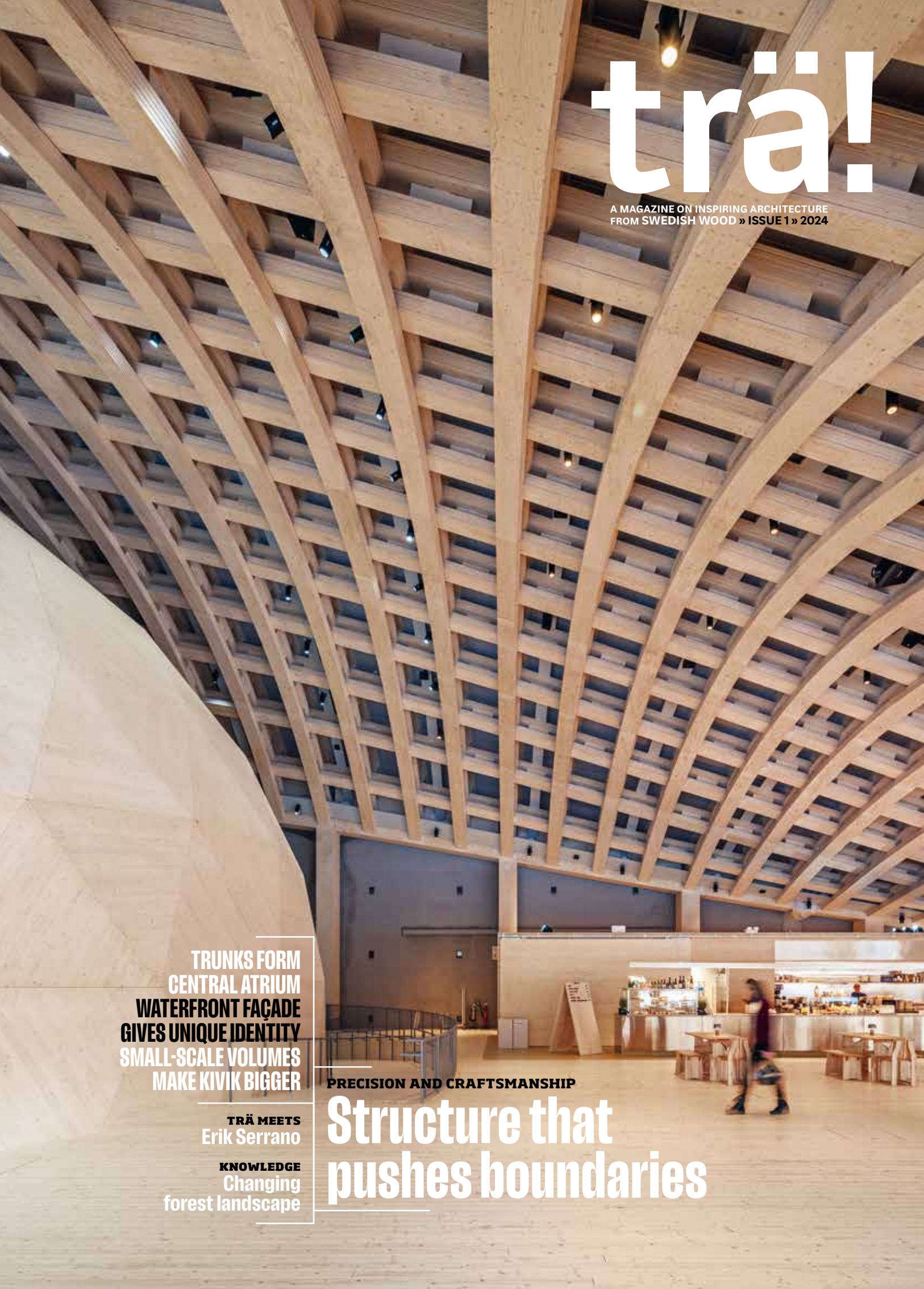
trä!

A MAGAZINE ON INSPIRING ARCHITECTURE
FROM SWEDISH WOOD » ISSUE 1 » 2024



TRUNKS FORM CENTRAL ATRIUM

WATERFRONT FAÇADE GIVES UNIQUE IDENTITY

SMALL-SCALE VOLUMES MAKE KIVIK BIGGER

TRÄ MEETS
Erik Serrano

KNOWLEDGE
Changing forest landscape

PRECISION AND CRAFTSMANSHIP

Structure that pushes boundaries

Restaurang Rummel på 375 kvm är belägen mellan Norra Stationsgatan och Dalagatan. Det sluttande taket är tio meter högt i ena änden och fyra meter i den andra. Fastighetsägare är Humlegården Fastigheter, arkitekter är den danska byrån Henning Larsen Architects och Martinsons Byggsystem har ansvarat för projekteringen och monteringen. Trästommen i limträ och taket i KL-trä har tillverkats i Holmens sågverk i Bygdsiljum.

trä!

ISSUE 1 » 2024
VOL. 37 » CONTENTS

Kyrre Sundal

Concave shapes in a geometric whole

Kristiansand's first tall wooden office building features concave green façade elements, a nod to the North Sea beside it and a symbol of the building's sustainability profile. Making the entrance level circular also softens the visual impact of the building..

SWEDISH WOOD

Swedish Wood disseminates knowledge about wood, wood products and wood in construction, contributing towards a sustainable society and a thriving sawmill industry. We achieve this by inspiring, educating and driving technical advances.

Swedish Wood represents the Swedish sawmill industry and is part of the Swedish Forest Industries Federation. Swedish Wood represents the Swedish glulam, CLT and packaging industries, and collaborates closely with Swedish builders' merchants and wholesalers of wood products.

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Editorial

Anna Ryberg Ågren Director, Swedish Wood

Count the benefits of carbon storage

ONSALA, SWEDEN The construction sector recently launched an updated roadmap for fossil-free competitiveness. The goal remains for construction to be climate neutral by 2045 and for its climate footprint to be halved by 2030, compared with 2015 levels. But we are already capable of building with half the climate footprint, and the message from the UN IPCC is clear: to reverse the trend, we must use existing technology – now.

Building with wood is by far the fastest way to reduce climate emissions here and now. Not only is the climate impact of the production process low, but the CO_2 absorbed from the atmosphere as the trees grow remains stored in the wood products as carbon throughout the life cycle of the building. The carbon stored in wood products is included as a negative item in international climate reporting for the land use sector, and the EU's recently adopted carbon removal certification framework also includes carbon storage in long-lasting products, such as wood-based building products, with a duration of at least 35 years.

However, it is not included in the context of climate declarations. As I see it, carbon storage should obviously be included as climate declarations are extended to cover more parts of the life cycle, not least to highlight the positive climate effect of the carbon stored in wooden buildings, for example. Using buildings as carbon storage requires no additional investment and is therefore a cost-effective way to capture carbon.

Another key factor for sustainability is ensuring that the buildings we construct have as long a life as possible, and architecture is crucial in this regard: we shouldn't prematurely demolish anything that is still both functional and beautiful. The Swedish Wood Award is a way for us to acknowledge good architecture in wood, choosing a winner every four years. In the last issue, I wrote that I was looking forward to watching the series on YouTube and following the jury's work. Having seen all the episodes, I can report that all the exciting wood projects made for an incredibly interesting journey through Sweden! If you missed it, the series is still available on the Swedish Wood website, while on the next page you can read more about the winning entry.

Another recently concluded event is the »New Eyes on Wood« architectural competition, a collaboration between Stockholmsmässan and Swedish Wood, supported by Architects Sweden. The winning entry »Masses in motion« by Simon Viklund and Tore Lagerquist will appear at the Nordbygg construction fair in Älvsjö in April. See you there!

Anna Ryberg Ågren

Emil Nordin

Sara Kulturhus wins Swedish Wood Award 2024. The building has a largely wooden façade on a CLT and glulam frame, with stiffening steel beams in a utilities level between the low and high sections.

Sara Kulturhus wins the Swedish Wood Award

OBJECT Swedish Wood Award winner 2024
ARCHITECT White arkitekter
DEVELOPER Skellefteå Municipality
STRUCTURAL ENGINEERS DIFK & TK Botnia
CONTRACTOR HENT Sverige

STOCKHOLM, SWEDEN The winner of the 14th Swedish Wood Award is Sara Kulturhus, a 20-storey arts centre with a distinctly wooden feel inside and out. Oskar Norelius and Robert Schmitz, the lead architects from White, developer Skellefteå Municipality and the structural engineers from DIFK and TK Botnia, together with contractor HENT Sweden, have created a building that richly deserves the spotlight.

Following a process that began with 145 entries and 30 site visits around Sweden, the jury announced the winner on 21 March.

»Sara Kulturhus has become an international trailblazer for wood construction and a real source of inspiration,« says jury chair Rahel Belatchew.

In addition to the Wood Award horse statuette and the great acclaim, there is also a cash prize of SEK 100,000. Congratulations to everyone involved and to Sara Kulturhus itself!

Watch the Swedish videos about the winner and the nominees at trapriset.se and read previous articles in Trä issue 3, 2021 and 4, 2021 at woodarchitecture.se.«

W| trapriset.se, woodarchitecture.se

Creative summer retreat

OBJECT Villa Minimale
ARCHITECT Clemens Kirsch architektur

VIENNA, AUSTRIA On an allotment site outside the city, regulations limited buildings to a floor area of 35 square metres and a maximum height of 5 metres, so some creativity was required to create a cosy but optimum retreat for a family of two adults and two children.

Four equal rectangular wooden boxes with monopitch roofs are arranged in a pinwheel formation, with the protrusions each forming a niche. Windows of varying shapes and sizes allow the landscape to flow through the building, creating views in all directions. The interior is framed by pine panelling and the exterior is clad in pale-glazed wood with a copper roof.

The communal areas are located on the ground floor, along with a cosy alcove for those who want peace and quiet without withdrawing completely. At the heart of the building, a circular opening has been cut out between the two floors, establishing an airy atmosphere. The upper floor has three sleeping alcoves with skylights giving views of the starry sky.«

W| clemenskirsch.at

Hertha Hurnaus

The opening between the floors combines with all the windows to give an airy interior.

Sebastian Schels

The visitor centre, built from local, untreated timber, provides space for both information and exhibitions.

Visitor tower for information and panoramic views of the mountains

OBJECT Haus der Berge
ARCHITECT Delueg architekten
STRUCTURAL ENGINEER Julian Marseiler

SEXTEN, ITALY In autumn 2018, a storm tore through the South Tyrol, felling many trees in its path. Now, some of the pine and larch timber has been given a new lease of life in a visitor centre designed to teach tourists more about the Dolomites World Heritage Site. The wood is untreated and no glue, paint or plastic was used in the project.

Built by local craftsmen, the five-storey tower stands as an architectural link between the mountains and the valley, and the municipality hopes that it will raise awareness of the distinctive landscape, its ecosystems and inhabitants. The visitor centre provides maps and information for those who want to get out into the mountains, but there are also exhibitions about the village and surrounding activities, all framed by knotty timber, as well as a mezzanine floor with striking wooden details. And those who climb the stairs all the way up to the panoramic rooftop terrace are rewarded with stunning views of the impressive mountain range. Almost like taking a tour of the peaks.«

W| delueg.com

Lara Swimmer

Curved glulam arches inspired by the surrounding topography form a new sports hall.

Curved arches embody nature and function

OBJECT Multi arena
ARCHITECT Opsis architecture
WOODEN STRUCTURAL ENGINEER Structure craft

MOSCOW, USA A new arena for sports, concerts and student events stands at the entrance to the University of Idaho campus. The curved glulam arches of the roof structure envelop the hall in a warm and welcoming embrace, in a design that also defines the spectator experience. The shape of the roof was inspired by the rolling landscape around it, in a project that also involved creating a new vertical structure for taller buildings.

But the choice of materials was not just about green construction. It was equally important to support the development and economy of an area that has been through some tough times, with the region reporting that work on the new arena has had a positive impact on local foresters, businesses and families.

The project is a collaboration with the College of Natural Resources, which is part of the university and was able to provide timber from its own experimental forests. Around 80 per cent of the 1,400 cubic metres of wood used was sourced this way.«

w| opsisarch.com

Roofed raft protects the environment and birdwatchers

HELSINKI, FINLAND Birdwatchers often stand in one place for a long time, waiting quietly so as not to disturb the birdlife around them, but now in Vanhankaupunginlahti nature reserve, they can sit comfortably in a floating hide in the middle of the reeds. The walls, floor and roof are made of locally grown, untreated larch, the grey surface of which allows the building to blend in with nature. The widely spaced slats in the walls let in sunlight and provide good views from wherever you sit, but without disturbing the birds.

To preserve the sensitive habitat, the raft was built on the other side of the inlet and towed to its location. If it later needs maintenance, it can easily be moved, limiting traffic in the area. Because it is floating on pontoons, it also leaves no footprint.

The viewing point is also meant to attract non-birdwatchers who just like being out in nature. Connecting to the platform is a fully accessible larch walkway that runs through the reserve for a kilometre.«

OBJECT Floating hide
ARCHITECT Studio Puisto
STRUCTURAL ENGINEER Jukka Reinikainen, Rakennusasiaintoimisto Aarre

w| studiopuisto.fi

Marc Goodwin

The shelter should provide a comfortable place for birdwatchers while being sufficiently secluded to avoid disturbing the wildlife.

Sociability through openness

SKAGEN, DENMARK What is known as Skagen's black period, when the houses along the sea were clad in tarred or painted wood, lasted until around 1875. As timber was in short supply, driftwood from the many shipwrecks around here was put to use. This history has now inspired a new beach house's dark façade of black-painted wood and its thatched roof, another nod to the past.

OBJECT Klitgård house
ARCHITECT PAX architects
STRUCTURAL ENGINEER Ole Møgelmose

The steep slope of the gable roof is a key feature of the interior. Open to the ridge, it gives the feeling that everyone is together under one roof, no matter where you are in the building. More intimate spaces contrast with the open areas, where the exposed glulam structure elegantly breaks up the scale of the ground floor, while the fireplace in the centre of the hall creates an extra room within a room.

Sliding glass panels along both lengths of the kitchen, framed in oak, create a seamless transition between outside and inside, as part of the vision for the house to blend in with nature.«

W| pax.dk

Rasmus Hjortshøj

The open roof and airy spaces give the feeling that everyone is together, even when in different rooms.

Thibaut Voisin

The day nursery and toy library in contemporary materials is the first stage in the regeneration of the neighbourhood.

Preschool and toys set tone for new neighbourhood

VELIZY-VILLACOUBLAY, FRANCE As the first part of a 1960s complex is given a more contemporary makeover, a former car park has taken on a new function. The focus is now very much on children, with a nursery and a lending library for toys under one roof. The building is framed by plants, both around and on the roof, and there is also a shallow pond just outside the window.

While from the outside the building looks closed, with no way of peering in, it is very much open inside, where the high ceilings provide a light and airy environment. Wood of various dimensions – exposed glulam beams and frames around doors and windows – combine with linear light strips to draw the eye out to the garden's decks and play areas.

The façade's grid of poplar slats, complemented by recycled sheets of coppery zinc, also plays an important role in shading the interior from the sun. The project has reused both slate and tree trunks from the site.«

OBJECT Preschool and toy library
ARCHITECT A+ Samueldelmas architects
STRUCTURAL ENGINEER Batiserf

W| samueldelmas.fr

Stephan Werk

The steep slope of the roofs allows snow to fall off easily, while also echoing the visuals of the surrounding mountains.

Cabins with a 70s feel

COLORADO, USA A-frame houses became an increasingly common sight in the US in the early 1970s. The small and relatively simple buildings were a popular and fairly easy way to create your own retreat, and in ski resorts and other snowy locations in particular, the steeply pitched roof served an important function in encouraging the snow to drop off. Now, a hotel in the Winter Park ski resort has taken this as the inspiration for a small collection of cabins, beautifully nestled among pine trees and close to both ski slopes and riverside walks. Prefabricated in modules, the 31 cabins have a dark metal roof that contrasts with the light cedar façade.

From the ground floor kitchen and living room, a solid staircase leads up to the sleeping loft, which is framed by the steeply sloping ceiling. The walls are panelled in birch and cedar. The 42 square metre cabins are slightly raised on plinths, giving a magnificent view of the Rocky Mountains through the large windows.«

OBJECT A-frame
ARCHITECT Skylab architecture
STRUCTURAL ENGINEER Resource engineering group

W| skylabarchitecture.com

Pavilion celebrates the circle of life

MORNICO AL SERIO, ITALY A furniture manufacturer celebrating its 60th anniversary wanted a temporary pavilion to both tell its story and highlight the need for more circular projects in the world.

The structure comprises eleven exposed glulam arches and a grid of glulam beams and joists supporting the angular roof, which is clad in larch shingles. One end has been left open to allow natural light to flow into the space. Inspired by the Italian public buildings that were once the focal point of cities, the portico allows visitors to move around freely and interact while being protected from the weather.

In addition to its sustainability, wood was chosen because it was considered the most suitable material to showcase the temporary architecture. In its changing nature, the wood calls to mind the circle of life, while also making it easy to dismantle the pavilion and put it to new uses elsewhere.«

Filippo Romano

The open form supported by columns is designed to allow visitors to interact.

OBJECT Pavilion
ARCHITECT AMDL Circle

W| amdlcircle.com

Carmen Izquierdo, architect SAR, MSA/arquitecto COAM

Innovations creating a paradigm shift

STOCKHOLM, SWEDEN What happens when something completely new happens? Do we even realise that it has happened? Or does it pass unnoticed in the present, its merit only becoming apparent in retrospect?

Their work makes architects uniquely placed to imagine alternative futures, but realising these visions is only possible when considered alongside ideas about implementation processes.

When architectural ideas drive an implementation process, it is very rare in the Swedish context for them to challenge established norms and break new ground. It is as if the ideas get trapped in a pressure cooker and bubble away, unable to escape. But in the recently inaugurated Wisdome, an extension to Tekniska Museet, the safety valve burst open and the ideas streamed out. The building envisioned by architects Elding Oscarson and engineer Florian Kosche captured the imagination of Swiss carpenters and engineers, who were fired up to create the technical solution and details.

The building, which had to be respectfully integrated into its context, consists of a weatherproof hall and a projection room for an immersive 3D cinema experience using the latest technology. Its form was adapted to both strict planning regulations and internal functional requirements, resulting in an internal spherical shell for the cinema auditorium and an enveloping free-form roof that sits on fully glazed external walls, extending the spatial experience into the museum's yard. The architects proposed a timber structure based on the gridshell principle, consisting of an undulating grid system in five layers of timber beams, spanning 48 metres without columns. While this structural approach has been previously explored, for example, by Frei Otto in his pioneering Multihall in Mannheim in 1975, there is no precedent in Sweden of the same scale and function, although there are smaller and less complex examples such as the Portalen pavilion in Hageby, Norrköping, created by Map19 Barcelona.

As a visitor, I would like to thank Tekniska Museet for getting the project across the finish line, and the architects, the engineers, the industry through wood supplier Stora Enso, the wood manufacturers, the structural engineers and the craftsmen from Blumer-Lehmann, for not only creating a unique building, but also pushing the boundaries of what is possible.

Go there, experience it in the flesh and be inspired by this rare work that, against all odds, has been both created and built in our capital city. Now we know what it takes to drive progress in our field: an idea-driven, knowledgeable, passionate and bold collective effort.

This is an opinion piece. The views expressed are the writer's own.

NEW TYPOLOGY TIES CULTURAL DISTRICT TOGETHER

PHOTOGRAPHER
Jan Bitter
OBJECT
Commercial building
ARCHITECT
Office
Park Scheerbarth
STRUCTURAL ENGINEER
Buro Happold

BERLIN, GERMANY Until the early 19th century, the Holzmarkt area on the River Spree was a main timber port for Berlin. When Berlin was divided, the area became a border zone between east and west, and after reunification the site was too polluted by past industry to be fully utilised. Instead, it became home to one of Berlin's famed techno clubs. Just over ten years ago, the area was developed into a cooperative cultural district with a concert hall, nightclub and restaurants attracting 500,000 visitors every year.

Now the area's first wooden building has landed among the mixed and seemingly improvised architecture. Clad in bright red wood, the three-storey building serves as a main entrance to the area. Its curved form is composed of simple geometric volumes, while the roof terrace is integrated into the district's sequence of open walkways and bridges, linking the block to the other buildings and creating a natural flow between them.«

- To stay on budget and ensure a small footprint, they used resources that were already in place, such as sharing a stairwell with the neighbouring building and using an existing basement as a foundation.
- The structure is a combination of both mass timber and CLT. The timber frame is prefabricated and all the elements are screwed rather than glued so they can be dismantled and reused.

w| o-ps.com

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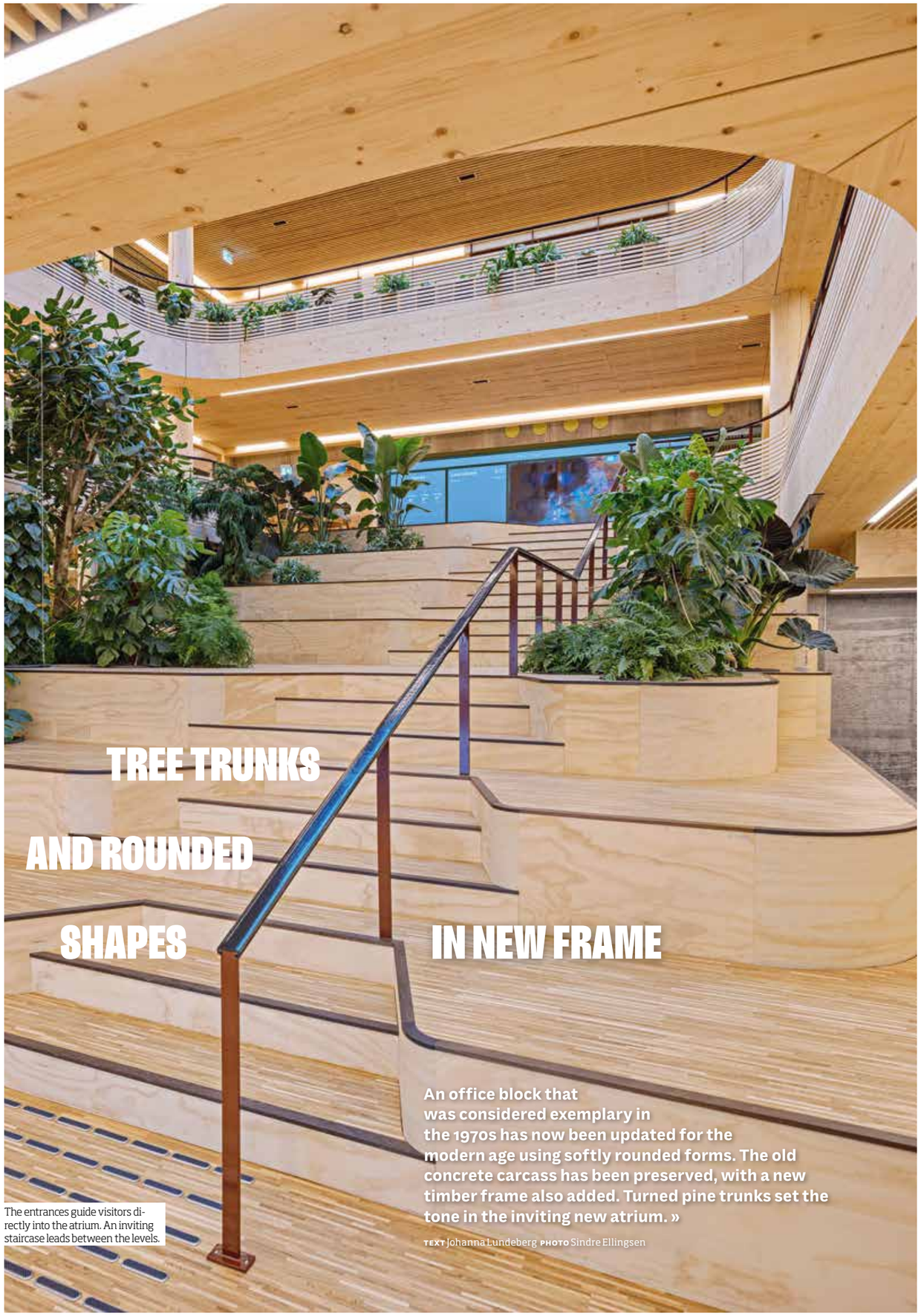
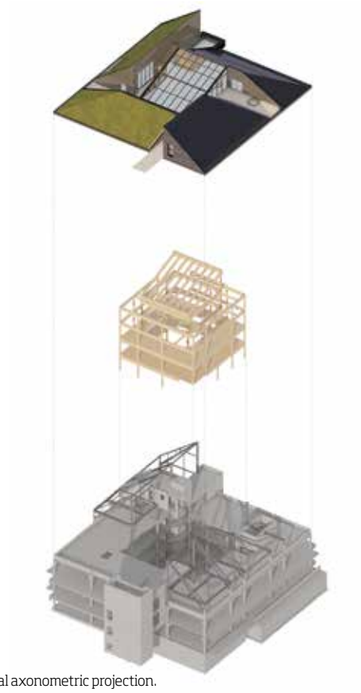


TREE TRUNKS AND ROUNDED SHAPES IN NEW FRAME

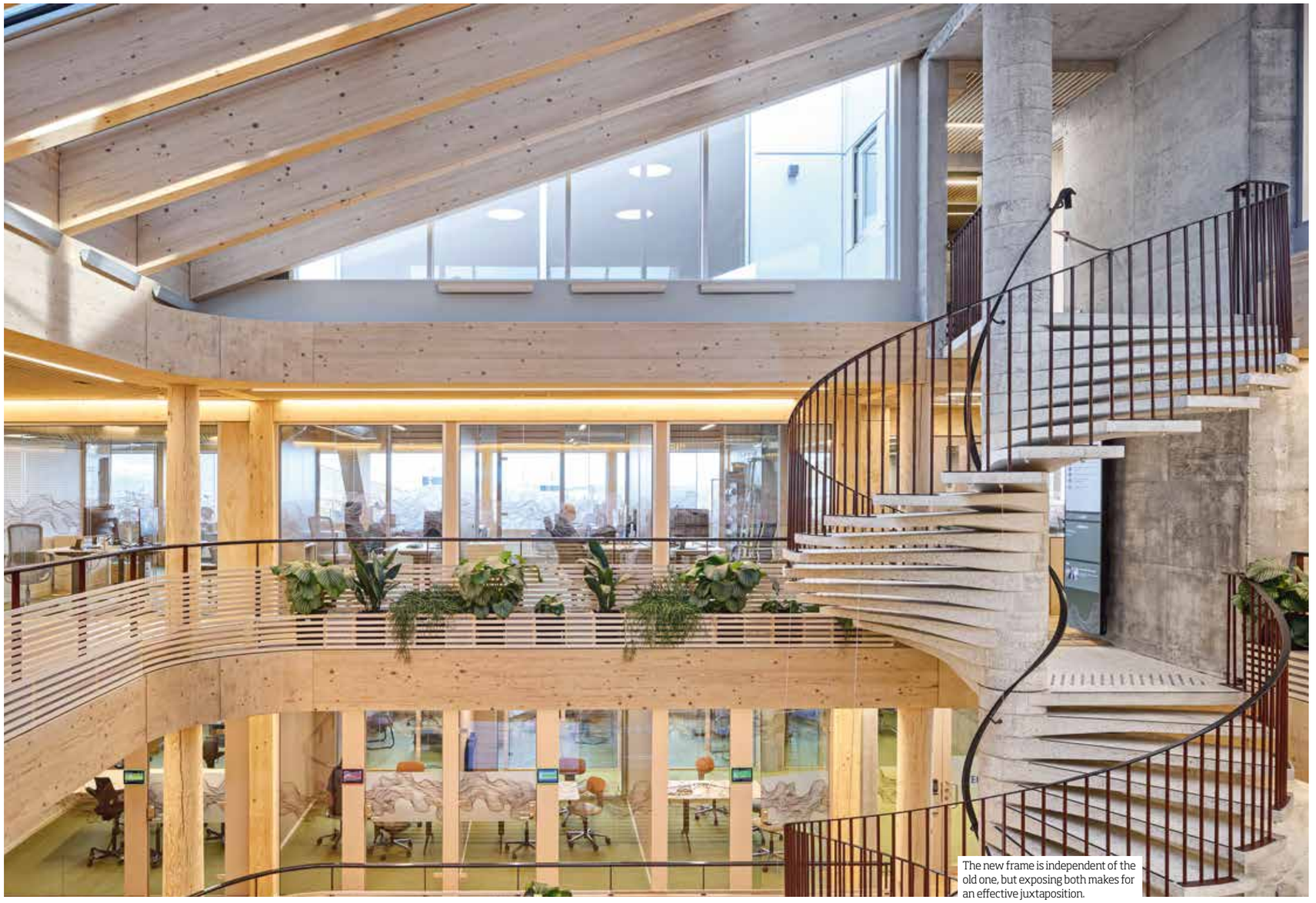
An office block that was considered exemplary in the 1970s has now been updated for the modern age using softly rounded forms. The old concrete carcass has been preserved, with a new timber frame also added. Turned pine trunks set the tone in the inviting new atrium. »

TEXT Johanna Lundeberg PHOTO Sindre Ellingsen

The entrances guide visitors directly into the atrium. An inviting staircase leads between the levels.



Structural axonometric projection.



The new frame is independent of the old one, but exposing both makes for an effective juxtaposition.

In the 1970s, the Norwegian coastal city of Stavanger, with its strategic location on the North Sea, took on an important new role as the country's oil capital, prompting several industrial companies and organisations to settle there. One of them was the Norwegian Petroleum Directorate, whose very first office has now evolved into a more contemporary offering, with a new property owner and new tenants. Preserved materials meet the new choices, linking the building's history with the future. Ingrid Sekse, lead architect for the project at Helen & Hard, describes her first visit. It was cold and wintry, she was freezing and all she saw was an old concrete structure covered with dull, cold and dirty aluminium tiles. Those are still in the building – but partially repurposed.

»These are fantastic materials that we wanted to reuse and combine with warm and soft wood,« says Ingrid Sekse.

The original property was preserved and the concrete frame now contrasts nicely with the building's wooden extension, but while the cold, hard material is beautifully interwoven with the warm, soft wood to form a visual whole, the new structure is completely free-standing, with columns and beams abutting the concrete frame. Building onto the existing structure while showcasing the new one was a major challenge on this project, explains Ingrid Sekse:

»You always have to deal with the irregularities that exists and the condition of the existing structure. When you start with a clean sheet, the site parameters and how you meet the ground are really all you have to consider. It can be complicated, of course, but here the site parameters are kind of present at every turn, and we wanted the new and old structures to meet.«

THE STRUCTURE IS made of pine and a combination of glulam and cross-laminated timber (CLT) from Germany, but what makes it stand out are the integrated tree-trunk columns that run from ground level all the way to the roof. The trunks are Norwegian pine, turned by Aanesland Treindustri, a manufacturer of ship masts, flagpoles and decorative woodwork. Each column consists of four debarked pine trunks, stacked on top of each other and turned into a conical shape with a larger diameter at the base.

»It's the natural shape of a tree, for one thing, and the loads are greater at the bottom than at the top, so it makes perfect sense structurally for it to look like that. We want it to look and feel like one long trunk, even though there are actually four of them,« says Ingrid Sekse.

The CLT and glulam have been given a transparent fireproofing treatment, while the tree columns have been left untreated. To prevent them from cracking too visibly, the supplier has drilled cavities in the centre of the trunk, which allows the wood to crack inwards rather than outwards.

»We've chosen not to repair and fill the visible cracks because they're a natural part of the wood. The contractor actually started to repair some of them, but they had to undo their work, because we wanted to show off the wood in its natural form.«

When the building was completed in the early 1970s, it largely contained office space and corridors, which was the optimal and efficient choice at the time. But things are different now, with companies and employees expecting other things from their office buildings – not just space for undisturbed workstations, but also group rooms, social areas and inviting meeting places.

»We wanted to focus much more on social sustainability, places to come together and functional meeting rooms, so we started by changing the worst part of the building,« says Ingrid Sekse.

The »worst part« was the inner courtyard between the offices, an open hole in the centre that served no purpose other than as a light well.

»There was no good place to spend time, it was all dark and dreary, so our idea was to turn the worst space into the best.«

And it looks like they succeeded: today the atrium is the beating heart of the building, a light, airy and open space flanked by green plants, and connected by the wide staircase that runs between the two lower floors, helping to create the sense of one large open space.

»This means that you enter the same space whether you come in from the park or the city on the first floor, or from the street that runs past the second floor. So whichever entrance you choose, the atrium becomes your first encounter with the building,« explains Ingrid.

To achieve a good flow in the building, the interior is organised around »onion rings«, with the atrium as the core of the building. This is followed by a ring containing the social zones and, beyond that, meeting rooms, then another ring of »

Architect **Ingrid Sekse**

»WE WANTED TO FOCUS MUCH MORE ON SOCIAL SUSTAINABILITY.«

The aluminium tiles that formerly lined the façade have been reused elsewhere, with fibreboard cladding replacing them.

» open-plan offices and individual offices located at the far end to ensure a good flow of light.

»We want people to come out of their nooks, via the atrium, and meet colleagues or other tenants, which is why we've also put a small kitchen in the atrium, so people don't remain in their own office all day,« explains Ingrid.

The façade is clad with fibreboard that is durable and requires minimal maintenance. The aluminium tiles that previously covered the façade have instead been put to new use on the façade and roof of the recessed sections on the first floor. The rest of the tiles have been reused on another project.

»We've also taken materials from another site nearby and designed them into the building, such as the marble we used for the counters in the café, and a lot of the furniture is reused as well.«

The old concrete spiral staircase that winds all the way up to the top floor has also been preserved, which took some doing. In the original, the spindles between the handrail and the steps were spaced 14 centimetres apart, three for each step, which is too wide under current building regulations. So an additional spindle has been added to give each step four spindles. The entire handrail was removed and a plate was attached to each step so the new spindles could be added. The handrail was then welded back in place again.

TWO NEW SEDUM ROOFS, supported by the timber structure, and bird boxes on the façade will promote biodiversity. The building uses solar panels on the roof and ground source heat pumps as part of its BREEAM rating, taking its energy class from F to A.

»Calculations show that even though the building is now larger, more energy is being saved. This is partly due to the added roofs, which have led the building to consume less than half as much energy as it used to,« adds Ingrid.

The 4,000 square meter floorspace accommodates a range of tenants, including serviced offices and major enterprises. One of these is Veni, which was responsible for the technical installations on the project. Project manager Liv Agathe Backer is pleased with the result, especially the flexibility on offer:

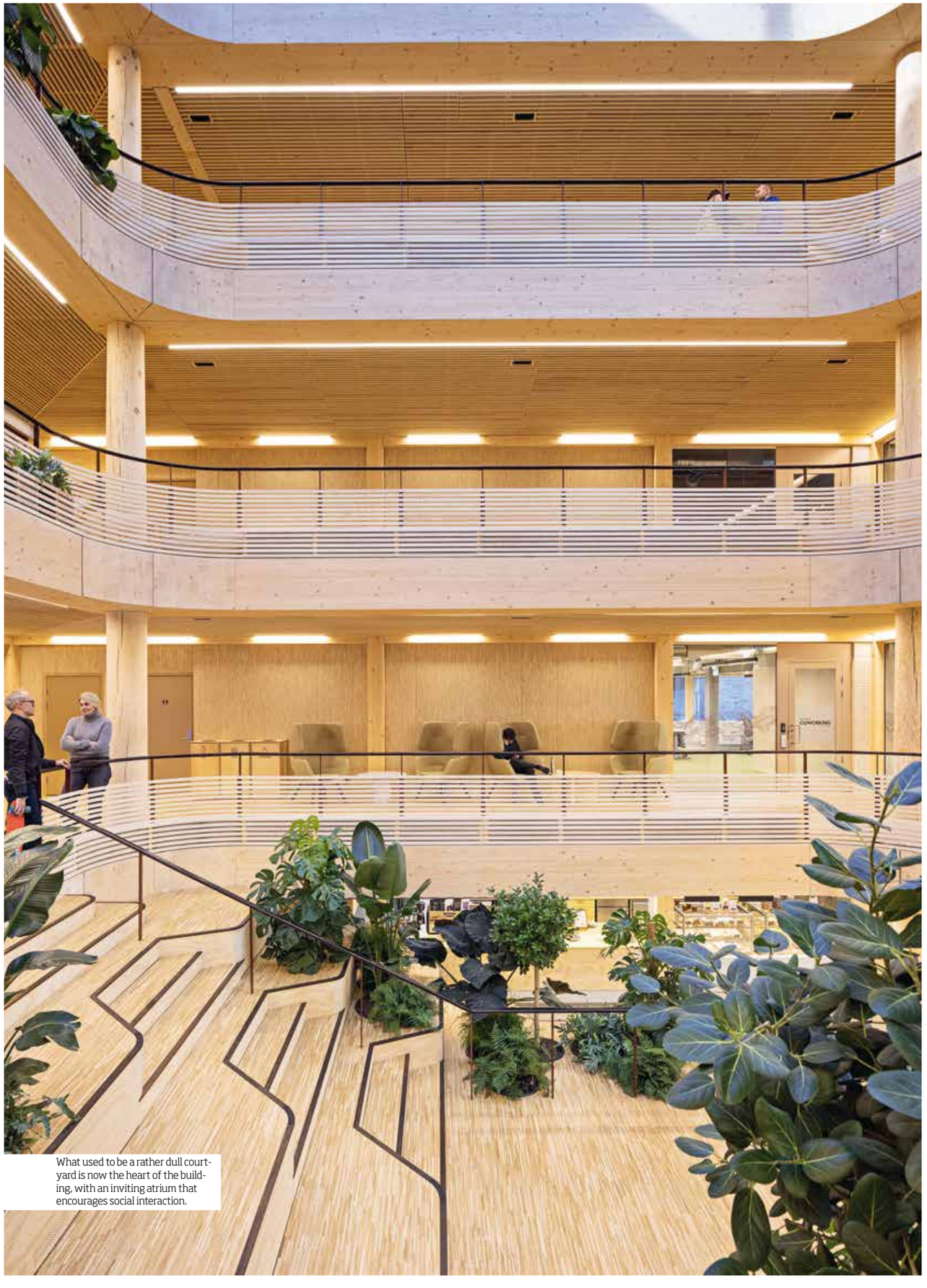
»It was all designed with the future in mind. It's a good building to have offices in, a transparent building with materials that work well together.«

With so many different tenants and open spaces, acoustics are crucial, so the atrium is lined with grasscloth wallpaper to dampen sound, and behind that there are also some acoustic panels.

»If there's one thing developers want, it's good acoustics, because they often get complaints from tenants on that score. But we've only had positive feedback, which is wonderful,« concludes Ingrid Sekse.

Innoasis
STAVANGER, NORWAY

ARCHITECT Helen & Hard.
DEVELOPER Smedvig Eiendom.
STRUCTURAL ENGINEER Procon.
COST Approx. NOK 100 million.
AREA 4,000 sqm.
ENERGY DECLARATION Energy class A.
CERTIFICATION BREEAM Very Good.
W| helenhard.no



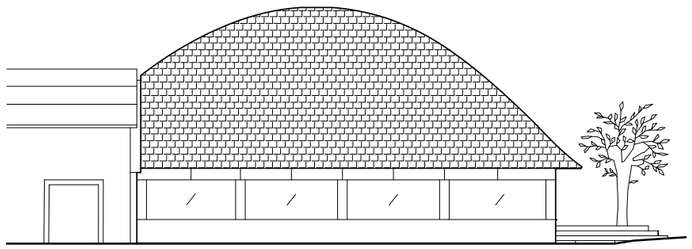
What used to be a rather dull courtyard is now the heart of the building, with an inviting atrium that encourages social interaction.

Wooden hall for visions and knowledge

The sophisticated Wisdome Stockholm extension has now discreetly settled into Tekniska Museet's yard, allowing visitors to experience the majestic timber hall and the domed theatre where state-of-the-art 3D technology makes our complex universe a little more understandable. »

TEXT Katarina Brandt PHOTO David Valldeby

The dome sits independently within the hall, allowing for flexible use. The lifespan of the hall is thus not dependent on that of the dome.



The west façade shows how the hall joins with the existing museum building.

Wisdome Stockholm has attracted considerable attention ever since the first ground was broken in February 2022. Now Tekniska Museet has thrown open the doors to the new domed theatre and the surrounding timber hall, which measures 1,325 square metres. The building is pioneering in so many ways and is considered one of the most advanced of its kind in the world. Its crowning glory is the arched roof with its huge spans of 26 x 48 metres. Entirely self-supporting, it is constructed using gridshell technology with double-curved beams that both bend and twist.

The structure consists of a 25-layer grid comprising over 20 kilometres of laminated veneer lumber (LVL) from Stora Enso, the main partner supplying the load-bearing parts of the wooden structure. The LVL was shaped and assembled on site with a margin of error of less than one millimetre. The dome itself is composed of 277 unique triangles, made of cross-laminated timber (CLT) from Stora Enso's Grums factory, assembled into a self-supporting spherical shape. Standing at just over 12 metres tall with a diameter of a little over 21 metres, the sphere contains a hundred seats and world-class visualisation technology, with huge computer clusters and projectors providing 3D experiences on a screen of more than 300 square metres.

»Since we were involved in the project from the concept stage, we were able to find an innovative way to realise the building using CLT and LVL elements in our standard dimensions. It's great to have this public building that allows everyone to see the amazing design and experience first-hand what you can actually do with wood,« says Jessika Szyber, Business Development Manager at Stora Enso.

The café has a window onto the high-tech geothermal system, plus a description of how it works.

THE WOODEN STRUCTURE and the dome combine to create a majestic yet warm and inviting spatial experience. Although the spherical dome forms the core of Wisdome Stockholm, the architectural firm Elding Oscarson worked closely with structural engineer Florian Kosche from wood construction company Blumer Lehmann to make the enveloping wooden hall an attraction in itself.

»The most obvious solution would have been to have the dome protruding from a lower volume, but to create a sense of expectation inside and an interesting external shape, we chose to place the freestanding dome indoors instead. Now the wooden hall and the dome can be used independently, and if the dome stops being relevant in the future, it can be dismantled without affecting the hall,« explains Johan Oscarson, architect at Elding Oscarson.

Tekniska Museet wanted to improve the flow of the museum, not to mention accessibility for visitors with wheelchairs or buggies. The level changes between the entrance, the machine hall and the extension are now managed by means of ramps that lead visitors down to the modest connecting corridor and into the extension. The museum also wanted to connect the extension to the outside space, where the low façades of the extension echo the scale of the lower buildings around the yard and the undulating roof reflects the shape of the machine hall.

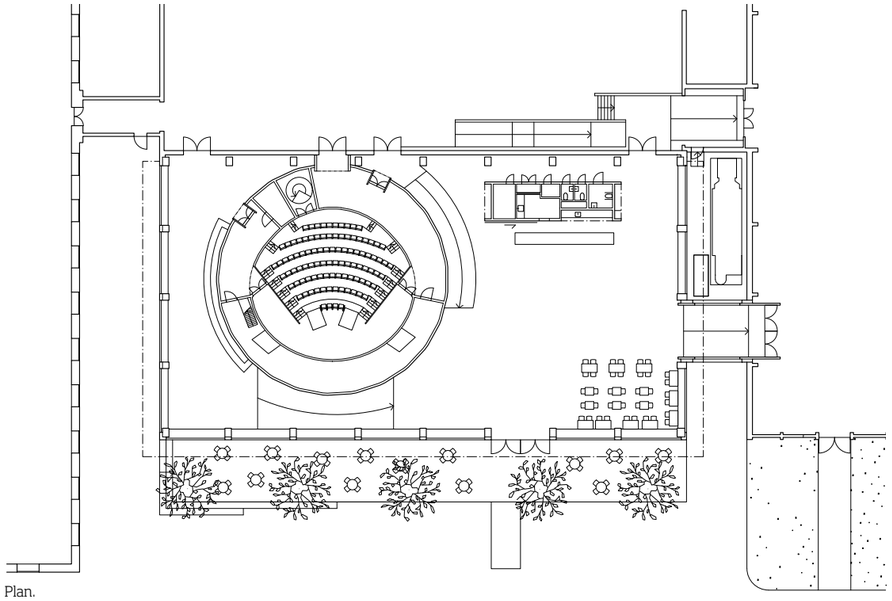
Shape, geometry and the sense of scale create a powerful space that takes visitors' breath away. But what is the secret to making it feel warm and cosy, like a living room?

»Our amazing collaboration with the other members of the project team enabled us to maintain and develop the sharpness of the finish and the detailing. It's also a lot to do with the low, glazed façade, which draws the light in from below, creating beautiful textures and shadows. Then, of course, the tactility of the wood plays a huge role, as do the acoustics, with none of the noisy echoing that is so common in large volumes. The spruce floor also helps. It feels almost rustic, a bit like the shingle roof outside,« says Jonas Elding, architect at Elding Oscarson.

In addition to the dome, the wooden hall has a CLT café area, along with tables, chairs and benches specially designed for the project by the Automobile design studio. Being a flexible open space allows the museum to bring in more dynamic content, such as events, festivals and concerts, which is a new departure for them. In the spring, the museum's Talbar debating venue will focus on themes such as wood and architecture, and a new three-year exhibition on the forest will open in mid-May. Tekniska Museet will also be involved in various collaborations, including one with Architects Sweden, to organise deep-dive architectural tours. »

Architect **Jonas Elding**

»THE LIGHT IS DRAWN IN FROM BELOW, CREATING BEAUTIFUL TEXTURES.«



Plan.

» »We've designated 2024 as the museum's year of the forest and wood, when we will focus on being a platform for conversations about wood, forests and the role of wood products with regard to climate change and innovation. Wisdome Stockholm will be a kind of central showcase for the possibilities of wood,« says Fanny Söderström Aupeix, Head of Exhibitions and Experiences at Tekniska Museet.

The newly laid timber deck is a perfect sun trap leading out to the yard, where visitors can sit when the weather permits. This outdoor space will be complemented by vegetation and a visible, educational stormwater system. The environment will have a more adult feel, inspired by places like the Jardin du Luxembourg in Paris and the Blå Porten courtyard restaurant next to Liljevalchs in Stockholm, where visitors can relax and have fun.

Mikael Olsson

The roof is clad in heartwood pine shingles to signal that this is a wooden building.

The yard is also the best place to get a view of the undulating roof, which is clad in 85,000 shingles made from Finnish heartwood pine by Nykarleby Spåntak in Ostrobothnia, Finland. The shingles come from butt logs with a very high proportion of heartwood. With regular maintenance, the manufacturer expects the roof to last at least 150 years, depending on the weather, compared with a sapwood shingle roof, which would last around 20–30 years. This says a great deal about the importance of the raw material.

THE AUTOMOBILE DESIGN studio that produced the furniture for the hall has a wide range of expertise that embraces both traditional craftsmanship and ideas that challenge what a piece of furniture can be. The furniture project was carried out as a collaborative project between Tekniska Museet, industry body Swedish Wood and Open Wood, with Swedish Wood providing the materials. Open Wood, a hub for experimental and design-driven projects focused on wood, was responsible for the production of the furniture in its workshop in Dals Långed.

The result of the project is a beautiful and functional furniture range, where the table can be loaded up with two benches and a chair underneath and then easily moved around using the clever wheelbarrow handles and wheels. The furniture is made of birch in a knotty grade that clearly demonstrates what furniture can look like when more of the log is utilised.

»To increase the use of locally produced hardwood, we need to shift our views on knotty wood and emphasise how we can build beautiful and functional furniture when the wood is used properly,« says Klara Fahrman, a furniture designer and one of the members of Automobile.

Technology, design and craftsmanship were ever-present as the group discussed strength, function and interaction with the space, which led to the furniture's expressive connections, including the iron brace between the table legs »

The tables, fitted with wheels and handles for easy movement, were created by the Automobile design studio.

Meet the architects **Jonas Elding & Johan Oscarson**

»Wood is fantastic, but not the only option«

The challenging task of designing and realising Wisdome Stockholm has not dented Jonas Elding and Johan Oscarson's enthusiasm for wood.

Anna Gerdén

IN FACT, their interest has increased, and they are keen to explore more from several different perspectives, such as the qualities of different materials, their properties and different structures.

»We haven't done a huge amount in wood before. It's a material with fantastic properties, but it's not the only option. We love other materials too, and the best approach is of course to begin with the purpose and choose what suits best, although wood currently has many things in its favour,« says Jonas Elding.

Working on Wisdome Stockholm has deepened the architectural duo's knowledge not just of wood construction, but also of processes and working practices. They single out the collaboration with the Swiss company Blumer Lehmann on the complex design and the fact that they now have a network of cutting-edge experts in wood construction.

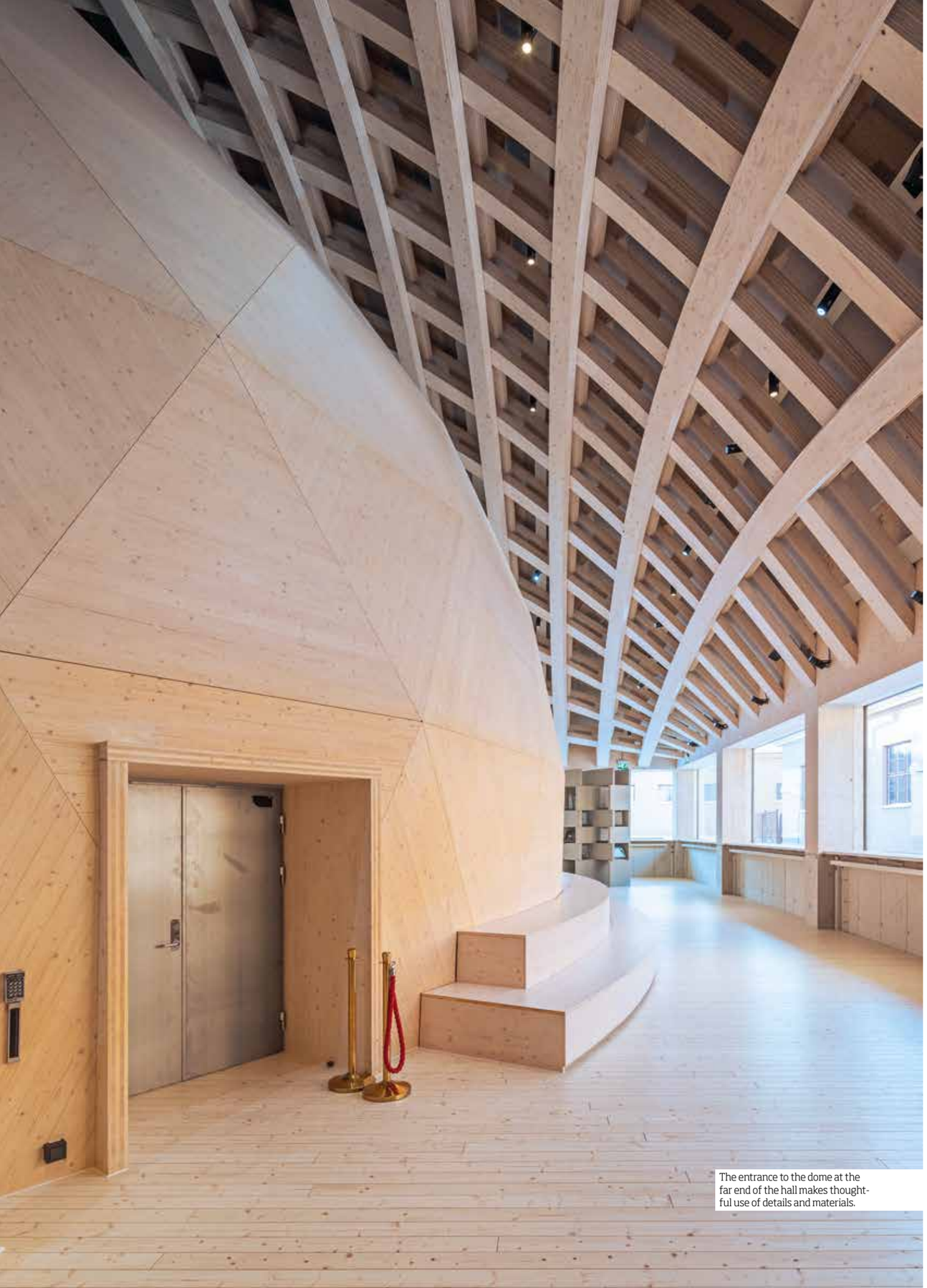
Jonas Elding and Johan Oscarson hope that greater knowledge of quality will generate a range of wood products that goes beyond the standard grades, with room for woods other than spruce and pine.

»Maybe old knowledge can come back in a new form, where the best pieces are chosen for the most vulnerable places, for example. We'd like to see more of this knowledge, as well as wider use of hardwood, which has excellent properties, not least in terms of strength and resistance,« says Johan Oscarson.

The spatial experience takes precedence over the exterior in almost all of the office's projects, as does a rigorous design process that extends from vision and concept to details and full realisation.

And this was certainly the case with Wisdome Stockholm.

»We're not suggesting that interior design is the most important factor, it's more about what the building's concept provides in terms of light and space. We feel this is as much a part of architecture as what's visible from the outside,« says Jonas Elding.



The entrance to the dome at the far end of the hall makes thoughtful use of details and materials.

» and the top, as well as the solid but sensitively designed crosspieces.

»The small-scale production at Open Wood involved many trade-offs between using CNC machines and other machines that require a more hands-on approach. All these factors make our furniture a great fusion of technology, design and craftsmanship,« says Klara Fahrman.

250 METRES DOWN in the ground, a geothermal heating system combines advanced control technology with numerous sensors to optimise the building's heating and cooling needs. This stems from a collaborative project between the heating technology company Nibe, KTH Royal Institute of Technology and RISE Research Institutes of Sweden, which participated in the project with a view to creating a public reference object for innovative and climate-smart solutions. By varying the extraction from ten different boreholes, the building's excess heat can be exchanged for a cooling effect from the ground, and the heat can then be reclaimed when needed. This innovative control system will allow even large buildings and premises to be heated more efficiently in the future.

The air conditioning system is also clearly visible to visitors, with an informative display showing what goes on behind the scenes to heat the building and cool the powerful technology needed to create the experiences inside the dome.

»Let's go to Mars,« shouts a group of children who have excitedly taken their seats in the dome for the interactive 3D adventure Open Space.

The space pilot who will be navigating between the planets has his answer as to their destination. This is a building that clearly opens the door to the future, both in terms of wood construction and travelling to alien planets.

»Wisdome Stockholm has exceeded our expectations for cosiness, care and tactility. The building evokes strong emotions and we've noticed that all our visitors, whatever their age, find the space pleasing. There's a kind of sensuousness and human scale where the careful work on the details meets the grandiose,« says Astrid Stenberg, project manager at Tekniska Museet.

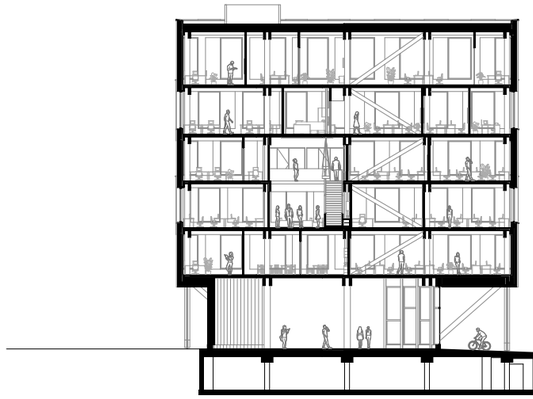
Wisdome Stockholm has already received considerable international attention, including winning the World Property Award 2022 and Svensk Form's Design S award at the Swedish Design Awards 2023.

Wisdome Stockholm
STOCKHOLM, SWEDEN

ARCHITECT Elding Oscarson.
CLIENT Tekniska Museet, Stockholm.
CHIEF STRUCTURAL ENGINEER Florian Kosche, DIFK.
STRUCTURAL ENGINEERS TIMBER FRAME Herman Blumer, Création Holz, SJB Kempter Fitze and Design-to-Production.
GENERAL CONTRACTOR Oljibe.
CONTRACTOR TIMBER FRAME Blumer Lehmann.
MATERIAL SUPPLIER Stora Enso.
PROJECT COST SEK 220 million.
AREA 1,325 sqm.
W| eldingoscarson.com

Read more about Wisdome Stockholm in Trä issue 2/23, focusing on the building's construction and design – woodarchitecture.se

The concave, green tarred façade indicates that the building is designed for a new, sustainable era.



Cross-section.

FLEXIBLE OFFICE BLOCK WITH CURVED GREEN FAÇADE PANELS INSPIRED BY THE SEA HAS UNIQUE IDENTITY

TEXT Sara Bergqvist **PHOTO** Kyrre Sundal

The six-storey Lumber 4 office block in Kristiansand, Norway, is a streamlined building with a strong identity. The green, concave façade elements are inspired by the rolling green North Sea just outside – as well as symbolising the building's sustainability profile.

In a former industrial area by the sea, a new district of housing, offices and shops is taking shape in the centre of Kristiansand. It is also home to the city's first large wooden office building, Lumber 4, and it is a building that will not go unnoticed. The façade comprises an undulating patchwork of green, concave façade elements that protrude above the rounded entrance level.

»Since Nekkar, the largest tenant and part of the same group as the client Skeie Eiendom, works in green energy, we wanted to create an expressive façade in wood that says the building has been created for a new, greener age. By setting the ground floor back and making it circular, we were able to achieve a lighter feel, while at the same time exposing the load-bearing structures and clearly showing that they're made of wood,« says Jørgen Tycho, lead architect at Oslotre, which was responsible for both the architecture and the timber structures.

OSLOTRE WAS CHOSEN because of an interesting article that the client had read about their demountable office building Hasletre in Oslo.

»By then they already had a design for a steel and concrete building so they asked if we could design a timber building for the same site, without it costing more than the other option. The starting point was that it had to comply with the basic requirements of Norwegian building standard TEK-17,« says Jørgen Tycho.

The load-bearing structure of Lumber 4 consists of double beams and glulam columns. The columns go all the way down to the bottom floor, where diagonal beams help »

Architect **Jørgen Tycho**

»WE'VE CREATED A VERY FLEXIBLE DESIGN, BOTH HORIZONTALLY AND VERTICALLY.«

» to absorb the forces. The hybrid floor system used between the floors comprises two-thirds CLT and one-third concrete. The concrete takes up the compressive forces and the wood handles the tensile stresses.

»It's an excellent, cost-effective solution that meets fire and acoustic standards and gives you the best of both materials. It also means you can keep the dimensions down, resulting in very slender structures. When we initially used it, we were the first in the world to do so on a large-scale build. We've chosen it several times since then and know that it works well,« says Jørgen Tycho.

However, he points out that Oslotre prefers to use just wood wherever possible.

»In this case, we had to take into account the car park under the building. And with such a long span, it was more efficient to use a hybrid floor than just wood.«

The lift and stairwell shared with the neighbouring building are also steel and concrete.

»If they hadn't already existed, we would have made them out of mass timber – we'll do that with the next building we construct in the area. But because our hands were tied in this instance, we used the lift and stairwell to help stabilise the building,« he says.

Spruce CLT and glulam make up the building's load-bearing structures, while the façade elements are heartwood pine, painted with green tar.

»We usually go for untreated heartwood pine, which turns grey over time, but here the green will fade instead. However, since the eaves above the concave elements are straight, darker semicircles will form beneath them, meaning that the façade will only become more dynamic, expressive and alive as the years go by,« says Jørgen.

Inside, the walls are mainly clad in white stained spruce panelling, with the exception of some lightweight walls in plaster. Between floors three and four there is also an atrium with an internal staircase made of CLT.

»We've created a very flexible design, both horizontally and vertically, making it easy to move the interior walls or open things up between floors,« Jørgen adds.

The tenant is the green energy company Nekkar, which moved in last March.

»We're very pleased with our new office, and the indoor climate and acoustics in particular. The combination of wood and light-coloured carpets creates peace and quiet and a warm feeling. And the ventilation ducts on the ceiling are actually quite nice. When you hide them behind a tiled ceiling, you get a bit of a hospital vibe. This feels more industrial, which fits in well with the setting,« says Ole Falk Hansen, CEO of Nekkar.

Apart from the ground floor, which is rented out to a furniture store, the building is all office space, and most of the tenants are tech companies like Nekkar.

»The building was 90 per cent leased even before it was completed, and now it's fully occupied. There are currently five tenants,« says Jørgen Tycho.

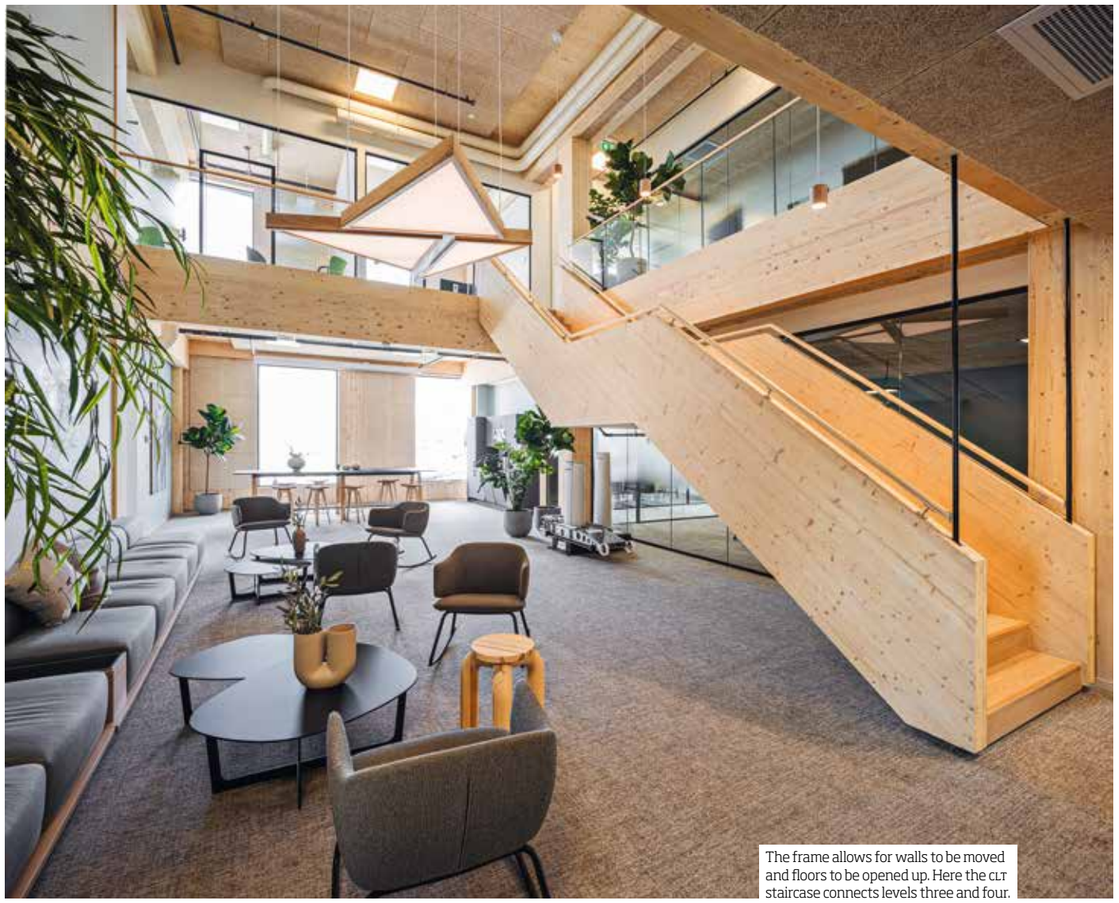
The build itself progressed at record speed, says Magnus Homme Jortveit, project manager for contractor VEF. This is the company's second major wood construction project with Oslotre.

»The design phase takes a little longer when working in wood, but once you get going it's an extremely effective and efficient process. In this case, it took six weeks to erect the entire six-storey building. If it had been steel and concrete, it would probably have taken four months,« he adds.

And that is not the only advantage.

»Our employees are much happier »

The recessed ground floor gives the building a slimmer profile. The diagonal beams help the columns to absorb the forces.



The frame allows for walls to be moved and floors to be opened up. Here the CLT staircase connects levels three and four.

» working with wood. There is less drilling, hammering and noise, less disruption and a more pleasant climate in general. We haven't checked the figures, but I feel that sick leave has decreased. Plus there's less waste,« says Magnus.

Another advantage that both he and Jørgen Tycho point out is sustainability.

»We've been able to cut carbon emissions by 53 per cent compared with a traditional building, which has contributed to the building's BREEAM certification with a rating of Very Good,« says Jørgen Tycho.

He and his colleagues at Oslotre are now working on the next major project for the same client and in the same neighbourhood: Lumber 5. This time it is a seven-storey office building made entirely of wood and twice the size of Lumber 4. Construction is scheduled to begin in the spring, with completion in 2025.

»I believe wooden architecture is the architecture of the future, with everything built in 3D models, prefabricated in factories and then assembled on site. This gives us a construction method that's much more precise, generates less waste and fewer errors, and is much faster. We're already seeing wood construction becoming very competitive with concrete and steel. And it's only going to get better. Wood construction in industrialised form is still a relatively young method at around 25 years, compared with 150 years for steel and concrete,« says Jørgen.

FOR OSLOTRE, THE story began in 2010, with a CLT factory. Jørgen Tycho explains that at the time, CLT had a bad reputation in Norway for being both defective and expensive. So they set up an architecture and engineering company to learn the design side and an assembly team to do the building.

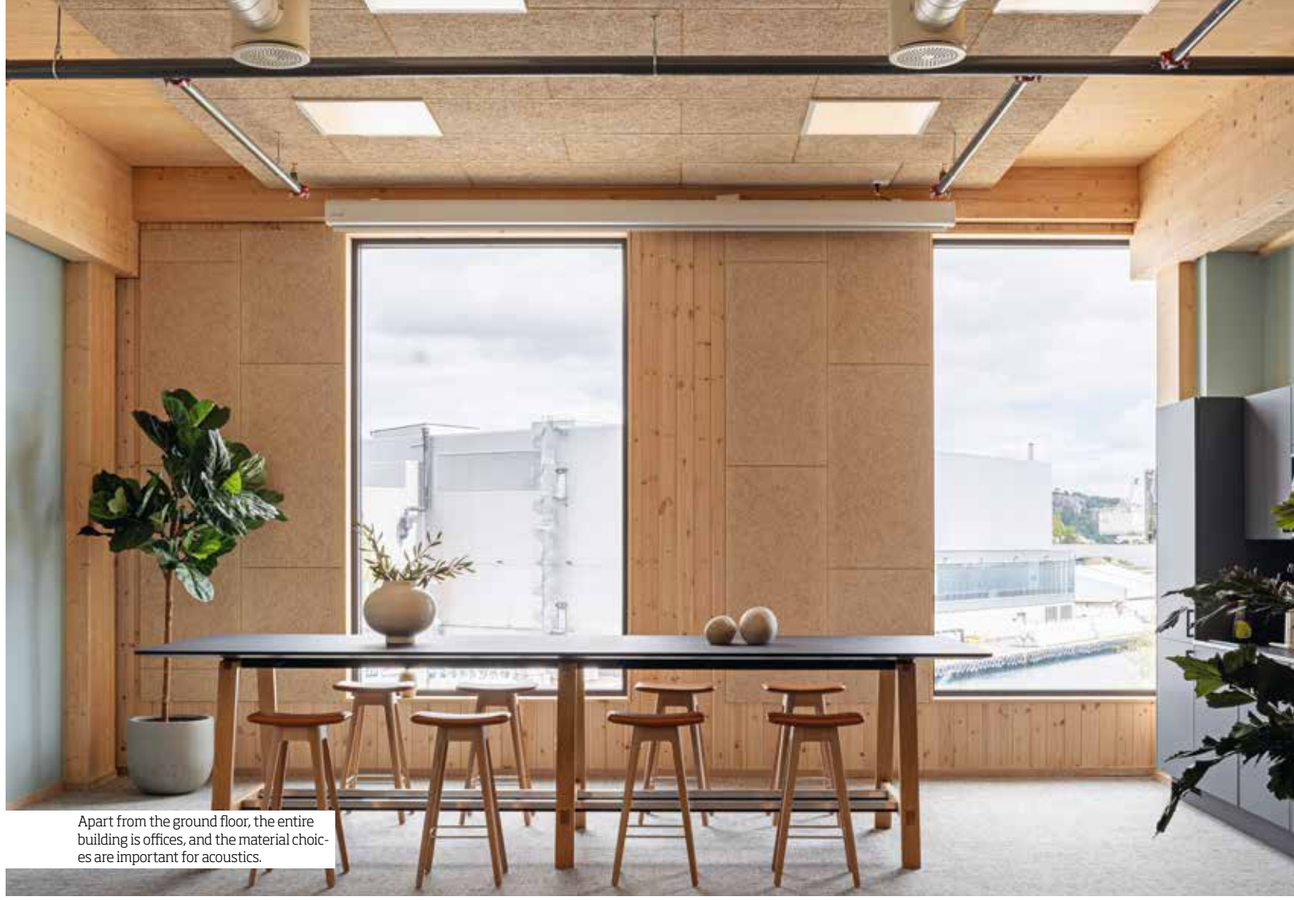
»That way we learnt about everything that happens before and during production, because the fault was not in the material. Wood, by its very nature, has few defects. The problem was that architects and engineers were unable to design in wood and construction companies didn't know how to build in wood. Our philosophy is that all the architects and engineers who work with us should go out to the site so they understand what they're designing. On site, you get a much clearer idea of what makes sense and what doesn't.«

The company sold the CLT factory in 2015 to focus on architecture and construction. And it proved to be a sound move.

»Despite the economic situation, we have a lot of work on, and are currently recruiting more employees,« says Jørgen.

Lumber 4
KRISTIANSAND, NORWAY

ARCHITECT Oslotre.
CLIENT Skeie Eiendom.
TIMBER ENGINEERING Oslotre.
COST (BUILDING ABOVE GROUND) NOK 74.5 millio.n
AREA (LOA) 3,106 sqm.
ENERGY RATING A for the offices, B for the retail space.
CERTIFICATION BREEAM Very Good.
w| oslotre.no



Apart from the ground floor, the entire building is offices, and the material choices are important for acoustics.

The softness of the carpet and the spruce cladding on the walls is broken up by the exposed technical installations.

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2

Low-key precision preserves setting and creates excitement

The Vyn restaurant in Österlen is a treat for the senses, and not just because of the memorably scenic views where the hills of Skåne meet the sky and sea. This is also where food and architecture meet in an exploration of quality, materials and landscape.

TEXT Torsten Hild **PHOTO** David Valldeby

Daniel Berlin is a Michelin-starred chef and restaurateur. His previous restaurant in Tranås was awarded first one and later two stars in the Michelin Guide, propelling him into the international firmament. His trademark can be briefly summed up as modern, Scandinavian, sustainable and locally produced. Now he has taken the next step and opened a restaurant in Gislövhammar, based on his vision of a holistic gastronomic experience. Interior architect Lisa Mannheimer from Fojab Arkitekter, who is responsible for planning the interior design, tells us about the challenge:

»This wasn't a project where I could sit in the office and browse through drawings. As a client, Daniel Berlin is very driven and meticulous about ensuring that the environment matches his approach to his culinary art. He spent many hours on the construction site, pinning down the exact qualities he was looking for.«

The new venture is located on a former farm, with several buildings jointly providing a restaurant, a hotel and a food and wine bar. While the concept may sound urban and international, it is first and foremost an environment that embraces presence, tranquillity, relaxation and nature. The restaurant and accompanying innovation kitchen – a private dining room that groups can book for a more exclusive culinary experience – are housed in the old barn.

In the local Skåne style, it is a brick building rendered inside and out, with a shingled roof that makes up the exposed full-height ceiling internally. The layout is designed not only with spatial efficiency in mind, also the harmony with the meal as an experience, a movement. Guests start in an intimate lounge area with soft seating – sofas and armchairs at low tables – where they can see into the kitchen and where they start with small plates. They then move into the smaller, lower-ceilinged dining room, where they have their main course, before finishing with dessert back in the lounge.

THE INTERIOR DESIGN may appear simple at first glance. Large surfaces, natural materials, generous daylight, geometric shapes and openly presented utilities. It may seem to hark back to the farm setting with a simple and robust design language, but a closer study reveals a very high level of precision in the use of materials. There are clear intentions in both the large surfaces that play with each other and the details that gradually reveal themselves. The interior makes extensive use of wood. The floor features broad oak planks, whose natural signs of life such as knots, cracks and colour variations are allowed to contribute to the otherwise simple design language. The cracks in the floor have been tied together with butterfly joints that lend an artisanal quality to the space. Similarly, the plastered white walls speak of a robust simplicity, but at the same time, the daylight becomes nuanced in the interplay between the matte reflection of the wood and the harder mineral tone of the walls. Overall, there is a warmth and a sense of clarity, enhanced by panoramic windows that showcase the scenic landscape as if it were a painting on the wall.

With a pared-back consistency, the furniture and fittings are also imbued with the same qualities. The seating and tables are made of wood, with leather and wool upholstery in natural colours, with splashes of deeper shades and terracotta. The large doorway connecting the lounge and dining room is decorated with wood carvings on a vegetable theme. Wool and seagrass rugs, limestone countertops, ceramics, porcelain and glassware are all made with a high degree of craftsmanship. »

1. The ceiling in the dining lounge next to the open kitchen was repaired and new shingles were installed, as can be seen in the colour difference between the left and right side of the ceiling.
2. Dining room with serving island and built-in bookshelves. The chairs were specially developed for the project by designer Anton Björsing and manufactured by Gärsnäs. Glass art by Ellen Ekh.

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» Although the general design language and the choice of materials are low-key, the level of precision adds a sharpness to the space. It is as if each moment offers a sense of peace and tranquillity, but in high-definition. The interior invites us to be still, but with our senses heightened, making us feel present. We are in the here and now.

THIS TYPE OF project is not easy to pull off. Compared with building from scratch, conversions place different demands on architects and builders. To start with, existing qualities need to be identified and used to inform the overall design concept. And not just the technical, practical or financial qualities, but equally what we perceive with all our senses, the combination of which creates the overall experience of an interior. An analysis like this encompasses aspects of interior architecture, history, materials, technology, design and more. Without it, there is a great risk that features worth preserving will be removed.

»The challenge in a project such as this is to complement the existing qualities that add value, while creating a coherent new whole,« says Lisa Mannheimer.

One example is how the structural timbers have been respected in Vyn. The roof, with its trusses, shingles and joists, was felt to contribute several essential qualities. The ceiling was renovated to make it a striking feature of the interior, and other new elements were added within the framework of the same design theme: floors, kitchen fittings, doors, etc. The difficult thing on this type of project, where not everything is planned out on the drawing board but is decided along the way and on site, is coordination.

Lisa Mannheimer explains that this was done in close collaboration with Daniel Berlin and the many others who brought their various expertise: builders, carpenters, lighting designers, furniture designers, furniture makers, kitchen makers, ceramists, glass artists and others.

»My job was to make sure the project stayed on track. Everything revolved around Daniel's idea of a holistic experience of place, space and food,« she says.

While Vyn may be a unique example, this is the kind of project that the construction industry will increasingly be working on. The sustainability requirements for our built environments, limited access to raw materials and rising production costs are placing an increasing focus on the qualities and possibilities of our existing buildings. Materials like wood will be judged not solely on technical performance, but also on how they contribute to the overall feel of the interiors. Wood will no longer be a material for realising ideas, but a precondition for them.

3. The private dining room upstairs overlooks the dining lounge.
4. The flooring manufacturer makes use of the whole tree by reinforcing cracks with butterfly joints.
5. The freestanding food and wine bar is furnished with recycled chairs from Daniel Berlin's previous restaurant. Breakfast is also served here for overnight guests.
6. Detail from the wine cellar.
7. A gently sloping walkway leads from the reception area to the restaurant's entrance.
8. The door to the restaurant features carvings by wood sculptor Carsten Nilsson.

»HOW WILL THE INDUSTRY VERIFY AND UTILISE THE FREEDOM IT HAS?«

The Swedish National Board of Housing, Building and Planning (Boverket) plans to launch its new 'Building Regulations of Opportunity' in January 2025. But there is a great deal of uncertainty about what they will mean for the construction industry. Erik Serrano, Professor of Structural Mechanics at Lund University of Technology, has been thinking about what effect the rules might have.

TEXT David Valldeby PHOTO Johan Persson

How do you feel about the forthcoming building regulations?
I must say that I'm essentially positive about them. The name suggests that they will provide new opportunities and not be as prescriptive as the current regulatory framework has felt. I think this is good news because it provides opportunities for an industry that is perhaps not known for having the strongest drive to innovate. The new rules also offer potential when it comes to construction costs – being able to think a little more freely, make efficiencies and find innovative solutions. But can we implement this in a good way? This is where I'm not sure the current proposal has succeeded. So when it comes to implementation, I have to say that I'm quite negative.

What are your main concerns?
A very clear concern is that we are in the final phase of the Eurocode work. And there are also other parallel projects going on at European level around harmonised standards, a construction products directive, circularity and reuse in construction. And now we have the new building regulations coming on 1 January 2025. I think it's a bit premature to launch as early as 2025. We should remain in step with Eurocode and with the work that may be needed from the Swedish Institute for Standards (SIS) and industry organisations. But then we're talking about 3–4 years from now.

But aren't the new rules supposed to be flexible in the event of change?
If there is flexibility once the new building regulations are in place, they will of course work with both the current and future Eurocode. The problem is that the industry will face one major change now and then another when the new Eurocode is finally in place. Implementing two things so close together is unnecessary, and concerns have been raised about this. I also don't know if there are other issues with harmonised standards and everything that will have to be synchronised with Boverket's rules, because we don't really know what they will look like.

What are the risks?
How will the building regulations be followed up? And who by? Who has the expertise to do it? And this is not an issue just for wood. However, it is true that wood construction faces different risks than other materials in terms of traditions. It's still new – although we've been talking about wood construction for the past 20 years, things have only started to pick up pace in the last 5–10 years. So based on general expertise in the industry, I don't know whether wood construction is more vulnerable to less regulation. There's not as much knowledge even about ordinary wood construction.

How will the new rules affect those involved in a project?
I think the main concern, and this applies to all actors, is how to reach agreement and how to verify and utilise the freedom you have. The control functions and the expertise in the industry become critical when you don't have a clear regulatory framework or clear solutions for verifying the alternatives, and this applies to developers as well as architects and designers.

So it is down to the individual?
It certainly is. There are concerns maybe about developers taking shortcuts, saying they want to do things in a different way that will be good enough.

How can municipalities deal with construction documents if they have nothing to refer to?
I'm very much in favour of the idea of freeing up and enabling construction. But we still have to have clear structures, rules and procedures for managing this freedom. I think the controls we have today are quite limited. I don't expect to see many more or fewer accidents or collapses in the future. Such incidents are not generally due to people being careless or taking calculated risks, but rather due to a lack of quality control and a lack of function and structures in the system. I believe this whole issue of getting new freedoms is about how it will work, if the regulations don't set out exactly how to make a calculation or verify compliance with the requirements.

Will the regulations lead to more innovation in wood construction?
I'm hopeful that it will be easier to incorporate innovative products into construction in practice. It could potentially open up opportunities to embrace experimental construction in a different way. But if there is no approval system in place, there will be no innovation.

So controls are the main challenge?
The challenge lies in alternative methods or whatever we want to call them. The problem boils down to what is expected of the different actors. The construction industry, material organisations such as Swedish Wood, and other stakeholder organisations. What is their mandate in relation to Boverket, in relation to SIS, in relation to the control function inherent in the municipalities' handling of cases?

The new regulations were planned to be published on 1 July 2024, but have been postponed due to the large number of comments received. The new plan is to launch them on 1 January 2025.

Moisture content creates new opportunities

While the last generation of 'timmermän' in the 1920s were still building cottages, cabins and farmhouses from logs in rural Sweden, engineers on the continent were experimenting with glulam and shell structures. Despite the considerable differences, there are points of contact between traditional craftsmanship and modern computer-modelled structures that become visible with the benefit of time.

TEXT Stina Hagelqvist

ITECH/ICD/ITKE University of Stuttgart

The different curvature of the CLT panels lends stability to the structure and shows how the technology has evolved over time.

WHAT CARPENTERS BUILDING log cabins and structural engineers have in common is that they know their building materials and have a thorough understanding of their limitations and possibilities. Their material knowledge is intimate, and while the carpenter could assess timber quality with the naked eye and an axe, today we can physically, chemically and mathematically investigate specific material properties such as fibre structure, density, strength and elasticity. And both cases involve developing methods to circumvent or exploit the material's properties.

What was once a constraint is now seen as an opportunity. »Winter felled and summer dried«, a carpenter in Dalarna declared in 1928, testifying to the practice of cutting the timber in winter, letting it dry for one or two summers and then building with it. It was a slow process that was subordinate to the properties of the material. However, the moisture content and movement of the timber, which used to be limitations, are now being used as an asset to produce new structures and shapes.

ITECH'S HYGROSHELL PAVILION, at the 2023 Chicago Architecture Biennial, presented a full-scale experiment on how the moisture content and drying process of wood can be utilised to create shell structures from laminated wood panels that are comparable to their concrete counterparts in the early 20th century. With digital models that take into account the anisotropic moisture properties of wood, Hygroshell was able to develop both new technologies and designs.

Using two cross-laminated panels with different moisture content and fibre direction, it was possible to create a shell structure that put itself together during the drying and shrinking process. A thicker active layer made of high-moisture-content boards was glued together with a thinner limiting layer of low-moisture-content boards. As the double-layered panel dries, it creates a curvature that follows the shrinkage of the lamellas, and this is what gives the structure its stability. The pavilion is an extreme example of how materials, form and manufacturing can be integrated and optimised.

The finished result displays a unique combination of hyper-modern form generated by the material itself and solutions seemingly rooted in local tradition. The winged shape resembles a bird in flight, while the outer shell on the top of the pavilion and the outside of the curvature call to mind fish or dragon scales. The diamond-shaped scales reference alpine cladding in southern Germany and are as practical today as they ever were. The pavilion was completely prefabricated, transported in three flat packages to the construction site and joined lengthwise. As the wings unfold during the drying process, the pre-assembled scales follow the expansion of the curvature and form their tightly sealed shell, which adapts to the movement of the material relative to the moisture content.

NEITHER THE TECHNOLOGY nor the design would have been possible without today's advanced analytical digital tools and models, or indeed without the special understanding of wood properties developed by master carpenters and refined by engineers. With today's interest in and need for lightweight, durable, wide-span structures that can be easily transported and assembled, Hygroshell's pavilion represents a further step towards a more cost-effective and sustainable solution that utilises and combines historical knowledge with modern technology.

The panels are installed flat with a specific moisture content.

After 48 hours, the bending of the wood is clearly visible.

After 96 hours, the pavilion has assumed the calculated shape.

ITECH/ICD/ITKE University of Stuttgart

Wood – a fossil-free, renewable material that stores carbon – has a key role to play in the green transition. But what is the situation with the forest? In a series of articles, Trä raises questions about why Swedish forestry looks the way it does and what opportunities and challenges are just around the corner.


Mostphotos

The sycamore (Acer pseudoplatanus) grows wild in Europe and the Caucasus region and came to Sweden in the 18th century. It is fast-growing and can easily become invasive as its seeds spread widely.

»We're discovering new species all the time«

As Sweden gets warmer, the boundaries of the climate zones are moving 10 km north every year. Per Simonsson and Mats Hannertz have worked in nature conservation for almost 50 years and are noticing a changing landscape.

TEXT Malin Age


Mats Hannertz.


Per Simonsson.

THE YEAR 2023 will go down in history as the warmest ever recorded on Earth, with the global average temperature 1.48 degrees warmer than in pre-industrial times.

»Greenhouse gas levels are record high. Global temperatures are record high. Sea level rise is record high. Antarctic sea ice is record low. It's a deafening cacophony of broken records,« said Petteri Taalas, Secretary-General of the UN's World Meteorological Organization (WMO), at a press conference following the RELEASE of a report predicting that 2024 will be even warmer.

But what are the consequences for Sweden's forests? How are they being affected by climate change?

Researchers Mats Hannertz and Per Simonsson recently presented an analysis of biodiversity in their report *Biologisk mångfald i skogen – tillstånd, trender och miljöarbete* (Biodiversity in forests – condition, trends and environmental work). Both researchers have extensive expertise in this area. Per Simonsson is a biologist with a doctorate from the Swedish University of Agricultural Sciences (SLU) and has worked in nature conservation for almost 50 years. Mats Hannertz has worked in forestry research since the late 1980s, is a certified forester and has a PhD in forest genetics.

One of their conclusions is that although global biodiversity is under pressure, the state of the Nordic forests is by no means as catastrophic as sometimes portrayed in the public debate:

»There is good reason to do more to promote biodiversity, but the threat to individual species is exaggerated. It's important to understand that mass extinction is not on the cards in Sweden,« says Per Simonsson.

Nature is never static, he reminds us. Not all species are naturally abundant, and in fact being uncommon is the natural state for most of them. There are about 30,000 forest-dwelling species in Sweden. Of those that live in coniferous forests, a total of 18 species are currently under acute threat from forestry, according to SLU Artdatabanken, which compiles the red list of endangered species. To be placed on the list, the species must have a small population, or be on the decline now or in the near future, or have declined over the past 10–20 years.

But, the list notwithstanding, there is limited knowledge of what condition nature is actually in, not to mention the lack of systematic, large-scale mapping and historical data. Moreover, new species are being discovered and added all the time.

»We actually don't know very much about biodiversity. And I believe the availability of new DNA technology is going to lead to the discovery of more species, particularly insects and fungi,« says Per.

AS A COMPLEMENT to making inventories and counting species, researchers are therefore measuring the conditions for different flora and fauna to thrive in the forest. Dead wood is important for the survival of many species, as is having a variety of tree species. It is therefore important to leave dead trees and mix tree species within a stand.

In the early 1990s, Sweden introduced a new Forestry Act in which the objectives for the environment and for production were placed on an equal footing. As such, it is just as important for the forest's environmental assets to be preserved and improved as it is to ensure high and valuable timber production. Per Simonsson and Mats Hannertz write in their report that forestry has come a long way in terms of nature conservation since the new Forestry Act was implemented.


Ola Kårén

Leaving old, dead wood is important to promote greater biodiversity.

»We've seen an increase in the amount of dead wood, the number of mature broadleaf trees and the areas of old-growth forest, which is positive. But the forests have also become denser. This may favour certain species, but those that need light, such as berry bushes and reindeer moss, don't do as well,« says Per Simonsson.

He believes that the warmer climate has already made its mark on Swedish forests. Born down south, but a resident of northern Sweden for more than 40 years, he has seen with his own eyes how bird species such as the goldfinch, hawfinch and nuthatch have become more common in the north. Compared to lichens and fungi, for example, birds are naturally more mobile, plus ornithologists have been collecting data for decades.

»We're seeing southern species moving further north and migratory birds arriving earlier than they did 50 or 100 years ago. This can mean that the insects on which the birds depend have not had time to wake up, making food scarce. We're also seeing more overwintering species that may not be able to cope with a sudden cold snap.«

Climate change also has implications for different tree species:

»Estimates suggest that the climate zones are moving 10 km north each year, which creates the conditions for hardwood trees to be planted further and further north. One of the tree species that is spreading in Sweden and Norway is the sycamore, also known as the sycamore maple,« says Per Simonsson.

The sycamore was introduced to Sweden in the 18th century as a parkland tree, but spreads easily through seeding and suckering. The wood is similar to that of the Norway maple, but often has a wavier structure, and is used on the continent for fine joinery and veneer production.

»Sycamores spread very easily, and this can of course cause problems. On the other hand, it has been observed that lichens and mosses that are otherwise mostly found on elm trees also grow on these trees. With Dutch elm disease threatening, perhaps the sycamore can take on a new function?« muses Per Simonsson.

As stated before, nature is never static.

Climate change doesn't just mean warmer temperatures. Extreme weather events are another consequence. In 2005, Storm Gudrun felled around 75 million cubic metres of forest overnight, compared to the average harvest in Sweden of around 90–100 million cubic metres per year.

»Fear of fires and new storms may lead forest owners to harvest their stands earlier, which would be bad news for biodiversity. On the other hand, that same fear could prompt more forest owners to mix coniferous and deciduous trees to a greater extent, which would be good for biodiversity,« says Per Simonsson, who suspects that we will see less spruce in the future.

During the dry summer of 2018, it became clear that the thirsty spruce has been planted on land that is in fact too dry. However pine, which would have done better, is more heavily grazed by wildlife, so forest owners sometimes avoid it. In the wake of the 2018 drought, large stands in southern Sweden in particular were hit by the European spruce bark beetle.

TO PROMOTE BIODIVERSITY, Per believes that the state should take greater responsibility and protect more forests, and that forest owners should create more diverse forests:

»Around six per cent of Swedish forest is currently afforded formal protections, but half of these areas are above the mountain tree line. The set-asides made voluntarily by private forest owners are as extensive as those protected by the state, so I think the state could do more. Forest owners can make forests more attractive for both biodiversity and people by creating more varied forests with a greater mix of tree species.«

Good read | Biologisk mångfald i skogen – tillstånd, trender och miljöarbete. (page 50) »

The houses, inspired by the older buildings in the Kivik harbour area, are built with sustainability in mind.

The houses comprise two equal-sized cubes, one of which is offset. Sedum roofs help to promote biodiversity on the site.

Material creates homeliness in space-efficient houses

On a hill overlooking Kivik's scenic coastal strip, a new neighbourhood is taking shape, featuring beautifully crafted houses with a strong focus on material sustainability.

TEXT Cecilia Bolter **PHOTO** Johanna Jonsson

SINCE SUSTAINABILITY RUNS as a common thread through the project, the houses feature wood throughout, which promotes a healthy indoor climate. There is no plastic in the walls and ceilings, with wood fibre insulating the walls, for example.

»Using breathable materials creates better air quality and more comfortable indoor temperatures. The sustainability perspective is a strong influence, and using so much wood radically reduces the carbon footprint,« explains Alexander Lenre Simittchiev, founder of the architecture practice Stadstudio.

It all began as a land allocation competition organised by Simrishamn Municipality, and as the winning company, Stadstudio also became the property developer, giving them full control over everything, including managing the budget.

»Stadstudio is paying for the feasibility studies, detailed development plans and building permits. We buy land from the municipality as houses are sold, and the buyers of the plot then engage Sätoftagruppen, the local contractor, at a fixed price,« says Alexander Lenre Simittchiev.

This project allows him and his team to fully focus on what they are really passionate about: the quality of the architecture, space and craftsmanship, with a strong emphasis on sustainability. It has also given them a sense of payback by bringing the role of the architect into sharper focus.

»The architect's role has been hollowed out to some extent in Sweden, but on this project we've been able to focus on quality architecture and craftsmanship.«

The land was previously used as an apple orchard and had no detailed development plan, which was great for the architectural team, who were able to plan everything from scratch. What emerged was a varied

Architect **Alexander Lenre Simittchiev**

»WE'VE BEEN ABLE TO FOCUS ON QUALITY ARCHITECTURE AND CRAFTSMANSHIP.«

structure of streets and garden spaces linking back to Kivik's historic town centre, all on a human scale. The area offers lush greenery and community spaces with a focus on people, and the masterplan is designed with social sustainability in mind. Although the 33 plots are small – around 250 square metres – a common area of green space for communal use has been planned as something of a central meeting place.

THE HILLY LANDSCAPE inspired the construction of terraces at different levels with a height difference of up to a few metres, making the feel of the surroundings varied and dynamic. Meadow grasses and various other plants are framed by apple and cherry trees in a pastoral landscape. The inclusion of wild vegetation is intended to promote biodiversity, a key aspect of sustainability. Each plot has a self-contained studio which, while smaller than the usual garden building at 12 square metres, is fully serviced for use as a guest house or office. There are two separate outdoor areas with wooden decking, one near the entrance and a deck at the back that connects the house to the studio. The rest of the garden offers green space that could be used for growing. Small green rooms in the garden weave together architecture and nature, not to mention the interior and the exterior.

The historic timber buildings around the »

Alexander Lenre Simittchiev

1

Alexander Lenre Simittchiev

2

3

4

» harbour in Kivik were an important source of inspiration, with Stadstudio developing two basic models: a single-storey house of 75 square metres with two bedrooms, and a slightly larger two-storey house of 105 square metres. The two-storey houses are planned around the central part of the site, while the single-storey houses are spread out towards the edges, nestled in greenery.

The houses are basically designed as two identical, square volumes in an offset position, with a well-planned interior that uses wood to achieve a homely feel. The layout is open-plan in the living room and kitchen. The modest windows are strategically placed with a focus on eye-catching views and admitting daylight, which enhances the spatial experience and the dialogue between the internal and external environments. Views of greenery are crucial to the success of the wide window at the back of the house, which links the interior and exterior and makes the living room feel like part of the garden.

»With too much glass, the room disappears,« says Alexander Lenre Simittchiev, who likes to use daylight to sculpt spatial relationships.

WORKING WITH A single material may seem simple, but it is actually a complex task that requires good knowledge of materials. The key is to create spatial variations and contrasts in the architectural environment, as showcased in the design of these houses, where simplicity and complexity run side by side. Double layers of 12 millimetre thick untreated pine plywood line the walls and ceilings, which meet to form a uniform volume, discreetly patterned by slender air gaps around each plywood sheet in a regular rhythm. The double plywood sheets are used to reinforce the sense of solidity, while also improving fire safety. Only the polished concrete floor on the ground level breaks the warm atmosphere created by wood – an elegant spatial solution.

1. The walls and ceilings are lined with pine plywood. Slender air gaps around the panels form a repetitive pattern.
2. The lantern light is open to both floors, emphasising the double height of the ceiling.
3. Floor plan.
4. Daylight is used to emphasise spatial relationships that change as the light moves.

The most spectacular feature is the pyramid-shaped roof of the houses, which slopes upwards and inwards at a sharp angle from the façade line and is topped with a glorious glass dome. This is a modern taken on the traditional Skåne longhouse.

The height variations are particularly noticeable in the two-storey houses, ranging from just over two metres where the façade and roof meet in the living room up to seven metres at the roof's peak. The impact of the daylight from the roof dome is very powerful.

»The light moves during the day and forms different patterns, generating exciting spatial experiences,« says Alexander Lenre Simittchiev.

An important part of the brief was to achieve maintenance-free houses, so the chosen façade cladding is spruce impregnated with silicon – the same treatment used for timber decking. Lightweight beams are used in the load-bearing frame, which is as strong as a cross-laminated timber design, but lighter – and cheaper. It is also better from an environmental point of view, as less timber is used. What is more, the natural substance lignin, a component of wood, is used instead of glue in the production process, which involves heating sheets of fibreboard to high temperatures and then pressing them together to form beams.

»Material prices skyrocketed during the pandemic, so we chose this solution. Details are very important in the Kivikhusen development, as well as how they're executed. The cooperation with Stadstudio has worked magnificently, with ongoing dialogues about ideas and solutions,« says Lennart Modéer, CEO of Sätoftagruppen.

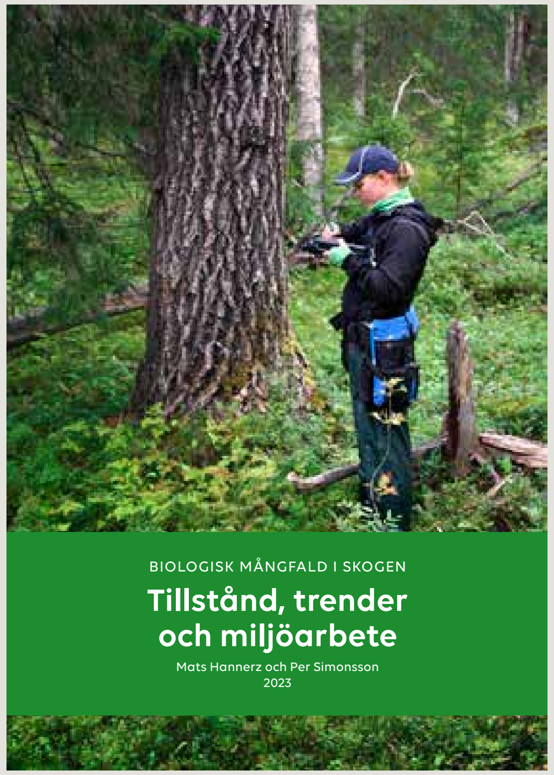
SO FAR, 13 of the 33 houses have been built. The economic slowdown has affected sales, but Alexander Lenre Simittchiev is happy. A showhome has been available for investors to view since last autumn, and reactions have been very positive so far, with four houses sold last autumn. One of the buyers was Thomas Thomasson, who moved in at the end of August.

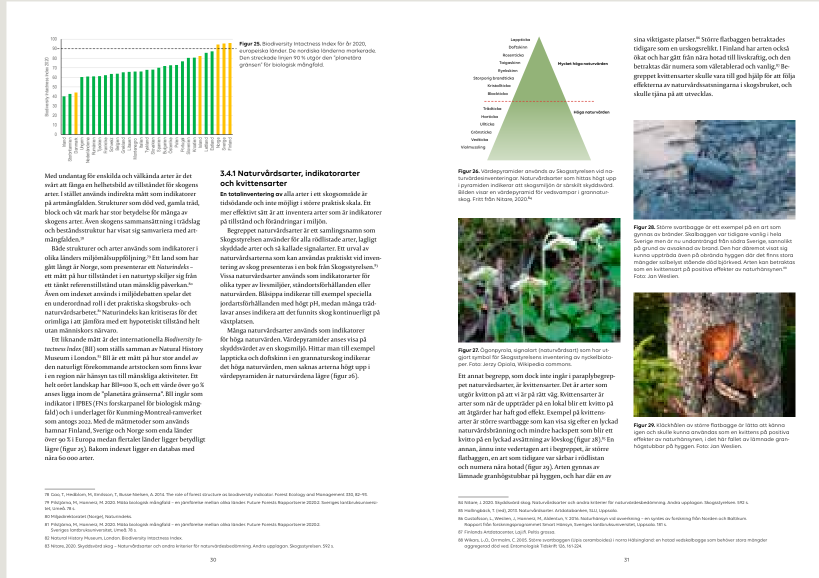
»My wife and I are a bit older, so we chose a single-storey house and we love it. It's well built and the details are perfectly executed. The layout and the materials really appealed to us,« he says.

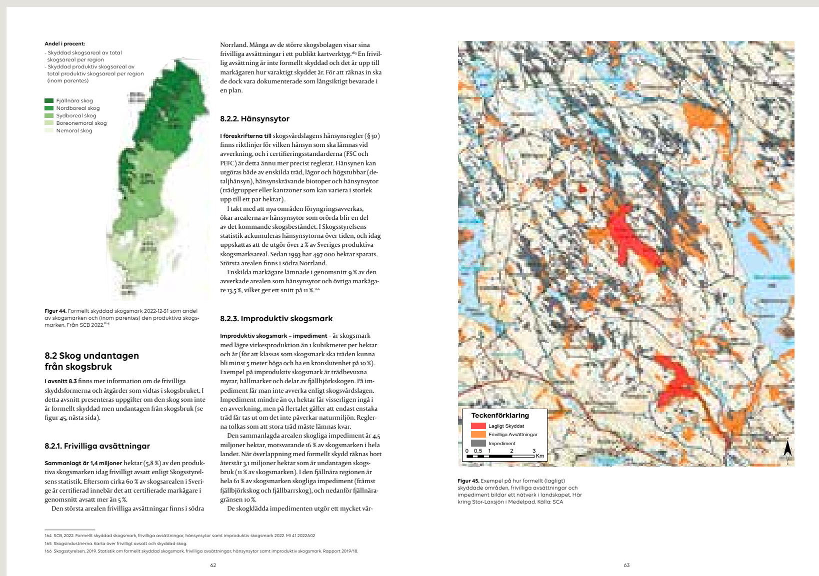
Kivikhusen
KIVIK, SWEDEN

ARCHITECT Stadstudio.
CLIENT Kivik Bostads AB c/o Stadstudio.
STRUCTURAL ENGINEERS Casper Bokelund, Mikael Thors.
CONTRACTOR Sätoftagruppen.
COST (EXCLUDING PLOT AND GROUNDWORK)
HOUSE TYPE 1 SEK 2,986,000 incl. VAT.
HOUSE TYPE 2 SEK 3,674,000 incl. VAT.
ENERGY DECLARATION Energy class B.
W| stadstudio.se

Good read
from Swedish Wood







Biologisk mångfald i skogen – tillstånd, trender och miljöarbete
Mats Hannertz och Per Simonsson
Swedish Forest Industries Federation (Sw)
978-91-985212-0-7

This Swedish report (Eng: Biological diversity in forests – conditions, trends and environmental work) was written by Mats Hannertz and Per Simonsson for the Swedish Forest Industries Federation. The conclusions and opinions in the report are the authors' own.

The summarised version opens with the text: »... as a final word, we would like to stress that although global biodiversity is under pressure, the state of the Nordic forests is by no means as catastrophic as sometimes portrayed in the public debate. On the contrary, the habitats and their composition of species is relatively stable and, with proper care, the vast majority of species will be able to survive in managed forests, which, after all, occupy most of Sweden's forest land. However, this assumes that we continue to protect and manage forests of high conservation value and that we ensure the existence of green infrastructure that allows species to both move and establish themselves.«

On pages 44–45 you can read an interview with the authors of the report on how our forest landscapes are changing due to factors such as forestry and climate change.

The report can be downloaded in full or summarised form, and can also be ordered.
w| forestindustries.se/news/

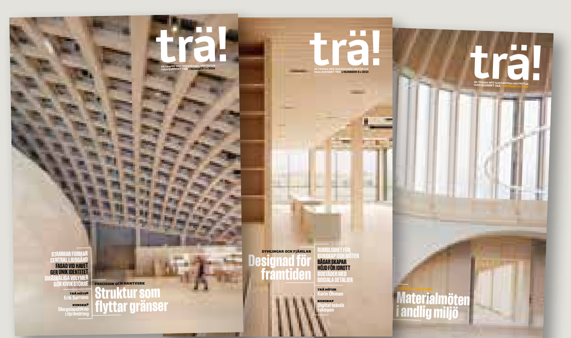
Calendar

Nordbygg
The future of the construction and real estate industry will be debated at Nordbygg, the construction fair that offers opportunities to meet people and learn about the latest innovations. Enjoy a dynamic mix of debates, talks, product demonstrations, networking and socialising over four days.
w| nordbygg.se

Café Nordbygg 2022. Foto Bosse Lind

Trä & teknik
Take the opportunity to network with colleagues, make new contacts and be inspired by how other companies have dealt with challenges. Four themes will be presented under the banner »For a sustainable wood industry – resource efficient at every stage, from local to global«.
w| traochteknik.se

Svenska mässan



5 June | Trä! issue 2
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