved this challenge by adding a half-storey attic room to the existing two-storey building.

**OBJECT** Half-storey  
**ARCHITECT** Bradley van der Straeten  
**STRUCTURAL ENGINEER** Constant Structural Engineers

The extension is not visible from the street, and because it keeps within the building's original roofline, it also has no impact on the area's silhouette. The new section protrudes discreetly from the exterior, clad in black roof tiles to blend in with its surroundings. However, the new addition is more prominent inside. It has been created above an existing bedroom, from where stairs lead up to the new child's room. The stairs, like the integral wardrobes and bookshelves, are clad in pale plywood, and even though the architects admit that fitting everything in took absolute precision, the room, with its sloping ceiling of exposed beams, provides an airy feel in the heart of the city. «  
[w|b-vds.co.uk](http://w|b-vds.co.uk)

## House for a growing budget

**SUNNDAL, NORWAY** A young couple in Sunndal, Norway, wanted their own home, but due to their limited budget they had the idea of building a simple little house that could easily be extended as the family grew larger. The result is a building of two parts: a two-storey residence and an open hobby section, both united by a shared roof. The roof is propped up on diagonal glulam posts that are integrated with the wood cladding of the walls. The triangular openings offer views in several directions, while also putting their stamp on the open volume. At the moment, the space serves as a garage, storage area, party venue and, not least, a place where the owners can keep their catches during the hunting season. The whole building may eventually become a traditional farmhouse, working outwards from the current residential section. The roof is ready and waiting for the day the couple decide to extend, and it will be easy to fit insulated walls and floors beneath it. «  
[w|reverdrage.no](http://w|reverdrage.no)

**OBJECT** 1/3-house  
**ARCHITECT** Rever & Drage  
**STRUCTURAL ENGINEER** Brødrene Gjershaug

Tom Auger



The outdoor area is currently used for the owners' hobbies, but when the family and budget grow, it can be converted into living space.



Marc Goodwin

## Three volumes around a core

**SAVOLAX, FINLAND** On Finnish lake Saimen stands a house whose surroundings are just as important as the actual building. In the interior, the side facing the lake has therefore been raised above the ground to give a feeling of floating on top of the water. The section with views of the local spruce forest instead has a higher ceiling to transport the viewer into the treetops. The house comprises three connected volumes, the larger of which provides the accommodation, while the smaller two are a garage and a sauna. The living section is built around a central core, which has surfaces in oiled walnut. From this, alcoves with different functions extend out. With their waxed oak floors, and walls and ceilings in stained pine, they mark where the core begins and ends. With the exception of the bathroom and garage, the house is made entirely of wood, from the frame and wood fibre insulation to the façade. On the exterior, the doors and windows reach a height of 2.3 metres. Up to that height, the façade comprises dark oiled wood, which then transitions to zinc above. The terraces and steps are larch. «  
[w|studiopuisto.fi](http://w|studiopuisto.fi)

**OBJECT** Three square-hus  
**ARCHITECT** Studio Puisto  
**STRUCTURAL ENGINEER** Reijo Koivuniemi

The exterior features dark oiled cladding that transitions to a zinc clad gable and eaves, giving the building a discreet look.

## Glulam for airy passage

**MELBOURNE, AUSTRALIA** When a new hotel was built next to Melbourne's largest shopping centre, the property owners wanted to connect the two buildings. The aim was for the passage to provide easy access between them and also create a more attractive entrance from the adjacent car park.

The hotel's curved glass roof has inspired a 110 metre long walkway with gently inclined steps alongside travellers, all framed by a silhouette that echoes the hotel. The arched glulam structure in Italian larch forms an arcade covered with a roof of transparent fluoroplastics. The light, curvy roof is meant to protect visitors from rain while still admitting light



Peter Bernmetts

The glulam frame forms an airy arcade that lets in both light and air in the walkway between the shopping centre and the hotel.

**OBJECT** Chadstone link  
**ARCHITECT** Make Architects  
**STRUCTURAL ENGINEER** Rubner Holzbau

and giving the arcade clear contact with the outside world. The sides have therefore been left open, which also provides

good ventilation and reduces the need for air-conditioning. The glulam frame reaches a height of 15 metres, and each element is carefully designed to support the next. The structure comprises a diagonal glulam grid with steel braces. «  
[w|makearchitects.com](http://w|makearchitects.com)

**Magnus Björkman**, architect at Theory Into Practice

## Mobile solutions for sustainable future

**STOCKHOLM, SWEDEN** The car is sometimes called the unseen community planner. Cars take up space, out on the roads and particularly when standing still. I once heard someone say that 90% of urban planning is about trying to fit in all the parking spaces.

In a housing project too, finding space for the required number of cars is a challenge. It is not uncommon for a garage to be placed under an apartment block – a solution that is expensive to build and maintain, and that not everyone can use.

Switching to sustainable and circular systems is a crucial issue for our age. In this context, there is unexploited potential for current developments to be designed so they support this transition; shaping buildings that then shape us.

So how many parking spaces do we really need? Already, mobility as a service and shared mobility can radically cut the demand for land and investment in parking spaces. From a longer perspective, the trend for the expansion of servicification, digitalisation, a sharing economy, e-commerce and autonomous vehicles is likely to fundamentally redraw the map of how and why we travel in the future. But how can wood be part of this future?

Let me offer a suggestion. The climate issue, along with technical and social developments, will undoubtedly affect future travel, although we don't yet know how quickly or in what way. We need flexibility in the different scenarios for future cities – i.e. the built environment that we are designing and planning today. Here, prefabricated wooden structures can play a key role in the transition to a more sustainable lifestyle.

If instead of digging out car parks under every block, we build mobility centres that can provide a whole area with both mobility services and car parking spaces for those who still want to own their car, we will create a better foundation for effective and coordinated solutions. In addition, the structure of such buildings has less of a climate impact throughout their life cycle. A modular design with generous ceiling heights can easily be adapted as the transition progresses, whether you want to convert the space for other purposes or preferably dismantle and recycle the structure to make way for other functions.

To support new behaviours and travel habits, we need a new, attractive living environment, where small electric vehicles can become part of the built environment in a different way to their fossil-based cousins. Here, wood stands as the obvious choice – climate smart, easy to work with, flexible and quick to assemble. And, above all, with the potential to irrevocably change the basis of future mobility for the better.





## INNOVATIVE NEW TYPOLOGY IN CLASSIC DISTRICT

**LONDON, UNITED KINGDOM** In the London district of King's Cross, what will soon be the world's largest wood façade is beginning to take shape. Behind the 23,300 square metre expanse, Google will have its new British headquarters, with space for 7,000 staff. The look of the façade is achieved through a repetitive sequence of acetylated glulam posts in varying heights. The design language is modern, but with a clear connection to the other local architecture. The height of the terraced building varies between 20 and 60 metres, with the highest point 11 storeys up. The façade is divided into four sections, with the glulam

**OBJECT**  
Google KG21 HQ  
**ARCHITECT**  
Big  
**STRUCTURAL ENGINEER (TIMBER)**  
Hess Timber

posts creating a cohesive exterior. They are also a key part of the interior, as each post extends over several floors, creating a sense of volume. The office spaces feature mezzanine floors whose exposed CLT, with its soft, warm surface, contrasts with steel and concrete. A diagonal staircase will lead from the ground floor to the roof, which will be punctuated with green spaces, a running track and a pool. ✦

- The 250 trees that will be planted on the roof have been carefully chosen so their leaves do not fall onto the neighbouring railway track.
- Inspired by the local infrastructure, the architects have chosen to see the building as a flexible space for flows between hubs, with the option of changing interior walls and rooms around as required.

[www.big.dk](http://www.big.dk), [hess-timber.com](http://www.hess-timber.com)

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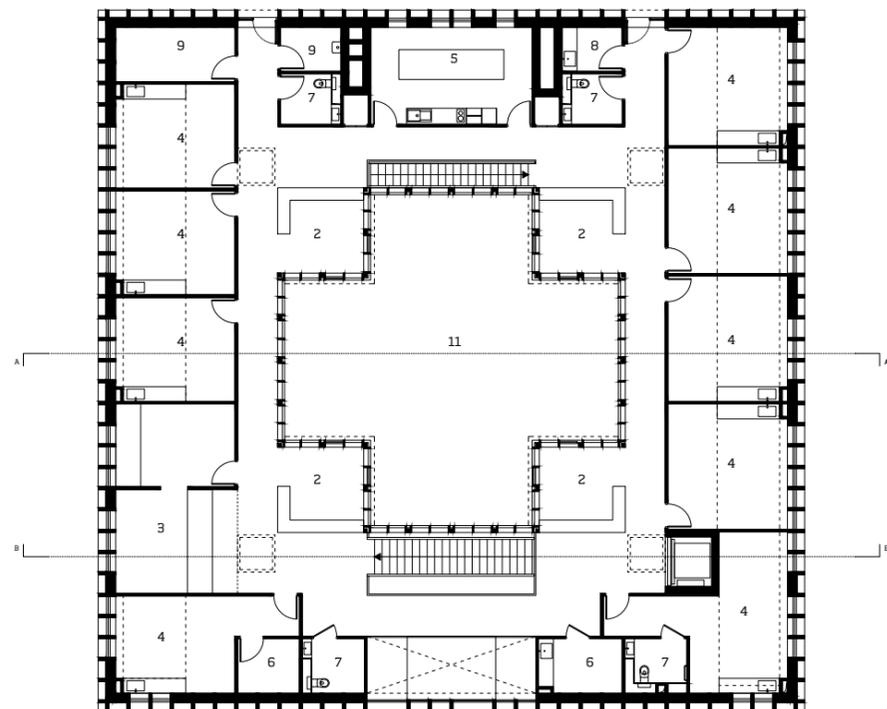


**WELLNESS  
ENCOURAGED  
BY  
NATURE**

A new medical centre was erected in the Paris suburb of Taverny in just four weeks. Douglas fir from French forests was used for the façade cladding and the structural frame, partly for its strength and capacity to store carbon dioxide, and partly for the wood's natural capacity to even out air humidity indoors, which contributes to the wellness of the patients. »

TEXT Annika Munter PHOTO François-Xavier Da Cunha Leal

The windows onto the inner courtyard are framed in timber and hang like a curtain in front of the load-bearing structure.



Having views of nature and greenery brings clear benefits for patients, as Professor Roger Ulrichs of Chalmers University of Technology in Gothenburg told us all back in the 1990s. According to his research, patients who are exposed to plants feel better and return to health more quickly. Since then a number of Swedish and international studies have confirmed similar theories. There are strong indications that just a glimpse of trees and fields can promote health – something of which French architect Marc-Antoine Richard-Kowienki is also keenly aware.

Four years ago, he and his colleagues at the firm Maaj Architectes were commissioned to design a new medical centre in the town of Taverny, outside Paris. The client, Taverny local authority, had two specific requirements: that the centre would gather a range of medical services under one roof and that the building would be a modern and eco-friendly addition to the townscape. The assignment required a great deal of careful thought and deliberation about materials and their properties.

»We wanted to optimise local natural resources, aid the local economy and increase the value of traditional know-how. We also wanted to create a relationship with the wider built environment. We were able to achieve this simply by using a renewable building material – wood,« says Marc-Antoine Richard-Kowienki.

**The architects began** sketching out a square structure entirely in wood, enclosing an outdoor space at the centre. They took inspiration from ancient monasteries and organised the interior spaces to make the most of this courtyard.

»Because the medical centre is located in a fragmented townscape, alongside a motorway, we wanted to design the building around a central courtyard. This brought several advantages, including natural light for the whole building. The quadratic shape made it possible to organise the

departments and consulting rooms in a functional way, around the outdoor space, which makes it an extension of the waiting rooms. It also serves as an intimate sensory place where medicinal plants grow, a reminder of the centre's health and curative purpose,« explains Marc-Antoine.

**The medical centre** opened in July 2019, placing a building with two discrete floors and a façade of untreated spruce at the heart of the town. A quartet of four-sided roofs rise up like towers in each corner, giving the square building the feel of a castle or fortress. This impression is accentuated by the dimensions of the façade's glulam beams and the many narrow window apertures that maximise privacy and shut out noise from the busy crossroads outside. Mass timber has been used for both the façade cladding and structural frame, partly for its strength and capacity to store carbon dioxide, and partly due to wood's hygroscopic properties, which means its natural capacity to absorb and release moisture, further contributing to the wellness of the patients.

»Wood gives a natural feeling of wellbeing, which is an essential property for a place of health and healing. The material comes across as light and pleasant, delivering the personal atmosphere we wanted,« says Marc-Antoine.

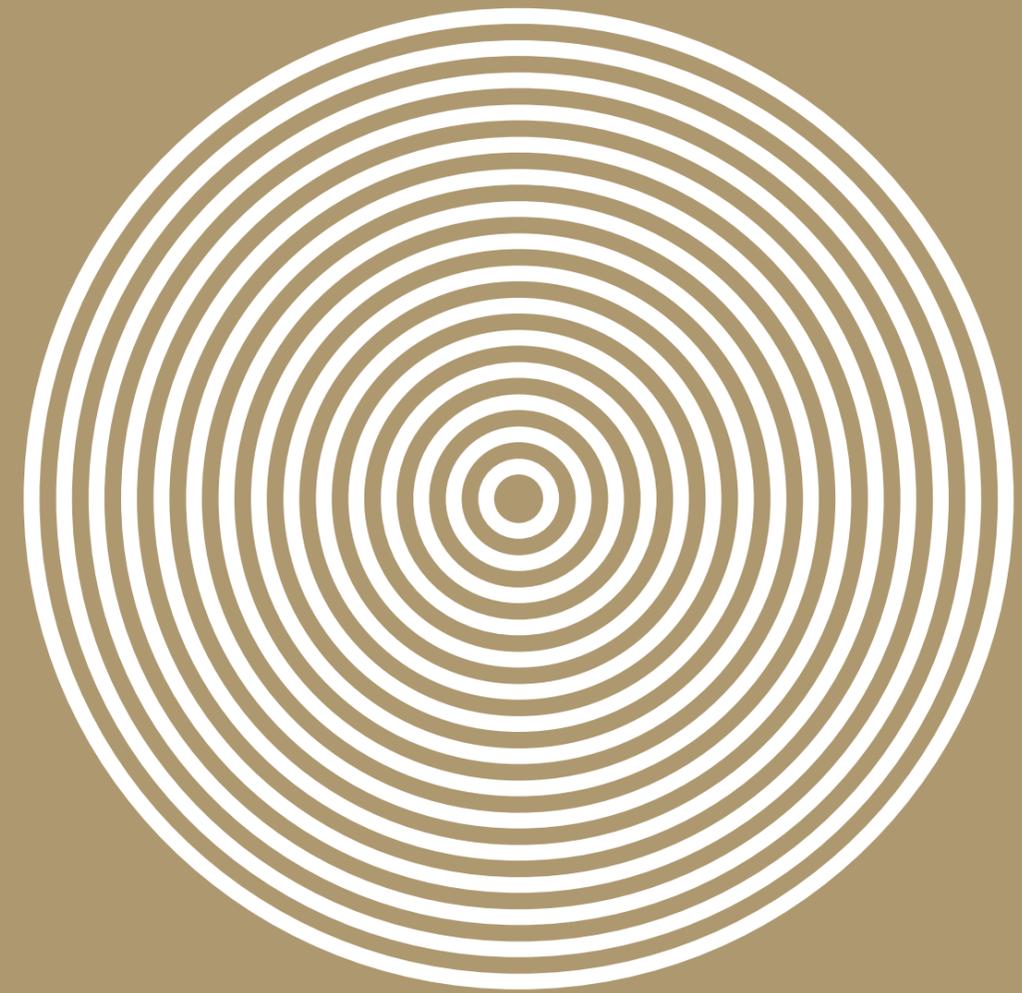
The structural frame is made from glulam beams in Douglas fir, while the floor structure between the two storeys uses CLT. The four-sided roof is constructed from traditional roof trusses, also in the same fir. All the frame and wall elements were prefabricated in a joinery factory in north-east France, less than 200 km from Taverny. The wood comes from French forests in the region of Jura, on the Swiss border, and was sawn at local sawmills.

The wood has a natural resistance to rot, and the façade has been left untreated so that it will silver over time. The overhanging roof structure protects the façade from downpours, while a concrete plinth raises the timber 20 centimetres from »



The French town of Taverny now has a climate-smart medical centre. Many studies show that exposed wood and green environments are good for people's wellbeing, and the architects have embraced this.

One of Sweden's biggest and most important architectural competitions



## Swedish Wood Award

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The Swedish Wood Award is one of Sweden's biggest and most important architectural competitions, presented every four years to a building that represents good architecture in wood and that reflects the times we live in. It is awarded to a new building, bridge or other structure in Sweden that exemplifies architectural qualities and makes full and proper use of wood's potential. Read more about the Swedish Wood Award at [swedishwood.com](http://swedishwood.com).



The town of Taverny's new medical centre is situated between a busy motorway, a library, a school and a theatre.

the ground. Where the different materials meet, a shadow gap has been used, giving the illusion of the wall hanging in the air, when in fact it is resting on a profile mounted in the concrete plinth. The same principle has also been applied internally between different elements such as posts and windows.

When it comes to fire safety, the architects were forced to go back to the drawing board during the planning phase. This was due to revisions required by the French health and safety authorities, because they felt there was a lack of proper evacuation routes.

»We always try to turn challenges into positives, and this was one of those occasions. The authorities said there had to be a direct link between the roof and the inner courtyard, so we decided to design wooden ladders that were integrated into the look of the outdoor space, as a central and essential component of the architecture,« says Marc-Antoine.

Another result of the official inspections is the wood fibre boards used in the ceilings. They meet the demand for suitable room acoustics by absorbing the reverberation of voices and movements in the rooms.

Exposed wood, not least around the windows, lends a warm feel to the otherwise austere hospital aesthetic. Daylight floods in through the glazing and makes the waiting rooms feel like an extension of the outdoor space, exactly as intended on the drawing board.

### Taverny Medical Centre

TAVERNY, FRANKRIKE

ARCHITECT: Marc-Antoine Richard-Kowienski at Maaj Architectes.

CLIENT: Taverny stad.

STRUCTURAL ENGINEER: Le Bâtiment Associé.

COST: EUR 29 million.

[maaj.fr](http://maaj.fr)

»The planting is a reminder of the medical centre's health-promoting purpose, but it also contributes to natural ventilation of the building. Circulating the air via the surface layer of the ground makes use of the substrate's natural warmth. This helps to keep the building cool in summer and warm in winter, without mechanical ventilation,« explains Marc-Antoine Richard-Kowienski, who also points out that wood has many benefits, as will no doubt have been seen this past spring, with the restrictions brought by the Covid-19 pandemic:

»We have no up-to-date information about how things have gone at the medical centre during the crisis, but we would guess that the choice of material and the architecture, with well separated departments and few doors, limit the ability of the virus to spread. The effective air circulation also helps.«

# Sustainable development with four lightweight extensions

The saying goes that the most sustainable square metre is the one that isn't built. At the same time, we need to build to alleviate the lack of housing and meet the demand for commercial premises in our cities. The solution is wooden extensions that have many advantages over newbuilds. »

TEXT Katarina Brandt

At Trikáfabriken, it needed to be obvious where old meets new, which is why the exposed wood frame is visible even from the outside.



All materials must be part of a circular system where the resources are recycled in an efficient way. This is becoming an increasingly common element of sustainable construction, and might, for example, involve reusing existing buildings and adding extensions to meet the demand for new residential and commercial properties. This is a clever way of increasing the density of our cities while also reducing the waste of resources thanks to fewer deliveries and better use of existing infrastructure.

»The biggest driver of wood construction is the issue of climate change, but the megatrend is definitely urbanisation, and that means making our cities bigger and denser in a built environment where people already live and work. In this context the smart choice is to use a circular business model where you give existing buildings a new lease of life with the help of extensions in wood.« says Susanne Rudenstam, head of the Swedish Wood Building Council.

**A prime example** of how to pursue urban densification in a sustainable way and at the same time save both time and money is the Styrpinnen 15 property on the corner of Kungsträdgårdsgatan and Näckströmshuset in the heart of Stockholm. The attractive fin-de-siècle edifice was designed by architect Erik Lallerstedt, and when it was built for Hernösands Enskilda Bank in 1889–1901, it marked the start of this district's life as the city's financial powerhouse.

Since then, the building has been refurbished and redeveloped several times. Now Styrpinnen 15 is being fully overhauled by the current owner Vasakronan. In addition to having the foundations reinforced, the layout changed and new technical installations added, the building has also gained a three-storey upward extension using CLT and glulam from Martinsons.

»We began by focusing on the problem of the settlement of the old building. This meant that any addition would need to have as light a frame as possible. The choice of wood was therefore a necessary and pragmatic decision. Then there's the fact that we as architects and Vasakronan as a property owner like the sustainability credentials of using wood.« says Morten Johansson, lead architect at Dinell Johansson.

Choosing CLT and glulam has brought numerous advantages. The structure's lower inherent weight, coupled with



The three-storey extension in Stockholm required a lightweight material. The glulam posts and beams also add to the comforting feel. The façade is clad in rust-brown sheet metal.

Architect **Morten Johansson**

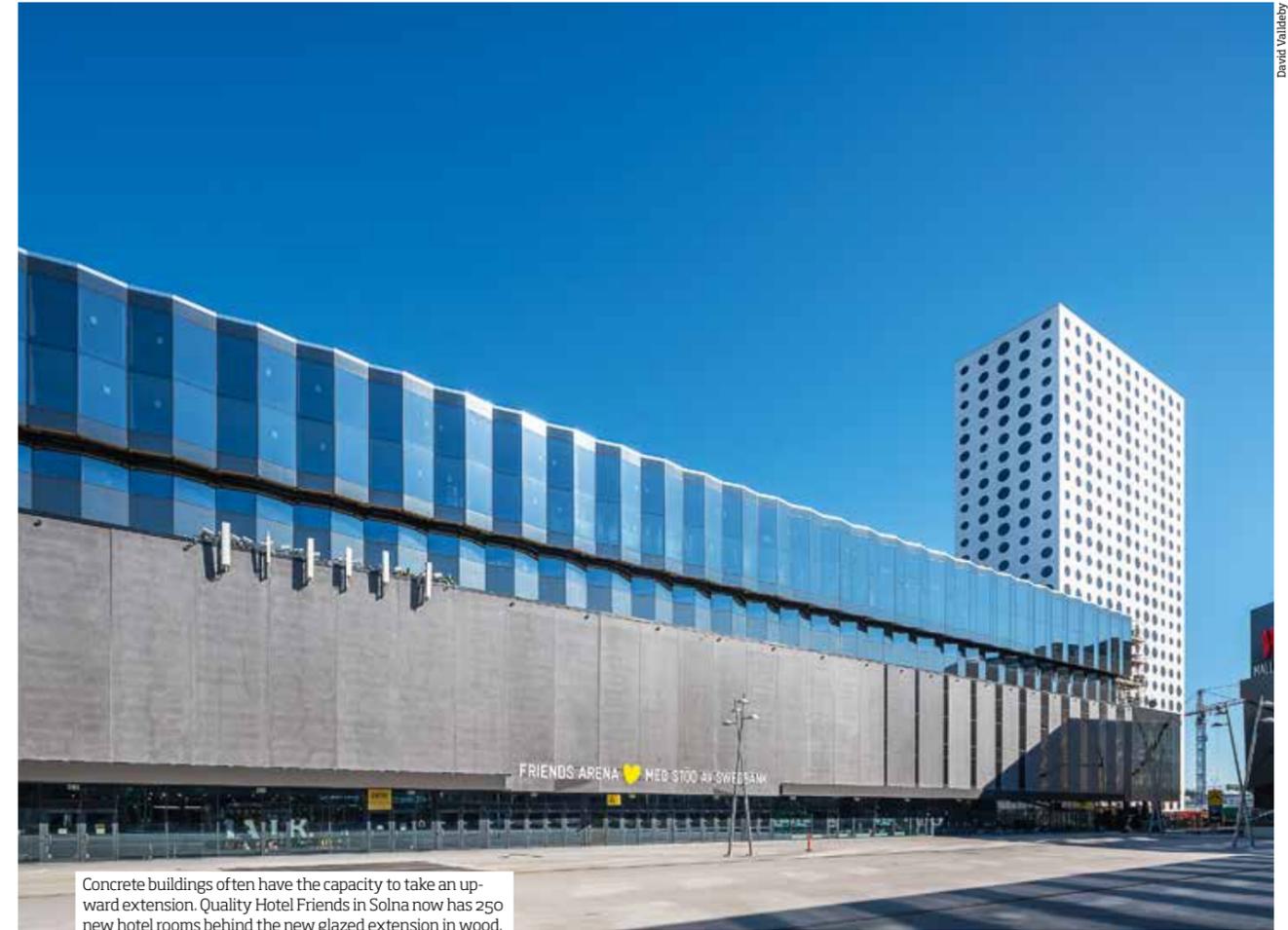
## » THE WOOD STRUCTURE IS OUR WAY OF FLIRTING WITH HISTORY «

the high degree of prefabrication, sped up the installation time, for example, which resolved many of the logistical challenges faced by a major construction project right in the middle of central Stockholm.

»Generally speaking, extending upwards in wood is a great means of densification within existing developments. From a sustainability perspective, it's also better to create workplaces in areas that already have public transport and good local services. What's more, our tenants seem to find the indoor environment in a wooden building more pleasant. In theory, this should make it easier for us to rent out premises and retain existing tenants in buildings with plenty of exposed wood.« states Vasakronan's Sustainability Director Anna Denell.

With Styrpinnen 15, Dinell Johansson has approached the extension as a modern roof design that happens to be three storeys high, rather than as just adding three new floors. The extension stands out due to its wavy façade in sheet-metal, with its rust-brown lacquer that is reminiscent of newly oxidised copper. Internally, exposed beams and posts in glulam help to create a warm and welcoming atmosphere.

»When you're doing an extension, it's important to get to know and understand the old building. To read up on and be aware of its history and what has happened on the site. The modern wooden structure on Styrpinnen 15 become our way of flirting with that history.« says Morten Johansson.



Concrete buildings often have the capacity to take an upward extension. Quality Hotel Friends in Solna now has 250 new hotel rooms behind the new glazed extension in wood.

Architect **Gert Wingårdh**

## » WOOD IS ALWAYS OUR FIRST CHOICE FOR THE STRUCTURAL FRAME «

New times mean new tenants. Once the revamped former banking centre is completed in autumn 2020, it will be a game developer, not a bank, that occupies the property's 4,350 square metres.

**In Solna, just** north of Stockholm, Arenastaden has taken shape as one of Europe's most modern urban districts. As the area has developed and grown, demand for hotel rooms has also increased. This has prompted Quality Hotel Friends to expand its business with the addition of over 250 new rooms, located in a CLT and glulam extension designed by Wingårdh. The new hotel rooms are spread across three floors on top of the lower section of the existing hotel, which is called Arena Gate.

»When you look at modern buildings in concrete, they often have the capacity to carry a greater load than they were designed for. This opens up the possibility of adding an upward extension, and if you choose a light material like wood, you can go for more than one floor. That was why we chose a CLT and glulam frame when extending Arena Gate.« explains Gert Wingårdh, architect at Wingårdh.

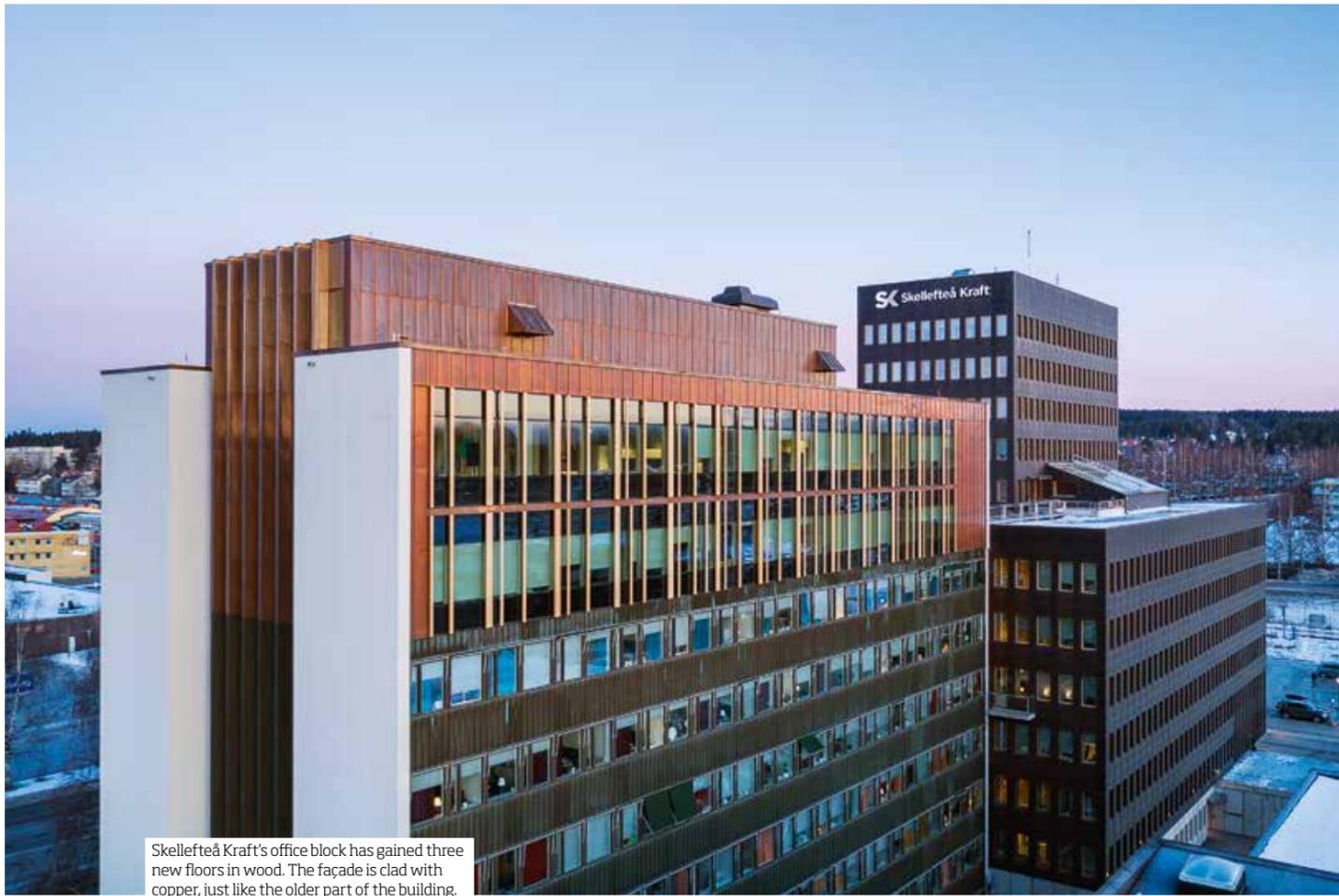
The extension has a black, fully glazed façade that follows the same pattern as the underlying building. The new façade is pleated to break down the scale, create a wave pattern and connect to the arena's angular surface. To separate the extension visually from the original building, the lower floor is set

back from the façade of the underlying structure. Although the hotel does not operate on the ground floor, the aim is for the extension to frame the site, light up and lend a welcoming feel.

»The drive for densification has helped, making upward extensions more common in attractive locations where more development is desired. And wood has clear commercial benefits in this respect. In addition to the material's architectural possibilities, wood frames also have a significantly lower climate footprint. The fact is that wood is our first choice for the structural frame in all our projects these days.« says Gert Wingårdh.

**And so we** move north to the modern city of wood that is Skellefteå. Here there are many examples of words been turned into action when it comes to pushing forward with advancements in wood construction. A prime example is Skellefteå Kraft's head office in the centre of Skellefteå. When the company needed more space to grow, they decided that the only way was up. The result was a CLT and glulam extension on top of the older of the two office blocks.

»The idea of doing an extension came up at quite an early stage. The main reason was that the head office is located in a densely developed area with no room for a newbuild. Going down the wood route was also the obvious choice, since Skellefteå has a wood building strategy that advocates sustainable



Patrick Degeerman

Skellefteå Kraft's office block has gained three new floors in wood. The façade is clad with copper, just like the older part of the building.

Susanne Rudenstam Swedish Wood Building Council

»IT'S ABOUT CHERISHING WHAT HAS ALREADY BEEN BUILT«

» building,« states Rolf Marklund, lead architect at Collage Arkitekter.

The structure, made entirely in wood, was supplied by local company Martinsons. Like the older parts of the head office, the façade is clad in copper.

»Both CLT panels and glulam allow for a high degree of prefabrication, which makes assembly more efficient and shortens the construction time. This was, of course, a major benefit considering that the existing building needed to be vacated for the duration,« says Rolf Marklund.

**Back to the capital** and the old industrial district of Hammarby Sjöstad, which in recent years has undergone a major transformation. Its crowning glory is the office building Trikäfabriken. Here, the original brick building from 1929 has been renovated internally and given a timber-framed extension rising up five floors. The project is a good example of how contemporary architecture can serve as a link between past and present.

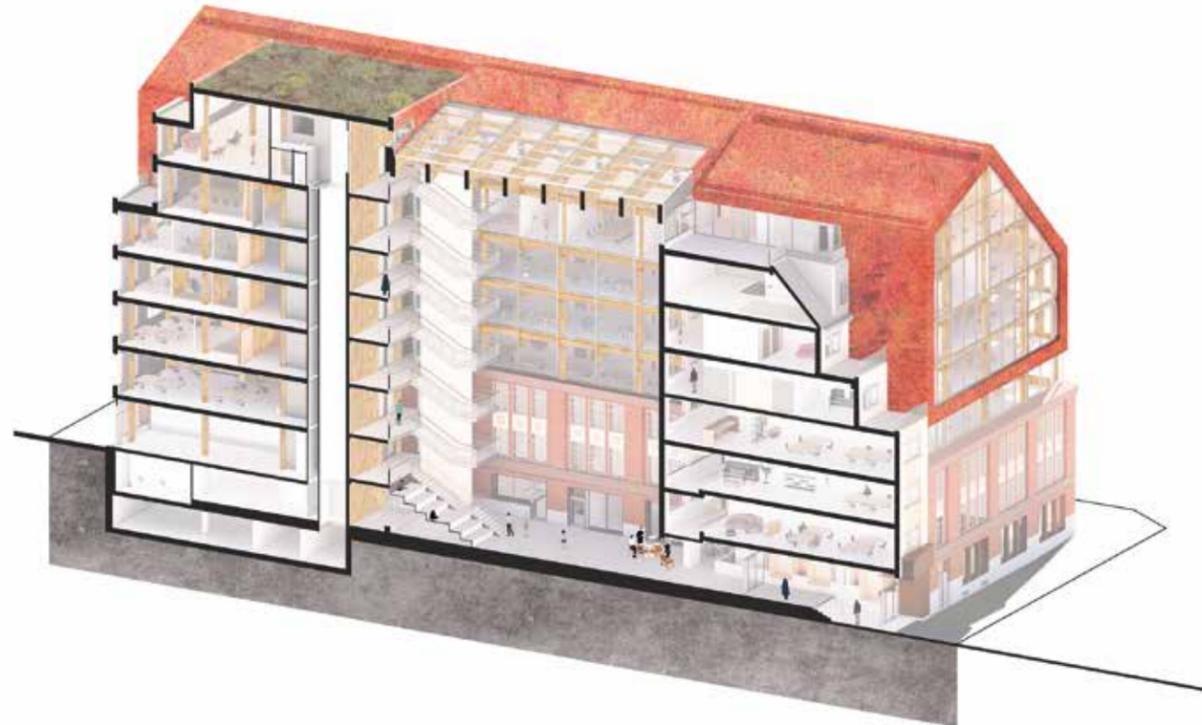
»Using wood for the extension was quite an easy choice for us. In addition to the climate benefit, we knew that it would result in less reinforcement work and that savings could be made due to the faster process. We also saw huge benefits in exposing the wood internally, as it provides a healthier indoor environment and is a friendly material that is easy to live with,« says Matthew Eastwood, lead architect at Tengbom.

Wood is a prominent feature of Trikäfabriken and the load-bearing frame is part of the design. The material highlights an honest approach to design, where nothing is concealed. The ambition was to make it as clear as possible where old meets new, which is why the wood frame is exposed internally and visible from outside.

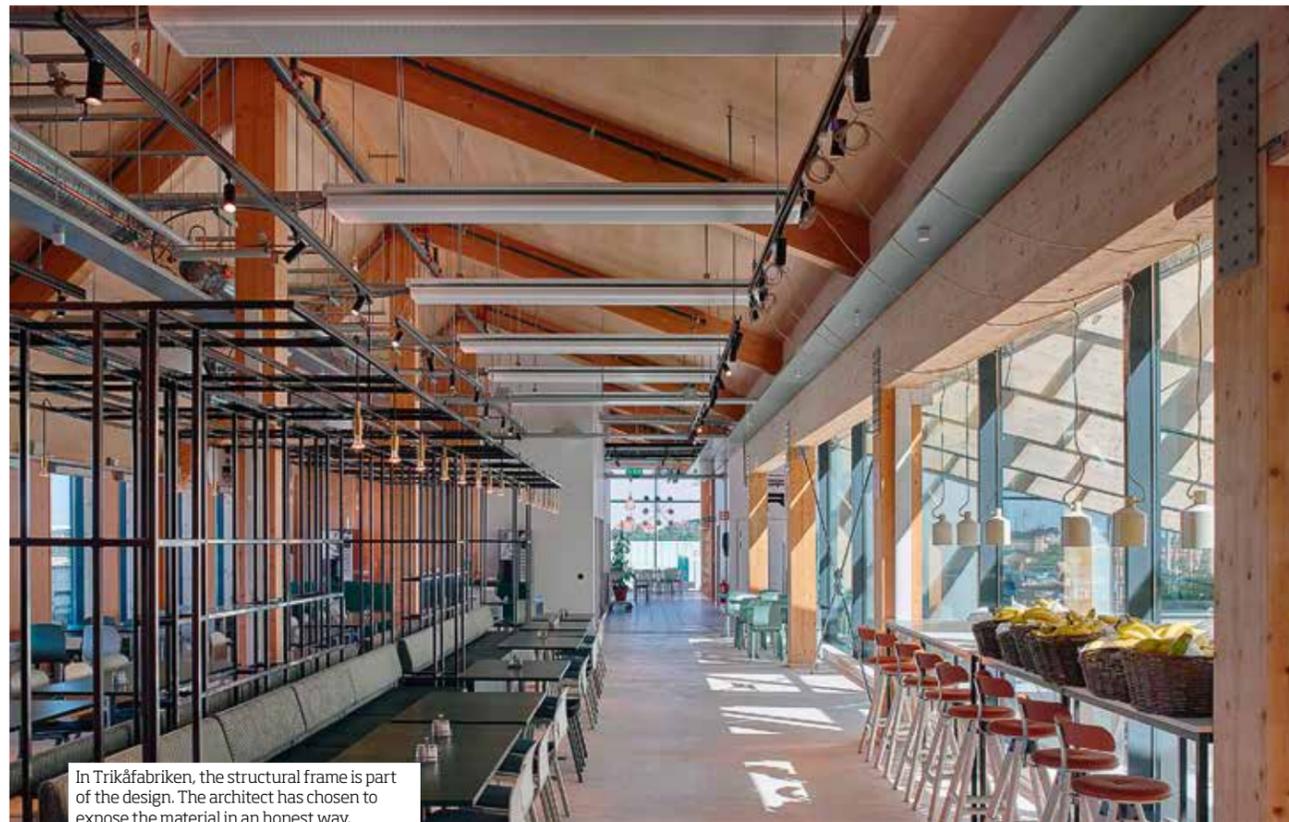
»Working with a wooden structure means that you have to think things through all the way to the end and see the material as an aesthetic asset within the architecture. An exposed wooden frame means that everyone involved has to be aware that this beam or this wall will be visible, from the people working on the planning and manufacture to those responsible for transport and assembly,« says Gustav Essebro, CEO of TK Botnia, which was responsible for the structural engineering work on the extension.

**The four projects** show that wooden extensions make it possible to increase density, extend lifetimes and use existing buildings in a more flexible way. Prefabricated wood building systems also enable us to build with a low climate footprint. This reduces the need for land and increases the scope to build in central, attractive areas where people want to live.

»It's very much about cherishing what has already been built, both from a sustainability perspective and with regard to people's living environments,« concludes Susanne Rudenstam. ©



Tengbom



In Trikäfabriken, the structural frame is part of the design. The architect has chosen to expose the material in an honest way.

Robin Hayes

**Trikäfabriken**  
STOCKHOLM, SWEDEN

ARCHITECT: Tengbom.  
CLIENT: Fabege Centrumfastigheter.  
STRUCTURAL ENGINEER: TK Botnia.  
AREA: 8,800 square metres.  
wj| tengbom.se

**Styrpinnen 15**  
STOCKHOLM, SWEDEN

ARCHITECT: Dinell Johansson.  
CLIENT: Vasakronan.  
STRUCTURAL ENGINEER: Sigma Civil.  
AREA: 600 square metres.  
wj| dinelljohansson.se

**Quality Hotel Friends**  
SÖLNA, SWEDEN

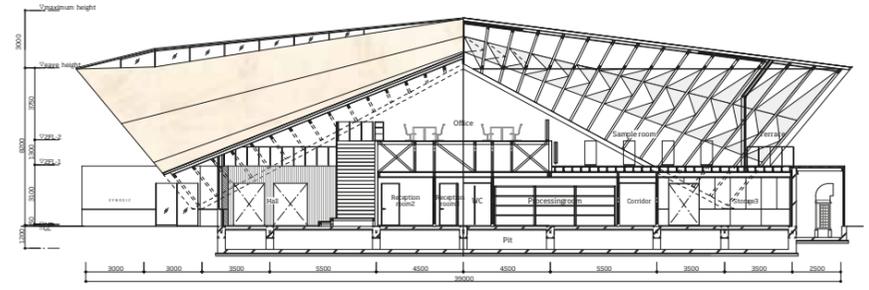
ARCHITECT: Wingårdhs.  
CLIENT: Strawberry Properties.  
AREA: 11,300 square metres.  
wj| wingardhs.se

**Skellefteå Kraft**  
SKELLEFTEÅ, SWEDEN

ARCHITECT: Collage Arkitekter.  
CLIENT: Skellefteå Kraft.  
STRUCTURAL ENGINEER: WSP Skellefteå.  
AREA: 1,500 square metres.  
wj| collagearkitekter.se



Joining glulam beams to triangular CLT panels has created a light but strong structure with an impactful look.



Section.

# ROOF STRUCTURE IN MANY LEVELS CREATES SPACE & INVITING ARCHITECTURE WITH CUSTOM FIXING SOLUTIONS

TEXT Sara Bergqvist PHOTO Hirai Hiroyuki

**W**ith the help of architectural practice Uenoa, screw manufacturer Synegic now has a magnificent showcase for what can be achieved with the company's products. The new headquarters, surrounded by leafy trees in the small town of Tomiya, neighbouring the much larger city of Sendai, is a marvel of exciting architecture.

»When we were commissioned, the client asked us to create advanced architecture that expands the horizons of what can be achieved with wood. From this, we drew up the design for this building, with its unique timber structure,« explains Fumie Horikoshi, architect and co-owner of the Tokyo-based practice Uenoa.

**The eye** is drawn to the geometrically advanced roof, which comprises two layers of triangles. The widest triangles have a base that reaches all the way from side to side and comprise a framework of glulam beams made from Japanese pine. The dimensions of these are 105x240 millimetres, a common size in Japanese buildings. Above the lower part of these trusses sit two long rows of triangular CLT panels in Japanese cedar, like

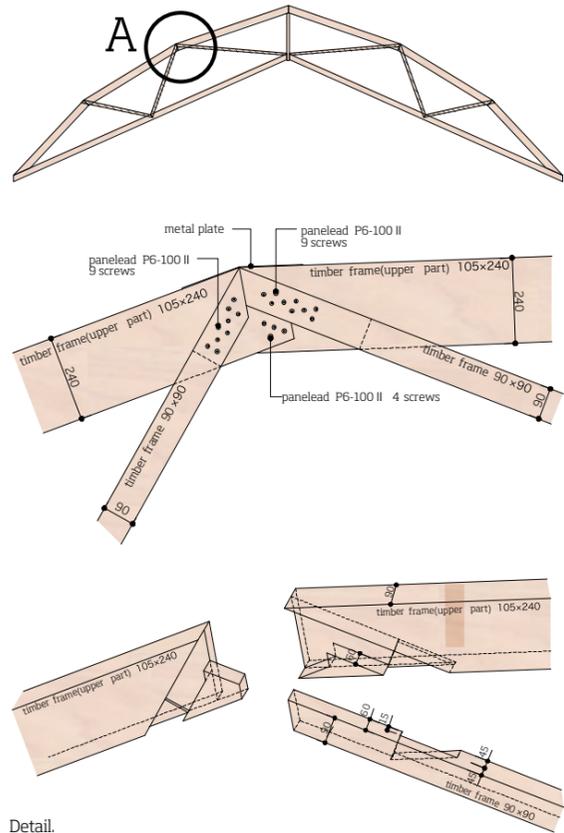
two flights of birds lowering their wingtips from the top of the roof down to the glulam beams. Where the wingtips meet the beams, both elements are connected with fixings at the centreline and two outer lines. Behind both structures, the roof is lined with longitudinal cladding in European red pine.

»By using CLT, which generally tends to be used for walls and floors, we were able to achieve a structure that was at once light, strong and effective. An alternative would have been to use beams here as well, but that would have made the nodes much more complicated. Instead, it was relatively easy to deal with these using CLT and screws – almost all of which were Synegic's own Panelad screws,« says Fumie Horikoshi.

Another advantage of the CLT structure was that it allowed for a rational method in which many elements could be prefabricated and then assembled on site.

The design removes any need for posts in the middle of the 18 metre wide building, which creates a sense of space and offers good visibility.

»We didn't want the beautiful timber frame, which is so significant for the »



Detail.

Architect **Fumie Horikoshi**

## » WE EXTENDED THE ROOF DOWN TO THE GROUND «

» appearance, to be something you only look up at. So we created multiple floor levels and extended the roof down to the ground at four points. This creates areas where you're close enough to touch the roof, while at the same time you get the sense of volume and monumental scale in the middle of the room,« says Fumie Horikoshi.

The trusses and triangular CLT elements continue outside, as the roof extends out over the façade. On the exterior, the roof is finished with a patchwork of small copper tiles. These give the impression of landing softly on the underlying wooden structure, like a piece of folded paper that drapes gently towards the ground.

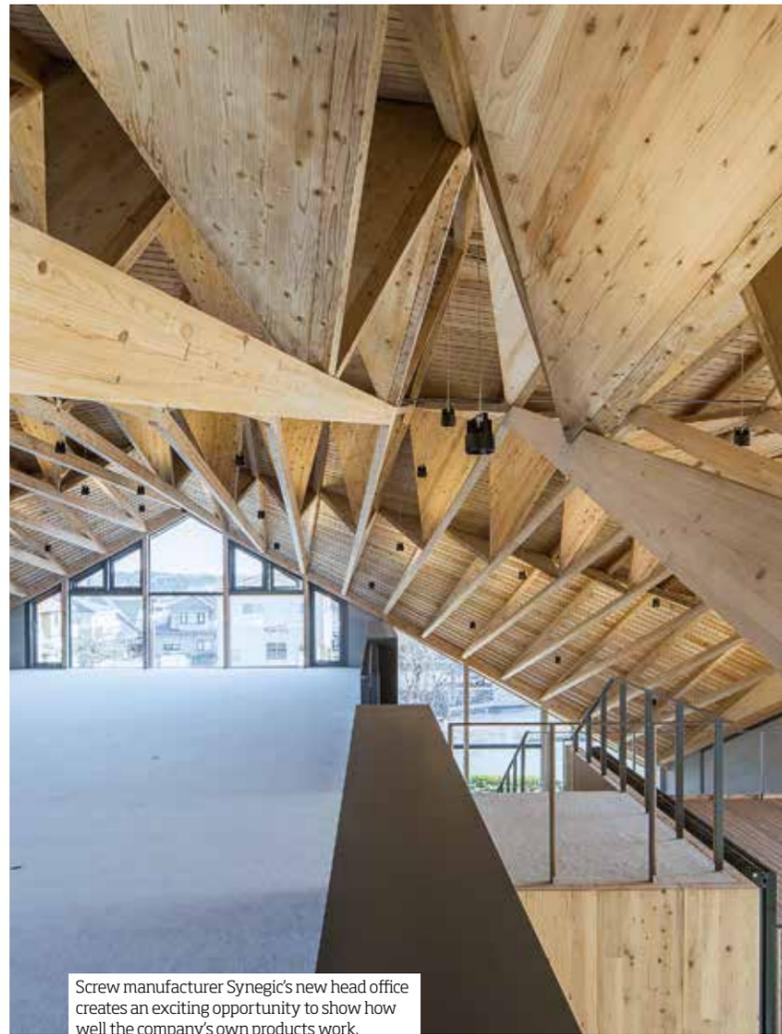
The external walls, internal walls and roof are structurally completely separate from each other, with the load-bearing inner walls made of CLT and the outer walls of steel. On the first floor there is also an extra partition wall in CLT that takes some of the vertical load. An important reason for keeping the different parts separate is to make future maintenance and renovation easier. In Japan there are also several restrictions placed on

large wooden buildings, many of them aimed at fire prevention.

»If you use wood internally, you have to have a fireproof outer wall that is independent of the interior. This is why the external walls are made of steel, coated with an extra layer of fireproofing,« explains Fumie Horikoshi.

**Around 35 people** work in the building that is now Synegic's head office. The workspaces are spread across two floors, with a mezzanine in between. The interior is designed to meet the company's need for different ways of working. There are office spaces with desks, and enclosed areas that are good for experiments and collaborations with external researchers. The open spaces create an inspiring environment that invites cooperation, encouraging employees from different parts of the company to engage with each other. There is an abundance of airy space, while the surrounding wood creates a warm, intimate and comfortable feel.

»I've also had several of the company's employees telling me how happy they are to



Screw manufacturer Synegic's new head office creates an exciting opportunity to show how well the company's own products work.

### Synegics huvudkontor TOMIJA, JAPAN

**ARCHITECTS:** Fumie Horikoshi och Yoshinori Hasegawa, Uenoa.  
**CLIENT:** Synegic.  
**STRUCTURAL ENGINEER:** Hakkoh construction.  
**AREA:** 633 square metres.  
**w|** uenoa.com

be working in such an uplifting environment. And they find it inspiring to see their own products used in the building,« adds Fumie Horikoshi.

On the back of this success and the experience of working with CLT in new ways, he sees opportunities for more projects like this in the future. This is also closely aligned with Uenoa's philosophy of working with sustainable methods and striving for uniqueness in their projects.

»The people at Synegic have told us they have many visitors from the wood and construction industry coming to look at the building for the advanced wooden structure that it is,« says Fumie Horikoshi.®



The roof structure slopes down to the ground at four points. Each floor has places where you can get close enough to touch the inside of the roof.



## »» A GLOBAL SOLUTION FOR A LOCALLY ACTIVE INDUSTRY ««

**As a newly graduated engineer, Gerhard Schickhofer embarked on a research project at Graz University of Technology (TU Graz) in Austria. The research focused on two areas – shell structures and wood construction. In 1994 he presented a thesis that paved the way for a product called »brettspertholz«. What we now call cross-laminated timber or CLT.**

TEXT & PHOTO David Valldeby

### **What happened after you had presented your thesis?**

Once I'd presented my theory-focused thesis, I began to think about how the product could actually be made in practice. I received a grant from the sawmill industry in Steiermark in south-east Austria, and together with three of its members, we developed CLT and founded the company KLH Massivholz. Then it just felt natural to continue researching CLT. In 2002 we founded a component centre in order to expand the fields of research relating to the product. A total of over EUR 12 million has been invested in research over the past 30 years.

### **How do you think CLT might develop in the future?**

In my experience, you can neither plan a career nor predict the trajectory of a trend. The past few years have been highly satisfactory and successful for the industry in terms of production volumes. Naturally, the two-digit growth rate has led to positive forecasts. But I am currently in self-isolation – due to coronavirus – and in this situation it's difficult to see where we go from here. I'm therefore going to avoid making a prediction for the next 10 years. According to the motto »think globally, act locally«, I see the unpatented idea of CLT as a global solution for a locally active wood and construction industry.

### **Is it possible to use CLT as an exposed element of a façade and if so what has to be borne in mind?**

CLT is a glued product, whereby the separate layers are arranged at 90° to each other to create a locking effect. This must be taken into account in the verification procedure, as well as mapping the stresses that arise between the different layers, compared with plywood, for example. With their locking layers, both these product families are sensitive to air humidity. This is also the reason why CLT is only approved for service classes I and II in Eurocode 5. Direct and permanent exposure to weather cannot be recommended without protective measures.

### **Why do you think CLT has become so popular in the last decade, compared with other mass timber products?**

Compared with other sheet material in wood, CLT is a highly engineered product. In addition, it allows designs to make use of surface units, making it comparable with building in concrete. Structures planned in concrete can also be realised in CLT.

### **What tools would you recommend for initial design values?**

Each CLT manufacturer offers consultancy services for architects and engineers and has their own solutions for verification. At Holz.Bau Forschungs we've also developed a very user-friendly and modular software tool and made it availa-

ble for free (cltdesigner.at). It's worth mentioning the CLT handbooks that have been issued in many countries (including Austria, Sweden and Canada) as well.

### **When will we see a common European CLT standard for manufacturing and calculating dimensions?**

Draft standards are already available both for production and for dimensions and design. It's therefore only a matter of time before standards are issued for the whole of Europe. Eurocode 5 is currently being revised. The new version should include everything to do with CLT. It's hard to give a firm publication date, but maybe 2023.

### **Does CLT have any weaknesses that people should be aware of?**

It's generally worth noting that wood is sensitive to moisture. Moisture can penetrate CLT from both the outside and inside of a building. Particular attention needs to be given to the design procedures for the ultimate limit state and the serviceability limit state, plus the durability of the structure. In this context, it's important to develop solutions that are suitable for wooden structures.

### **Do you have any thoughts about how CLT can be used to reduce energy consumption in a building?**

Wood is a capillary, porous material that is 50% to 60% pores on average. This means wood has a very large inner area that absorbs water from the air. This affects practically all the physical, mechanical and technical properties of wood, including engineered wood products such as CLT. With wooden structures that are protected against the weather, an equilibrium moisture content of around 10% to 12% is usually achieved. This has been demonstrated by long-term measurements taken in wall structures of residential buildings that use CLT. In this desirable band of values, thermal conductivity where lambda is around 0.14 W/mK can be expected. This equates to an equivalent insulation thickness (with lambda 0.04 W/mK) of around 30 millimetres for a 100 millimetre thick CLT wall.

### **Are there any good combinations of CLT and other products that can reduce the amount of material used (statically speaking, a CLT building often has an overcapacity)?**

CLT can be used as an individual load-bearing element and in the form of various hybrid solutions. Rib panels – a wood-wood hybrid of glulam and CLT – are one of the main ways of achieving large spans. Composite solutions with concrete, steel profiles and veneer-based engineered wood products are also worth mentioning. ©



# Bring wood to life with the right lighting

A lighting and room concept by Amanda Ames and Svante Pettersson shows how different types of light zoning and colour temperatures can make the material, room and atmosphere feel completely different.

Ames Studio

**Light and lighting play an important role in the design of a building. This becomes particularly clear when working with natural materials such as wood. Carefully considered lighting brings the wood to life, but get it wrong and it can feel plastic and dead.**

TEXT Sara Bergqvist

One of the most important factors for achieving good lighting is to incorporate light into the early stages of planning.

»Lighting plays a huge role in the overall effect, and including it early on really opens up the potential. It means you can ensure that the material shows off its best side with the help of daylight and artificial light. It also means you can use concealed and integrated installation principles that help to create a different level of detailing and a more thoughtful end result,« says Anna Ekberg, lighting designer at Paloma Design Studio.

There are many different aspects to consider when illuminating wood. The first thing to think about is what situations offer particularly interesting options for pairing up light and wood, and what you want to achieve.

»Do you want to accentuate the wood or rein in the woody feel? Highlight the rough or the soft? Place the focus on the

load-bearing structure or hide it?« comments Torbjörn Eliasson, lighting designer at White Arkitekter.

He is currently involved in lighting IKEA's new design office in Älmhult, with its exposed glulam beams and heavy-duty wooden posts. These are going to be lit in a way that brings out the honesty of the structure and the warmth of the wood.

»If you have a building with an exposed wood frame, it can be great to accentuate the solid structure rather than magicking it away. This is a principle that also works well in buildings with a wood frame and glass façade,« he adds.

In domestic projects, he often works with frame-sawn timber, which produces wonderful surfaces to light. Shallow-angle lighting really brings out the exquisite texture.

»You don't get anything like the same effect with concrete and plaster. And if you're going to use shallow-angle lighting on a painted surface, bear in mind that it'll highlight every stroke of the paintbrush. In cases like this, I always tend to talk to the tradespeople, so they know where they have to be particularly careful,« he says.

Many people who are not accustomed to working with lighting tend to focus on the design of the light fittings rather than the lighting design and what you want the light to pick out.

»Of course a light fitting can be seen as a

subtle piece of ornamentation, but the most important thing is to actively work with the light to emphasise the chosen features to the best effect. This is true not least when you want to bring out the warmth of wood. I like to aim for simplicity. Wooden surfaces lit with well-shielded light fittings can in turn illuminate the rest of the room,« says Svante Pettersson, lighting designer at Bjerking in Uppsala.

The two bridges Fyrisspången and Edaspången in Uppsala, which he recently lit, are great examples of this. The one bridge is made entirely of wood, while the other is steel with cabin sole decking.

»The pale cabin sole flooring reflects light up onto the trusses above. When you look at the bridges from the side, you can see how the arches are gently accentuated without any visible light source illuminating them,« he says.

The floor of the wooden bridge has a natural, neutral wooden colour, but the fencing has been painted with a darker stain.

»This makes the floor stand out most and we get a good balance. If everything had been the same light colour, there would have been a real hardness along the top edge,« says Svante.

It is also important to bear in mind that wood changes colour over time, and with painted and treated surfaces their glossiness should also be taken into account.

»If the surface is shiny, you don't want too hard a light that creates unwelcome flashes



Paloma Design Studio did the lighting for the Frantzén restaurant in Stockholm. Soft light on the walls creates a cosy feel. The charred end-grain flooring is lit with a more contrasting light.

Etik Lefvander



Fyrisspången's pale cabin sole decking reflects light up onto the trusses above. From the side, the bridge's arch stands out without any further light sources.

Svante Pettersson

and reflections and makes the material look plasticky,« advises Sofie Bamberg, lighting designer at Paloma Design Studio.

She feels that gentle and diffuse light often works well in most contexts when illuminating wood, while concentrated points of light on the wall have a tendency to distort the material.

»Of courses this varies, depending on the building and the room and what you want to emphasise. In some cases, you might want to create contrasts. A good example of this might be lighting semi-transparent structures such as slatted wood panels and rattan, creating interesting contrasts and shadows,« says Sofie.

Another consideration is the colour temperature, which is measured in Kelvins. Low colour temperatures mean a warmer tone, like the light from a candle or a fire, while high colour temperatures give a colder light that is more like daylight.

»When lighting wood, we work almost exclusively in the warm spectrum, rarely higher or colder than 4,000 Kelvins. A warm light with good colour rendering is generally better for accentuating the natural properties of wood,« says Anna Ekberg.

Svante Pettersson adds that sometimes you may need to go very low down the Kelvin scale to achieve a pleasant warmth from LED lights.

»To achieve the same warm feel that you used to get from the old incandescent lamps, you may need to go down to 2,300 Kelvins or even 1,900 if you really want to get the full effect,« he says.

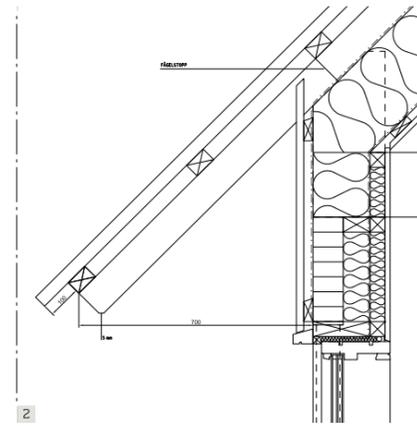
However, there is more to it than simply looking at the colour temperature. It is at least as important to make sure you use light sources with good colour rendering, which is measured in cri (colour rendering index).

»The colour rendering should come in at a

minimum of 90 CRI, preferably more, and the light source must have good rendering across the whole spectrum. Rendering of the red tones is particularly important when lighting wall materials such as wood. LED light sources with poor rendering in the red spectrum can create a distorted and unnatural look,« says Anna Ekberg.

To get the best results, it is important to experiment and to test the light source and the light fitting you want to use against the intended material. The combination of the light fitting's location, the colour temperature and colour rendering of the light source and the texture of the material is going to affect what gets accentuated.

»One kind of light might make the wood look shabby, another might make it look refined and a third could render it invisible. That's why you should always do a trial set up with the right light fitting in the right place,« says Torbjörn Eliasson. ☺



# Honest materials in harmony create an exciting whole

**Behind the dark, charred façade hides a light interior with plywood walls and rafters that give the long room a different feel. The holiday home on Vaddö showcases an ingenious combination of multiple materials and techniques.**

TEXT Johanna Lundeberg PHOTO Åke Eson Lindman

The dark, robust façade sits discreetly on the rural plot. Here, in the Roslagen archipelago, the chilly winds of the rugged coast meet the island's warm and sunny glades. The holiday home is located right on the border, with one side facing the sea, and therefore had to be both open and closed to the changing landscape.

»A key element of the home's architectural concept was that it should be honest and simple, and make use of solid, durable materials,« says architect Gustav Appell.

The house has quickly blended in to become a fixture of the area, largely thanks to its façade, inspired by the Japanese shou sugi ban technique, which involves burning the

cladding. The result is a charred surface and a durable material that requires minimal maintenance. The technique remains uncommon in Sweden, and none of the construction team had used this method before, so it was a case of trial and error for everyone, including carpenter Niklas Lundblad. Gustav Appell describes the method as easier than you might think.

»They used a gas torch, the same kind you use to lay roofing felt. Of course, it does take a bit of practice to get the right look.«

They therefore tried burning the first few small areas for different lengths of time and over several rounds, to see which result they wanted to use. Then the cladding was cleaned with a wire brush, installed and finally treated with linseed oil.

»The time it took and the overall cost came in at around the same as it would if we'd painted the house, with the difference that future maintenance will not require nearly as much work. Minimising the need for maintenance was a clear part of the brief from the family. What's more, the façade has exactly the special look we were after. Rough,

1. The sturdy size of the rafters contrasts with the slimmer forked uprights, creating a design that affects the whole look of the room.
2. Detail, eaves and wall.
3. The pine façade has been charred using the Japanese shou sugi ban method, and now requires little maintenance.
4. The glazed sections slide across to get closer to nature, but the more private areas have smaller windows to avoid a fishbowl effect.
5. The pine plywood walls provide a fine contrast with the polished concrete floor. The mix of materials allows for plenty of exposed wood, without it becoming overbearing.

but with a soft, tactile surface,« says Gustav.

The combination of the muted façade and the light roof in corrugated zinc creates an exciting picture. There were many reasons for choosing zinc.

»It's a maintenance-free material, it ages attractively and in its corrugated form it has a clear and distinctive appearance that matches the unusual façade,« Gustav explains.

Many of the structural and technical solutions follow traditional building methods, with mineral wool insulation and a concrete floor with inset underfloor heating. Coupled with generous glazed sections that can be slid all the way to one side during warm days for full contact with the outdoors, the floor offers a distinct contrast with the rest of the interior, which is entirely made of wood, with walls finished in pine plywood and an exposed roof structure, also in pine.

»The relationship between the different materials creates a harmony and ensures the wood isn't too dominant. At the same time, it was important for us to reveal the wood internally as well, to emphasise the architectural

## Villa Vaddö NORRTÄLJE, SWEDEN

ARCHITECT: Gustav Appell

Arkitektkontor.

CLIENT: Private.

STRUCTURAL ENGINEER:

Thorbjörn Dorbell.

BUILDER: Niklas Lundblad,

Måttstocken.

AREA: 90 square metres.

[www.gustavappell.se](http://www.gustavappell.se)

concept – to show that this is a wooden house. It's meant to come across as a hand-crafted building that is easy to understand.«

The eye-catching roof is designed to give the long room added character. It had to be possible to build the structure on site, and it had to be attractive enough to be left exposed. The wood used for the exposed roof trusses is premium, knot-free timber, the dimensions of which were chosen partly for aesthetic reasons. The sturdy 45x195 millimetre beams contrast with the slimmer forked uprights, a 22x120 millimetre board on each side of the centrepoint on the beam. The upper frame is connected to the lower one in a simple manner with nailed plywood plates (node reinforcement) hidden inside the wall. However, the uprights are fixed to the beams with a prominent stainless steel bolt, washer and nut.

»The whole house, and everything we do, features a conscious and creative relationship with the structure. It should be allowed to influence the design and the architecture, and the fact that it's clearly visible only enriches the building,« says Gustav Appell.Ⓜ



# BUILD BACK BETTER

**As we rebuild Britain, we can decide whether to carry on as usual or build a greener future.**

Stirling Award-winning timber frame housing by architects Mikhail Riches.  
Photo ©Tim Crocker

**The Committee on Climate Change advised: “Using wood in construction to displace high-carbon materials such as cement and steel is one of the most effective ways to use limited biomass resources to mitigate climate change”.**

**Furthermore it recognizes that: “costs of using wood as a construction material are essentially negligible”.**

Using wood from sustainably-managed forests instead of other materials is a good way to reduce CO<sub>2</sub> emissions. For more information visit [woodforgood.com/CO2](http://woodforgood.com/CO2)

Wood CO<sub>2</sub>s less is a collective mark of Wood for Good Ltd.

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