Spring 2016

Timber and technology

The city of the future is made of timber

Timbatec
Timber and Technology

Timber construction is progressing

Timber buildings enhance cities and townships. Timber buildings are ecological, very fast to construct and enable compact constructions, especially in congested areas. After all, adding to existing buildings is usually only economically viable using timber as a lightweight building material.

Huge progress in timber construction: the largest timber construction complex ever planned in Switzerland will be built in Winterthur Neuhegi.

1 | Timber is fast

Timber is five times lighter than concrete. Timber is a lightweight building material. One cubic metre of timber weighs 500 kg, while a cubic metre of concrete weighs in at an impressive 2,500 kg. Transporting timber therefore takes much less effort. Modules for timber structures can be prefabricated at the workshop. They are then transported to the building site with little effort and assembled in a short period of time. The crane is only needed for a few hours and the space it requires is soon available again – an advantage in tight and busy city quarters. Even larger buildings take just two or three weeks to erect. For example: the "House of Switzerland" that was designed for the Winter Olympics in Sochi was also used for the 2014 European Championships when it was erected on Zurich's Sechseläutenplatz. The house with a surface area of 750 m² is as big as three to four single family dwellings. It took just four days to assemble.

2 | Timber is good for the environment

Timber buildings are environmentally friendly.
Firstly, timber buildings permanently store CO_2, which is of benefit to the climate. One cubic metre of wood removes around one tonne of CO_2 from the atmosphere. Very different to concrete and steel: the production of these materials causes huge CO_2 emissions that contribute to global warming. Another benefit: timber construction requires less energy for construction and running costs. An example from Zurich: the building society Zurlinden (BGZ) is oriented on the aims of the 2000 watt society, i.e. the reduction of current energy consumption levels to around one third. That is why the society banks on timber construction for new buildings. During a convention in March 2016, BGZ board member Stefan Kälin presented energy savings achievable thanks to timber buildings: BGZ homes made of timber use up to 90 per cent less energy than the society's conventional buildings. The environment also stands to benefit when the buildings are demolished: the building materials can be recycled or used for energy production.

3 | Timber is inexpensive

Timber buildings cost roughly the same as solid buildings.
This is shown by figures calculated by consultants Wüest & Partner. In fact, building with timber is actually cheaper per square metre when constructing multi-family dwellings with a volume of up to 10 million Swiss francs (9,016 million euro). Buildings costing up to one million Swiss francs have construction costs per cubic metre of just under 600 Swiss francs for timber and just over 600 Swiss francs for solid construction materials.

4 | Timber benefits urban development

Timber enables condensed construction in cities.
For static reasons, existing structures can often only be extended upwards if the extension is made of a lightweight material such as timber. The examples on pages 8 and 9 show how timber enabled new, contemporary living space to be added to existing commercial buildings in Zurich.

Timber construction in Zurich's Habsburgstrasse: the building was completed in just a few weeks thanks to prefabricated elements.

The “House of Switzerland” is a pure timber structure. Whether at the 2014 Winter Olympics in Sochi or other large-scale events: assembly took just four days.

5 | Enough timber: Nature keeps it coming

There is no need to worry about the supply of timber as a construction material in Austria.
In our country, 30 million cubic metres of it grow back every year, of which 22.5 million can be used. In other words: enough timber grows back every ear to build 2,100 single familiy homes every day of the year. Consumption currently lies at just 16.5 million cubic metres. Another 6 million could be used before stocks would start to suffer.

6 | Timber construction is making progress

Huge technological progress has been made in timber construction in recent years.
The project “sue & til” in Winterthur is one such example: work on the largest timber complex ever planned in Switzerland began in April 2016 on a former industrial area in Switzerland's sixth-largest city. The basement, ground floor and stairwells are the only sections designed as solid structures. The remaining four to five storeys will all be made of timber. The complex in Oberwinterthur will be the first of its kind to feature solid timber ceilings with a layer of elastically bound chippings without concrete on a large scale. Previously, ceilings in large timber constructions were usually designed as timber-concrete composite ceilings. This development shows that timber construction is gaining independence from concrete step by step. Timbatec CEO Stefan Zöllig: “We believe that concrete is no longer contemporary in structural engineering and that timber construction methods can be an economical, clean and dry replacement.”

3 questions for Stefan Zöllig, CEO of Timbatec

“Timber construction is well established in Zurich!”

Stefan Zöllig is convinced that timber buildings are the future of urban construction as the method has made some decisive progress. Today, it is possible to construct a timber housing estate with up to 1,000 homes. This would have been inconceivable just a few years ago.

Timber buildings appear light, bright and friendly and enable a huge variety of shapes.

How do cities benefit from timber structures?
Cities benefit from more bright and cheerful homes that are also more cost-effective. Cities also benefit from the greater scope of shape made possible by timber construction. Other building materials cannot achieve the same variety. And: adding floors to existing buildings is a quick process, taking just a few weeks or even days. That is unachievable with solid construction. It is another reason why timber construction has a future in the city.

What makes you so sure that timber construction has a future?
Ten years ago, people thought I was crazy when I said I wanted to set up business in Zurich. Timber construction doesn't have a chance, they said. We proved the opposite. Timber construction is well established in Zurich. We add timber storeys to 20 to 30 buildings a year in Zurich alone. Furthermore: we timber types are looking forward to the future. In contrast to basically every other construction material, we can effortlessly fulfil standards such as Minergie P, Minergie Eco and others. More standards will come. They are not a problem for timber construction.

What helped timber construction establish itself in Zurich?
A lot of research was done with regard to timber construction. That is why it has made such dramatic progress in recent times and the volumes have increased rapidly. Twenty years ago, timber construction was good for the occasional family home. Things are different today: a development with more than 300 family homes is currently under construction in Winterthur. A timber complex of this size would have been unthinkable just a few years ago. I would even say that a residential complex with 1,000 homes is possible today.

“We timber types are looking forward to the future. We effortlessly fulfil standards such as Minergie P, Minergie Eco and others.”

Stefan Zöllig
Founder and CEO of Timbatec

An impressive facade defines the heart of Köniz

Urban living at a central location: a timber building with 33 apartments was erected in Köniz in 2015.

Strong timber: the cantilevered concrete balconies on the garden side are mounted to the timber concrete-composite ceilings.

The structure with the shape of a quadrant is impressive. The timber facade made of slats that run vertically across the upper floors give the building its characteristic appearance. The house designed by the architects of “Büro B” in Bern is located at the centre of Köniz. The ground floor of the residential and commercial building “Am Neuhausplatz” features shops and doctors' surgeries, among others. The ground floor and basement are solid constructions - unlike the four residential storeys: they are prefabricated timber structures that meet the Minergie Eco Standard. The building's owner, the Stanley Thomas Johnson Foundation of Bern, explicitly requested timber construction. Sustainability was of importance to the foundation alongside a low-profile CO_2 footprint and a good living climate, says Büro B architect Stefan Gölz.

Simple vertical support structure, no long transoms: the load-bearing walls stand on top of each other on each storey.

Photos: Alexander Gempeler

An independent estimator was appointed to estimate the cost of timber construction and solid construction. As his calculations show: timber construction is very competitive, says Lukas Rüegsegger of Timbatec. The two methods were just a few per cent apart depending on the standard. And: the higher the insulation standard, the more competitive timber becomes. In fact, it is cheaper than solid structures when the Minergie P Standard is applied.

Distinguished: the building at Neuhausplatz was acknowledged at the Prix Lignum 2015.

Ilgen Nursery, Zurich-Hottingen

A timber house for city kids

Timber is strong. Timber supports are even capable of supporting heavy concrete ceilings. For example, in the “Ilgen Nursery” in Zurich, a hybrid structure made of timber and concrete that was opened in August 2015.

The new nursery of the Ilgen school complex stands in idyllic surroundings: the nursery's timber facade blends in with the trees of the copse surrounding the building designed by architects Wolfgang Rossbauer and Susanne Triller.

The supporting role of timber

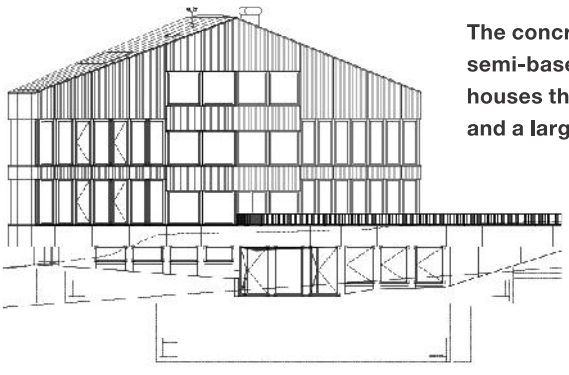
Special feature of the Ilgen nursery: the facade of the three upper storeys are designed as timber elements that support the concrete ceilings. In other words: the concrete ceilings were cast on prefabricated timber facade elements. “Many find it unusual to install a concrete ceiling on timber supports”, says Andreas Burgherr of Timbatec, “but timber can support nearly the same kind of weight as concrete.” This solution was made possible because both the architect and Timbatec were convinced it could be done. At one point during the planning phase it seemed as if steel supports would be the solution – although architect Rossbauer had won the municipal competition for the nursery on the basis of a timber construction. “We both wanted a timber construction”, says Rossbauer, “and Andreas Burgherr wanted it too.” This solution exploits the advantages of timber for the nursery. “Timber insulates and supports simultaneously; it enables precise machining and timber elements can be prefabricated and quickly assembled”, says Burgherr. In addition, timber creates a warm ambience and insulates against noise - very important in a nursery.

Generous: the Ilgen nursery's six dayrooms offer space for up to 240 children.

The timber elements in the nursery support the concrete ceiling and create a homely ambience for the children.

Photos: Dominique Marc Wehrli

Zurich's first free-standing nursery blends in harmoniously with the environment.

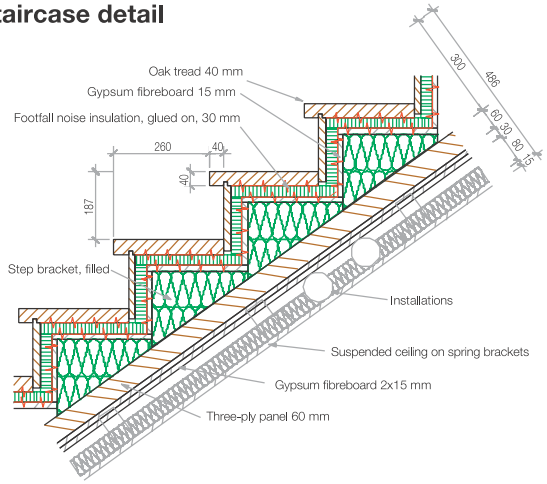


The concrete semi-basement houses the kitchen and a large hall.

More flats for Zurich thanks to timber construction

Timber construction solutions from Timbatec made it possible to create more living space in two older buildings at the heart of the City of Zurich. And: adding storeys to both of the formerly purely commercial buildings was only possible thanks to timber construction.

Staircase detail



Protection from fire and noise: clever solution for internal stairs

Condensed urban construction is much in demand in times when living space is at a premium. Two formerly purely commercial buildings now boast generous living quarters thanks to timber construction solutions from Timbatec. One example is the “Rauti-Huus”, a commercial building of long-standing in Zurich-Albisrieden. Built in 1948, it was once the headquarters of the compny Luwa; today, it houses a medical laboratory, among others. In 2014, three storeys with 17 lofts designed by Zurich-based architect firm Spillmann Echsle were added. This raised the living space from 0 to 40 per cent. Timbatec's timber construction engineers were put to the test to make the project a reality. The building's statics were precarious and its existing fabric was poor. Adding new storeys meant first having to deconstruct the two storeys that had been added to the building in the 1960s.
That was not the only challenge: the layout plans of the planned apartments did not match up with the strict grid pattern of the existing office floors. The load placed on the facade supports would have been too unbalanced.

This commercial building is now also a home: 17 nested lofts with unique floor plans were built as timber structures.

The engineers at Timbatec found an unusual solution: a steel strut grid whose cross-members rest on the solid structure's facade supports was designed to support the new storeys. The grid lies on defined rubber bearings to spread the load evenly across the supporting elements.

Steel grid for the three new timber storeys

Condensed construction is in demand: the need for urban living space continues to grow.

Multi-functional staircase

A creative solution was also needed for the stairs connecting the apartments to the corridors. The stairs must fulfil a number of purposes: “They serve as a fire safety element, separate the apartments from one another and need to fulfil strict requirements with regard to noise protection”, says Andreas Burgherr from Timbatec's Zurich office. Triangular timber wedges were screwed to cross-laminated timber boards. The wedges were insulated with rock wool and clad with plaster board as fire protection measures. The oak treads were glued to hard-pressed rock wool to protect from noise.

Like a floating cube

The office building in Lessingstrasse 3 has also been a place to call “home” since 2013. Two additional timber structure storeys were added to the building not far from the large Sihlcity complex. The commercial building now also houses five apartments, three of which are spacious maisonettes. The initial plan was to add a single storey to the existing building. The design provided for a storey that would project over one side of the storey beneath it by 1.30 to 2.90 metres. This gives it the effect of a cube floating above the building. “However,” explains Andreas Burgherr, “it was established that the existing hollow rib concrete ceiling was not suitable for supporting a storey whose weight is distributed in such an asymmetrical way.” Hence the decision to deconstruct the third storey and rebuild it as a timber structure. The partition walls between the apartments were designed as supporting panels made of 120 mm cross-laminated timber boards standing on two punctiform bearings.

The storeys could only be added to the building in Lessingstrasse thanks to timber construction. “The existing foundations were too weak for a solid structure”, says Burgherr, “but removing the concrete ceiling kept the weight load on the foundations at more or less the same level.”

Hardly visible from the outside: the 3rd storey in Lessingstrasse is also a timber structure. The commercial building now houses five apartments.

“Even as a child I loved working with wood.”

Urs Flükiger trained as a carpenter and has continuously engaged in further education ever since. The 31-year-old is responsible for detail designs at Timbatec, but also for complete two and three-dimensional construction designs.

Urs Flükiger, how did you find your calling?
Even as a child I enjoyed hammering and sawing, building model aeroplanes, an aerial railway and many other things. I have always loved working with wood and developed an interest in carpentry early on. During my apprenticeship as a carpenter, I became fascinated by CAD. My thirst for knowledge motivated me to gain a professional certificate with a focus on technology, architecture and life sciences and then to acquire a diploma in timber engineering from the Higher Technical School of Wood in Biel.

What other courses have you completed?
I wanted to keep my office job options open due to the physical burden of working on construction sites. For this reason, I completed various courses in the fields of CAD and BIM, fire safety, building physics and project organisation and management.

What is your main activity at Timbatec?
I mainly deal with detailed design, but I also draw up complete two and three-dimensional construction designs for our customers. I prepare detailed price quotes and cost estimations, manage our IT infrastructure and support our trainee staff. We are a good team and work together on varied projects with interesting tasks and assignments.

What other prospects of development do you see in your profession?
The digital planning chain certainly has a lot of potential that is often underestimated. BIM optimises communications between those working on the construction project and reduces error sources. I have already acquired a valuable wealth of experience in this field thanks to various complex assignments. However, this development has only just begun and will affect all of us.

Photos: Frédéric Giger

“The digital planning chain has huge potential. I have already acquired a valuable wealth of experience in this field thanks to various complex assignments.”

Urs Flükiger
Timber Construction Engineer HF, at Timbatec since 2008

In your opinion, what makes timber especially suitable as a building material?
Timber is warm to the touch and easy to work with. Its versatile areas of use range from aviation to construction to my Swiss harmonicas. Timber is one of our very few native raw materials and is also CO_2-neutral.

Urs Flükiger: A typical example of a Timbatec employee pursuing a specialist career. In recent years, he has completed training courses in fire safety, building physics, CAD & BIM and project management.

Professional progress

Career, individually defined

In many companies, only those employees who have leadership qualities and an overwhelming urge to get to the top will have a successful career. Not so at Timbatec, where various career types are provided for and consciously promoted.
Project managers and specialists can also climb the career ladder at Timbatec.

Management career

There are people who were born with the qualities of a leader. They have the ability to lead and motivate others. They are willing to take on responsibility for the further development of a department or an entire company.

Specialist career

A specialist career is just right for experts who are absolute cracks in their field – an example in Timbatec's case is fire safety. They have acquired so much specialist knowledge in their field through further education and extensive practical experience that they are often asked for advice by colleagues and external partners. Specialists can make themselves indispensable. And they can specialise entirely in their core area as they do not need to take on management tasks that take up valuable time.

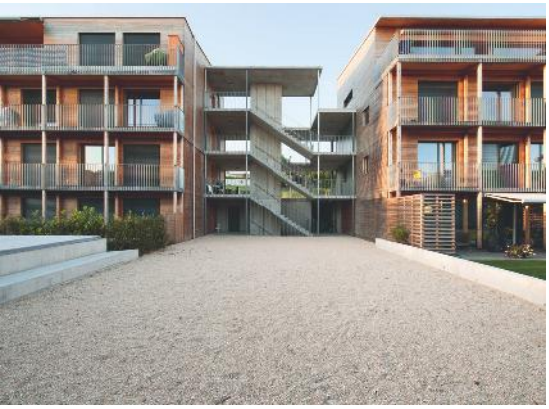
Project career

To conceive, plan and implement a project through to completion – these are the strengths of a project manager. They also need to command networked and interdisciplinary thinking and have a quick grasp of complex tasks. The project manager's place is not on the management board, but rather wherever demanding projects need to be pulled through to completion. These skills can be learned and Timbatec actively promotes their acquisition.

Timbatec is celebrating!

Timbatec's Zurich office will celebrate its 10th anniversary on 1st July 2016. Reason enough to invite customers, partners and employees to enjoy drinks and snacks on the roof terrace.

2013
House of Switzerland, Sochi



2006
Sunny Watt, zero-energy estate in Watt-Regensdorf

The City of Zurich has been of importance to Timbatec since the first few years. It was responsible for around a quarter of the company's turnover from an early stage. That is why Stefan Zöllig decided to open a branch office in the town on the River Limmat. Timbatec Zurich started out on 1 July 2006 with just two people – and on that same day received its first large-scale assignment: Sunny Watt, the first zero-energy residential estate in the Zurich region with two multi-family dwellings and seven terraced houses. It was a dream start for the office in Zurich. Since then many more projects have been planned here, as the examples on this page show.

2015
T5 Suret wildlife crossover near Aarau

This year Timbatec will celebrate the first anniversary of its subsidiary in Vienna, Timbatec Holzbauingenieure GmbH. This August the entire team will therefore visit the "World Conference on Timber Engineering" in Vienna to expand its knowledge and stay abreast of developments in timber construction.

Concept/design: Basel West Unternehmenskommunikation AG Editor: Stephan Lichtenhahn Design: Frédéric Giger Lithography: Sinia Brugger

Timbatec
Timber and Technology

www.timbatec.com

Austria:
Main Office Vienna
Timbatec Holzbauingenieure GmbH
Im Werd 6/31a, 1020 Vienna
Telephone +43 720 2733 01
wien@timbatec.at

Switzerland:
Main Office Thun
Timbatec Holzbauingenieure Schweiz AG
Niesenstrasse 1, 3600 Thun
Telephone +41 58 255 15 10
thun@timbatec.ch

Branch Office Zurich
Timbatec Holzbauingenieure Schweiz AG
Weinbergstrasse 41, 8006 Zurich
Telephone +41 58 255 15 20
zuerich@timbatec.ch

Branch Office Bern
Timbatec Holzbauingenieure Schweiz AG
Falkenplatz 1, 3012 Bern
Telephone +41 58 255 15 30
bern@timbatec.ch