

Timber and Technology

Regenerative Construction



Timbatec
Timber and Technology

One group – one goal

Stefan Zöllig founded the company Timbatec in Steffisburg 25 years ago as a sole proprietorship. Since then we have implemented over 3,000 timber construction projects and recently founded three new companies, with another in the pipeline.

25 years after the founding of Timbatec, we are a group of companies with a shared goal: "To raise the market share of timber construction in the building sector." Each of the companies is making its own contribution.

Timbatec

Timbatec – the driving force behind Timbgroup – promotes the use of timber in its capacity as innovative engineering firm. We develop new technologies for modern timber construction and are available to architects as

a service provider in the areas of structural analysis and design, fire protection, building physics and the supervision of timber construction projects.

TS3

The TS3 technology enables a column and slab construction made of timber in a manner that was previously only possible with reinforced concrete. This is opening up new markets for timber construction.

Timber Finance

The Timber Finance Initiative, co-founded by Stefan Zöllig in 2021, connects the construction world with the world of finance and facilitates sustainable investments.

Timbase and Scrimber CSC

Timbase designs and builds timber basements as a total contractor. Scrimber CSC develops new timber construction products. Both companies will be established during the year.

Our companies and offices

| 1997 | 2001 | 2006 | 2014 | 2015 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|--|---|--|--|
| <ul style="list-style-type: none"> • Timbatec founded as a sole proprietorship | <ul style="list-style-type: none"> • Thun office founded | <ul style="list-style-type: none"> • Zurich office founded | <ul style="list-style-type: none"> • TS3 AG founded • Bern office founded | <ul style="list-style-type: none"> • Vienna office founded | <ul style="list-style-type: none"> • Management passed on to Andreas Burgherr | <ul style="list-style-type: none"> • Delémont office founded | <ul style="list-style-type: none"> • Timber Finance founded | <ul style="list-style-type: none"> • Timbatec 25-year anniversary • Scrimber CSC and Timbase founded |



Timbatec is growing

Timbatec is growing steadily. Our people are highly qualified – because new ideas require bright minds. And we can only manage the many thrilling projects with a well-trained team. That is why all our employees are entitled to 100 hours of personal further training per year. Four team days and other events add fun and shared experiences to the company year. Which is one reason why our teams continue to grow. "Do you also want to join our team? Get in touch with us – we're looking forward to getting to know you."

The Timbatec team at the home ice rink of HC Aioje.

Cover:
Generation House
W52, Zurich.

Wellmann Architekten

Dear partners, customers and timber enthusiasts

Around 40 per cent of global CO₂ emissions originate from the building sector. We want to reduce this environmental burden. About half of emissions originate from the construction of buildings, the other half from their use. This demonstrates the importance of the choice of building products and materials. Regenerative construction helps to keep the environmental impact of building construction as small as possible. Good concepts for the building envelope and building technology minimise emissions in the course of their use.

We are dedicating this magazine to regenerative construction. By this we mean responsible construction within the limits of our resources and climate. We refrain from the use of climate-damaging building materials such as steel and concrete. Wherever possible, we aim to reuse no longer required components and materials (recycling) or use these to create new components (upcycling or downcycling).

If buildings and infrastructure can be made of CO₂-absorbing building materials such as timber, this offers great potential as a temporary CO₂ sink. If a CO₂-storing building component is transferred to a second life cycle after the demolition of a building, the carbon that it holds will remain captured for longer.

A circular construction industry is thus extremely interesting from an environmental viewpoint. In this way, the construction sector can make a significant contribution to climate protection.

Indeed, timber is now considered "best practice" and is recommended by the SIA in its position paper. Load-bearing components such as glued laminated timber beams or cross laminated timber panels are ideally suited for reuse. The use of fast growing organically based raw materials such as straw, hemp or flax also show great potential. Today we are developing solutions for regenerative methods of construction so that we can minimise the future material input. We invite you, dear readers, to help us to build regeneratively.




Simon Hess
Manager of Building Physics Area
Timbatec Holzbauingenieure Schweiz AG

Timbatec offers an all-round package


A building is more efficient and economical if it is understood as a whole. When it comes to planning timber constructions, the best idea is to consult a timber construction engineer who has skills that go beyond mere structural design. We offer an all-round package in planning and will support you through to execution. We will also gladly develop solutions for your project where none yet exist. Our core competencies:




Structural analysis and design




Fire protection



Building physics



Product development



Construction management

Flagship project in central Zurich

Thanks to clay panels, sheep's wool insulation, flexible walls and TS3 technology, the timber construction on Wehntalerstrasse is highly interesting from an ecological and technical point of view – a model timber construction in terms of sustainability.



The choice of clay panels and clay plasters are ideal for the moisture balance. The end result is apartments that feel cosy.

The GenerationenHaus W52 with GEAK-A energy label actively fosters communal and intergenerational living. From the outset, the client and architects emphasised a method of construction that was ecological and energy-optimised. This necessitated the careful selection and minimal utilisation of building materials.

Reuse possible thanks to TS3

For the ceilings, the architects chose cross-laminated timber panels. On the construction site, these are joined together using TS3 technology to form larger surfaces. If the building is demolished, these large panels can be straightforwardly cut to the desired format and reused in another building. The TS3 technology enables the cross-laminated timber

panels to be transferred to a new life cycle with no downcycling.

Flexible interior walls

We developed three design variants for the interior walls: The basic variant is utilised inside the apartments. With extra panelling on both sides, it becomes a partition wall, while at door openings the walls are replaced by door thresholds. The result is a highly flexible building with apartment sizes that can be adapted to current needs. This is made possible by three specifications.

Resource-saving construction

The resource-saving use of building materials was at the heart of the Wehntalerstrasse development. The cross-laminated timber

panels are covered by an only 6-centimetre thick Fermacell honeycomb infill, 3 centimetres of glass wool for impact sound insulation and 6 centimetres of anhydrite. TS3 technology is used to connect the latter to large surfaces. This composition conserves resources and also meets noise protection requirements. In the choice of materials, attention was always paid to environmental compatibility, whereby the use of timber, clay and sheep's wool was a logical outcome. The materials are not just ecological – the well-thought-out concepts for building acoustics and protection from the summer heat make for apartments that feel extremely cosy.



“Development, planning, implementation – with the W52, all of the strengths of modern timber construction and interdisciplinary cooperation are applied in an exemplary manner.”

Roland Füglistner

Project Manager W52, co-owner BURKART AG trilegno



Photos: Wellmann Architektur

Architecture

Wellmann Architekten AG, Zurich

Timber construction engineer, building physics, fire protection

Timbatec Holzbauingenieure, Zurich

Timber construction

BURKART AG trilegno, Auw

The ingenious wall system is based on three specifications. The TS3 technology enables straightforward dismantling.

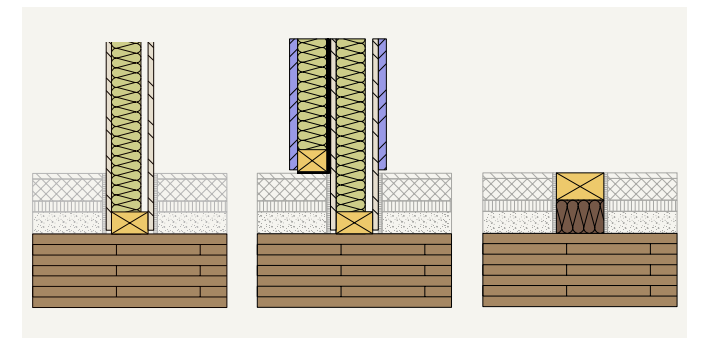


Image: Zola Timmer

“The multi-axial load-bearing ceilings permit floor plans with no columns or beams, enabling adjustments to the apartments at a later date. Together with the choice of materials, this provides the basis for an ecological and sustainable building.”

Caspar Wellmann

Architect HTL ETH SIA

“Timber construction needs new products.”

Stefan Zöllig is driving forward timber construction with new developments including Scrimber and timber basements. He is hoping to bring about a construction industry that dispenses entirely with steel and concrete.



Image: Timbatic / Nils Sandmeier

And material use is even lower if entire components are reused. How does Timbatic view the reuse of components?

In the future, the circular construction industry will increase in importance, which is why it is discussed repeatedly in important papers such as the SIA position paper or the UN's status report. Wooden components have an advantage when it comes to the reuse of building materials, as they are easily separated and transported. So that CO₂ remains bound in the wooden components, we should not burn components after dismantling but should put them to further use. Our building physics team is seeing increasing numbers of enquiries about the reuse of components.

Nevertheless, many houses today continue to be constructed using concrete and steel. What's your opinion on this?

My predominant thought: this is worst practice. Also: vast CO₂ emissions with little benefit. It's worth pointing out that this also applies to the highly acclaimed recycled concrete, which emits even more CO₂ than regular concrete. The construction industry is caught in a concrete trap. I am convinced that the days of steel and concrete are over – not only in building construction but also in infrastructure construction. Following the acceptance of the motion “Research and innovation of the material timber for use in infrastructure construction as a contribution to decarbonisation”, it turns to us to present solutions on how to replace steel and concrete with timber in all of these areas in the future.

And finally: One quarter of a century of Timbatic – did you celebrate?

Yes – and how! We stayed at the Hotel Giessbach for three days with the entire team and really had a great time. I am delighted that in the course of 25 years, Timbatic has grown into a group of several companies that complement one another and work together towards our objectives. And I'm excited to see how the story continues.

Stefan, what does the city of the future look like?

Our vision is to build entire cities out of timber. This will turn the existing building and infrastructure in Switzerland into a CO₂ sink. The possibilities are there. When building, it makes sense to dispense with steel and concrete entirely and instead to use timber or other bio-based raw materials such as straw, hemp or flax. Today this is possible: A 54-metre-high skyscraper is being erected in Reinach near Basel, in Thun we have constructed the first apartment building with a timber basement, and in Suhr and Neuenkirch, wild animals can cross the motorway over enormous wooden wildlife overpasses. Today, we construct using timber in ways previously only possible with steel and concrete.

Do we have sufficient timber to manage without steel and concrete?

Yes, but we must utilise timber in a manner that is more resource-conserving. New building products are needed in order to satisfy the demand. Current well known and commonly used glued laminated and cross-laminated timber products generate a lot of waste. Neither the branches, treetops or sawing waste

can be used for the manufacture of load-bearing building products, which reduces the tree to its trunk and the yield of the tree by around 30 per cent. This is inadequate. New products are needed for the timber construction market. For example, we are developing Scrimber CSC for load-bearing areas. This is a product similar to chipboard or OSB panels but made from rolled and intact fibre strands.

So, do we need a Scrimber factory to accommodate the demand for timber products?

Yes, that is one part of the solution. Right now, a research project is underway together with the Bern University of Applied Sciences. Alongside, we need better planned components. Good engineering is becoming more important all the time. In the past, the sayings “mass is equal to noise insulation” or “mass is equal to heat storage” used to apply. Today I say: “Mass equals ignorance”. A lot of mass may be good from the perspective of building physics, but it is simply a waste of building materials. In our Innovation Lab, we are constantly developing new structures with minimal use of materials and extremely good properties.

News from Timbatic

If the construction sector is to move beyond steel and concrete, then timber from trees must be better utilised. With Scrimber CSC, we are achieving a timber yield of almost 100 per cent. Switzerland's first pilot and demonstration plant is set to be in place by 2025.

Predominantly glued-laminated and cross-laminated timber products or solid timber are used for load-bearing purposes in timber construction. These are good products but they have low yield. For the construction sector to move beyond steel and concrete, we must make better use of the wood available from trees. Scrimber CSC and its timber yield of almost 100 per cent offers a possible solution. The development of Scrimber CSC multi-layer panels results in products that are comparable to solid timber but with lower production costs and higher yield.



Wood splinters from the roller

In contrast to conventional chip-based products such as chipboard or OSB panels, with Scrimber the tree trunks and branches are shredded into individual fibre strands using large rollers. We augment these with adhesive and process them into construction products in the desired shape and size. The long sliver-like elements run along the wood cells and can thus absorb significantly higher tensile and bending forces than obliquely cut shavings. There is already a “Scrimber” product developed in Australia and the US that is based on the same technology, but it cannot be fully automated and manufactured continu-

ously. Scrimber CSC aims to change this state of affairs.

Soon, building products for static applications will be made from splinters.

Scrimber – a new Timbatic company

Many technical details remain to be solved before the first pilot and demonstration plant can be built. This is planned for 2025 in Emmental, with the first large-scale system to follow three years later. To this end, an Innosuisse project headed by Prof. Dr. Heiko Thömen and with TS3 as business partner was launched at the Bern University of Applied Sciences at the end of 2021. The Innosuisse start-up funding is supporting Scrimber CSC in the founding of the company.

Timber Finance Index

The Timber Finance Initiative has been a part of the Timbatic since 2021. The initiative will become the “Swiss Competence Centre for Timber Investments” and will close the gap between investors and the timber industry. The Timber Finance Initiative (TFI) has launched the “Timber Finance Carbon Capture & Storage Index” (TCCS). The index focuses on the CO₂ storage effect of wood and tracks the forest and timber industry in the USA, Canada and Europe across 30 selected

listed companies. Since March 2020, the TFI Index has clearly outperformed other indices.

Index History



Even the elevator shaft is made of wood

The wooden shell construction for the Naturquartier, including balconies and building envelope, was erected in just ten weeks – almost half a year faster than a comparable concrete building.

The Naturquartier Weissache is the largest residential building in Tyrol and an outstanding example of how timber construction has evolved in recent years. “Timber is a renewable and regionally available raw material. In particular in times of the climate crisis and not least because of the coronavirus, the importance of local materials and short transport routes is increasing”, says JOSEF Feichtner, Managing Director of Unterberger Immobilien. The natural building material receives excellent ratings not only for the aesthetic design options and the cosy atmosphere, but also in the areas of thermal insulation, energy efficiency, fire protection and longevity.

Constructed in record time

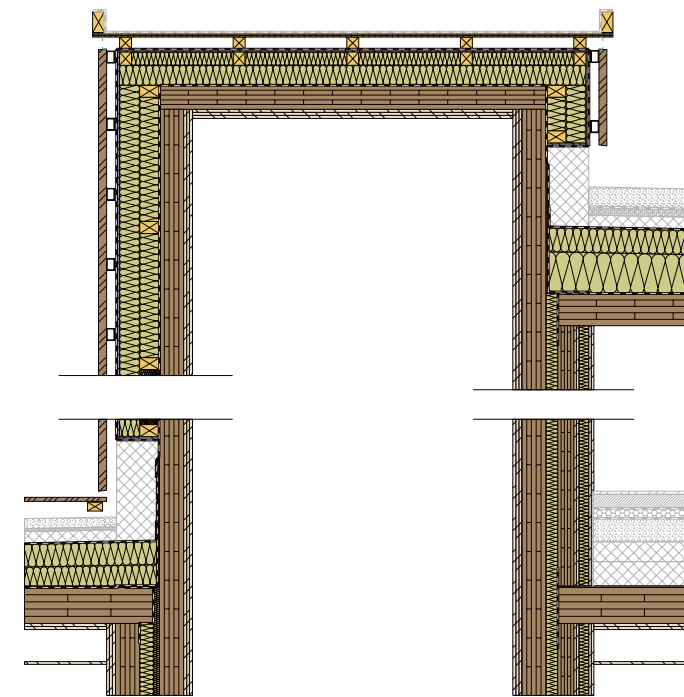
Project manager Florian Huber sees another advantage in the shorter construction times: “In just ten weeks, we were able to complete the wooden shell, including windows, balconies and facade. Thanks to prefabricated timber elements, the construction phase was shortened by six to seven months compared to conventional methods of construction.” In this flagship project, the building material timber is utilised not only in the construction of the building and on the facade but also in the interiors, and is partially visibly on the ceiling and wall surfaces. Environmentally compatible materials and sustainable construction solutions help raise the 34 condominiums to the highest quality standard of Climate Active Gold.

Elevator shaft made of timber

In Austria, the escape routes in buildings such as the Naturquartier Kufstein must meet the requirements of fire resistance class REI 90-A2. This means that in the event of a fire, the escape routes must be safe for 90 minutes and must be constructed using non-combustible materials. “Thanks to a fire protection concept that makes provisions for fire protection panelling for all of the components in the escape route, it was possible to also construct the stairwell and the lift shaft out of timber”, explains Tamir Pixner, Managing Director of Timbatec Vienna.



Photos: Unterberger Immobilien GmbH / Alex Greiner



With a sophisticated concept, it is even possible to make lift shafts out of timber.



Timber remains visible inside and outside, offering a pleasant atmosphere.

Building owner

Unterberger Immobilien GmbH, Kufstein

Architecture

HVV Architektur, Kundl

Timber construction engineer

Timbatec Holzbauingenieure GmbH, Vienna

Civil engineer

Hanel Ingenieure, St. Johann in Tirol

Building physics

Ingenieurbüro Rothbacher GmbH, Zell am See

Timber construction

Schafferer Holzbau, Navis

A house made of beetle wood

The client attached great importance to regionality and a choice of ecological materials. It is therefore an obvious choice for the Generationenhaus to be made largely of regional beetle wood.



More than ten years ago, Elsi Reimann and Thomas Kaufmann started a conversation and laid the foundations for what is today the Wohngenossenschaft Langnau im Emmental living cooperative. Visits to various successful cooperative projects followed as well as the highs and lows of the search for a suitable piece of land, and then planning. Today, the construction project is almost finished and the members of the cooperative will soon be able to move into their apartments. On this path, the cooperative has been guided by three questions from the mission statement: “Does it serve people?”, “Does it serve the environment?” and “Does it serve peace?”. Timbatec also identifies strongly with these values. In our work, we also always ask ourselves whether our construction projects are environmentally compatible and whether they are optimally tailored to the users.

The building

Anyone who includes environmental aspects in the project definition usually goes on to choose sustainable timber construction. This was the case with the GenerationenHaus. At the centre of the three-story building is an atrium as a meeting and access zone. This is where the “caring” approach and the non-commercial community really come to the fore. To enable this core zone, the surrounding balconies serve as access and meeting zones.

The arcades serve as escape routes in the event of a fire.

In the apartments, an electrobiology network keeps electrical radiation to a minimum. This network is laid in the building envelope and between the residential units. The building envelope is exemplary also in terms of energy: The house is certified to the Minergie-P standard, uses solar energy from solar panels and a photovoltaic system for partial self-sufficiency with regard to electricity and heat. Moreover, special attention is given to the particularly efficient utilisation of passive solar energy in the architecture.

Choice of materials

The high ecological requirements of the client are satisfied through the use of sawn and planed beams, while laminated duo and trio beams are avoided where possible. It is only possible to dispense with adhesives in the large glued laminated timber beams and the wood-based materials. Ultimately, almost half of the used timber is unbonded. In all the products, we gave special attention to the simplest possible processing with the aim of facilitating subsequent dismantling. For example, the ceilings are made of a simple layer of solid timber beam tiers supplemented with three-layer and OSB panels. Solid timber is only installed dried and in its natural state. This

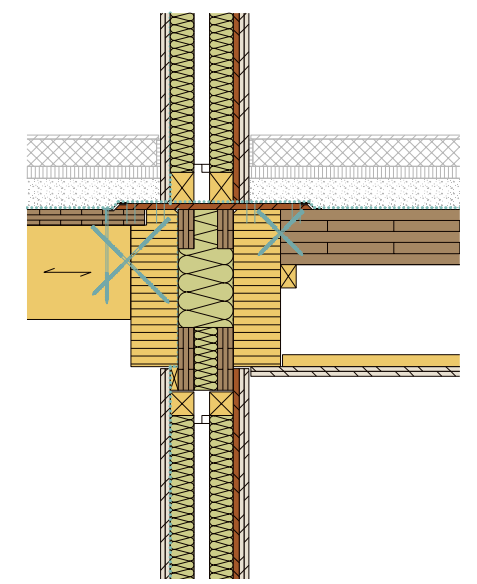
means that it can be used without foreign substances such as glue or paint.

Beetle wood

Storms and longer periods of drought are making things difficult for our spruces, as spruce forests damaged by drought and windthrow are a haven for bark beetles. The small beetle lives under the bark of the spruce and can even kill healthy trees if their numbers are high enough. To counteract the explosive spread of the bark beetle, beetle-damaged wood – also known as beetle wood – is removed from the forest. This wood has the same material properties as conventional sawn timber and can be used without restriction as a material in timber construction. This is because the bark beetle lays its tunnels in the bark and the bast, namely the area between the bark and the trunk, and not in the load-bearing wood body itself. Nevertheless, beetle wood is frequently avoided because individual burrows are visible due to discolouring. This is not the case in the Mooseggstrasse development. Half of the solid timber cross sections are made from regional beetle wood. This is sustainable, in solidarity with regional forestry and is in the interests of climate protection. As such, it serves both people and the environment.



- Building owner**
Gemeinnützige Wohngenossenschaft, Langnau
- Architecture**
Werk.ARCHITEKTEN, Langnau
- Construction supervision**
Lehmann AG Baumanagement, Langnau
- Timber construction engineer**
Timbatec Holzbauingenieure, Bern
- Timber construction**
GLB Emmental, Emmenmatt
- Sawmill**
Peter Berger Sägerei, Steffisburg



The electrobiology network (blue dots) shield the apartments from one another.

Anniversary

25 years of Timbatec

In the spring of 1997, Stefan Zöllig founded the company Timbatec in Steffisburg as an sole proprietorship. In its 25 years of business, Timbatec has grown into a successful timber construction engineering company. We celebrated this achievement.



Photo: Daniel Rhs / Jonathan Leicht

We celebrated our anniversary with the “TimBall” at the Hotel Giessbach.



www.timbatec.com

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