what's next, ubm?

Timber Pioneer

ubm is developing Frankfurt's first ever timber hybrid office building

ubm edition in progress | issue 6

MARTINA MALY-GÄRTNER, COO THOMAS G. WINKLER, CEO PATRIC THATE, CFO MARTIN LÖCKER, COO

Timber Pioneer is one of those momentous projects created by enterprises with a long history, you might even say they are obliged to create this kind of structure. UBM Development is such an enterprise, and can draw upon 150 years of experience. As the project name itself suggests, Timber Pioneer is undeniably a pioneering achievement – specifically, it is the first timber hybrid office building developed by UBM. However, the name also represents the beginning of an era in which we would like to become recognized as Europe’s largest developer of timber structures.

An epochal event, the onset of the coronavirus pandemic in 2020, marked the birth of Timber Pioneer. At the time, we were the biggest hotel developer in Europe, and so we found ourselves in a situation that was less than ideal for our planned projects. Indeed, we were originally planning to build a hotel where Timber Pioneer now stands, and this was precisely the asset class that would suffer most from the pandemic. Putting heart, soul and effort into finding a new approach, we tore up the existing planning and approval, and considered what the (real estate) world could need in the future. The result is Timber Pioneer.

Timber Pioneer is Frankfurt’s first ever timber hybrid office building. Its design will allow around 1,800 tonnes of CO_2 to be stored over the long term. However, Timber Pioneer is not just “green”, it is also “smart and more”. In other words, it features all the intelligence and sophistication on offer in new office buildings. Moreover, its architecture is far more attractive than can be usually expected of a building that is planned for investors.

But take a look for yourself: on the following pages, the images and descriptions will help you gain an impression. Or even better – come and explore Timber Pioneer for yourself. We would be delighted to show you around!

BEFORE & AFTER:
ARCHITECT EIKE BECKER IN THE EXCAVATION ON EUROPA-ALLEE 92, AND THE SUSTAINABLE OFFICE BUILDING TIMBER PIONEER AFTER COMPLETION.

A UBM Development project, *Timber Pioneer* is Frankfurt's first ever timber hybrid office building. Besides its retail ground floor, this eight-storey building also offers 14,000 m² office space, a working atmosphere with a feel-good factor, and an impressively low carbon footprint. The timber used for construction stores 1,800 tonnes of CO_2 over the long term, and intelligent building technology reduces the operating costs.

Welcome to Timber Pioneer!

IMMERSED IN LIFE:
WITH THE TRADE FAIR DISTRICT
(MESSE FRANKFURT) WITHIN WALKING DISTANCE
AND FAST CONNECTIONS TO THE CITY, THE
OFFICE LOCATION OFFERS AN IDEAL SETTING.

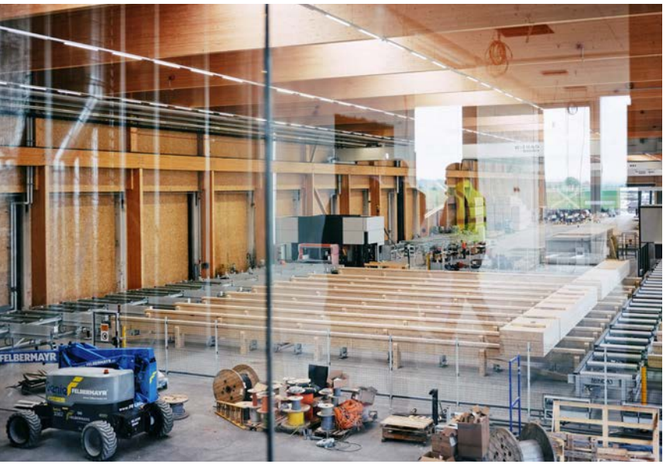
GOOD MORNING, FRANKFURT!
TIMBER PIONEER IS ADJACENT TO THE NEW F.A.Z. TOWER
AND IS ONE OF THE FINAL PROJECTS IN THE DEVELOPMENT
OF FRANKFURT'S NEW EUROPAVIERTEL.

The new way to build

Prefabrication of the timber hybrid elements allowed *Timber Pioneer* to be constructed in a record time of just 15 weeks, with the process also being much quieter and cleaner than on a conventional building site. The spruce wood used for construction stores the carbon emissions of a whole village.

The expansive premises of timber engineering company Wiehag are situated on the edge of Altheim in Upper Austria. Bordering on fields furrowed with tractor tracks, huge production halls stand in rows next to stocks of timber and tall towers. Prefabricated packs are stacked at the very end of this production line. Solid glued laminated timber beams plus corresponding connectors are lying wrapped up outside the large hall, ready to be loaded onto a lorry and transported to the building site. A label reveals where their journey is headed:

Timber Pioneer, Frankfurt.



“The decision was taken with our heart and soul, and we were in no doubt: it’s time to build with timber.”

MARTIN LÖCKER

Taking a different path.

The excavation directly next to the F.A.Z. Tower, which was another UBM Development project, was actually prepared for a hotel with 348 rooms. That was the original plan. But then the world was hit by COVID-19, and when Europe entered its first lockdown, it was clear to UBM – Europe’s biggest hotel developer at the time – that things had to change. Within only a few weeks, the property developer had devised a new corporate strategy: “green. smart. and more.”, with a focus on the development of sustainable, intelligent and aesthetically sophisticated real estate.

“The decision was taken with our heart and soul, and we were in no doubt: it’s time to build with timber,” recalls UBM Development COO Martin Löcker. As a trained carpenter from a family of tree farmers in Styria, over many years he was able to personally experience the development of wood into a high-tech building material. While in times gone by timber was most closely associated with the rustic charm of log cabins, there is now increasing awareness of sensational high-rises produced by timber construction engineering.

A new approach was needed.

Together with project partner Paulus Immobilien, the team returned to the drawing board. The original plans for a hotel were jettisoned in favour of an office building as a timber hybrid construction to be added to the underground section that had already been completed. Timber construction projects of this size require very special expertise, explains Löcker. “Project workflows have to be redesigned and also newly implemented.”

This approach meant breaking into new territory – not just for the developers, but also for Frankfurt’s building authorities. On a guided tour of the timber construction site, head of the city’s building control department Simone Zapke observed: “The use of timber for high-rise buildings was not regulated at the time.” She added that developing the necessary regulations called for pioneering work, without which “these constructions would not be here today”.

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3 QUESTIONS FOR:

Simone Zapke,

Head of Building Control, Frankfurt

HOW SIGNIFICANT IS THE PROJECT TIMBER PIONEER FOR THE CITY OF FRANKFURT?

Timber Pioneer has special significance for Frankfurt. It is the first timber hybrid high-rise office building, an extremely important project for us. It is rather a shame that we didn't investigate this construction method much earlier. The project is a marker that will doubtless prove to be a milestone for the future. In this sense, we are delighted to be able to be involved in this project.

WHAT IS THE POTENTIAL OF TIMBER HYBRID CONSTRUCTION, IN YOUR VIEW?

In the coming years, we will place an increasing focus on timber hybrid construction. It might even become the norm in a few years, also for high-rises. We all know that we urgently need measures that minimize carbon footprints in the building sector. However, circular building is also important in order to return building materials to the cycle. Wood is definitely key to improving the carbon balance.

ARE THERE ANY PLANS TO PROMOTE TIMBER CONSTRUCTION IN FRANKFURT?

Some years ago, Frankfurt took initial steps in this direction and developed guidelines for housing development in order to enable timber constructions and additional storeys made of timber. In other words, this is a very, very important topic for us. It is especially relevant in built-up areas because it allows construction sites to operate differently. And besides all the benefits for the climate, the whole process is quick as well. The public authorities in Frankfurt are already using wood to build almost all of their schools. This shows that timber construction has an especially high priority for the city of Frankfurt.

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VISITING THE CONSTRUCTION SITE:
Middle photo: Martin Löcker (COO UBM Development), Sahir Yakoub (UBM Project Manager), Simone Zapke (Head of Building Control, Frankfurt), Christian Paulus (CEO Paulus Immobilien)

Essentially, it was not exactly building but rather assembly work – which is much quicker, quieter and cleaner than a traditional construction site.

The construction process is digitized.

Anybody who visited the Timber Pioneer site and witnessed the construction work in Frankfurt's up-and-coming Europaviertel will have quickly realized that this is a new way to build. Essentially, it was not exactly building but rather assembly work – which is much quicker, quieter and cleaner than a traditional construction site. The individual elements of glued laminated timber were furnished with QR codes that were recorded in a digital system and specified their precise position in the construction. A relatively small assembly team then connected the elements of the push-fit system and screwed them to the slim concrete parts, forming a stable unit.

The shell was completed in record time.

“You often hear about the extreme precision that comes with timber construction, but when you see the joints fitting together precisely with your own eyes, down to the last millimetre, it really is very impressive,” enthuses Sahir Yakoub, Timber Pioneer project manager at UBM. The high degree of prefabrication and the digital processes enabled around 1,000 m² of building shell to be completed per week. This means that the project regained the time lost by its redevelopment.

1,800 t CO_2

are stored by the wood used for Timber Pioneer.

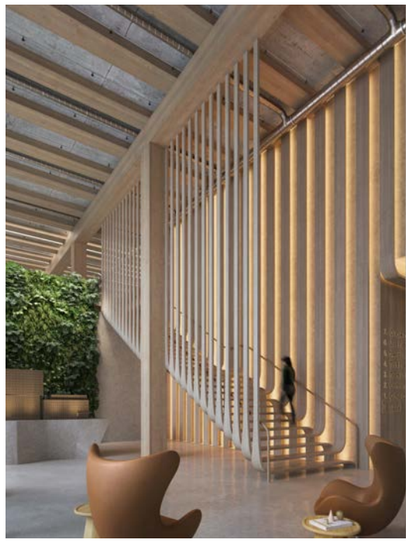
Wood is a natural building material.

Even on the construction site, the atmospheric quality often ascribed to wood is palpable. Light-coloured and high-grade, spruce radiates a sense of dignified comfort. Its resiny aroma evokes woodland walks, and its soft feel is almost irresistible. “I was neither the first person, nor the only one to put their arms around one of the pillars,” admits Löcker. “Quite a number of people were struck by a sudden impulse.”

Storing carbon emissions for a village.

While Construction 4.0, as it is popularly known, is currently setting its sights on digitization of process workflows, this is already part and parcel of timber construction – which is also a crucial step ahead. Timber is a renewable building material that locks up carbon from the atmosphere and stores it over the long term instead of leaving it to harm the climate, and using timber for building is therefore an important way for the construction industry to reduce its huge consumption of resources and energy. Compared to conventional buildings, timber structures can save up to 80 percent of emissions that harm the climate.

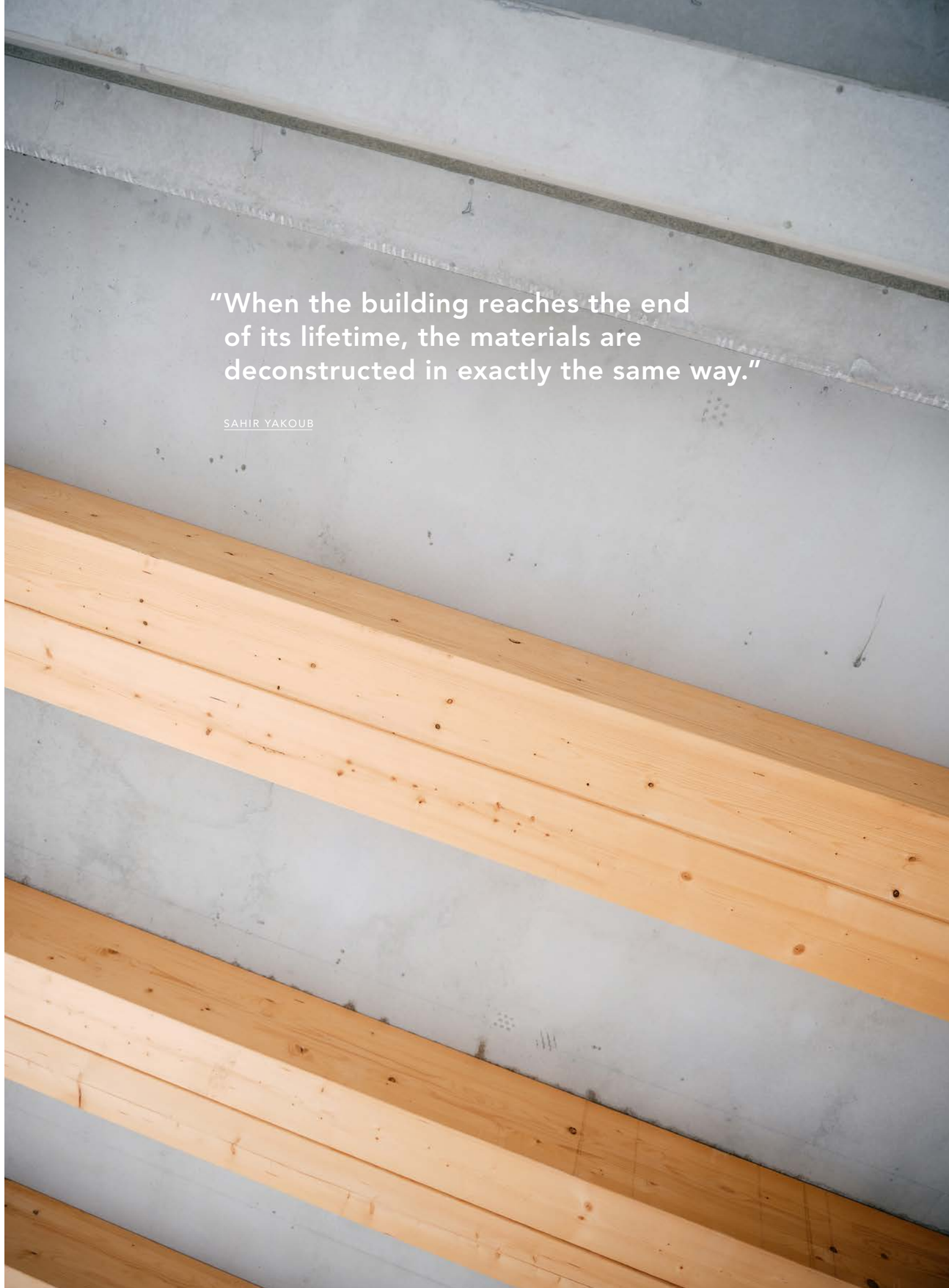
Timber Pioneer is therefore not just an energy-efficient office building that conserves resources, it is also a huge carbon reservoir. At least 1,800 tonnes of CO_2 are stored by the timber used here. “That corresponds roughly to the annual carbon emissions from a mid-sized village with 250 inhabitants,” Löcker calculates. The crux of the matter is that the longer the wood is kept in the material cycle, the longer the carbon remains stored.



No more building rubble.

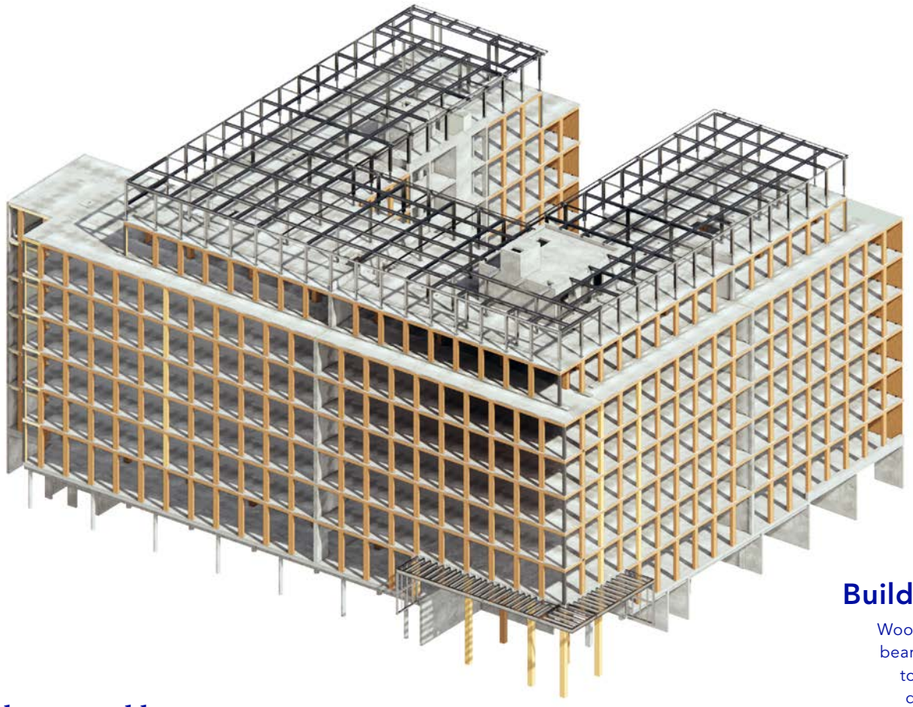
It is important to note that the lifecycle of a recyclable building does not come to an end with the arrival of demolition balls and dumper trucks. “When the building reaches the end of its lifetime, the materials are deconstructed in exactly the same way,” explains project manager Yakoub. Current reuse projects in Canada prove that timber beams aged up to 100 years can easily be reused in new real estate projects.

SCAN QR CODE FOR ASSEMBLY VIDEO



The modular principle

The timber hybrid design for *Timber Pioneer* is based on a modular system with fully prefabricated building components.

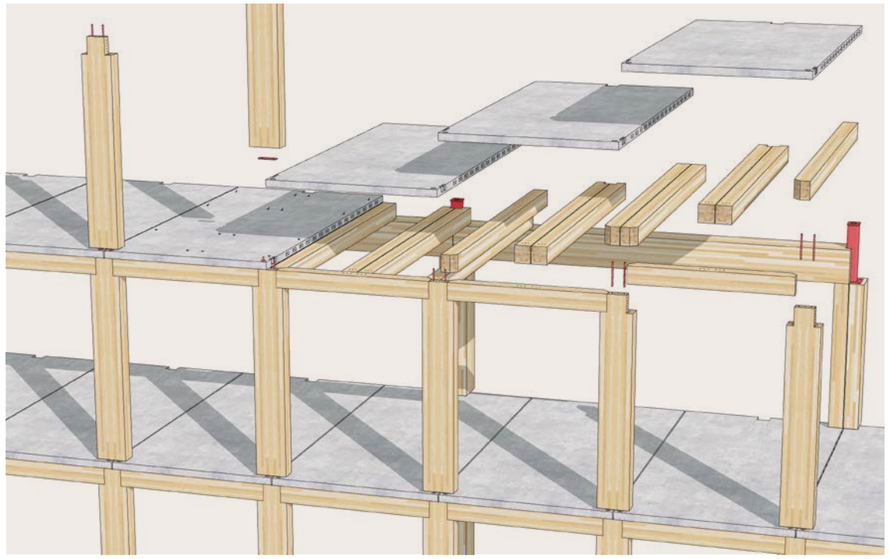


Building shell

Wood and concrete bear the static load together and are designed to use minimum resources.

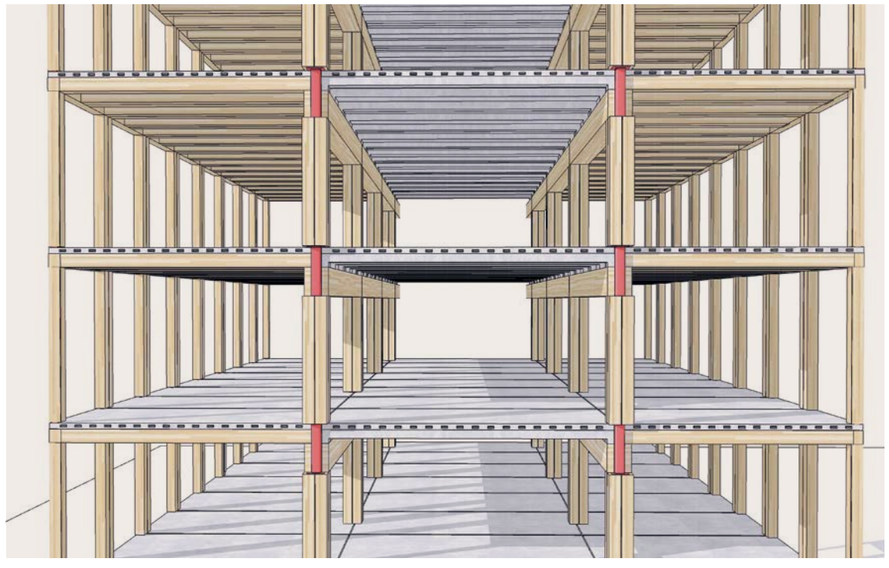
Basic structure

In timber hybrid construction, the prefabricated parts adhere to a modular design. The concrete elements are screwed to the glulam beams and supports, forming a timber-concrete composite ceiling.



Cross section

The slim concrete elements contain media ducts for the building technology cables.

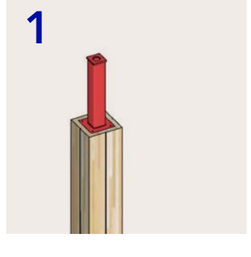


Due to the renewable building material wood and the efficient use of other building materials, carbon-neutral construction of the building shell was possible for the office storeys.

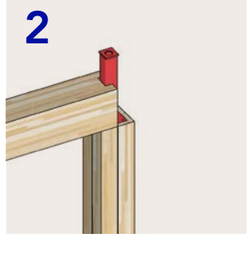
The following illustrations show how the individual elements are joined together to form a stable unit.

Assembly of the middle section:

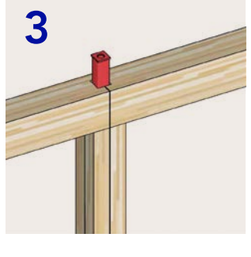
1 The central column is put into position, with a steel head connector ready fitted.



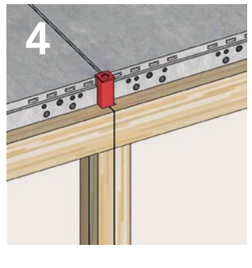
2 The girders are placed …



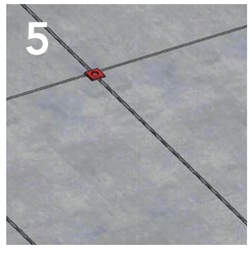
3 … on both sides of the central column.



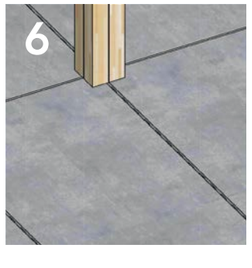
4 The ceiling elements with integrated media ducts are fitted.



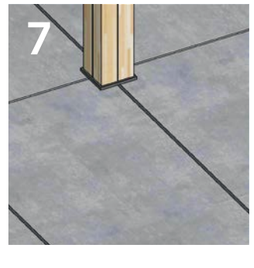
5 The remaining ceiling elements are installed and the joints are sealed.



6 The column for the next storey is fitted.



7 All the joints are fully sealed.



"As a building material, timber has arrived in the 21st century"

A positive carbon footprint, a very high level of prefabrication and a wide spectrum of creative opportunities make timber especially suitable for the future of building. The potential of this natural building material is far from exhausted, frequently due to a lack of expertise and a prejudiced approach. *Martin Löcker,* timber construction enthusiast and COO of UBM Development, shares some facts and dispels widespread myths.

Wood is one of humanity's oldest building materials. Remains of stilt houses from the Neolithic period through to the Bronze Age bear witness to a very early culture of timber construction. Wood seems to have been the most important building material in the Middle Ages, which gave rise to sophisticated methods of construction and forms of design.

In the medieval period, the majority of houses were built out of wood. But during the 20th century it almost disappeared from our cities as a building material. Why?
Martin Löcker: In the course of industrialization, steel and concrete became mass-produced and replaced wood in support structures for buildings. Until then, wood was probably the most important building material in Europe and beyond as it was available in large quantities and it was also easy to transport and process. Timber buildings were robust and durable. These are exactly the same reasons why we are turning to timber today, quite apart from its ecological benefits.

Large fires also burned cities to the ground in medieval times. And even today, many people still associate timber constructions with a higher risk of fire compared with conventional buildings. What actually happens to wood in a fire when it is used as a building material?
Yes, a fire will make wood burn. However, it burns far more controllably because you know the exact rate at which it is burning. In a fire, a charred layer rapidly forms on the surface of the timber, which protects the inner structural components. This ensures that the core of supporting timber structures remains unharmed for a long time.

What makes modern timber construction so different from medieval building methods?
Over recent decades, timber construction has undergone huge technological development. Above all, glued laminated timber and cross laminated timber have been further developed and now enable both a new way of building and also constructions with large spans. And these materials have the advantage that they are less reactive to external factors than conventional structural timber, which swells up and shrinks depending on the moisture content. I would say that as a building material, timber has arrived in the 21st century.

Some people say that if you build with timber, you need to keep well away from water. Is that another myth?
Wood naturally has to be protected against moisture and water. In modern timber construction, this is achieved by means of integrated, constructional wood preservation that is taken into consideration right from the start. There are proven methods that ensure the longevity of the material. Water leaking into the structure in certain places can cause the greatest harm, and so it is absolutely essential to ensure proper construction.

Steel and concrete seem more stable than wood at first glance. Are modern timber constructions built by engineers just as sturdy and durable as buildings that use conventional building methods?
From a purely statistical perspective, timber constructions achieve comparable strength values to buildings that use steel and concrete. And sometimes the values are exceeded. When it is subjected to tension, wood has a much better capacity for load bearing than reinforced concrete. But every material has its strengths and weaknesses. For example, it makes no sense to use wood in a part of a building that is continually exposed to changing weather conditions. It is important to use and combine the materials in accordance with their characteristics.

MARTIN LÖCKER
is COO of UBM and a trained carpenter. Born in Styria, he graduated in industrial engineering and construction from the Technical University in Graz, Austria. He completed post-graduate work in real estate economics at the European Business School in Munich. Since 2007 he has held various management positions at UBM and is responsible for its operational activities.

The sustainability of building materials has been the subject of controversial discussion recently. People have been saying that wood is not as sustainable as we are led to believe.
Wood is a carbon sink, in several respects: the stored carbon not only remains in the wood that is used for building, but the wood also continues to absorb more carbon as the years go by. At the same time, new trees grow back in the place of the felled ones, and these new trees capture even more carbon from the atmosphere via photosynthesis. In addition, timber replaces other building materials that are known to release high emissions during production.

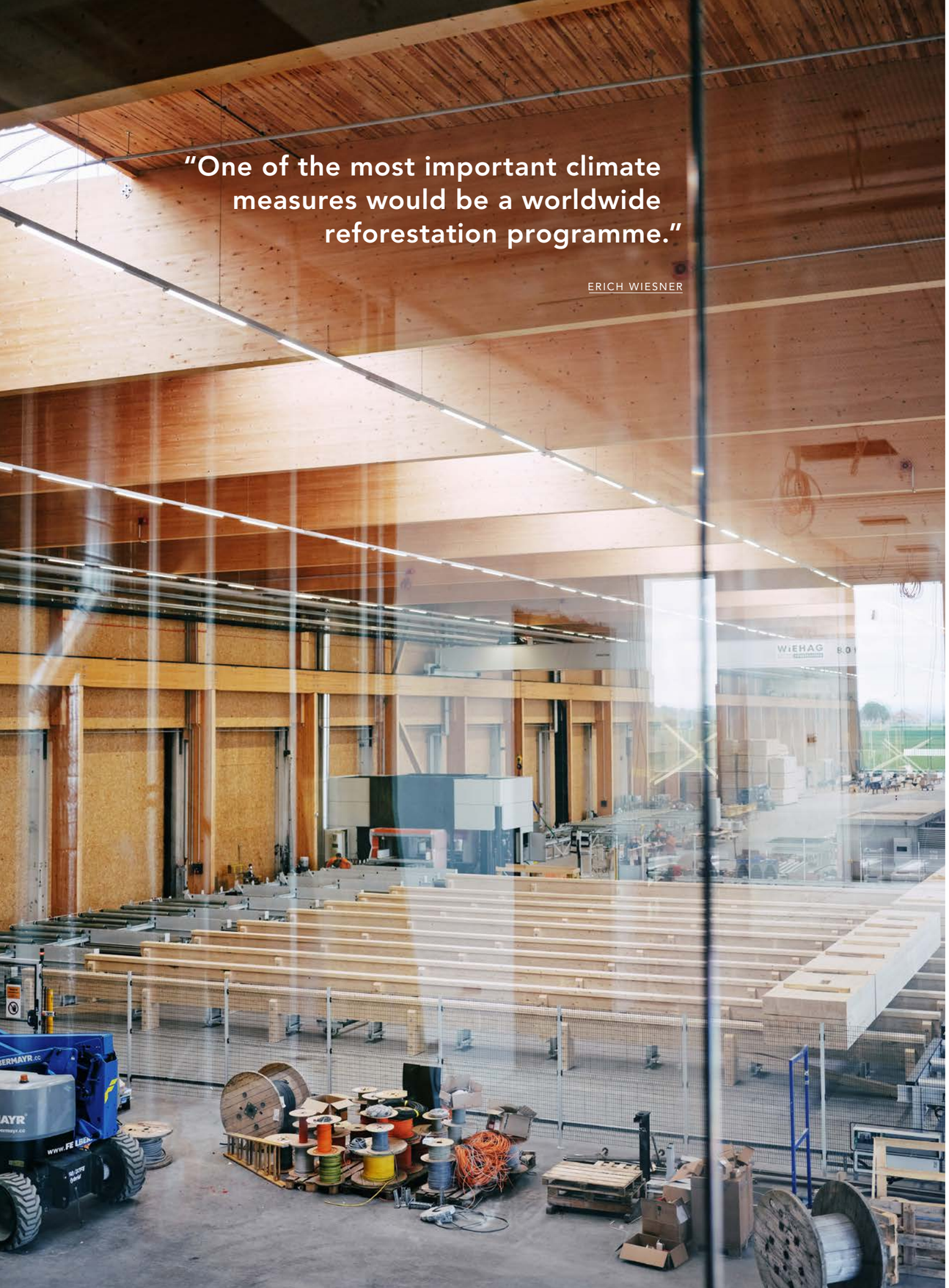
And so it isn't better for the environment to leave the trees in forests?
No. Building with wood basically allows a kind of second forest to grow in place of the old one. Critics say that increased timber construction leads to higher logging frequency in forests, and less carbon is stored as a result, but this just isn't true. Sustainable forestry as practised in Austria and Germany doesn't remove any more wood than is grown back. For example, in Austria the entire annual volume used for construction purposes comprises just one third of the wood that is regrown.

“There is currently a paradigm shift in the construction industry”

Based in Upper Austria, Wiehag is one of the global leaders in the timber construction engineering sector. In an interview with managing shareholder *Erich Wiesner,* he talks about the beginnings of timber construction and the new trend currently experienced in the construction industry.

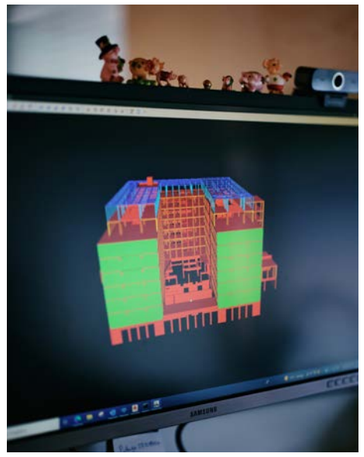
DR. JUR. ERICH WIESNER, MBA

studied law and business management in Salzburg and Linz, and gained his postgraduate degree at Loyola Marymount University in Los Angeles. He has been managing shareholder of Wiehag Holding GmbH since entering the family business in 1990. For 25 years he was Chairman of the Association of Austrian Wood Industries and he is currently Chair of the Forst Holz Papier (FHP – Forest Wood Paper) cooperation platform in Vienna.



“One of the most important climate measures would be a worldwide reforestation programme.”

ERICH WIESNER



TIMBER PIONEER HAS AN AVATAR. DIGITAL PROCESSES HAVE BEEN THE NORM IN TIMBER CONSTRUCTION FOR OVER 20 YEARS.

The list of international prestigious buildings given as references by Wiehag is a long one. Timber construction engineering made in Austria is relied on by famous architects, from Kengo Kuma to Norman Foster. Managing director Erich Wiesner reveals why their expertise is in such demand around the world.

Glued laminated timber is seen as a German invention, cross laminated timber as an Austrian one. Together, they have ushered in a new era in timber construction engineering. What part was played by Wiehag in this historic development?

Erich Wiesner: We are a family business in its fifth generation and have played an influential role in the development of timber construction engineering. In the early 1960s we were one of the first companies in Austria to begin producing so-called Hetzer beams. These are now called glulam beams. That marked the beginning of large-span and self-supporting timber constructions.

You decided to invest in wood at a time when it was seen as uneconomical and technically outdated as a building material. When did this change?

Buildings have always been made out of wood. But in the past it has been seen as more modern and straightforward to use concrete and steel. Timber construction engineering eked out a niche existence. Only very few large projects reached the market. This has been changing over the past few years, however. I recognized one sign of this when over ten years ago star architect Frank Gehry was planning a Guggenheim Museum in Abu Dhabi using timber. It hasn’t been built yet, but the people who were responsible set off around the world to look for potential timber construction companies who could handle the implementation. They discovered that the expertise required for timber construction engineering is not really widespread. And so ultimately we were awarded the job. It was then that I realized the value and uniqueness of our experience and knowledge in engineering and production.

Today, Wiehag is part of the biggest timber construction projects around the world. How did you come to be this far ahead of the rest?

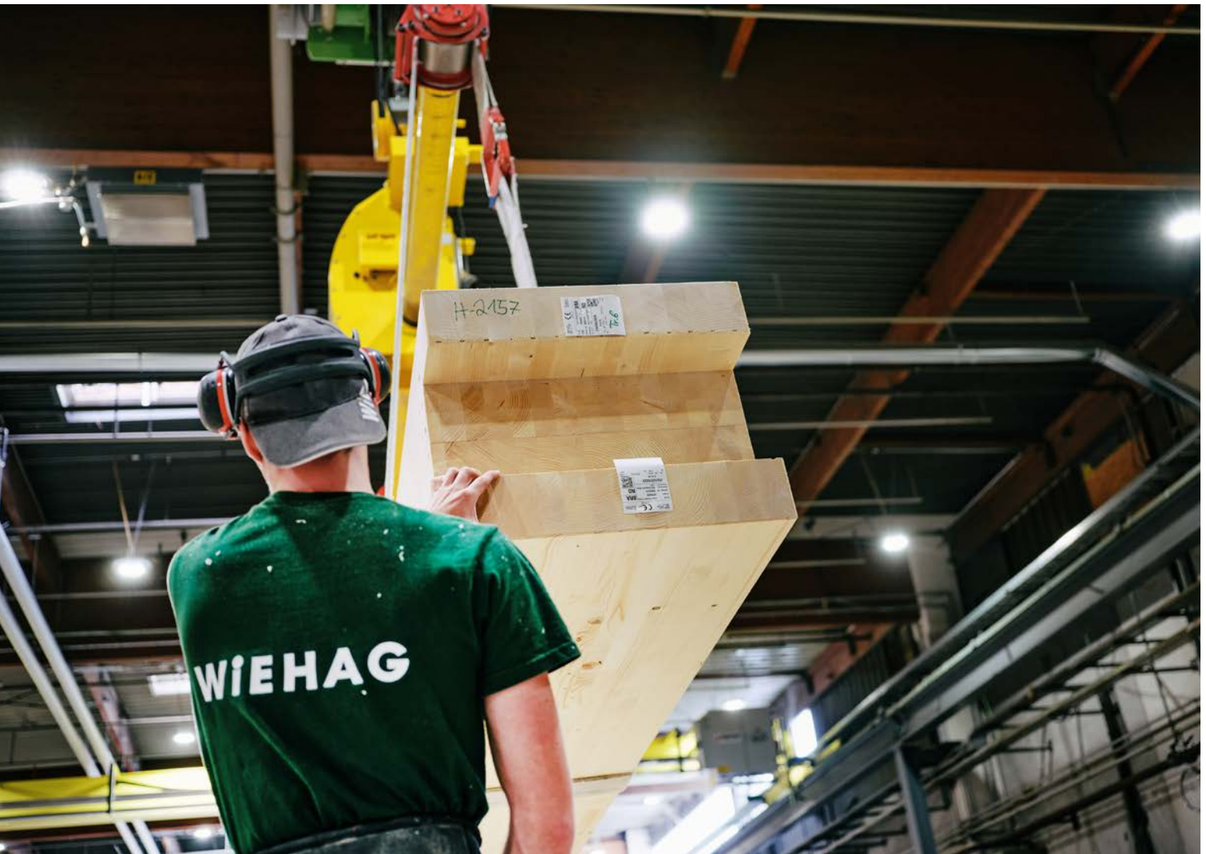
We were not just one of the first producers of glued laminated timber in Austria, we were also pioneers in timber construction engineering. Since the 1950s we have operated our own in-house engineering offices and have therefore been able to support planners and property developers in the implementation of their ideas. For example, architect Gustav Peichl planned Austria’s pavilion for the New York World’s Fair in 1964 to be made of timber. Implementation was pioneering work in terms of the prefabrication involved. Another milestone in our company history was the construction of the Klagenfurt exhibition hall in 1966. Back then, it was the largest self-supporting timber hall in Europe.

Ascent Tower in Milwaukee (Wisconsin), which is currently the world's tallest timber high-rise, was prefabricated in Altheim, Upper Austria. Can you describe how you approached this project?
We received the project during the coronavirus pandemic. The customer must have had a lot of trust in us because we were given the go-ahead in a video conference. We provided advice for the engineering and construction, as well as all timber parts for the support structure. The structural parts arrived at the construction site in a completely prefabricated form, including prefitted steel connectors. All they had to do on the building site was screw everything together. That sort of thing is only possible if everything has been planned perfectly, if you have faultless logistics and high-precision production. And then it doesn't matter if the goods are sent to America or Frankfurt.

Would you say that timber construction is competitive enough compared to steel and concrete?
If our hall construction hadn't been competitive in the past compared to steel and concrete, then timber construction in its present form would no longer exist. In effect, it was merely the economic criteria that were important. Our prices had to be competitive and we delivered the ecological benefits available at no extra cost. In the meantime, the environmental factors are playing an ever greater role, and so there is currently a paradigm shift in the construction industry. Investors and the building sector have to be guided by specified sustainability goals. Fulfilment of ESG criteria is required. As a renewable raw material, wood has most to offer.

Timber construction projects are growing in number and they are getting larger all the time as well. Will there be enough wood for everybody in the future?
In Europe, sustainable forestry has been customary for generations. For more than 165 years we in Austria have had some of the strictest forestry legislation in the world. In fact, in this country more forest grows back than we remove. Elsewhere in the world it is unfortunately a different situation: Especially on other continents, clearings for agriculture and illegal use mean that forests are in decline. One of the most important climate measures would be a worldwide reforestation programme.

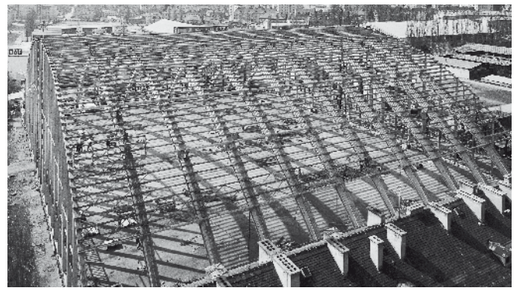
SCAN QR CODE FOR PRODUCTION VIDEO



Wiehag History

PIONEERING TIMBER CONSTRUCTIONS SINCE 1849

Wiehag is a family-owned company, now in its fifth generation. Since its establishment in 1849 by master carpenter JOSEF WIESNER, a globally active timber construction company has emerged from a workshop and open-air joinery. "Hetzer" beams have been produced at Wiehag since 1964; today, these are known more commonly as glulam beams. They ushered in a new era in timber construction and enabled large spans and self-supporting constructions made of wood. In this way, Wiehag had a considerable influence on modern timber construction engineering.

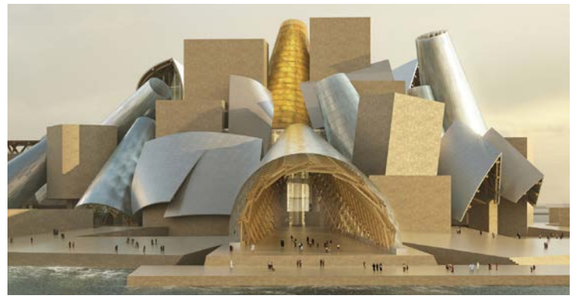


THE KLAGENFURT EXHIBITION HALL –
The largest glued laminated timber hall in Europe (1966)

At the time, construction of the arched-girder hall with a span of almost one hundred metres represented a pioneering achievement in its technical and organizational approach. The individual glued laminated timber beams were manufactured at the factory in a length of 55.5 metres, dismantled into three parts for transport by rail, and then reunited on the building site using a patented assembly joint. Following plans by architect OTTO LOIDER, this created a HALL ENTIRELY FREE OF SUPPORTS, with an impressive 7,000 square metres.

AUSTRIA PAVILION
at the New York World's Fair (1964)

Austrian star architect GUSTAV PEICHL won the competition to construct this exhibition building with his design. "The fact that timber has been a main material of domestic architecture for centuries, and that it represents a valuable export commodity for Austria today", proved to be an advantage even then. In addition, timber as a building material is ideal for prefabrication, thanks to WIEHAG engineering. The individual parts of the pavilion, planned according to the modular principle, were prefabricated at WIEHAG in Altheim and assembled on site in New York.



GUGGENHEIM MUSEUM IN ABU DHABI

Planning for this spectacular art museum has been underway since 2006. It is expected to be situated next to the Louvre Abu Dhabi on Saadiyat Island, which has been earmarked as the centre of a new cultural district. Over ten years ago, FRANK GEHRY'S ARCHITECTURE firm commissioned Wiehag with the timber construction engineering. After a delay of eight years, the Guggenheim Abu Dhabi is expected to open its doors in 2025.

THOMAS G. WINKLER:

“We are targeting 50% for timber construction.”

ERICH WIESNER:

“Timber high-rises open up entirely new perspectives.”

Since the turn of the millennium, one of humanity's oldest building materials has been experiencing an impressive revival. Between towering stacks of sawn timber, piled up as high as a house, UBM CEO *Thomas G. Winkler* and Wiehag Managing Director *Erich Wiesner* discussed their joint project and the potential of this renewable raw material.

An excerpt from the UBM climate action dialogue on timber construction.

SCAN QR CODE FOR VIDEO OF CLIMATE ACTION DIALOGUE

THOMAS G. WINKLER ON ...

... TIMBER PIONEER ...

In the office building Timber Pioneer, 14,000 m² have been developed as a timber hybrid construction. The extensive use of this renewable raw material saves 1,800 tonnes of CO_2, which makes us very proud.

... GREEN. SMART. AND MORE. ...

Our strategic reorientation as "green. smart. and more." makes sustainability a top priority for UBM. The approach means that it isn't a trend at our company, but rather an attribute. And for us, "green" primarily means timber construction because that is the most important lever for saving CO_2 when you build.

... ESG ...

The driver behind the current boom in timber construction is clearly ESG – Environment, Social, Governance. Cash flows are now being sent in this direction with incredible consistency. Investors tell us what they want, and as a property developer we pass on their requirements to the architects.

... UBM'S GOALS ...

We are targeting 50% for timber construction. With 100,000 m² already planned for implementation, and over 200,000 m² in the pipeline, we are well on the way to becoming Europe's biggest developer of timber constructions.

ERICH WIESNER ON ...

... THE DIGITAL TWIN ...

Timber construction adopted digitalization at a very early stage because we needed to design 3D models for controlling our production machines. In other words, we have already been using a "digital twin", as it is famously called, for over two decades.

... WORK ON THE CONSTRUCTION SITE ...

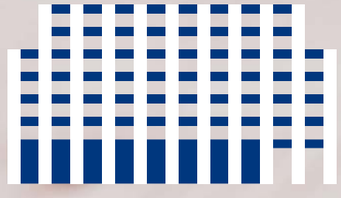
Prefabrication simplifies work on construction sites. It means that assembly firms only have to fit the components together, like a modular design. Production in a hall protects against weather exposure, while also increasing precision and quality.

... HIGH-RISES MADE OF TIMBER ...

We used to build horizontally, with support structures spanning long distances, and now we are building upwards. We are constructing high-rise buildings. A few years ago, nobody could have imagined that we would build a 100-metre high-rise made entirely of wood. It opens up entirely new perspectives for timber construction in the future.

TIMBER REMAINS IN THE CYCLE

From tree to house …



1. Tree

Trees store CO_2 in the form of carbon, and therefore help the climate by reducing the amount of CO_2 in the Earth's atmosphere. A large, healthy tree stores an average of 10 kg CO_2 per year.

2. Timber Pioneer

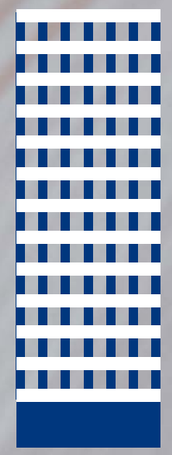
1,800 cubic metres of timber from sustainably managed forests are being used for the office building. This means that around 1,800 tonnes of CO_2 are stored over the long term in the prefabricated parts. In Austrian and German forests, the amount of wood used for Timber Pioneer grows back in five minutes.

3. Adaptive repurposing

The building has a flexible design that enables it to span several generations of use, and if necessary also be repurposed.

4. Deconstruction

The skeleton design allows Timber Pioneer to be deconstructed without problems. The supports and beams made of glued laminated timber are very high-quality and can be reused as building material for a new real estate project. Each construction company keeps a record of which other materials can be deconstructed in what way.



5. Downcycling

If the timber cannot be used as a building material after it has been deconstructed a second time, the next step in the cascade is downcycling. For example, the timber construction parts can be used for making furniture or in the production of chipboard.

6. Thermal use

The cycle is complete when the wood is composted or used thermally. Carbon stored in the wood is released back into the atmosphere as CO_2.
If the tree had remained in a forest, this would have happened much sooner.

… and back again

green.
smart.
and more.

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