Working Wood

SÖDRA HEMLINGBY
Comfort and natural feeling in four floors of wood

VILLAZERO
New solutions in climate-neutral house

Seedlings for the future

Improved seedlings should be able to withstand different climatic conditions and continue to provide sound, durable wood for generations to come.

A MAGAZINE FROM SETRA PROMOTING GREEN BUSINESS • ISSUE 1 2022

01

Contents

22

"SWEDEN IS AT THE FOREFRONT OF INDUSTRIAL WOOD CONSTRUCTION.

EDITORIAL

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 twice a year in Swedish and English. **CIRCULATION:** 4,800 copies **ADDRESS:** Setra Group, Box 3027, 169 03 Solna, Sweden. **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. **PRINTED BY:** Åtta 45. **COVER:** Improved seedling. **PHOTOGRAPHER:** Klas Sjöberg. All unsigned material is editorial. Want to subscribe to Working Wood? Register at www.setragroup.com/workingwood. 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.

SVANENMÄRKET 3041 0001 TRYCKSAK

FSC MIX Paper FSC® C023277

Compensated according to ClimateCalc. www.climatecalc.eu CC-000093/SE

IMAGE: KLAS SJÖBERG

KATARINA LEVIN
President and CEO
of Setra

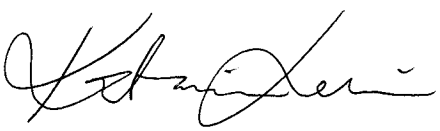
GRÖNSAMHET
We want to do business where everyone prospers – not just ourselves but also our customers, nature and society. When a business profits everyone, we call that "Grönsamhet" – Green profit. We create green profit.

"Driving the construction industry in a greener direction"

Now it really feels like change is happening, doesn't it? Industrial wood construction is reforming the way we look at construction and pushing the building industry in a greener direction. Not only in terms of sustainable materials, but also in terms of productivity and health and safety issues. Did you know, for example, that multi-family dwellings with a wooden frame are on average three months faster to complete than those that use conventional construction systems, according to a new study from Luleå University of Technology?

It is exciting to work in an industry with such strong future prospects – to be surrounded by colleagues who also feel that we can actually have an impact and make a difference for the climate. In this issue of Working Wood, you can read about Sweden's first carbon-neutral house and new moisture-protection that makes building in wood even easier. Two clear examples of how we are driving progress.

Many of us in the wood industry have had a strong year in terms of profits. At Setra, we are now investing heavily in upgrading our sawmills so that we can produce more building materials with even better climate performance. At the same time, we face new global challenges. Our thoughts this spring are of course with the people of Ukraine and we support their right to live in freedom and democracy.



Setra

We produce sawn and processed wood products, construction products and bio-products from responsibly managed forests.

CONTACT US – WE ARE HERE TO HELP
info@setragroup.com | Phone: +46 8 705 03 00

In brief

PRODUCTION | WOODEN BUILDINGS | INNOVATION

HAMNBAD STOCKHOLM
In 2023, Stockholmers will be able to swim in the new year-round facility Hamnbad Stockholm in the central quay Munkbrohamnen. The CLT structures will be transported by water to the construction site. Architect Oopeaa.

Setra is expanding

Setra's forthcoming investments will increase capacity by approximately 400,000 m³ sawn wood products once fully implemented. The list includes an increase in drying capacity at the Heby and Hasselfors sawmills, a new saw line at the Skinnskatteberg sawmill, and a new log intake, a new saw line, an updated trim saw and a new drying plant at the unit in Malå.

SETRA HAS PRODUCTION IN eight Swedish locations: Färila, Hasselfors, Heby, Gävle, Långshyttan, Malå, Nyby, Skinnskatteberg and King's Lynn in the UK.

ERIK PELLING,
Chair of Uppsala's municipal board
Uppsala is the winner of Wood City 2021.

"Developing the municipality requires a sustainable and climate-smart approach, which is why we need wooden buildings. Building in wood is the future."

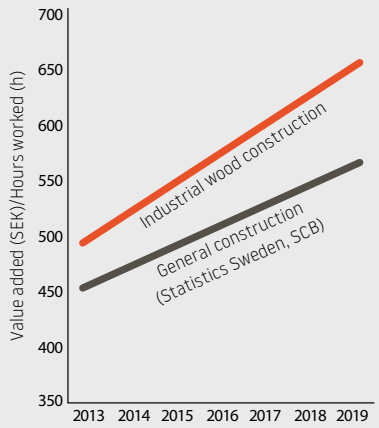
Faster construction

The Swedish industrial wood construction sector is increasing productivity and shortening construction times, according to a study from Luleå University of Technology.

While the traditional construction industry has been sluggish, the industrial wood construction sector is making rapid advances. Susanne Rudenstam is head of the Swedish Wood Building Council.

"The sawmill industry is already international, but industrial construction is also well placed to become an export industry. The industrial wood construction sector is becoming one of the most technologically advanced, and we have secured that position by honing the production process. We focus on process development, with strong influences from the automotive industry. This is a knowledge industry on the rise," she says.

Trend lines for productivity in industrial wood construction.



Source: Report Productivity Measures for Industrial Wood Construction.

19%

In Sweden, 19% of newly built apartment blocks had a wooden structural frame in 2021, which is about the same level as in 2020. In 2015, the figure was just 9%.

Source: SCB/TMF.

IMAGE: FALU MECHANISKA

Firewalls made of CLT stop fire

Stop fires with a CLT firewall – safe, smart and quick to install.

Cosmetics company Svenska Krämfabriken operates one of the most modern production facilities in Europe and has expanded its premises in Borlänge by adding 3,100 square metres of new warehouse space.

To prevent the spread of fire, the extension has a 120-metre long and almost 6-metre high firewall made of cross laminated timber, CLT, from Setra. The structure itself is being built with a steel frame. According to the structural engineers at Falu Mekaniska Verkstad, CLT is the best firewall solution because the material retains its stability and load-bearing capacity in the event of a fire.

Amanda Roberg, project manager at Setra Group, comments:

"Using the properties of wood is very much in step with current thinking. We'll see similar solutions in the future, as wooden firewalls prove their worth in terms of both cost and space efficiency."

IMAGE: FORSLUND ARCHITECTS

Sustainability in Sigtuna

Sigtuna Stadsängar wants to become Sweden's most sustainable urban district. One of the new blocks, Honungskupan is being built with wooden frames and includes outdoor space for growing food and keeping bees. The buildings are certified according to the Nordic Swan Ecolabel and feature pure natural materials such as exposed wood in the stairwells. The development is being built by Veidekke for Obos and the cross-laminated timber frames are being manufactured by Setra. The new residents will start to move in in summer 2023.

DID YOU KNOW ...

The UN settlement of Kalobeyei in Kenya has gained a new community space made of CLT, sponsored by Setra.

Hold your mobile camera over the QR code to see a UN Habitat video about the project.

Planting for the future

380

Forest regeneration can be achieved through planting, natural regeneration and sowing. Planting is the most common method of creating new forests and at least 380 million trees are planted in Sweden every year. Growth of the forest is greater than the volume harvested.

Planting

New forest is planted 1–3 years after felling and after mechanical soil preparation, such as harrowing. Planting can be done in spring or autumn.

Sweden's forest stock consists of 41% spruce, 39% pine and 12% birch. The remaining 8% comprises various types of broadleaf trees.

On most land, it is advisable to plant between 2,000 and 2,500 seedlings per hectare, giving each tree 4–5 square metres of space.

RIGHT SPECIES IN THE RIGHT PLACE

The pine tree can cope with dry and poor soils, while the spruce thrives on moist and fertile soils. Birch, aspen and alder are found throughout Sweden, while larger broadleaf trees such as beech and oak only grow south of the Dalälven river.

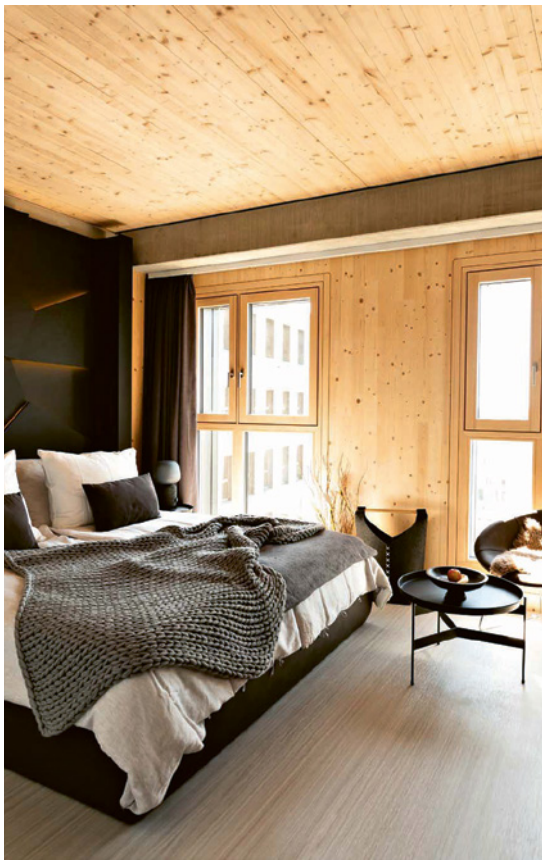
Light elegance defines the facade, clad in an organic composite made of wood shavings.

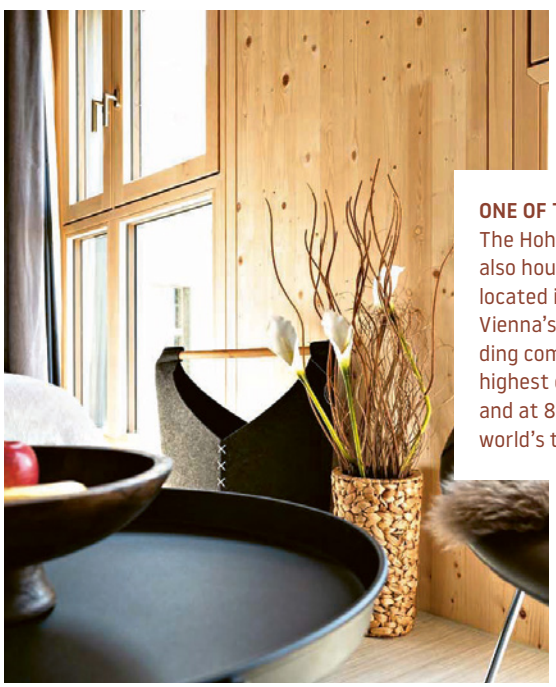
Tall pioneer

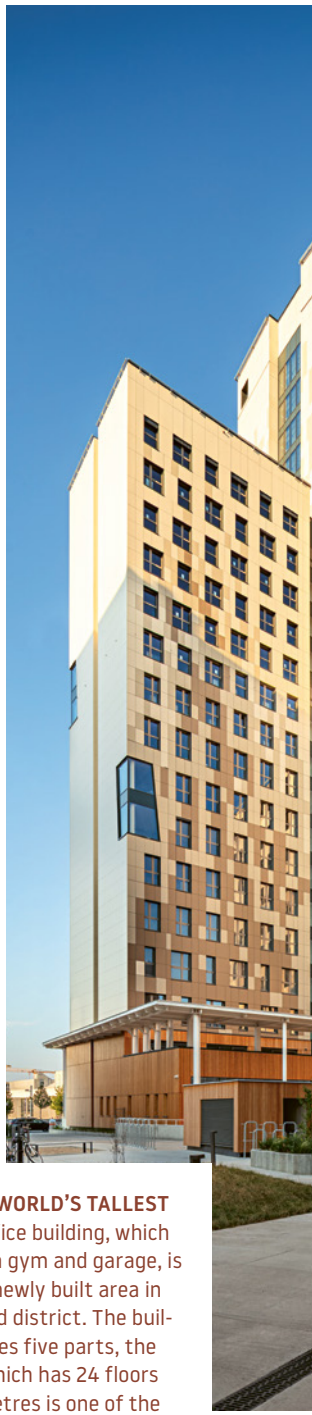
At 84 metres, ***Hoho*** offers magnificent views over Vienna. The underlying structure that made one of the world's tallest wooden buildings possible is equally fascinating.

TEXT: **HEDVIG ANDERSSON** IMAGE: **ROBERT FRITZ**

Visible materials. Hoho is the building that wants its materials to be seen. Where there is wood in the frame, it is exposed, and the same goes for any concrete.







ONE OF THE WORLD'S TALLEST
The Hoho office building, which also houses a gym and garage, is located in a newly built area in Vienna's 22nd district. The building comprises five parts, the highest of which has 24 floors and at 84 metres is one of the world's tallest wooden buildings.

Six years ago, an ambitious project was launched in Austria's capital Vienna. Five wooden buildings, the shortest with six and the tallest with 24 floors, began to take shape next to Asperner See in Vienna's 22nd district, where a new neighbourhood is emerging. Almost three years ago, Hoho was completed. The complex, designed by architect Rüdiger Lainer, currently houses offices, shops, a hotel, a gym and a garage. With a height of 84 metres, it is one of the world's tallest wooden buildings. Although there is a long tradition of building in wood in Austria, its height makes Hoho a pioneer.

"This building is exceptional when it comes to showing what can be achieved with wood. It truly opens a new chapter in modern timber engineering. It shows that wood is a sustainable alternative, both economically and environmentally, even for tall buildings in big cities," says Georg Jeitler, head of innovation at Hasslacher Group, which buys timber from Setra.

Hasslacher Group has supplied glulam and cross-laminated timber from sustainably managed forests for the five blocks, which are 75% built in wood. The structure consists of four main prefabricated elements: the load-bearing structure, facade elements, roof panels and the floor system. The load-bearing structure consists of steel-reinforced glulam and

glulam columns. The external wall elements are made of cross-laminated wood, while the floor system between the storeys is a wood and concrete composite. The facade is finished in an organic composite made of wood shavings.

"The steel in the supporting structure takes over if a glulam column breaks, distributing the weight to the other columns via the reinforced concrete elements," explains Georg Jeitler.

Glulam is a prerequisite for building this high in wood.

"Glulam has become an indispensable product in modern wood construction. The low density and high strength of glulam allows it to withstand large spans and high loads, like those in the facade columns of this building," he continues.

Working with prefabricated modules made the construction process easier, but also placed high demands on manufacturers to deliver components with precise dimensions. The fact that the modules were built in a factory freed the building process from the vagaries of the weather, which streamlined the work and when it came time for assembly, each storey took only a week and a half to complete.

There is no question that the exterior of this high-rise pioneer makes it a landmark, but the interior of Hoho is also a showcase for the possibilities of the material and a pointer to the future of large-scale wood construction. The same type of wood that characterises the exterior can also be found inside.

"In order to prevent the wood used in the interior from becoming marked during installation or yellowing over time, it has been treated with a water-based product that is free from chemicals and has UV-absorbing properties.*

"GLULAM HAS BECOME AN INDISPENSABLE PRODUCT IN MODERN WOOD CONSTRUCTION."

Georg Jeitler, Hasslacher Group

ABOUT THE PROJECT

LOCATION: Vienna, Austria

YEAR: 2019

GROSS AREA: 25,000 m²

ARCHITECT: Rüdiger Lainer

BUILDING CONTRACTOR: Handler Group

CONSTRUCTION MATERIALS

Glulam, CLT, steel and concrete.

75%

of the five buildings is wood.

THE NAME HOHO

Hoho stands for Holz Hochhaus – wooden high-rise in German.

MATERIAL FOR THE ENVIRONMENT

Borlänge is home to Sweden's first ***carbon-neutral house***. The choice of building materials has guided the entire design process, which means that the base plate is made of CLT instead of concrete.

TEXT: **LENA LIDBERG** IMAGE: **VILLAZERO**

Wooden interior in Villazero.

The recently completed Villazero building is attracting a great deal of attention, not only in Sweden but also internationally. Work began in June last year and since then, groups of visitors have flocked to the innovative wooden house in the Paradiset residential area of Borlänge.

The idea was born almost two years ago as a collaborative project in Dalarna, as a means of testing more climate-smart construction techniques.

"The factor that has the greatest environmental impact on a building is the choice of materials," says Gabriella Hagman, CEO of Mondo Architects Dalarna and one of the initiators of the project.

In working on Villazero, the architectural firm has therefore turned the entire design process on its head, with the materials playing the main role, while the design followed in the next stage. The result is that the foundation, walls and roof are all made of wood. Even the insulation is made of cellulose and wood fibre.

The base plate is one of the house's groundbreaking elements. Instead of concrete, the project team has used solid CLT from Setra's factory in Långshyttan.

"Initially, there was some concern about damp issues, but now we have a solution with a moisture-proof barrier on top of the wood. The structure will be monitored for several years – the whole building is filled with sensors that will give us large amounts of data over time," says Gabriella Hagman.

Even before construction began, it was clear that Villazero would be more than just a showhome. One of the project's initiators has chosen to buy the villa and live in it.

"I am both the client and the end customer," explains Gunnar Jönsson, CEO of Fiskarhedenvillan, which delivers around 700 houses to clients in Sweden, Norway and Åland every year.

He and Gabriella Hagman note that Villazero is providing important knowledge for the future. Both are convinced that climate-neutral construction will soon become a matter of course.

"Alongside the choice of materials, the energy consumption of the house is what has the greatest impact on the climate. That's why Villazero is designed to be as energy-efficient and space-efficient as possible. For example, rooftop solar panels contribute to heating, hot water, household electricity and electric car charging. The solar panels will even generate a little surplus electricity," says Gunnar Jönsson.

Behind Villazero lie many hours of climate calculations and complex considerations. The intention is that the house will obtain a Nordic Swan Ecolabel licence and Sweden Green Building Council's NollCO_2 certification, both of which take account of the building's entire life cycle.

The team behind Villazero has also challenged the industry on another front. For the first time, an entire construction team, including carpenters, metal workers and electricians, has been made up of women.

"This is important in raising the issue of inequality in the construction industry and showcasing female role models," says Gabriella Hagman.*

"THE BIGGEST ENVIRONMENTAL IMPACT COMES FROM THE CHOICE OF MATERIALS."

Gabriella Hagman,
CEO Mondo Arkitekter Dalarna

"VILLAZERO IS DESIGNED TO BE ENERGY-EFFICIENT."

Gunnar Jönsson,
CEO Fiskarhedenvillan

VILLAZERO is a collaboration between Fiskarhedenvillan, Mondo Architects Dalarna and Structor Byggteknik Dalarna, with Byggpartner as contractor.

At the heart of the action

Helena Lidelöw has devoted her life to wood through a mix of academia, industry and a passion for the material. Now her journey has taken her way out west – from Piteå in northern Sweden to Tracy, California.

TEXT: **MARIE KARLSSON** IMAGE: **MARIA FÄLDT**

HELENA LIDELÖW

CURRENT ROLE: Newly appointed Chief Technical Officer at Volumetric Building Companies (VBC) in the US.
CAREER: Previously research and development manager at Lindbäcks Bygg. Researcher in wood construction, Luleå University of Technology, and assistant professor in industrial construction.

Helena's love of wood dates back to her childhood in Sunne in the forests of Värmland. The family furniture factory and trips to the woods with a lumberjack grandfather paved the way for her own carpentry projects.

As the new Chief Technical Officer of Volumetric Building Companies (VBC), Helena will be translating her Swedish expertise in automated industrial wood construction to the US market. The assignment covers both cultural conditions and raw materials, with a focus on building sustainable wooden modules for multi-storey buildings. This is exactly what she and her former employer Lindbäcks Bygg in northern Sweden have spent many years developing unique solutions for.

Sweden is at the forefront of industrial wood construction, not least in demonstrating that manufacturing wooden modules in a factory and assembling them into buildings on site is climate-smart and efficient. The functional production process and its benefits are attracting more and more people, and Helena is delighted to see the industry evolve.

"When I first came into contact with industrial construction, around the year 2000, it was an uphill battle. Clients, builders and architects were all sceptical about producing modules in one place and building in another. But today the method is flourishing. In 2022, sustainability, carbon footprint, fast lead times and forest resources are the buzzwords of the day. Suddenly I'm at the heart of the action," says Helena.

"Wood is a living, tactile material that has to be handled with feeling, even in industrial production."

With the forest on her doorstep as a child, a successful academic career in wood construction and many years of experience in production, Helena's life is strongly influenced by her relationship with wood. She is looking forward to driving the work of VBC, which hopes to revolutionise the US housing market with prefabricated wooden modules from its newly purchased automated factory. Over there, Design for Manufacturing and Assembly (DfMA) is a big new trend, but it is just another name for exactly what we've been doing in Sweden for the past 20 years, Helena says.

"I've always loved wood and it's wonderful to work with something that's also a passion. It's so exciting to be involved in creating the American homes of the future using a technology and material that I know inside out. The DfMA label is cool and this is right up my street – even though I'm a long way from home."*

Comfortable with wood

Södra Hemlingby in Gävle offers green spaces, exercise trails and great opportunities for recreation, making it a place where many people want to live. Gavlegårdarna is responding to this demand by building 132 climate-smart rental apartments in natural materials.

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

The interior of the apartments will also have a natural and distinct wooden feel, according to Mattias Jansson of Gavlegårdarna and Amanda Roberg at Setra.

The first tenants will receive the keys to their new homes in autumn 2023.

With cross laminated timber (CLT) frames and slate cladding, the newly constructed four-storey buildings will blend in beautifully with their natural surroundings. The choice of wood and stone materials is part of the housing company Gavlegårdarna's conscious desire to create comfort and convey a natural feel with a focus on ecofriendliness.

"There are many ways to put the environment first. We use materials that fit in well with the area, that are sustainable and that also work with the architecture of the blocks. This is our first project involving multi-storey buildings made of CLT, and it was a good one to start out with, as the buildings are not too high," says Mattias Janson, Construction Manager at Gavlegårdarna.

The development was designed by White Arkitekter and comprises a total of six buildings, in three different designs. Five buildings are identical in size, while one building is slightly smaller. There will be a total of 132 rental apartments, featuring exposed wood in the stairwells and inside the homes –

SÖDRA HEMLINGBY

PROJECT: New development in Södra Hemlingby

COMPRISES: Six blocks, 132 rental apartments of 1–4 rooms

LOCATION: Södra Hemlingby, Gävle

BUILT IN: 2020–2023

GROSS AREA: 15,177 m^2

DEVELOPER: Gavlegårdarna

ARCHITECT: White Arkitekter in Uppsala

STRUCTURAL ENGINEERS: Limträteknik i Falun

FRAME: Setra

BUILDING CONTRACTOR: Byggpartner

CONSTRUCTION MATERIALS

CLT and glulam structural frames. Concrete foundations, with facades clad in black, dark grey and green slates.

Wood is also used in the stairwells of the buildings and in the interiors, with exposed wood in the apartments on the long sides of the blocks.

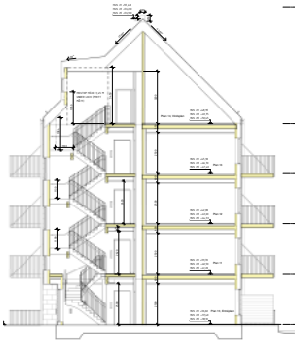
DIMENSIONS

The largest CLT frames measure 3.5x18 metres. The floor system measures up to 12.3 metres.

NEIGHBOUR TO A UNIQUE MIXED-USE BUILDING

»Across the street from the apartment blocks, Gavlegårdarna and Gavlefastigheter are erecting a mixed-use building, also with a wooden frame. It will house a nursing home with 80 apartments, linked up to a school, preschool and sports hall. This co-location makes smart use of resources, while also encouraging encounters between the generations.

The floor has been moisture-proofed using a new technique.



Left: Cross-section of the finished building.
Below: Block 2 under construction.

something that requires a little extra care, explains Amanda Roberg, Project Manager at the frame supplier Setra.

"We like the fact that the wooden elements in the buildings can really be seen and felt. It gives clear character to the homes and reinforces the feeling that solid wooden buildings are being constructed. But delivering visible quality demands a little more from us. It requires a higher-quality raw material and high precision throughout, from production to packing and transport, so that the exposed walls remain blemish-free," says Amanda.

Sustainability and environmental considerations are not only the basis for the choice of materials, but run like a common thread throughout the project – not least when it comes to production and logistics.

The raw material comes from the forests of the Mälardalen region and is sawn in Heby. Then the shipment from Setra's factory in Långshyttan takes just a couple of hours to reach Gävle by road from Avesta. Mattias Janson feels particularly fortunate to have been so close to the materials and deliveries in these times.

"The project has high aesthetic standards."

Mattias Janson,
Construction Manager
Gavlegårdarna

"Of course it feels good to have local partnerships, as they bring so many positives, not least in terms of sustainability. But it has struck us that the supply issues experienced by the construction industry during the pandemic could have caused us many delays. The same goes for the uncertainty surrounding cement. We didn't know about any of this when we made the decision, but today we're very happy that we chose to build in wood," says Mattias.

The apartment blocks in Södra Hemlingby

are being built in close cooperation between the developer Gavlegårdarna and the main contractor Byggpartner. Setra's job is to produce and deliver the frames, i.e. the supporting wooden structures, in the form of glulam and CLT, while Byggpartner and Limträteknik have been responsible for the structural engineering. The exterior walls and load-bearing core walls are also produced by Setra. Magnus Emilsson, Structural Engineer at Limträteknik, explains the advantages of the large, prefabricated elements that are assembled directly on site.

"The design of the structure takes into account the number of elements that need to be installed. We want to reduce assembly time and Setra's ability to deliver such large elements means we can minimise the number of crane lifts and assembly stages. On this project, we're working with CLT in panels up to 3.5 x 18 metres in size and floor elements that are as long as 12.3 metres. That is a real time-saver," says Magnus.

"The exterior design of the blocks really stands out. Wooden buildings with slate facades are unusual."

Magnus Emilsson,
Structural Engineer
Limträteknik

Setra expects to deliver approximately 4,200 cubic metres of CLT to Södra Hemlingby.

NEW MOISTURE-PROOFING
In Södra Hemlingby, a diffusion-open membrane is used for moisture-proofing. The membrane consists of a durable fibre fabric with integrated acrylic adhesive and an anti-slip polyolefin functional layer. The design allows the material to breathe without water penetration.

Behind the fixing plate, you can see how the waterproof membrane is folded up along the wall to damp-proof the wood during installation.

Another difference between building in wood and in concrete is the way the structural elements, i.e. walls and floors, are assembled and fixed together. With wooden elements, great emphasis is placed on the details and the design of good fixings.

"In designing good connections, as well as load-bearing capacity, we also have to ensure robustness. In principle, the building should be able to withstand the collapse of one wall without the whole block coming down. We need to decouple wooden elements from each other to prevent sound from spreading between apartments and at the same time we need to meet fire regulations, which require

the structure to be tightly sealed. The detail solutions for a wooden building are more challenging than for a concrete one, and that is of course also true here in Södra Hemlingby," Magnus explains.

The processes are being fine-tuned as the build progresses, and the team is constantly finding details that can be improved. Amanda Roberg at Setra describes the project in Gävle as an exciting learning process.

"With many steps being repeated, we can be efficient in both production and delivery. We're learning as we go. I'm sure it will be a great place to live and we're proud to be part of the apartments in Södra Hemlingby."*

KRISTIAN HAGLUND

OCCUPATION:
Project Manager
WORKS AT: Byggpartner

Moisture-proof assembly – the wood is made ready in the factory

The apartment blocks in **Södra Hemlingby** are being built using a completely new moisture-protection technique. For the first time on a major Swedish construction project, a technique is being used where parts of the wood material are covered with moisture-proofing in the factory.

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

Just before Setra packs the goods for delivery to Gävle, a moisture-proof membrane is applied to the top and end-grain wood of the floor system.

Kristian Haglund, Project Manager at Byggpartner, has been involved in developing the innovative new technique.

Why is the moisture-protection being tested in Södra Hemlingby?

Work on developing the moisture-protection has been going on for some time, in cooperation between Byggpartner, Setra and the company Siga. The buildings in Södra Hemlingby are well suited to direct use of the method. They are moderately high blocks, with long assembly times spread over the different seasons of the year, which gives us clear results.

What are the benefits?

The method replaces more traditional weather protection and makes work on the construction site easier and more efficient. The membranes allow us to produce non-stop, whatever the weather, and not using large tents that have to be erected and moved shortens the construction time and saves money.

Briefly – how do the membranes work?

The protective layer is applied in the factory, when the wood is dry. It's a sophisticated technology with membranes that can breathe and release vapour, but are sealed enough not to let any water particles through. However you build, in whatever material, moisture is a fundamental factor. You have to constantly make sure there is no moisture penetration.

What kind of results are you seeing?

We have erected entire blocks in mass timber and the measurements definitely indicate that the membranes work. The wood is dry, even though it has been exposed to plenty of weather. So far, the moisture-protection has far exceeded the performance requirements, which feels fantastic.*

Wood is wood, right?

Does it matter what species of wood is used for different products? And if so, what determines the different characteristics of the northern species of spruce and pine? Forest researcher Mateusz Liziniewicz explains the differences between spruce and pine and how they are affected by the conditions in which they grow.

TEXT: **MARIE KARLSSON** ILLUSTRATIONS: **ASTRID LINNÉA ANDERSSON**

MATEUSZ LIZINIEWICZ
RESEARCHER, SKOGFORSK

The material properties of wood vary between and within different wood species. The external features of a tree, including crookedness, thickness and the arrangement of the branches, affect the final product, such as planks and boards. Inside the trunk, factors such as the length of the fibres and the angle of the trunk are important. Crookedness and low angles can create problems with unstable, warped planks during sawing.

"Large, thick branches mean large knots inside the trunk, which negatively affect the strength. The wood industry needs logs of large volumes that are ideally straight, stable and don't have too many knots," explains Mateusz Liziniewicz, a forestry and processing researcher at the Forestry Research Institute of Sweden (Skogforsk).

Forest management also affects the characteristics of the trees. Choices such as natural regeneration or planting and how thinning is carried out will affect the trees. The greatest opportunity to make an impact is at the planting stage and the beginning of the tree's life. After clearing and thinning, you are largely bound by what you have created.

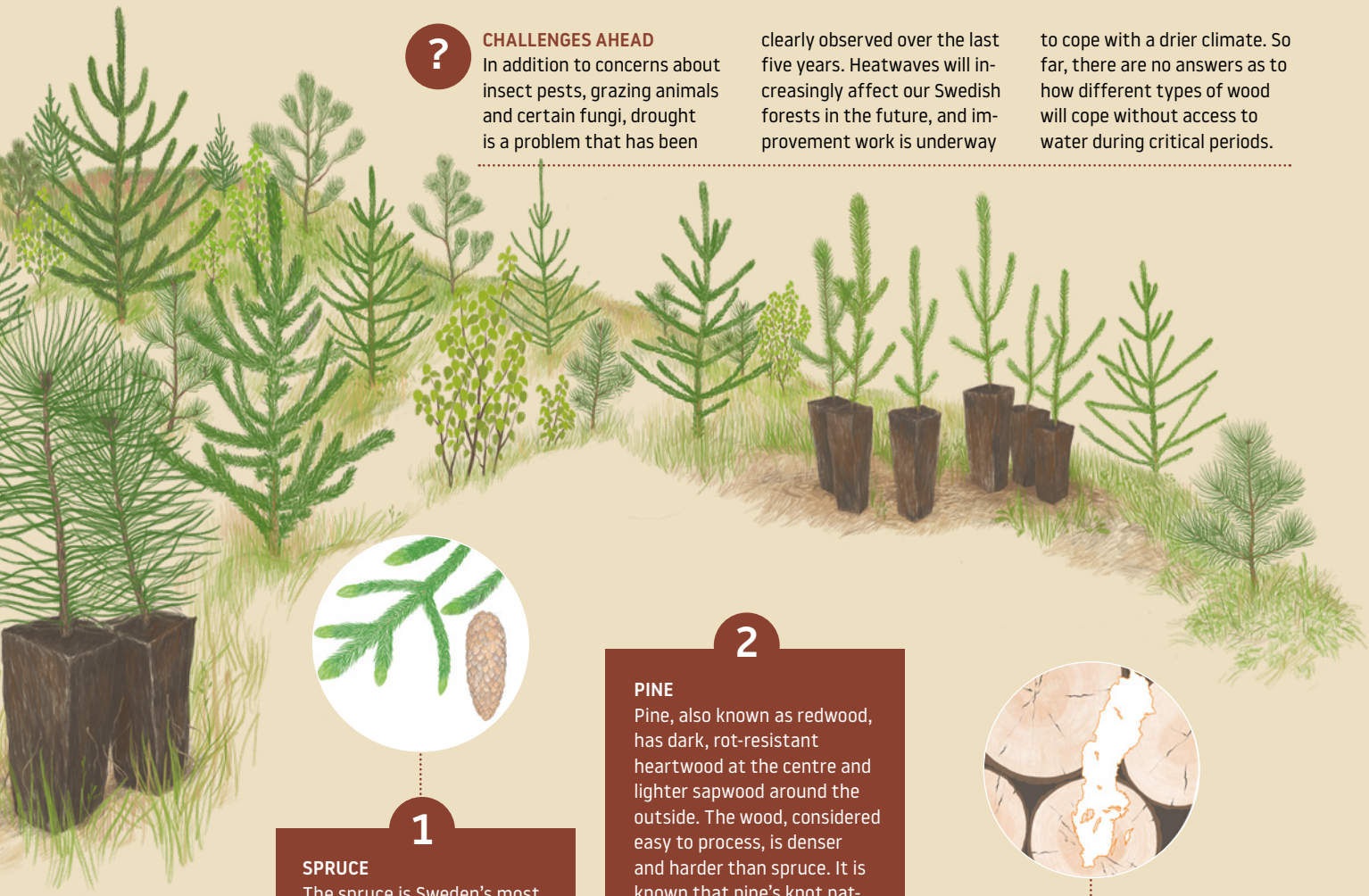
Through research and breeding, Skogforsk is trying to find tree varieties with properties that can withstand our current and future climate. One way is to choose offspring from trees that grow well in a wider range of climatic conditions.

"We're testing materials in different places. Cloned seedlings and offspring from trees growing in southern Sweden are being planted a little further north, and seedlings from the north are being planted in the south. We then select the individuals from all the trials that performed best overall. Hopefully, they'll have the greatest chance of doing well in the future," says Mateusz.*

?

CHALLENGES AHEAD

In addition to concerns about insect pests, grazing animals and certain fungi, drought is a problem that has been clearly observed over the last five years. Heatwaves will increasingly affect our Swedish forests in the future, and improvement work is underway to cope with a drier climate. So far, there are no answers as to how different types of wood will cope without access to water during critical periods.



1

SPRUCE

The spruce is Sweden's most common tree. Spruce is the predominant tree species in building and construction, but it is used in many different contexts. The pale wood of spruce is relatively soft, light and porous, and is also known as whitewood. In addition to construction, spruce is widely used in the paper and pulp industry, where its long fibres produce a strong paper that is well suited to paperboard production, for example. Crooked spruce trees with large branches can cause problems in the sawmill industry. The preference is for straight logs, without too thick knots, which provide strong and stable planks.

2

PINE

Pine, also known as redwood, has dark, rot-resistant heartwood at the centre and lighter sapwood around the outside. The wood, considered easy to process, is denser and harder than spruce. It is known that pine's knot pattern depends on genetics, and breeding work deliberately avoids trees with branches at a low angle to the trunk. Pine is processed into a wide range of products, including furniture and construction timber for wooden windows, doors, cladding and mouldings.

3

HOW DOES GEOGRAPHICAL LOCATION AFFECT THE PROPERTIES?

Wood from southern Sweden is generally denser, stronger and more durable than wood from the northern parts of the country, where the forest is instead slow-grown and fine-grained. The place where a tree grows plays a major role in its characteristics. Factors such as temperature and humidity have an impact.

»Setra's markets are Sweden (31%), Europe (35%), Asia and Australia (20%), North Africa and the Middle East (11%) and the USA (3%).

Wallmart's headquarters.

Giants choose wood

US corporate giants Google and Wallmart are leading the way in sustainable wood office construction. This year, Google's five-storey office block in Canadian mass timber will be completed in California. Wallmart's new headquarters in Arkansas are the largest solid wood project in the US to date, comprising 30 wooden buildings.

IMAGE: JRARKITEKTER

New retirement home in CLT

Belsjö Terasse, a retirement home with 24 residential units, is being built beside the golf course in Frogn Municipality, Norway. The two three-storey buildings are made of solid CLT from Setra's factory in Långshyttan and have a shared roof terrace for residents.

Skanska is the developer and Jostein Rønsen Arkitekter in Oslo designed and planned Belsjö Terrasse on behalf of the municipality. New residents will start to move in in summer 2022.

EXTREME CONTAINER PRICES

CONTAINERS

There is a shortage of container capacity, mainly due to increased imports into the US from Asia. Much of the world's container capacity has been shifted there to meet demand, leading to reduced capacity on other routes. High absenteeism and quarantine rules due to the pandemic have slowed down work in ports, leading to delays and disruptions to ships' routes.

» The total container capacity in the world is sufficient for current demand but unbalanced flows, long waiting times in ports and delays have locked up capacity.

EXPENSIVE SHIPPING

The imbalance in the container market has pushed up shipping rates sharply. The index cost of a standard container (12m/40ft) has risen from USD 1,500 in 2019 to USD 9,400 in 2021.

Source: Drewry World Container Index

US IMPORTS CONSTRUCTION TIMBER

The future is bright for planed construction timber in the US. Demand for houses is high and planed timber is the dominant building material. The order backlog across the US currently stands at around 5 million homes. Canadian wood supplier KP Wood imports Setra timber to meet US market demand.

"Current demand exceeds US production capacity, so imports of European timber are set to continue," says Richard Robertson, CEO of KP Wood.

Wood has been and remains the primary material used for single-family housing in the United States. From the early settlers to the present day, wood has been used for housing because of the easy availability of timber, its versatility, ease of use and strength. In recent years, the environmental benefits of wood have also contributed to its expansion in the construction sector.

CONSTRUCTION
Much of the timber sawn at Setra's Hasselfors plant is made into planed construction timber.

IMAGE: PHOTO AGENCY

Framework for sustainable construction

A wooden building stands or falls on its structure. Carefully sorted and strength-graded structural timber is used as a load-bearing framework for buildings.

TEXT: **MARIE KARLSSON**

Scanned and classified

Construction timber must first pass through the sorting machines' scanner, which assesses strength. The wood is then sorted into different strength classes. These are defined by various properties set out in agreed standards. Different classes are used for different purposes, mostly for load-bearing structures. In Sweden, the most common strength class is the load-bearing class C24. It is used for load-bearing functions such as roof trusses, joists, ceilings and external walls.

STRENGTH
The construction timber is examined to determine how much force per square metre can be applied to the timber.

IMAGE: CHARLIE URMSTON

* The number after C corresponds to the bending strength in MegaPascals.

Different dimensions

Europe has a tradition of using planed timber and follows a common standard, but there are some variations. The UK commonly uses C16 as construction timber and in Norway C24 is used. Roof trusses in Norway require C30, while the UK uses a specially developed grade, TR26. In Australia, dimensions vary according to the area's exposure to severe weather, but generally MGP12 is used for roof trusses and MGP10 for less demanding components. Strength is always guaranteed.

SPECIFIC PRODUCTION
Setra produces many products according to the standards of international markets.

IMAGE: KLAS SJÖBERG

DANIEL HALVARSSON, EVP Building Solutions & Components at Setra, comments on market trends for engineered wood products.

"WE'RE MEETING DEMAND THROUGH STRATEGIC INVESTMENTS"

Demand for processed wood products is growing strongly, not just in Sweden but globally. Europe is a strong market for cross-laminated timber (CLT), while the whole world wants glulam and components.

So what is driving this demand? The climate issue and a desire to reduce emissions by using renewable materials is the short answer. But other factors also come into play. Demand for glulam, for example, has been high during the pandemic as more people have chosen to spend resources on their own homes, both in terms of remodelling and new builds.

Knowledge of CLT is also growing among construction companies and clients, as they increasingly realise the benefits of prefabricated frames that are easily assembled on site. This trend is now also supported by laws and directives. Since the beginning of the year, for example, the climate impact of new buildings must be reported in Sweden, and wood has a lower impact than other building materials. Wood is the only fully renewable construction material, and it also binds carbon dioxide throughout its life cycle, even after felling.

The construction process is faster with wood, which saves money, and the total construction cost is therefore lower with wooden frames. Wood provides a cleaner and better working environment and creates a pleasant place to live. All this means that today, both apartment buildings and public buildings are being built with glulam and CLT, and we are seeing demand steadily increase.

At Setra, we have chosen to meet this demand with strategic investments in value-added products such as planed wood products, CLT, glulam and components. Over the year, we will be stepping up the pace in planed construction timber and this summer we will add another product to our range: glued components for the door and window frame industry. This will make us an even more complete supplier of processed wood products in Scandinavia.*

LÅNGSHYTTAN

»Setra's facility in Långshyttan is a state-of-the-art wood industry hub for CLT, glulam and components. The high-tech factory was inaugurated two years ago. When operating at full strength, Långshyttan will have a total production capacity of 200,000 cubic metres of processed wood products per year.

MARCH 2022
SÖDRA HEMLINGBY
GÄVLE, SWEDEN

Property company Gavlegårdarna is building 132 rental apartments in natural materials. The large, prefabricated CLT walls are assembled directly on site.