Working wood

CONSTRUCTION ECONOMICS
Work out the total cost of the project

HYBRID FRAME
Permobil gets tailor-made new factory

Prefabricated CLT frames are playing a key role in the expansion of one of northern Sweden's oldest schools.

Drilling into the future for wood

Interest in wood construction is growing among Sweden's municipalities and regions.

A MAGAZINE FROM SETRA PROMOTING GREEN BUILDING • ISSUE 1 2024

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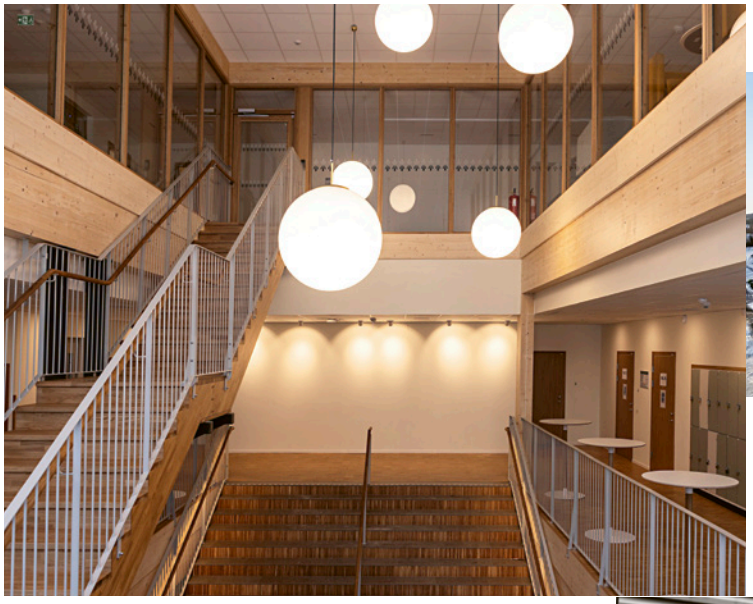

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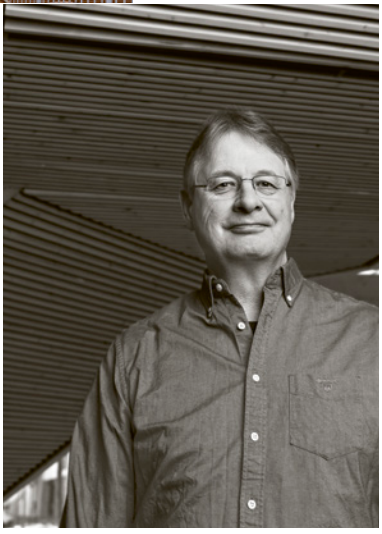

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EDITORIAL TEAM

Setra

Working Wood is aimed at Setra's customers and stakeholders in Sweden and abroad, with a view to increasing knowledge about wood as a building material and providing inspiration. The magazine is published in Swedish and English. **CIRCULATION:** 4,800 copies **ADDRESS:** Setra Group, Box 3027, 169 03 Solna. **TEL:** +46 8 705 03 00. **E-MAIL:** workingwood@setragroup.com. **EDITOR:** Linn Treijs. **RESPONSIBLE PUBLISHER:** Lovisa Krebs. **PRODUCTION:** Chiffer AB. **EDITOR:** Iva Stepán. **ART DIRECTOR:** Anna-Karin Schröder. **REPRO:** Italgraf. **PRINTING:** Åtta 45. **COVER:** Prefabricated CLT frame. **PHOTOGRAPHER:** Klas Sjöberg. All unsigned material is editorial. Photos without a byline are credited to the agency. What would you like to read about in the next issue? Suggestions and ideas should be sent to workingwood@setragroup.com. For more Setra news, visit setragroup.com and follow us on LinkedIn. FSC® Licence Code FSC-C004269

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IMAGE: KASPAR HAMMARLING

MARCUS WESTDAHL
President and CEO of Setra

GRÖNSAMHET
We want to do business where everyone prospers – not just ourselves but also our customers, nature and society. When a business is profitable for everyone, we call it Grönsamhet – green value.

"Onwards and upwards for wood in large construction projects"

Several exciting things have happened recently at Setra, not least the commissioning of a new CNC machine at our CLT factory in Långshyttan, which will enable us to double our capacity for CLT frames. This is a welcome initiative that will strengthen our competitiveness and enable us to fulfil our customers' wishes even more successfully. Using forest raw materials as efficiently as we possibly can is another important area for us, so it is gratifying to have our new small-diameter log saw up and running at our sawmill in Skinnskatteberg. This will improve optimisation of the raw material and production flows within Setra.

Among our customers, we are seeing a lot of interest from schools, the public sector and companies building new factories and offices. In this magazine you can read all about the extension to Vasaskolan in Gävle, which was required to blend in naturally with the old school buildings. The timber frames provide a pleasant environment for everyone who spends time in the school. We have also visited Permobil in Sundsvall, a highly sophisticated factory and office building with a hybrid frame. The combination of different materials in the frame is an excellent example of how the best effect can be achieved in terms of function, cost and the climate. Wood is a prominent feature, not least in the atrium staircase.*

In brief

BUILDING SYSTEMS | TIMBER FRAMES | APARTMENTS

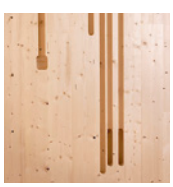
COOP'S FIRST WOOD PROJECT In autumn 2023, Coop's first wooden project was inaugurated in Öjersjö outside Gothenburg, a store built with a timber frame, a cedar facade and recycled aluminium. Setra supplied the frame in glulam and CLT.

IMAGE: SEMRÉN & MÅNSSON

CLT production steps up a gear

As wood construction grows, Setra's factory for cross-laminated timber is taking its next step, adding another CNC machine to more than double its capacity.

"We want to help building contractors and property developers to develop standardised building systems and thus reap the huge benefits of industrially manufactured timber frames – in terms of both sustainability and project economics," says Jesper Åkerlund, Business Manager for Building Solutions at Setra.



Setra's building solutions in CLT and glulam are manufactured in Långshyttan, Dalarna, close to the largest centres of construction in Sweden.

IMAGE: JONAS MALMSTRÖM

TOBIAS OLSSON, *Director of Architects Sweden.*

"The challenges of sustainability are driving rapid changes in the architecture profession and we believe architects will be instrumental in changing the current linear mindset to a necessarily circular one."

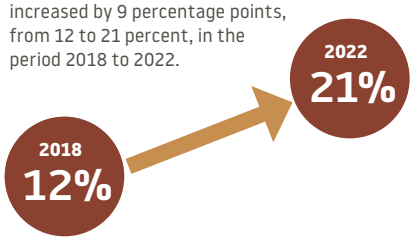
Timber frames gain market share

The proportion of buildings in Sweden constructed with timber frames continues to rise, in a trend whereby wood is capturing market share from steel and concrete. This is according to data in Prognoscentret's forecast for the years 2018–2022.

Of the multiple reasons that may lie behind this trend, sustainability is one of the biggest for both municipalities and regions, but also for private actors. An efficient construction process that delivers good economics is another key factor. Lina Emanuelson, Sales Manager for Building Solutions at Setra, confirms this picture.

"Despite the sluggish construction market, we're experiencing a high number of incoming enquiries. Many customers have an explicit sustainability strategy and that makes wood the natural choice. Many of them also find that a wooden structure is cheaper when they look at the overall cost. A CLT frame is quick to assemble, has no drying time and is also lightweight, which means that groundwork, for example, costs less."

THE SHARE OF DEVELOPMENTS in Sweden built with timber frames increased by 9 percentage points, from 12 to 21 percent, in the period 2018 to 2022.



The share of wood is increasing in all types of buildings; for example, 34 percent of all schools and sports halls are now built with a timber frame – up 89 percent compared with 2018.

Source: Prognoscentret on behalf of Martinsons.

17

17 countries have committed to increase their wood construction by 2030. The decision was announced at the 28th UN Climate Change Conference in December 2023, based on the premise that sustainably managed forests contribute to climate solutions in the construction sector.

IMAGE: FOJAB

Wood, glass and greenery

Terassgården, with its 56 new apartments in Lund's new Råbylund neighbourhood, will be ready for occupation by the end of 2024.

The area is the first in Lund to be built entirely according to sustainable building guidelines. The choice of materials, energy use, indoor environment, moisture protection and urban biodiversity have been guiding factors and the residents will be welcomed into an environment dominated by wood, glass and greenery. Choosing a timber frame and assembling it in stages has shortened the construction time by several weeks.

"Wood is an easy material to work with and erecting the frame has been super quick. The structural elements have always been very precise, and we've maintained a close dialogue with Setra, who have provided excellent support," says Fredrik Stark, project manager at KL-Projekt AB.

Setra has supplied CLT and glulam for the project being built by Danish Absalon Pension. Architect: Johan Sennström, Fojab. Building contractor: Thage i Skåne.

IMAGE: KROK & TJÄDER

Exposed wood in school

We are seeing more and more examples of modern schools being built in wood, and Djupadalsskolan in Jönköping municipality is one of them. It will accommodate 415 pupils in years 7–9. The school also has a new full-sized sports hall in CLT and glulam, with plenty of exposed wood. The school is expected to be completed in autumn 2025. The project is being constructed by Gärahov, ByggPartner, and Huskomponenter Linghed. The architectural design is by Krook & Tjäder AB. Setra is supplying the wooden frame.

DID YOU KNOW...

Nordbygg, Northern Europe's largest construction fair, welcomes visitors with a wooden structure. Nordbygg will run from 23–26 April at Stockholmsmässan. Setra is participating along with Swedish Wood on stand C:14:41.

To find out more, scan the QR code using your phone camera.

Growing climate benefits

90 million tonnes CO2

The Swedish forest industry's annual climate benefit is estimated at around 90 million tonnes of carbon dioxide equivalents. This compensates for all of Sweden's territorial emissions twice over.

Double effect

The major climate benefit is due to the ability of trees to capture carbon dioxide from the atmosphere and store it in the form of carbon. The double effect occurs when wood-based products and energy are then used to replace fossil alternatives, cutting out their associated fossil emissions.

Green transition

The green transition can be accelerated by harnessing the unique power of the forest. To drive development forward, Sweden's forest industries have formulated three joint pledges in the areas of climate, circularity and biodiversity.

Read more about the forest's role in the green transition at Skogsindustrierna.se

COMMITMENTS FOR 2040

CLIMATE BENEFIT

The forest industry's climate benefit will increase by 30 percent – for example, by boosting forest growth, producing more wood products with a long life and replacing fossil-intensive products and fuels to an even greater degree.

CIRCULAR SOCIETY

The forest industry's products will be completely fossil-free and recyclable – this also means that domestic transport will transition to being completely fossil-free.

BIODIVERSITY

Thriving forests with richer biodiversity – forests should be managed in a way that increases both growth and biodiversity. This requires, among other things, more varied forest management with more of a focus on nature conservation.

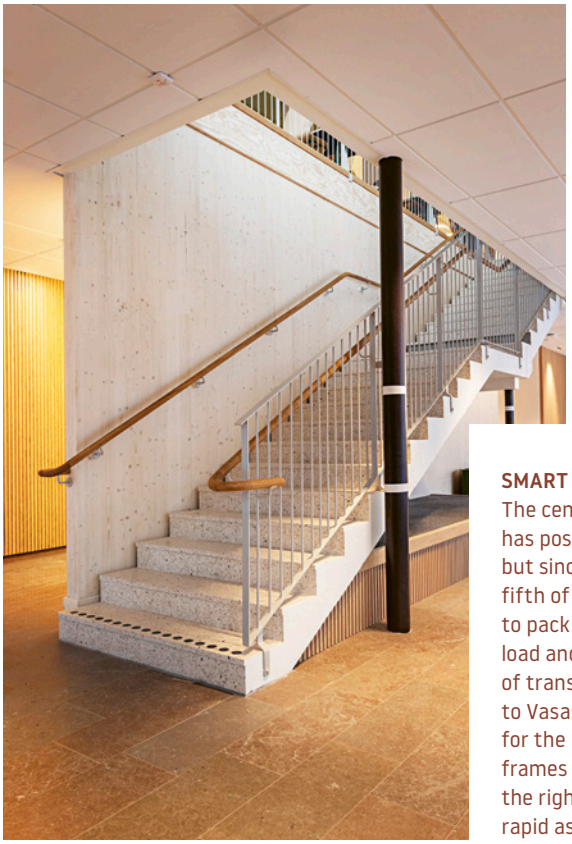
A meeting of eras

Vasaskolan's new additions are inspired by the grand Art Nouveau style of the old main building. The basic theme of the architecture is drawn from nature, with green facades and timber frames playing key roles.

TEXT: **MARIE KARLSSON** IMAGE: **KLAS SJÖBERG**

Vasaskolan in Gävle. The plastered facades in dark green are in dialogue with the pale yellow walls and green copper roof of the old building. The new buildings also have green roofs.

From spring term 2024, students and staff will be able to enjoy both a new canteen and a new science building at the historic Vasaskolan.



Dating back to the 16th century in places, Vasaskolan in Gävle is one of northern Sweden's oldest schools. The current main building, in its present location in the town centre, dates from the late 19th century. With increasing student numbers and a desire to gather a previously scattered operation in one place, Gävle municipality decided to place two additional buildings immediately next to the original.

"The town is growing and we need more upper secondary school places. We were faced with either building something brand new, or upgrading the existing school premises. We decided to expand the facilities on the Vasaskolan site in the form of a new canteen and a new science block, two spacious buildings that add new capacity and free up space in the main building," explains Lilianne Axelsson, project manager at Gavlefastigheter.

The extensions complement the attractive main building, which continues to take centre stage on the site. The architecture deliberately flirts with 19th-century Art Nouveau, but the modern additions are considerably more pared down and much simpler and more direct in nature. The science block has four floors, providing approximately 4,500 square metres of modern classrooms and

SMART TRANSPORT
The central location of the site has posed logistical challenges, but since wood weighs one fifth of concrete, it is possible to pack more units into each load and minimise the amount of transport. Setra's deliveries to Vasaskolan were optimised for the build, meaning that the frames were delivered in exactly the right order for smooth and rapid assembly.

laboratories for teaching biology, chemistry and physics. The premises include a café and most of the staff rooms, counselling rooms and offices. In addition, the building houses a lavish biological museum, accessible to other school students in Gävle.

The new canteen building also has four floors, totalling around 2,300 square metres, making space for a large catering kitchen for 1,500 diners, a large dining room, a smaller dining area, staff facilities and an open study area.

"AN EXPOSED TIMBER FRAME HELPS CREATE THE SENSE OF NATURE BEING CLOSE AT HAND"

Karolina Dahlberg, architect, Maxim Arkitekter.

ABOUT THE PROJECT

LOCATION: Gävle

YEAR: The extensions were built in 2022–2023. The main building will be renovated in 2024 and 2025. The whole project is expected to be completed in 2025.

GROSS AREA: 6,800 m², spread over two buildings.

CLIENT: Gavlefastigheter AB

ARCHITECT: Maxim Arkitekter AB

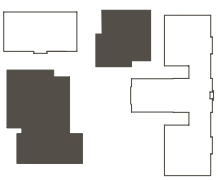
STRUCTURAL ENGINEER: WSP Sverige

FRAME: CLT

BUILDING CONTRACTOR: Sehed Bygg Gävleborg AB

BUILDING MATERIALS

Setra has delivered 1,100 cubic metres of CLT and 110 cubic metres of glulam. Concrete basement, with steel elements in the structure.



The grey buildings are the new additions.

Common to both extensions are their open spaces, with large windows that let in plenty of light. They also share interiors studded with as much visible wood as possible. An exposed timber frame helps to create the sense of nature being close at hand, which is the basic concept behind the architecture and design of the buildings, explains Karolina Dahlberg, architect at Maxim Arkitekter.

"We started with the site's materials and influencing factors, not least the dominant greenery. Materials such as wood and green colours have been chosen to tie in with the surroundings, to accentuate the original building and to demonstrate an environmental and climate perspective," says Karolina.

The brief was clear that both new buildings should have a CLT frame, a preference based on developer Gavlefastigheter's good experiences on previous municipal wood construction projects.

"The municipality's ambition is to build in wood wherever possible; this was decided at the political level and informs all our activities. We endeavour to achieve the greatest possible environmental benefit in our construction projects, and choosing a timber frame makes a strong contribution to this. We know that good material choices generate major sustainability gains and we're keen to build with renewable materials, from both a climate and a quality perspective," says Lilianne.*

SUSTAINABLE COMMUNITIES

Interest in ***climate-smart*** construction is growing among Swedish municipalities and regions. Wood is becoming increasingly common as a building material, but more knowledge and collaboration is needed to make it easier for the public sector to build in wood, according to WoodCity Sweden.

TEXT: **MARIE KARLSSON** IMAGE: **ERIK THOR**

Wood construction is an important factor in modern urban development. And if the public sector is to meet its energy and environmental requirements, it will have to build in wood. As major commissioners of buildings, municipalities and regions are a particularly interesting target group for training and development, says Helene Hellmark Knutsson, chair of WoodCity Sweden and Governor of Västerbotten County.

"The carbon footprint needs to go down, materials need to be recyclable and we want to use more renewables – all of which is achieved by building in wood. But for it to fully work, more knowledge is needed, not least among public sector clients and planners. In the past, large public buildings were mostly made of steel and concrete. Ordering and building in wood is different, but there is a clear desire to learn how to build sustainably and renewably."

In its online training course Wood First, WoodCity Sweden offers municipalities and regions support in developing a wood construction strategy for climate-neutral building. There is a lot of interest and strategies are being adopted across the country to proactively encourage more sustainable construction.

"We've seen wood construction make rapid headway over the past ten years. Only a few percent of multi-storey buildings used to be built in wood – today it's around 20 percent and steadily increasing. This is largely due to a greater awareness of the many benefits of wood, such as load-bearing capacity, shorter assembly times and new industrial construction techniques. But above all, more people are now aware of how superior wood is from a sustainability perspective," says Helene.

Collaboration between academia, the private sector and public stakeholders is the key to expanding wood construction. One municipality that has long focused on the wood industry is Skellefteå, the place where international delegations come to learn more about wood and the location of the Wood Innovation Cluster, a hub for collective knowledge about wood development in Sweden.

Britt Inger Brisádottir is development strategist for sustainable construction and coordinator of the Wood Innovation Cluster in Skellefteå.

"Our region has a long tradition of using wood. Now, Skellefteå is a centre of excellence in research and development, and Sweden is seen as a pioneer in the modern wood industry. In 2023, Skellefteå municipality adopted a new programme for sustainable construction in wood, as it plots a course of sustainable development until 2030. We're proud to be contributing as part of a vital industry of the future, both locally and globally," says Britt Inger.*

Sara Kulturhus in Skellefteå is Sweden's tallest wooden building. Standing 20 storeys and 74 m high, the arts centre contains 12,200 m³ of wood.

"WE'VE SEEN WOOD CONSTRUCTION MAKE HEADWAY."

Helene Hellmark,
Chair, WoodCity Sweden
and Governor of
Västerbotten County

"OUR REGION HAS A LONG TRADITION OF USING WOOD."

Britt Inger Brisádottir,
Coordinator,
Wood Innovation Cluster,
Skellefteå.

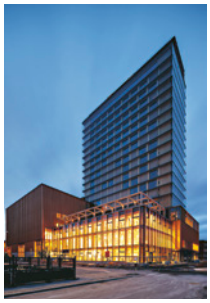


IMAGE: JONAS WESTLING

BJÖRN JOHANSON

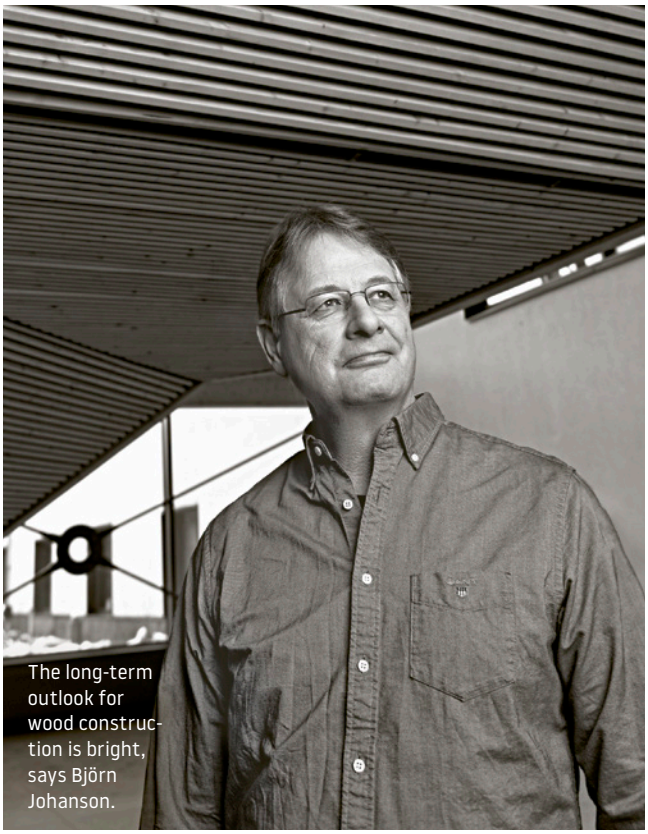
CURRENT PROJECT: Bjerking is building the new Tunagården sheltered housing in Borlänge together with Setra. Advisory expert to the jury for the Swedish Wood Award 2024.

ROLE: Specialist in wood construction, head of property development at the technical consultancy firm Bjerking.

Thirty years in wood construction

In his 30 years as a specialist in wood construction, ***Björn Johanson*** has seen the industry advance from his front row seat. He predicts that within ten years, wood will be very much 'the norm'.

TEXT: **IVA STEPÁN** IMAGE: **KLAS SJÖBERG**



The long-term outlook for wood construction is bright, says Björn Johanson.

Choosing CLT for the frame enabled Cederhusen in Hagastaden, Stockholm, to be built on a limited plot. Wood is strong and light in relation to its weight, which made it possible to build all the floors required for the economic viability of the project. Structural engineer: Bjerking.

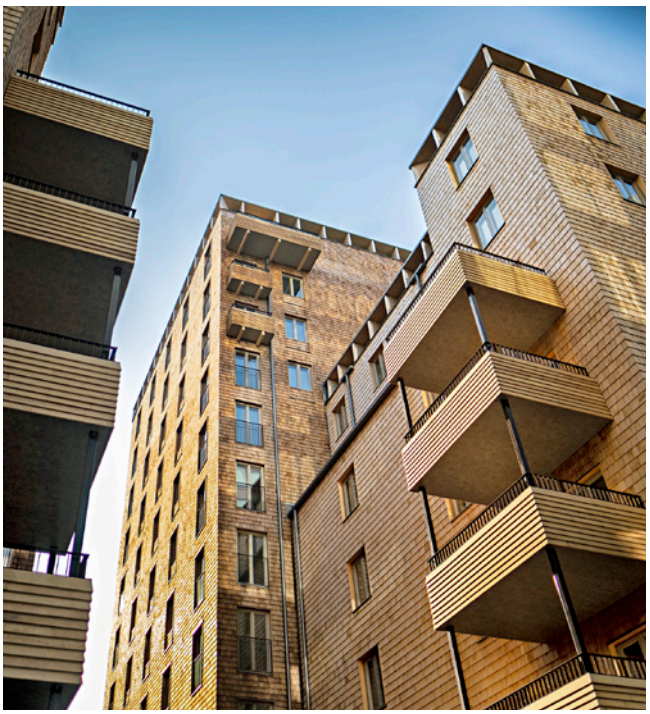


IMAGE: SWEDISH WOOD/FREDRIK HJERLING

Björn Johanson has played an active role in the development of Swedish wood construction. The 1990s saw the first large buildings in wood, as industrial wood construction began to establish itself. And engineering consultancy firm Bjerking was one of the players that helped develop the technology and the industry from the very start.

"By the time the major wood projects started going up in Sweden, I had already been working at Bjerking for over ten years," says Björn. "It was my first 'proper' job after school – I personally approached the CEO in the early 1980s and asked to be hired. Since then, I've never felt the need to work anywhere else."

Initially, Björn had his sights set on working with steel. But Fate had other ideas.

"I didn't plan to specialise in wood, but I've always liked the material and enjoyed carpentry. Wood offers so many possibilities, making it easy to create different structures. The demand for knowledge in wood construction has constantly grown. There hasn't been much competition in the industry so we've helped each other instead."

"Wood is the only truly sustainable building material."

Today, progress is being driven by the need for sustainable solutions. The climate goals set a clear marker for the energy and environmental standards that new construction must meet. Building in wood is often the only way to fulfil these criteria.

"Wood is the only truly sustainable building material and my goal is for half of all buildings to be made of wood – except perhaps the very largest projects. Municipalities and regions have embraced wood construction or sustainability strategies, and within ten years, wood will be very much 'the norm'."

Beyond the sustainability aspect – the fact that wood is the only renewable building material – Björn sees many advantages to choosing wood.

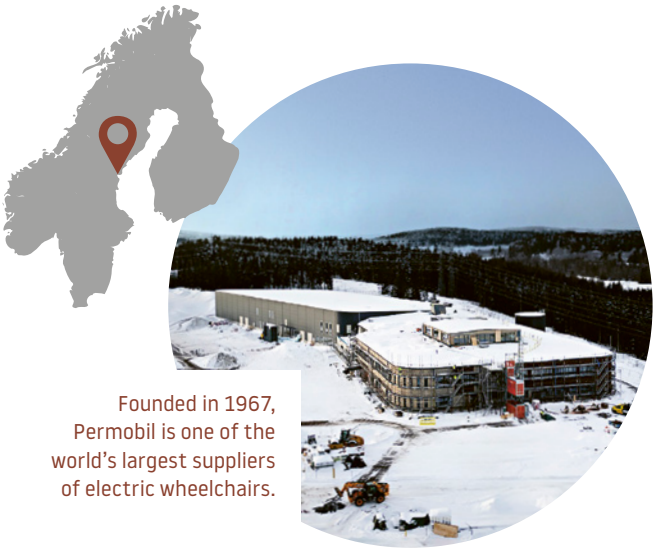
"Wood is a very capable material, strong in relation to its weight, allowing for strong but lightweight structures. It's the easiest material to work with and is both flexible and attractive. It's also quick to assemble and contributes to a good working environment.*

Function first

Permobil's new headquarters is tailored to the needs of the mobility company, reflecting the business it is being built for. The design embraces sustainable material choices, with a hybrid frame allowing optimal form and function.

TEXT: **MARIE KARLSSON** IMAGE: **KLAS SJÖBERG**

The 14,000 m² building houses offices, a production hall and research and testing facilities.



Founded in 1967, Permobil is one of the world's largest suppliers of electric wheelchairs.

The building that is emerging just north of Sundsvall is as closely adapted to its future tenant as Permobil's mobility products are to its customers. To continue creating advanced support solutions for people with disabilities, Permobil needs a working environment of the same innovative calibre. This translates into a new 14,000 square metre headquarters with space for 250 employees, production, research and development, offices and testing facilities.

After an intensive planning period in autumn 2022, construction began in early 2023 on a plot of nearly 50,000 square metres. Extensive groundwork preceded the laying of the foundations and frame assembly, which took place over the spring and summer. The main body of the building was in place by autumn 2023, since when the roofing, interior works and installations have progressed at a rapid pace, with a target completion date of September 2024.

PERMOBIL'S NEW PREMISES

PROJECT: New headquarters

COMPRISES: One building, split into a production hall and an office area, plus space for research and development

LOCATION: Birsta industrial and retail park in Sundsvall

BUILT IN: Jan 2023 – Aug 2024

GROSS AREA: 14,000 m²

CLIENT: Vectura Fastigheter

ARCHITECT: Sweco

STRUCTURAL ENGINEER: Main structure Sweco, Frame ProDesign

FRAME: Hybrid frame in wood, steel and concrete

BUILDING CONTRACTOR: Byggdialog

FRAME ASSEMBLY: CG Solutions

BUILDING MATERIALS

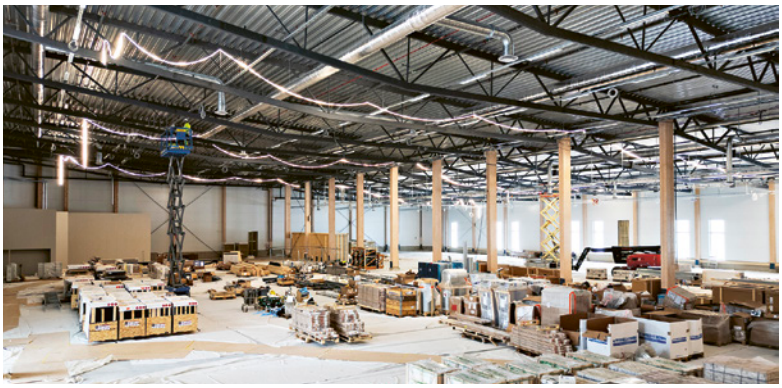
The production hall comprises glulam columns, steel trusses and sheet metal roofing. The external walls are made of Paroc-insulated units. The office section has both steel and glulam columns and beams, but in the atrium and the visible sections, the frame is all wood. The floor system uses HDF elements. The exterior walls consist of timber curtain walls finished in heat-treated timber cladding.

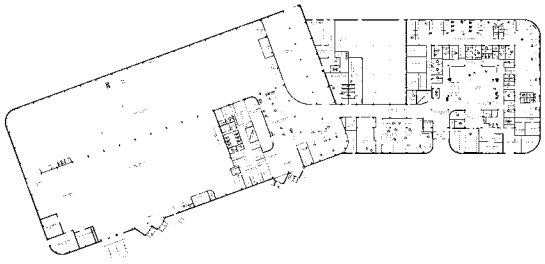
SETRA SUPPLIED: Glulam, CLT

CONNECTIONS

»Joining different materials together requires special types of connections. The hybrid frame for Permobil uses the ALUMEGA connector from Rothoblaas. This high-capacity connection has allowed for great design freedom, handling both the strong forces and long spans that feature in the building's post-and-beam system.

In the production hall, open spaces are created by keeping the lines of columns to a minimum. Long spans have been achieved by combining glulam columns with steel trusses.





Plan. Production hall to the left and office section to the right.

The new premises will see Permobil move its entire operation to Sundsvall from Timrå where, for many years, they have been working in poorly adapted spaces across different buildings, with few natural meeting places. As Sara Karlenäs, project manager at the turnkey contractor Byggdialog, puts it, something completely different now awaits in Birsta.

"In Sundsvall, we're creating the workplace Permobil needs: a substantial building of two parts – a spacious production hall with assembly lines at one end and a welcoming office area at the other. The latter is spread over two floors, with plenty of communal areas. And at the heart of the building sits a welcoming atrium, a great place for creativity and meetings," explains Sara.

"A hybrid frame is ideal for a varied architectural solution like the one we have here."

André Nilsson,
Project manager at CG Solutions

Although the operations are divided up, the building is joined in the middle, giving the visual impression of a single structure. The premises have been carefully adapted to the various functions they need to fulfil, right down to the frame. The building is constructed on a hybrid frame, supplied and assembled by CarlGustav (CG) Solutions.

"A hybrid frame is ideal for a varied architectural solution like the one we have here. It combines wood, steel and concrete, with optimised placement of the materials for the best function and design. Having vertical and horizontal load-bearing structures in wood and supplementing them with a concrete floor slab is just one example of how we've optimised the functions. The spans in the production hall, for example, are very challenging, so we've chosen to work more with steel trusses and concrete, while wood is more dominant in the parts of the building where the frame is exposed," explains André Nilsson, project manager at CG Solutions.

The premises therefore vary in terms of both structure and design, but the aim is for the different parts of the building to be as similar as possible internally. The working

Top image: Much of the timber skeleton is visible in the building. The fixings between column and beam consist of inset steel plates. Bottom image: Timber trusses support the roof of the atrium.

Sitting at the heart of the office section, the atrium features many exposed timber components, including a freestanding staircase in cross-laminated timber.

environment needs to be equally good in both workshop and office, and it is important that the property offers everyone the same conditions. Accessibility is one of the key features of the new headquarters. Anyone, regardless of disability, should be able to work and live in the building with ease. There is therefore a strong focus on the creation of social spaces, large amounts of light and many visible wooden features.

"Everything about this building is carefully considered, including the use of CLT and glulam columns. The feel of the building is meant to be warm and welcoming, something that wood as a building material helps with. In the office section, and especially in the atrium, the wooden elements of the hybrid structure are clearly emphasised to create an extra pleasant experience in the communal areas," says Sara.

"Everything about this building is carefully considered"

Sara Karlenäs, project manager, Byggdialog

Permobil's new headquarters have a very high sustainability profile. The building is following the global LEED Gold certification system, which measures environmentally friendly design, construction, operation and maintenance. The extensive inclusion of wood in the hybrid frame is crucial in meeting the exacting LEED requirements for climate-smart solutions with a minimal carbon footprint.

Setra is delighted to have been part of this project, delivering both glulam and CLT. The best solutions for the design of the hybrid frame were honed in close cooperation with CG-Solutions and the designer ProDesign. And including wood as a natural

part of the hybrid frame is beneficial to all parties, says Victor Jacobs, project manager at Setra.

"It's good to see wood being used in more and more contexts, in this case in a combined production hall and office section. Using 'the right material in the right place' optimises both form and function. For example, wood can withstand high pressures in the direction of the grain and here the timber elements are used in smart and more niche ways. Setra has supported the project by providing solutions to make the timber elements work in terms of both manufacture and structural integrity. We hope Permobil will enjoy its new premises," concludes Victor.✳

KARIN JÖNSSON-LOO

ROLE: Project manager Vectura Properties
CURRENT PROJECT: Vectura is the owner of Permobil's new factory premises.

New spaces for progress

Vectura designs its properties in close collaboration with its tenants. A deep understanding of Permobil's business lies behind the form and function of the new building," says Karin Jönsson-Loo, project manager at Vectura Fastigheter.

TEXT: **MARIE KARLSSON**

Vectura wants to create spaces that give Permobil the perfect conditions to develop and produce mobility solutions. All of Vectura's buildings are designed to promote growth and development, with pleasant spaces and environments that they hope will contribute to their tenant's success.

What was the thinking behind Permobil's new factory and office building?

It's important for the project to be a joint venture, with close dialogue and plenty of mutual openness. Permobil shares our vision of creating spaces that encourage innovation, creativity, flexibility and human interaction across organisational boundaries. For Permobil specifically, it was also important to put extra emphasis on accessibility. As for the production and development space, Permobil are the experts, and they've been fully engaged on this front. With the offices, the goal is to create a pleasant, accessible and healthy environment. We're pleased with the result.

Why go for LEED Gold certification?

All our newbuild properties are LEED certified. In this case, we chose to apply the relatively strict environmental and sustainability requirements of the Gold level, not least because it encourages us to always push the envelope. LEED is an international certification scheme that works well in this context, as Permobil is also an international player.

How do you feel about wood as a building material?

Wood is a natural, renewable and therefore sustainable choice. Vectura prefers to build in wood and we strive to optimise the form and function to suit the specific project. The multiple timber elements in Permobil's hybrid frame are crucial for us not to exceed our carbon footprint and LEED certification targets. Wood also matters visually – exposed wood creates a sense of well-being and warm, appealing indoor environments that have positive effects on the workplace.✳

Economic benefits of wood

The economic situation is challenging for the construction industry and it can be difficult to make the sums add up. Choosing a wooden structure can provide many benefits.

TEXT: **MARIE KARLSSON** IMAGE: **MADELEN LINDGREN**

ELIAS BAENA
BUSINESS DEVELOPER, TYRÉNS

Tyréns' designers are very familiar with Setra's production, enabling Setra to deliver complete solutions that include project planning.

When it comes to economic calculations, things are rarely black and white. Many different factors affect the overall cost of a build, and a material choice that looks expensive initially may turn out to be the most affordable solution in the long run. The most important thing is to consider the complete picture, says Elias Baena, business developer at Tyréns.

"It doesn't really matter what the individual parts of a project cost – overall economic viability is what counts. Building in wood can provide multiple financial benefits, including lower transport costs as a rule. The overall project period is often shorter, reducing expenditure and allowing the buildings to be occupied sooner, which in turn brings in revenue more quickly. Wood is also easier to handle, making many of a project's processes simpler," says Elias.

Matching the right materials to the right needs is fundamental to successful project costing. In terms of global demand for climate-smart, sustainable material choices, wood is very competitive, says Elias.

"Wood is renewable and generates lower carbon emissions than other building materials in the manufacturing process. Wood allows for circular and resource-efficient material flows and fulfils a number of key sustainability requirements. We also know that being surrounded by wood makes people happier and healthier. These dimensions of sustainability should be including in a holistic approach," says Elias.*

!

WORK OUT THE TOTAL COST

Full costings and efficient financial management are fundamental to a successful project. But total cost is the crucial detail. This includes not just the choice of frame and materials, but also factors such as transport, installation, assembly time and sustainability.

1

EXPERIENCE AND PREFABRICATION

Wood lends itself well to a high degree of prefabrication. Replicable framing systems, combined with experience in building with wood, are two factors that impact heavily on the overall economics of a project. Timber construction systems have made significant advances in recent years, and greater industrialisation makes building in wood a favourable option.

2

WOOD IDEAL FOR EXTENSIONS

At a mere fifth of the weight of concrete, wood is a lightweight material that is well suited to both densification and upward extensions. Consider whether building from scratch can be substituted with extensions, conversions or upward additions to existing properties. A few extra floors on a block can make a big difference. Making use of an existing development and creating more space vertically can be a smart choice financially – not least in minimising unnecessary use of land and avoiding new foundations, which are costly for both the budget and the environment.

3

THINK IN ADVANCE AND THINK TOGETHER

A wooden building should be carefully planned and never built from designs originally intended for other materials. Amending drawings and redesigning incurs additional costs and delays. The sooner adequate knowledge is introduced into the process, the more accurate the input data on costings and prices will be. Include factors such as transport, installation and assembly time early on and compare different solutions and results. Getting the structural engineer to optimise the frame avoids specifying excessive dimensions.

»Setra's markets are Sweden (32%), Europe (32%), Asia and Australia (14%), North Africa and the Middle East (13%) and the USA (9%).

IMAGE: SWEDISH WOOD

The 'Furniture for a Sustainable Life' project has seen Chinese furniture companies design and produce furniture in Swedish pine.

Swedish wood in China

Swedish wood is popular in the Chinese furniture market. The main export is spruce timber, popular for its blond colour.

"Around 8–12 percent of our sawn wood products are exported to China and the country is a well-established market for the Swedish wood industry," says Olle Berg, Marketing Manager at Setra.

IMAGE: NICHOLAS KIELBASA/TIMBERLAB

Wooden high-rises earthquake tested

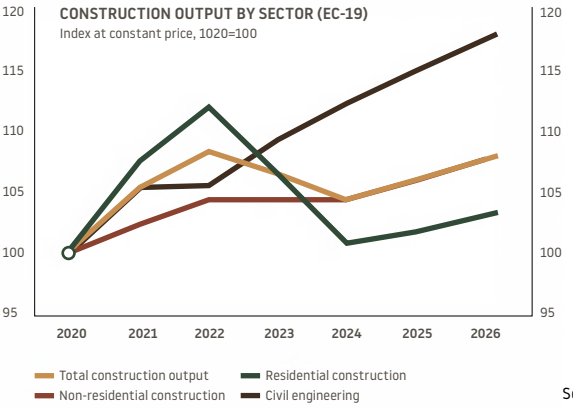
Tall wooden buildings have the potential to withstand even major earthquakes without damage, according to tests conducted by Think Wood* in cooperation with wood industry organisations in the US. A 10-storey timber structure has been tested on a shake table at the University of California San Diego at magnitudes of up to 7.0+ – a strength of earthquake that occurs on average once every 2,500 years.

The building was subjected to 88 earthquake simulations of varying intensity and remained standing without the need for any major repairs.

* Think Wood is a US initiative to raise awareness of wood construction.

BRIGHTER HORIZON

High interest rates, inflation and rising construction costs led to a decline in overall construction activity of 1.7 percent across Europe in 2023, and the forecast is for an even greater decline of 2.1 percent in 2024. But then things turn around, with growth of 1.5 and 1.6 percent predicted in 2025 and 2026.



Sources: Euroconstruct/Prognoscentret

»POSITIVE SIGNALS FOR THE WOOD INDUSTRY

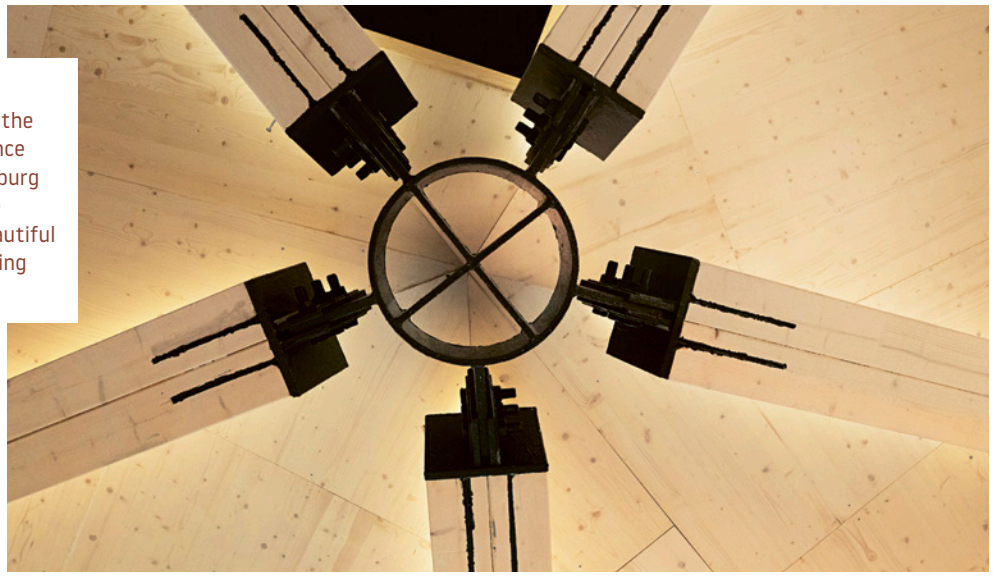
- Stabilised interest rates
- Slowing inflation
- Demand for sustainable solutions is allowing wood to take market share from other building materials
- Pent-up need for renovation

SUSTAINABLE PROFILE FOR OLYMPIC ARENA

The only new permanent venue being built for the 2024 Summer Olympics in Paris is the Aquatics Centre. The modular building will be able to seat 5,000 spectators for the Olympics, after which it will be scaled down to 2,500. With its timber frame and roof, solar panels, a water recycling system and an interior of recycled materials, the building leads the way on sustainability and energy efficiency.

In 2023, the building won the Paris Grand Prix BIM d'Or for best design. Setra supplied the raw material for the glulam.

IMAGE: ©SBP.DE



UNIVERSEUM
The extension to the Universeum science centre in Gothenburg features creative solutions and beautiful fixings. The building opened in 2023.

Getting connected

Sometimes all you need are some screws. When ***joining*** the different parts of the building, there are a variety of solutions for joints and connections. The common denominator in assembling wooden buildings is simplicity.

TEXT: **IVA STEPÁN** IMAGE: **KLAS SJÖBERG**

Dismantle more

The construction industry is moving to increase the reuse of construction materials. Today's buildings are not designed to be dismantled, but the buildings of the future will be optimised for dismantling so that building materials can be recovered and reused.

Various research projects are looking at how to design fastenings and nodes so that a building can be easily disassembled. How should floors and walls be fixed together? What types of fittings should be used? How will this affect the economics of a project?

TIMBER NODES
Most fasteners are made of steel or sheet metal, but research is underway to develop nodes and fasteners made of wood, such as plywood. Inspiration can be drawn from old timber buildings or the Japanese art of construction, which traditionally secures joints just using wood.

IMAGE: SETRA

Get out your screwdriver

With the emergence of industrial wood construction systems for larger and taller buildings, the screw and fixings industry has constantly had to develop new fasteners.

There is now a wide range of options for wood construction. Walls, floors, ceilings, columns, beams and other building elements don't need customising; the fixing solution comes down to the choice of fixings. The way the building is joined together largely determines how robust it will be – but the actual procedure is straightforward, as it can mostly all be done with screws and screwdrivers.

THINK ABOUT THE DESIGN
Attractive and visible nodes fulfil an architectural function. Manufacturing and assembly methods, fire safety requirements and load capacity needs are other factors that determine the design of joints, connections and fittings.

JESPER ÅKERLUND,
Business Manager Building Solutions and Components at Setra, is pleased to see the advances in industrial wood construction.

"NEXT PHASE FOR INDUSTRIAL WOOD CONSTRUCTION"

Most people today know all about the benefits of building with wood. Sometimes wood is the only conceivable option if a project is to fulfil climate and energy requirements, but there are plenty of other benefits to be had, including shorter construction times, easier assembly and a better working environment on the construction site.

Knowledge about building with wood has evolved and we are moving towards standardisation and streamlining of the construction process, with CLT and glulam now frequently employed wherever they are of most use. This trend is a good thing, because the environmental benefits of wood will only really materialise when we are able to scale up industrial wood construction. Instead of building the occasional prestige project entirely in wood, the material needs to become a natural component in the majority of new building work.

We are now seeing construction companies developing their processes – reducing the number of elements that have to be built on site, for example, and designing wood construction systems that can be used and replicated across multiple projects. It is also a question of using different materials as efficiently as possible and saving time. Overall, this benefits both the construction economy and the environment.

Here at Setra, we support this development in several ways. We maintain a close dialogue with the client in order to optimise the use of wood and increase the degree of standardisation. Working with standard dimensions for frames in the design phase, for instance, saves both time and money. We also enable the client to gain control over costs through our CLT and glulam frame offering. And we have a modern and efficient production line, enhanced with the recent addition of another CNC machine at our CLT factory in Långshyttan.

We are well on the way to an industrial level of wood construction in Sweden. Only once it is fully implemented will society realise the full benefits of sustainable construction. We look forward to playing an important role in that development!*

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MARCH 2024
PERMOBIL | SUNDSVALL

Permobil is getting the workplace it needs in Sundsvall. Sara Karlenäs is project manager at turnkey contractor Byggdialog.