

Timber and Technology

Timber Construction –
inhabitable CO₂-storages



Timbatec
Timber and Technology

**Dear partners, dear clients,
dear timber enthusiasts**

Who would have thought that the water- and air quality would improve in such a short period of time during the lockdown...

It proves that new chances arise from any crisis. Our main task now is to address it correctly. It is commonly known that we emit way too much fossil carbon dioxide. Whilst we make use of complex technologies and expensive machines to ensnare and store those emissions, the woods are doing exactly that, although quiet and at no expense.

Do you know, how much CO₂ a tree absorbs whilst growing and storing, in its branches, trunk and roots? Up to 20 tons! That equalizes the emission of about 150 000 kilometers driven by car. Therefore, the Swiss woods unburdens the atmosphere annually by 10 Mio tons of CO₂. The pending question is, if we can use that carbon dioxide thoughtfully and thoroughly. Because by burning a tree or letting it to get rotten, the equivalence of CO₂ will be released into the atmosphere.

Our main aim is to store that carbon long after a tree's expected lifecycle. This is what Timbatec advocates for, for the past 20 years. Applied in bearing structures made of timber which captures and stores the CO₂.

As a result, timber buildings massively contribute to the storage of CO₂. Whilst any other construction material merely emits CO₂. Conventionally built buildings start off with an immense CO₂-hypothech from its creation and perpetually increases until its final destruction. Wooden buildings stand in strong contrast to this, simply by starting off with a CO₂ deposit. How quickly that is depleted is entirely down to the occupiers.

Due to cutting-edge procedures we were able to realize major projects such as the "Croccodile" which is built with little to no steel or concrete and therefore prevented 6 418 tons of CO₂ of being emitted. Let us make use of the enormous potential of our woods. We could build entire cities made of timber; this could be our very own contribution to climate protection. Dear readers, unite with us and build with timber and create your own inhabitable CO₂-storage!



Andreas Burgherr

Head of the Executive Board at Timbatec Engineers

Timbatec is offering an all-round package

A building is more efficient and economical if understood integrally. When planning timber structures, architects should preferably add a timber construction engineer to their team to gain expertise above and beyond standard structural engineering. Therefore, we offer a full range of services for planning and implementation support. In cases where viable solutions do not yet exist for specific applications, we are able and willing to develop them from the ground up. Our core competencies lie in these following four areas:



Timber Engineering



Fire Protection



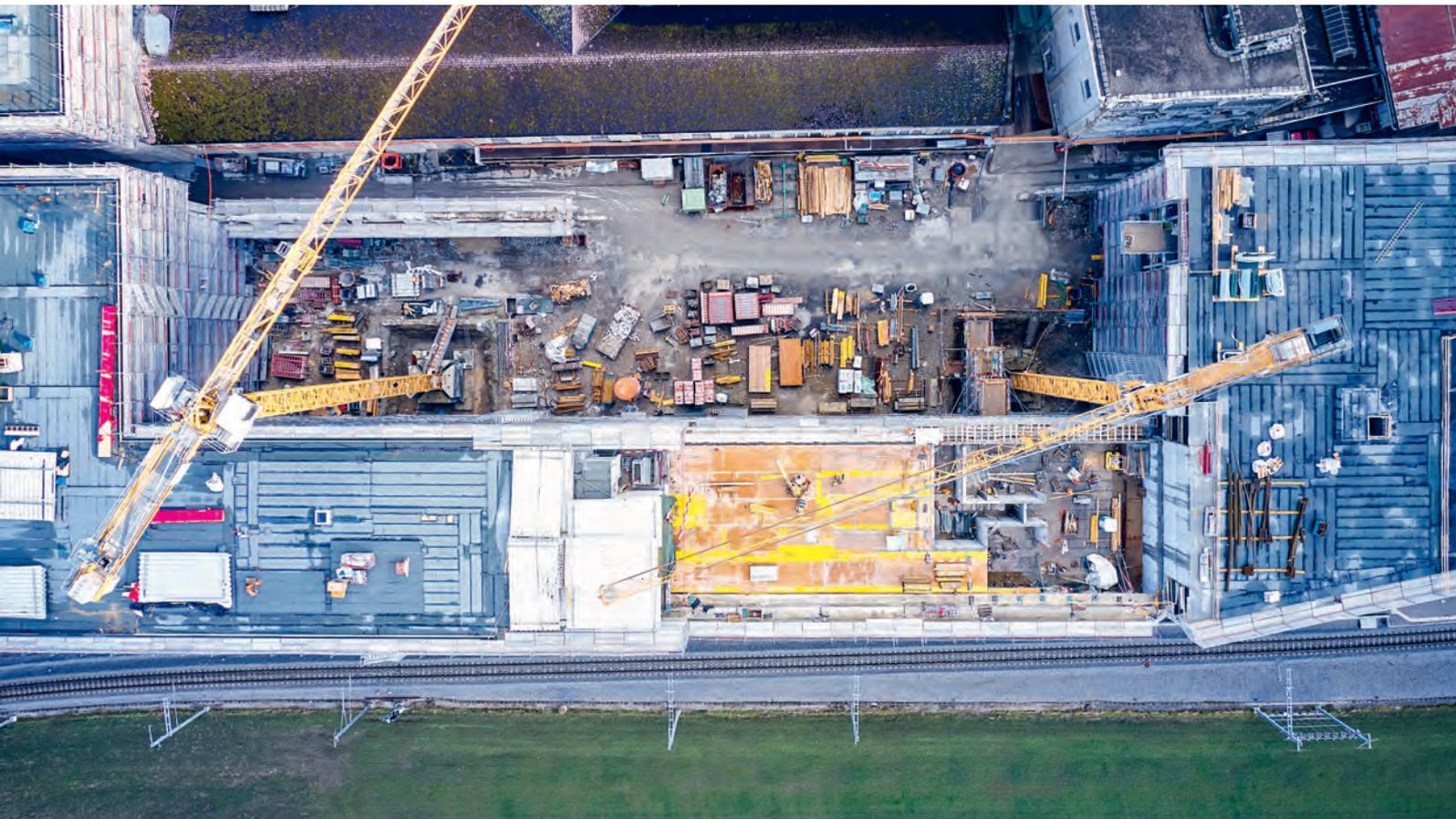
Building Physics



Product Development

Building – savior or destroyer of the climate?

Everyone who wants to contribute to the climate's protection, builds with timber. It is the eco-friendliest building material in existence. It stores CO₂ long term and convinces with its climate balance. Whereas in contrast the cement industry is one of the biggest climate sinners.



Concrete is consisting of gravel and cement as binders. In addition to that it needs to be reinforced with steel. These three building materials are extremely damaging for the environment. The cement manufacturing alone is responsible for five to eight percent of the CO₂ emissions worldwide. The production of a single cubic meter of armored steel creates an emission of about 500 kg.

CO₂ neutral concrete- a throw of dust into one's eyes

A lot of enterprises advertise with the so-called CO₂ reduced or even CO₂ free concrete, but when looking closely it is clear that this is only partly true. The manufacturing of CO₂ neutral concrete is questionable. Although old car tires and wood waste are used to melt the

concrete, the very emissions originating from this process are not accumulated when certifying the end-product. And whenever the necessary requirements aren't met, complementary certificates are bought for its CO₂-compensation. That those compensation certificates aren't used to absorb the wasted CO₂ but instead to reduce its emission to happen elsewhere remains concealed. Ferro-concrete is and always will be the environmentally most harmful material on the market.

Whereas the regrowing woods only needs solar energy and water for its making. Its harvest is kept at the lowest energy level. And don't worry, about our woods: a farmed forest is more robust and protective of natural catastrophes than an untouched acre of woods.

The differences between conventional ferro-concrete and timber buildings are numerous. That is why the Berninapark AG utilized timber when topping up their office building situated in Stettlen.

A crocodile made of timber

Meanwhile a new district arises where once locomotives and machines were built. The building “Crocodile” is one of the biggest timber constructions nationwide. Timber took over!



Timber takes over: a new building with 254 apartments arises near Winterthur's train station.

Urban living- and workspace for over 1 500 people emerges close to Winterthur's train station. The house called “Crocodile”, a 6- to 8 storey building with patio, states the first milestone of the massive building complex “Lokstadt” and represents the area's diversity. It will be consisting of 254 condos, rentals and co-operative flats. With just over 30 000 square meters of floor space it is one of a kind.

Though not only its size attracts attention but also its innovative construction procedure. Usually with building projects this big, the builders cast the staircase core in concrete

first and the carpenters assemble their prefabricated elements after. However, Timbatec decided to reverse this chronology: Carpenters assemble all timber components first and later serve as a lost shuttering for the concrete.

Timber is more precise than concrete

The reversal of the chronology is the most efficient building procedure anyhow. Because: timber construction demands millimeter-precision when concrete doesn't. Timbatec had this efficient and resource-sparing procedure planned exclusively for the “Crocodile”.

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Carpenters assemble the staircase components first, which will serve as a lost shuttering for the concrete.

Building owner

Implenia Schweiz AG, Zürich

Architect

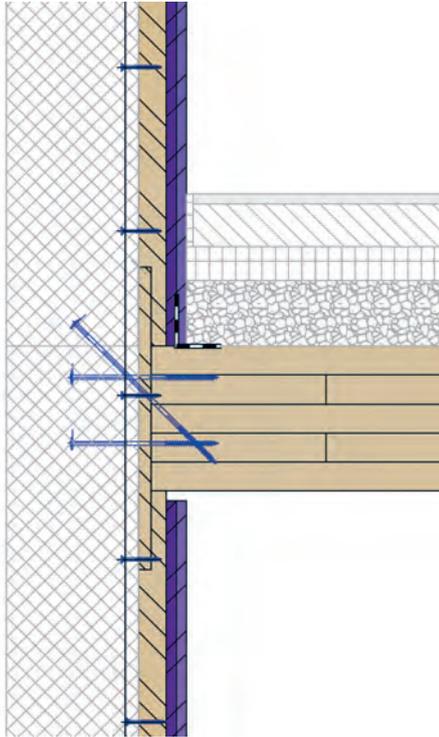
Baumberger & Stegmeier AG, Zürich

Timber subcontractor

Implenia Schweiz AG, Zürich



Treppenhaus



The timber structures serve as a lost shuttering for the concrete. This way we saved time, 1270 tons of concrete and 24 tons of steel.

The advantages are obvious: the demand for steel profiles and screws has been reduced immensely. Due to this ground-breaking procedure we were able to avoid making use of around 1270 tons of concrete, 24 tons of steel, 5000 heavy goods-anchors as well as over 10000 screws.

The digital twin

Building projects of this size require thorough and strategic planning. For this very purpose the prime contractor Implenia decided that the “Crocodile” will be constructed in BIM from the ground up. On account of that, architects

and engineers amongst many parties involved continually fed BIM with information during the drafting process. Which resulted in a nearly final digital version of the house even before the groundbreaking ceremony. Although this greatly simplifies the actual construction phase, as collisions can early be detected and eliminated, it generates a more challenging and costly planning process than usual.

A CO₂-certificate for the “Crocodile”

The timber used for the building imbibes the environment of 6414 tons of CO₂ and stores it



The timber used for the building imbibes the environment of 6414 tons of CO₂. The CO₂-institut’s certificate records the valuable contribution of the project for climate protection.

in the long run. One cubic meter of timber stores up to one ton of carbon whilst growing. This equals about 42.8 million kilometers driven by car or the nationwide CO₂-emission of 1283 people a year.

In other words: the amount of carbon absorbed by the timber used for the “Crocodile” equalizes the amount of CO₂ emerged by manufacturing the concrete used for the sublevels and staircases. In comparison: if the building were conventionally with concrete ceilings and brick walls it would have generated over 11000 tons of CO₂.

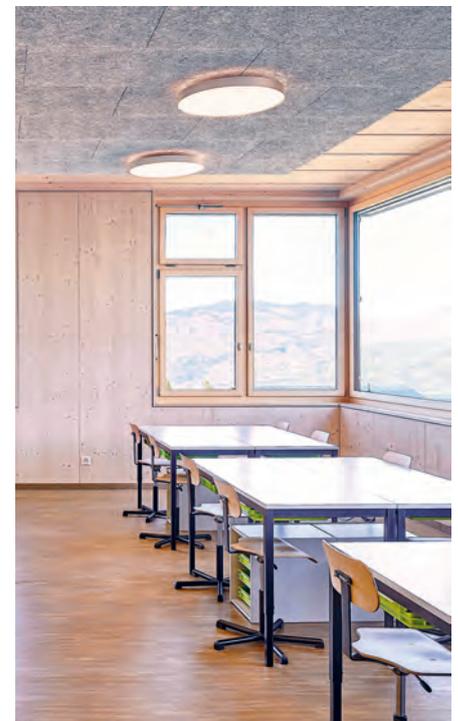
School made of communal timber

The primary school building of Frutigtal in the canton of Berne has reached its full capacity. They made it their main aim to use local timber for its pending extension. A huge opportunity for regional companies as well as for the environment.



The three storey timber building complements the existing school in Aeschi

The timber provides a good atmosphere for study – at the same time it stores 650 tons of CO₂.



Firstly the extension was supposed to be built in ferro concrete. Timbatec amongst local sawmills and carpentries pitched to execute this project in regional timber. “Their proposal convinced us and looking back we are proud of our change of plans.”; the mayor Christian Daepf says; “Bernese timber – our pride!”.

To ensure fair competition throughout the building process it is not permitted to prescribe the usage of Swiss timber in public biddings. Unless the parish demands to use local timber due to its existing stock, which can be the perfect solution, especially in a project like this. Everyone who wants to use local timber must start planning accordingly

from an early stage: an abstract construction documentation has to take place, in order to start conversations with the rangers, so they can start cutting the trees early on.

Forward-thinking

Not only the construction material is sustainable, but also the architecture combined with it; the interior walls are non-bearing and therefore enable repositioning. Usage-flexibility is a key requisite as the sizes of classes and their tuition forms are in constant change for the years to come. Additionally, all components are dimensioned and assembled in a way that an addition of storeys is viable at anytime.

Building owner
Einwohnergemeinde Aeschi

Architect
Jaggi Frei Brügger Architekten, Frutigen

Timber subcontractor
ARGE Däpp, Aeschiried / Bärtschi, Frutigen

Local timber for the Cup winners

The HC Ajoie made it to the top: The cup winners amazed their fans with ambition and skills and in return got rewarded with a near full stadium when having a home game. They will be able to do this in a new stadium from next year on. The uniqueness of it: the newly build stadium will be consisting of communal timber.

"Timber!", it echoes through the woods, shortly after a chainsaw has been switched off. The tree falls on the ground into the swatch, just as predicted. The forest ranger looks satisfied. The trees he will be cutting today will be used for the new stadium in Puntrut. "It feels great, to know where this timber will be implemented at", he says.

Early scheduling is key

Those who want to use local timber must think ahead. For the timber to be ready in time the community must include the rangers as early in the process as possible. For this very stadium, Timbatec had designed a concept for local timber from an early stage. Regional

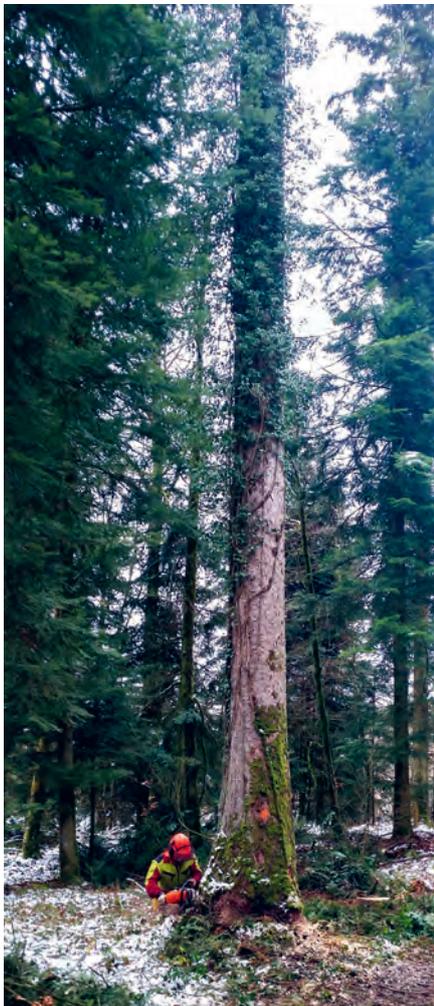
enterprises have produced numerous timber beams and planks for this stadium. Furthermore all the by-products have been used to manufacture multilayered solid timber planks, which also have been assembled on site. This procedure increased the log exploitation immensely.

Over 1000 tons of CO₂ stored

This new stadium will be the home game hall of the icehockey team and cup winners HC Aijoe. Even figure skaters and the aspiring ice hockey national team will be practicing under their roof. The construction provides not only shelter against wind and weather - it also stores 1 161 tons of CO₂.

The new stadium will contain 4650 seats and becomes the home game hall of the cup winners.

Pidoux SA cuts trees – not far from the new stadium.



The Swiss woods and its timber economy is dear to us.



From the woods to the construction material. Timbatec supervises the process.

Building owner

Syndicat intercommunal du district de Porrentruy

Architect

Dolci Architectes, Yverdon-les-Bains

Timber subcontractor

Konsortium Batipro, Courfaivre / Ducret, Orges

We are nearby

We are happy to provide you with expertise in consultation in one of our four branches in Thun, Bern, Zurich and Vienna. We are also working from the Swiss Romandy with french speaking employees. We are glad to increasingly receive requests from this part of Switzerland.



«We are always on the lookout for enthusiastic and good peers and would be happy to receive your unsolicited application – especially for our upcoming projects in the Romandy.»

Johan Maitre, Head Romandie

Our biggest benefit is our well-educated and motivated staff. Therefore, everyone at Timbatec is provided with an annual 100 hours of advanced training to improve their knowledge. This way we are always up to date in fire

protection, building physics as well as quake protection. We value our staff. As one of the leading Swiss timber engineering companies we support our staff wherever possible.

Timbatec offers not only one, but three possible career paths: The leading-, the specialized- and the project supervisor career. This way we make sure that various talents can evolve individually.

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