

Timber and Technology

Timber construction and digitalization –
Hand in hand towards the future



Timbatec
Timber and Technology

Dear partners, customers and timber enthusiasts

Timber structures are writing history. When once only barns and attics were built in timber, we are now building hospitals, major projects and even entire cities in wood. That is gratifying as wood has numerous qualities, such as its great supply in nature, its CO₂ storage whilst growing and it being the most ecological construction material on the market.

One major advantage of building with timber is that prefabricated elements can be put together rapidly when arriving on site. To ensure a smooth unit assembly, every component must be planned precisely. That is where the digitalized planning process, such as Building Information Modelling (BIM), comes into the picture. Timber construction and digitalization go hand in hand towards the future.

It is time to leave conventional planning structures behind and focus on new digitalization tools. Planning teams draft an exact digital version of the building long before its groundbreaking ceremony, to ensure that there will be no collisions and all components meet their requirements.

By eliminating construction and coordination errors early in the planning process, costly and time-consuming mistakes can be prevented.

These days many lectures are given on digitalization, especially in the context of innovation. We do not want to leave it at that, therefore Timbatec is taking part in various research and development projects with universities and other organizations. This way we cannot only make use of gained knowledge, but also be part of its development.

Dear readers, please join the movement of digitalization and plan your building project based on BIM. We will gladly help you on this journey.

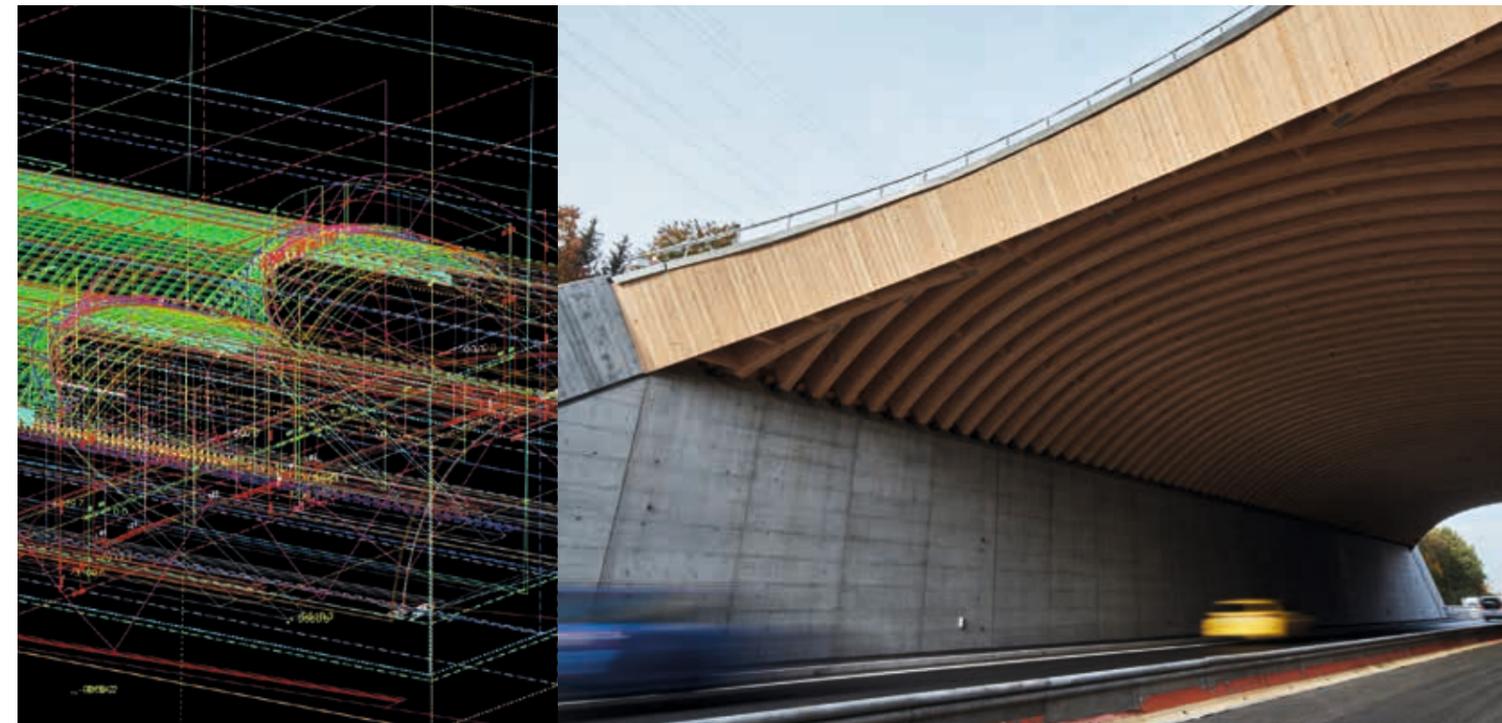


Lukas Rügsegger
Managing Director,
Bern Branch

Cover picture:
Apartment building
Sue&Til in Winterthur

Three-dimensionally drafted arch construction

Timber components can be prefabricated and are thus ideally suited to digital planning. That's why the Swiss government and investors increasingly use this renewable resource – for Switzerland's first wild animal bridge built in timber, for example.



Timbatec offers the all-round package

A building is more efficient and economical if it is understood as an integral whole. For the planning of timber buildings, architects prefer to work with a timber construction engineer who has skills that go beyond mere structural design. We offer an all-round carefree package in the planning and supervision of timber construction projects. We will gladly develop solutions for you where there aren't any just yet. Our main competences lie in these four areas:



Timber Engineering



Fire Protection



Building Physics



Product Development

Lifecycle costs are vital for big projects. That's where timber structures can score. New guidelines like the federal law of public procurement or the Swiss Standards like the SIA 101 "regulations for building contractors" clearly favour timber as the main building material. This is done for many good reasons. Timber as a renewable resource is not only more climate-friendly than concrete and steel, it is also very economically beneficial in terms of maintenance and lifecycle costs. Because timber usually comes in prefabricated units to the construction site and its fast assembly is a lot more economical than buildings made of ferroconcrete. These are two main benefits for a planning process using BIM. This hence leads to investors predefining the project to be built in timber, even though the planning and building costs could end up slightly higher.

Thanks to the precise three-dimensional planning of the wild animal bridge "Rynetel",

the components were manufactured accurately on a CNC machine, so that no adjustments had to be made on site. This way the 17-metre-long portal arches with their complex shape were assembled quite rapidly on site.

Digital planning processes become mandatory

From 2021 on public construction projects must be planned using digital collaboration methods. Thanks to the modelling-based planning process, the components of all parties involved will be tested as to their compatibility so collisions can be detected and eliminated early on. This more complex and costly planning phase is compensated for by fast assembly during the construction phase. Timbatec already has a lot of experience in projects executed like this and thus is very skilled in that way of building.

Timber is the right choice: even wild animal bridges over motorways are built in timber these days.

Photo: Nils Sandmeier

The building “Crocodile”, Lokstadt in Winterthur

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The digitally planned “Crocodile”

The former factory of the first electrical Gotthard locomotives is being replaced with one of the biggest timber complexes nationwide. The locomotives and the new building have one thing in common: they are the first of their kind.

Employees at Timbatec, constructing the building “Crocodile” based on CAD-WORK and BIM-collab.



The 3D-drafted components were accurately manufactured using CNC machines and assembled on site.

Photo: building complex “Crocodile”: Jürg Zimmermann

Building contracting
Implenia Schweiz AG, Zurich

Architecture
Baumberger & Stegmeier AG, Zurich
KilgaPopp Architekten, Zurich

Timber technology
Implenia Schweiz AG, Zurich

Built within merely 16 months thanks to the digitalized planning process.

Urban living- and workspace for over 1500 people is emerging in the midst of Winterthur. The new district goes by the name of “Lokstadt”, as once locomotives were manufactured on this parcel. The house called “Crocodile”, a six to eight storey timber building, represents the first milestone of the massive building complex. With over 250 condos and just over 30000 square metres of floor space it is one of a kind. Tenants have been continually moving in since the beginning of November.

Short construction phase due to BIM

The “Crocodile” has been built at great pace. In May 2018 the first diggers showed up to excavate a massive pothole, where many basement floors were to be built, mainly for a huge underground car park. By April 2019 carpenters started building their timber construction. Today, only 16 months later, the first apartments have already been moved into. That record-breaking construction time required meticulous planning.

To ensure such quality, the entire building with all particulars was planned using BIM from wthe feasibility analysis forward. The planning team had basically constructed a digital twin of the building long before the first piece of timber was even processed. This way many errors were detected and eliminated early in the planning process without generating high costs in the building phase.

Interaction between different planning models

These days the “Crocodile” is inhabited, there is running water, electricity and the entire building could withstand an earthquake. To ensure that, countless planning teams had to be able to work together and communicate well. This communication has been a challenge, but it was worth the effort. It made sure that the conduits didn’t collide, that they only cut through walls and ceilings where there were no static functions in place.

Experts call this process of identification and collision validation between various planning models “BIM Issue Management”. In this project they have been collaborating on a platform called BIMcollab Cloud. That platform enabled a well-structured exchange and solution-oriented way of working on collisions, so-called issues.

Next step: “closed BIM”

Coordinating the various models and BIM Issue Management take an unnecessarily large amount of time, and every intersection is a potential source of errors. If all planning teams could work on the same model, such as in the “closed BIM”, communication would get a lot easier. Yet, this still lies in the distant future.

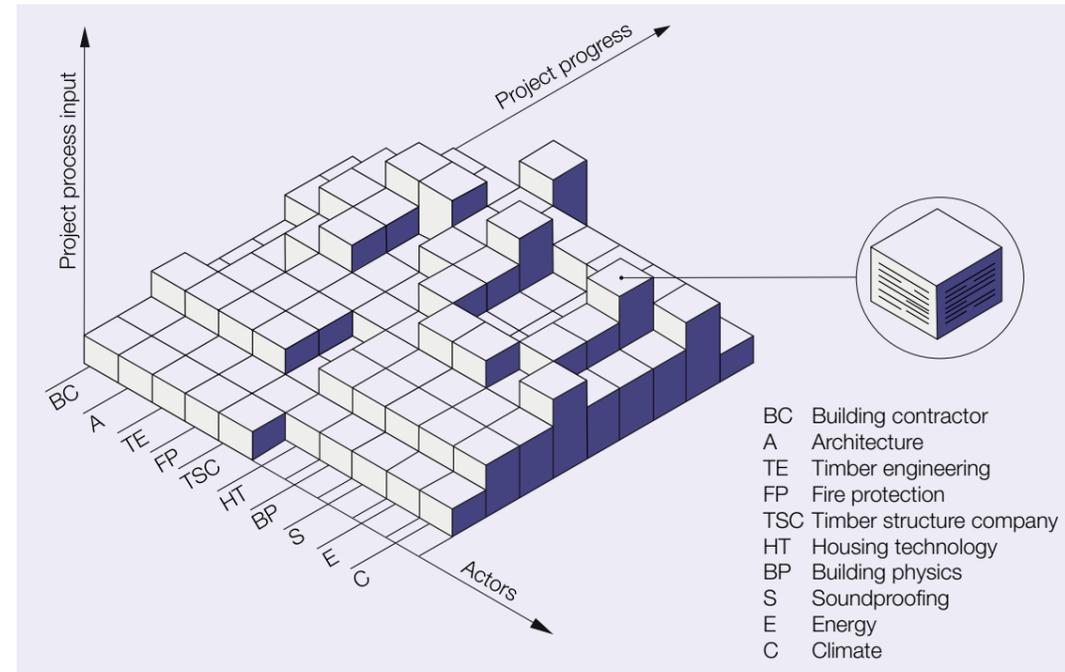


“BIM is a magnificent tool which greatly simplifies communication and the coordination between intersections. This way we get to spend valuable time on our professional expertise instead.”

Silvan Stierli
Project Manager “Crocodile”

BIM and timber construction – a dream team

The prefabrication of timber units calls for meticulous planning and therefore a digital planning process. Thus, we are constantly participating in various research projects to improve the tools given and help bring timber construction forward.



The numerous planning teams have to be geared to each other.

It is Timbatec's vision for all planners to interactively and simultaneously work on the same model. With the "closed BIM" approach all problematic intersections and therefore miscommunications could be dissolved. This would simplify both planning and building processes.

Benefitting from other industries

Having an eye on other industries, it becomes obvious that they found a way to interactively work on projects a long time ago. Working on so-called PLM platforms is already standard in the automobile and aerospace industries, for example. There you can even draft entire jumbo jets in detail. So why not apply this working method and planning process to timber construction and adjust it where necessary?

One model for everything

A research project called "DeepWood", in collaboration with the universities of applied sciences in Lucerne and Bern, is taking on the

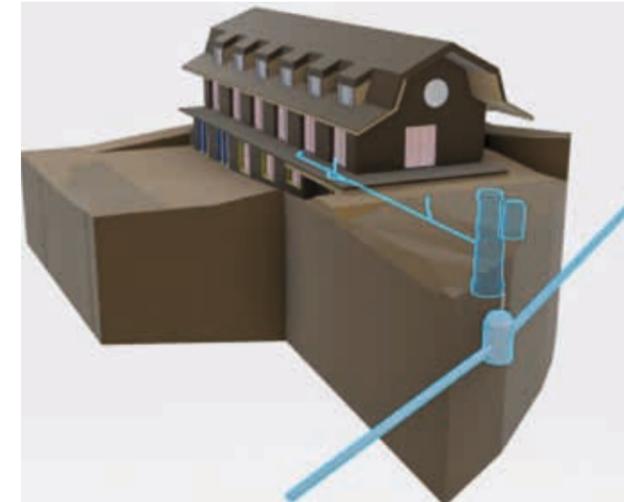
consolidation of platforms. They are developing a basis for those platforms to work together interactively and efficiently. The biggest challenge seems to be the coordination between different crafts. Thus, different working methods need to be synchronized and standardized, so all parties involved can work simultaneously and prevent collisions.



"Timber is the construction material of the future. The LUASA, the BUAS and Timbatec are developing new planning models to bring timber construction into the digitalization age."

Prof. Thomas Rohner
Bern University of Applied Sciences,
project manager research project "DeepWood"

The apartment building in Thun has been constructed using CATIA.



Aligning with the execution
The main focus of "DeepWood" lies on aligning planning with the actual execution process. Its acquired knowledge finds implementation in the project of an apartment building in Thun. Its planning basis was a platform called 3DX from Dassault Systèmes, using CATIA. As of now there were no adjustments to be made, as the research knowledge has already been implemented. For this new way of working in timber construction to establish itself, clear structures will be needed in terms of processes, routines and schemes – from the planning process all the way to the collaboration with machines and the output of blueprints.



"The demand for advanced planning processes in timber construction is great. The research project 'DeepWood' is trying to adjust and apply knowledge from other industries."

Dr. Sonja Geier
Lucerne University of Applied Sciences and Arts,
project manager research project "DeepWood"

Efficient housing technology

The growing urge to save electricity costs leads to an increasing demand for efficient technical housing installation (TGA). However, the lack of involvement when deciding on a construction structure still poses a great obstacle, as the expertise for the respective knowledge is missing. In order to get a better

understanding of it Timbatec has taken part in a network project called "TGA Timber" in Austria. A greatly improved intersection concept was the result of an interactive exchange of knowledge between craftsmen, experts and research institutes. The planning and execution processes were greatly optimized

and thus more cost-effective. The new insights were immediately applicable and therefore reduced the prefabrication and building time. Timbatec is already making use of them in its planning processes.



"Everyone has to work closely together for the advantages of the new intersection to be applied in modern timber construction."

Dr. Bernd Nusser
Holzforschung Austria, project manager research project "TGA Timber"

New branch in Romandy

Being close to our clients and being available at all times is important to us. That's why we are located near train stations. As of late in Delémont as well.



The timber construction industry is booming. Timber is the most climate-friendly building material on the market and provides ideal preconditions for a digitalized planning process. That is why many building contractors want to build with it. We rise to the challenge and expand our business to Romandy. Timbatec is currently located in Thun, Bern, Zurich and Vienna and by 2021 also in Delémont. We are looking forward to welcoming you at Avenue de la Gare 49.

Timbatec has its finger on the pulse of the time. Our biggest advantage 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 on fire protection, building physics as

well as seismic protection. Are you keen on joining our team? Get in touch, let us get to know each other.



“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 Romandy.”

Johann Maître

Area manager, head French-speaking Switzerland

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