Timber Basements

Comfortable space below ground level

Timbase
Timber Basements

Timber has it all

Welcome to Timbase

Timber structures are booming. Professional investors and the public sector are turning to this renewable building material. And with good reason: Timber projects are completed in record time at the same costs as projects in steel and concrete. Timber is by far the most ecological building material. It grows back in our forests and stores CO_2 as it grows.

Nowadays, basements are usually made of concrete. This causes massive carbon emissions. Our goal is to completely eliminate steel and concrete from the construction industry. By doing so, we contribute to reduce climate change. Basements in timber are an important part thereof.

Timbase is part of Timbagroup. When designing basements, we work in close collaboration with the engineers of our sister companies Timbatec and Timber Structures 3.0.

Take a step inside! Discover how a basement can serve as a solid foundation for your timber project!

Stefan Zöllig

A basement made of timber

The first apartment building in Thun, Switzerland, with a basement completely made of timber is now reality, despite what seemed impossible for a long time.

The basement has a similar atmosphere to an apartment

Building land and real estate prices have increased greatly over the past few years. This requires utilizing every inch of a building thoroughly and wisely. By building basements with timber instead of moist concrete, a cozy living space can be created without any extra cost in a shorter construction period.

Regula A. Bircher and Stefan Zöllig have done exactly that in their building, which consists of six apartments in Thun. The first timber basement in Switzerland has a multi-purpose room that houses a communal kitchen, office and workshop rooms along with a guest bedroom. In addition, the approximately 230 m² basement offers space for a laundry room, installations, and cellar compartments with plenty of storage space.

Yoga classes in the basement

Doris Baumgartner teaches yoga in the timber basement with around ten individuals from the district on a weekly basis. “Various exercises/ Asanas are done on the bare wooden floor, for others we sometimes use yoga mats”, says the yoga instructor. The basement’s wooden flooring and warm surfaces create a calming and cosy environment that supports both body and soul during yoga.

Economical and climate protective

It is not only the users who are pleased with the timber basement. It benefits both investors and the environment. The reason for this is that steel and concrete are among the most climate-destructive building materials in existence. Their discontinuation is a valuable contribution to climate protection. Furthermore, a basement built with timber is assembled much faster than than its counterpart made of reinforced concrete.

Report in NZZ-Format on Switzerland’s first timber basement.

The timber basement seen from above.

Architecture
HLS Architekten, Zurich

Building owner
Yamanakako AG, Thun

Timber structural engineers
Timbatec, Zurich

Large scale timber floor slabs
TS3 Timber Stuctures 3.0 AG, Thun

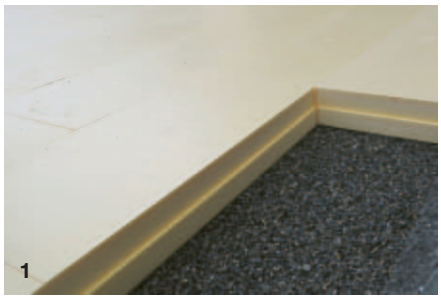
Timber construction and general contractor
Stuberholz AG, Schüpfen

«The community room in the basement is the ideal place for yoga lessons thanks to the cosy atmosphere created by the use of wood.»

Doris Baumgartner
Iyengar-Yoga-Teacher, www.bern.yoga

If kept dry, timber lasts forever

The most important principle in timber preservation is the protection against moisture. If timber is kept dry, it will last forever. The solution is a monocoque made of timber with construction details that are similar to those found on flat roofs.



A layer of chippings is used to lay thick insulation boards.

A non-woven fabric is used to safeguard the waterproofing and the integrated full-surface moisture monitoring.

The cross-laminated timber floor slab is laid on the waterproofing and the full-surface moisture monitoring system.

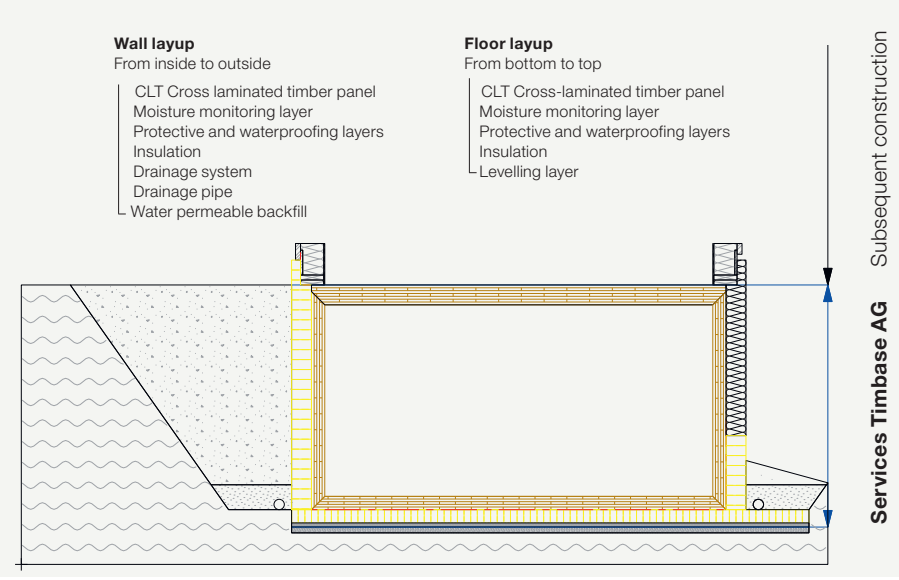
Technology in the ground area
A layer of chippings and a thick insulating board are used to lay cross-laminated timber boards. The wood is protected against moisture by an EPDM membrane using the black tank principle. A full-surface moisture monitoring system ensures the tightness and longevity of the basement.

Basement waterproofing and a flat roof have similarities. The waterproofing is accomplished by utilising an EPDM membrane, which is commonly employed for flat roofs, along with multiple layers of non-woven fabric. A membrane under the basement is less exposed than a flat roof, where roots, birds and the weather can cause damage to the waterproofing membrane. The floor structure, on the other hand, must be capable of withstanding roots and moisture from the ground.

Massive timber areas
TS3 joints connect the individual cross-laminated timber panels together to form a monocoque structure of wood. Timber Structures 3.0 technology makes this possible. This process enables the creation of large surfaces from wood. The edges from the panels are pretreated at the CLT plant. At the construction site, the boards are then molded with casting resin without pressure to form a rigid bond. This construction is utilised throughout the basement. The floor slab, walls, and ceiling above the basement serve as a load distribution slab for the building.

Assembly made simple
Modern timber houses are prefabricated in factories accurately. Sleepers are installed to guide the walls. Measuring, levelling, and installing these sleepers in a concrete basement would be time-consuming. On the timber basement slab, the timber construction can start in the usual manner.

The basement is being built by Timbase AG, which includes the ceiling above it.



CLT cross-laminated timber panels are used to build the walls.

CLT cross-laminated timber panels serve as a load distribution slab.

Above this, the timber construction company is installing the subsequent parts of the timber building.

Timber basements are inexpensive

Wood, a natural, high-performance material, has a number of advantages. Make more living space without additional financial effort.

A significantly shorter construction time can be achieved through the construction of the basement using timber.

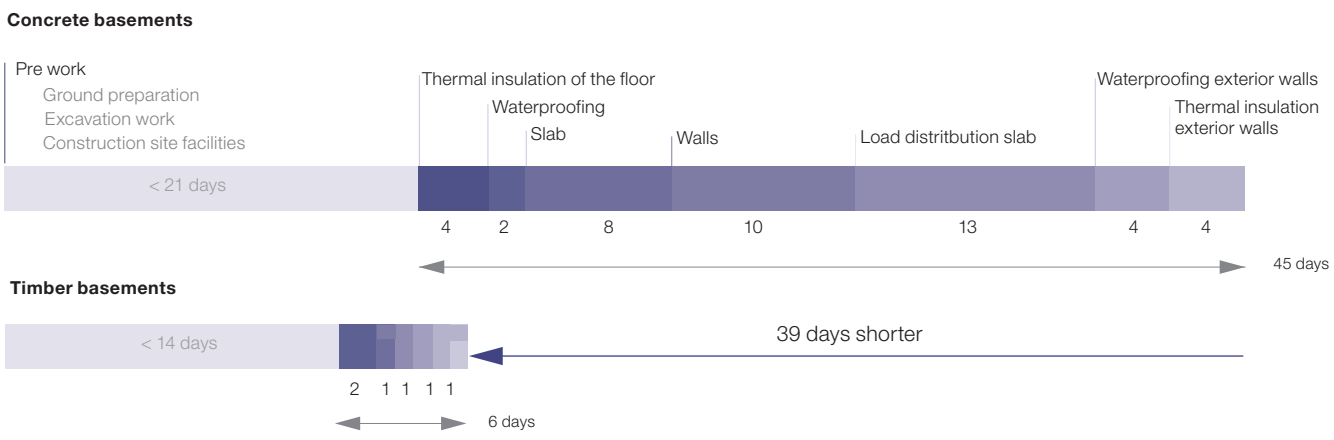
Quickly built

Why not make the most of timber construction's fast, dry construction for your basement? Timber basements can be built much faster than conventional concrete basements. A comparison of the Thun project reveals that installing a basement for a six-apartment block took only six days. In comparison, installing a concrete basement would take approximately 45 days, not including the time it takes for the concrete to cure. The timber-constructed basement allows for a significantly shorter construction time. The subsequent works can start as soon as the timber basement is finished, with no delays and significant advantages in terms of assembly.

Efficiency and cost optimisation

The timber basement is also impressive in terms of cost: thanks to the fast and dry timber construction method, a high standard of finish is achieved after just a few days. The cost benefits can be attributed to the natural timber surfaces and finished floor structure. Concrete requires a curing and drying period before the floor structure and wall or ceiling finishes can commence. Overall, the construction time is much shorter, which means the building can be occupied earlier.

Construction time comparison



«A timber basement
offers lots of possibilities.»

Timber basements have a positive impact on the climate

Concrete is currently the standard building material for basements in Switzerland. However, this is about to change. Timber basements offer an environmentally friendly alternative and make a valuable contribution to the next generation.

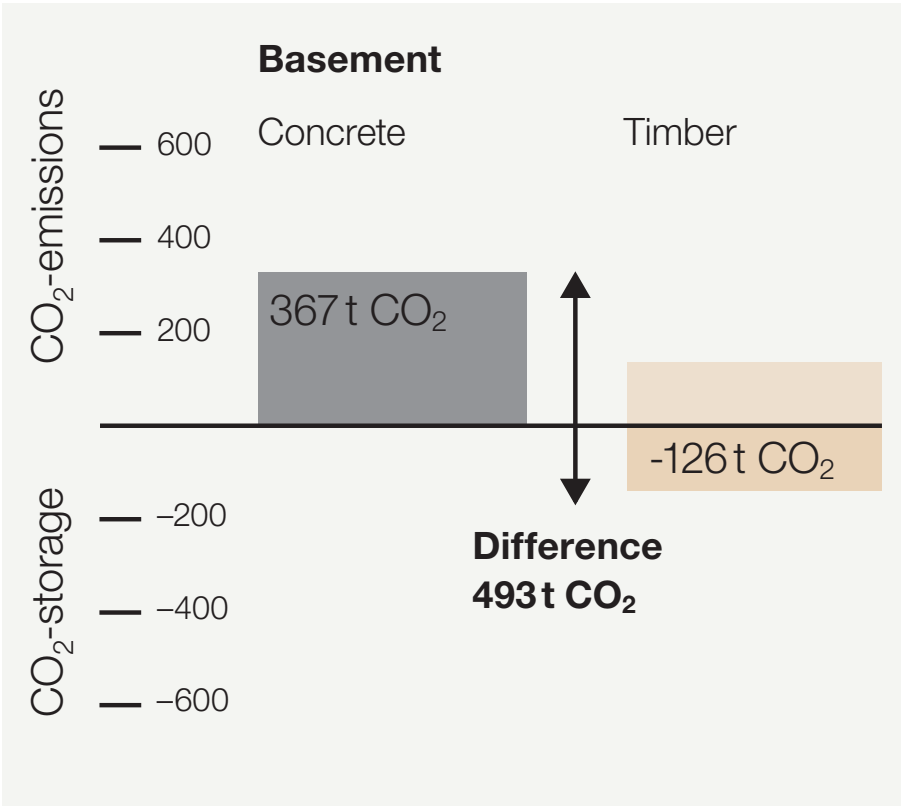
One tonne of CO_2 is stored in a cubic metre of wood

Today, steel and concrete are the building materials of choice, but they are very CO_2-intensive. One cubic meter of reinforced concrete creates around 500 kilograms of CO_2 emissions, while one cubic meter of timber stores about one tonne of CO_2. The release of CO_2 into the atmosphere is caused by the burning of wood after it has been felled or the rot of the dead trunk in the woods. Preventing this can be achieved by using it for building instead. As long as the building exists, CO_2 will remain within the material.

222 tonnes of CO_2 saved

In order to reach climate neutrality by 2050, we must cease building with steel and concrete and instead invest in timber buildings. Building with timber is something anyone who wants to contribute to climate protection can do. A total of 222 tonnes of CO_2 is stored in the apartment building on “Blüemlimattweg” – 126 tonnes of it are stored in the basement alone. 367 tonnes of CO_2 emissions would have been generated by the manufacture of these materials alone if the basement had been built in concrete. There is a discrepancy of 493 tonnes of CO_2!

Investing in a timber basement is a valuable asset for the future – it makes a significant contribution to the next generation. Choosing a timber basement is a way to take responsibility and promote sustainable building practices. Building a timber basement today is a good idea for everyone to increase their living space and have a positive impact on our environment.

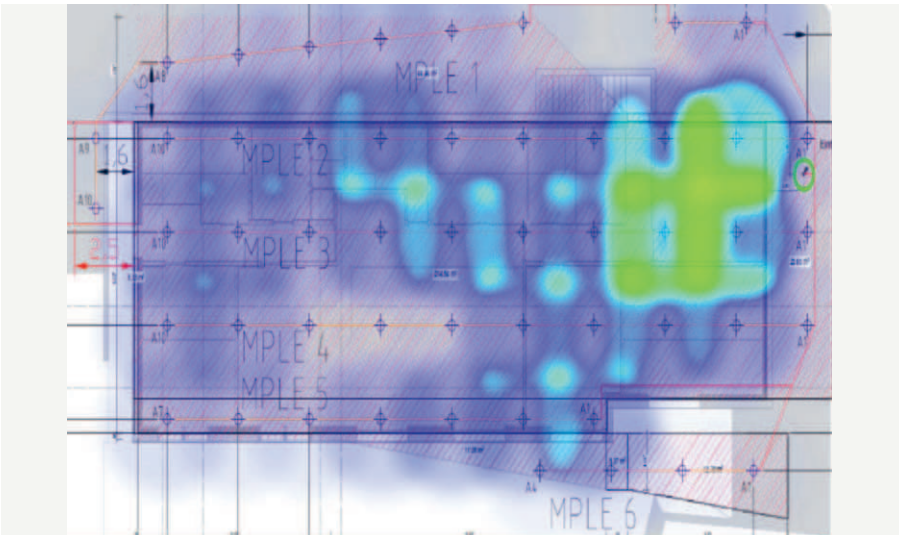


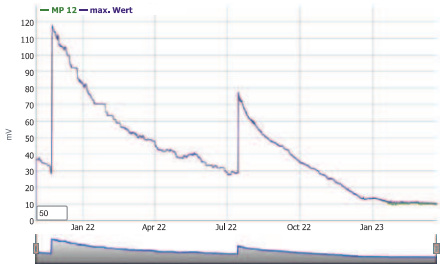
«The aim of sustainable construction is to avoid using materials that harm the environment as much as possible. If a basement is required, a timber-based one is the obvious choice.»

Andreas Burgherr
CEO Timbatec

The key questions have been answered

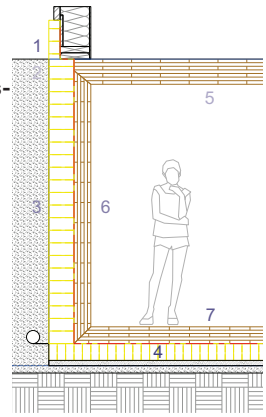
Before mass-producing wooden basement floors, there were a number of questions that needed to be answered. The research project was directed by Professor Christoph Renfer from the Bern University of Applied Sciences (BFH) who tested the idea of the wooden basement.

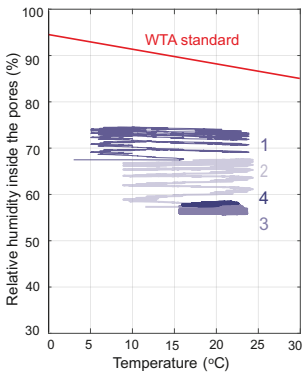


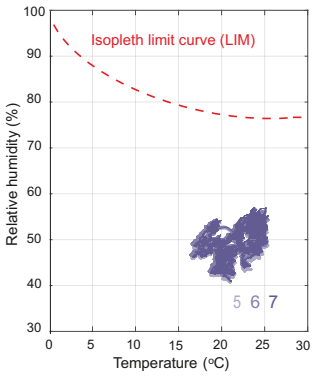


Due to a water leakage from the ventilation system and the washing machine, the humidity increased rapidly and then dried out again. The humidity monitoring system measures at the blue crosshairs the voltage between the individual measuring points.

Simulating the possibility of moisture build-up in wood by comparing it to standard and WTA criteria.







Waterproofing

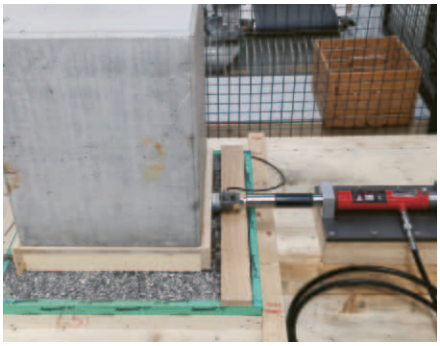
Timber basements can benefit from years of experience in waterproofing technology for flat roofs and landfill sites. The pilot project is being supported by researchers at Bern University of Applied Sciences to test the long-term quality requirements and structural aspects of timber basements.

Will the wood remain dry?

The short-term drying behavior was confirmed and a long-term prediction (> 50 years) was developed using building physics models. The WTA 6-8-2016 guideline and DIN 4108 (2014) criteria indicate that there is no risk to the wood. The integrated, full-surface monitoring system, which is standard, uses modern technologies to provide building owners with guarantees and quality.

Stability

Timber weighs less than concrete. Special friction tests in the laboratory and measurements from the pilot project have confirmed the building's stability. Using newly determined coefficients of friction, the design phase can reliably calculate the elimination of displacement due to earth pressure.



Laboratory test to determine friction coefficients

«Objectively speaking, there are no reasons against wooden basements.»

Prof. Christoph Renfer
Professor for Fire Protection and Timber Construction, Head of Fire Safety and Building Physics at Bern University of Applied Sciences BFH

Christoph Renfer, you participated in the pilot project "Timber Basements" as a research partner in the context of an Innosuisse project. What is the precise nature of your research?
The goal of our project is to present scientific proof for this building system in order to guarantee a minimum lifespan of 100 years, which is expected on the market nowadays for a basement. Our current focus is on monitoring the wooden basement that has already been built in Thun. Our monitoring encompasses the interior of the basement, timber walls, and the surrounding soil. We take measurements of both temperature and humidity. Based on this data, we can determine how these parameters in the building system will behave in the future.

A waterproof membrane surrounding the timber construction prevents water from getting into it from outside. What is the outcome if the construction is getting wet anyway?
Our research project also includes this issue. We determine how much humidity the system can handle before things become critical. Our focus is on finding a solution to repair the timber walls and waterproof membrane from the inside. At the same time, we are examining all measures to prevent dampness from the inside.

What other factors should be considered when building a timber basement?
A timber basement is much lighter than a steel and concrete basement. The lower mass presents its own challenges, and our job is to find appropriate solutions. It's important to ensure that the building won't float if it's in water. If the house is not surrounded by soil on all sides, there is a possibility of earth pressure, which could push it down the slope.

What is the project's personal appeal to you?
As shown by constructions from all over the world, timber buildings are resilient. Typically, the wood is either totally submerged in water or completely removed from it in these situations. The conditions in a basement are a mix of both. With the help of a timber basement, we are setting a new precedent in Switzerland and doing things that no one else has done before. To be honest, there are no arguments against using

timber below ground. A waterproof membrane is necessary for a solid construction basement to be completely resistant to water. The more I thought about it, the more obvious it became.

What is the course of action now?
The wooden basement is attracting a lot of interest. There are other ways to utilise wood, such as underground car parks. Timbase and other business and research partners will be working with us to address the significant new issues caused by traffic every day in a new research project.

Research and practice partners of the Innosuisse Project

Research institute
Bern University of Applied Sciences

Waterproofing/Sealings
Contec AG

Monitoring
Progeo AG

Large areas in timber
Timber Structures 3.0 AG

Timber engineering
Timbatec Holzbauingenieure AG

Flat-roof construction
Gyger Flachdachbau AG

Timber construction
Stuberholz AG

Partner
Staudenschreiner GmbH

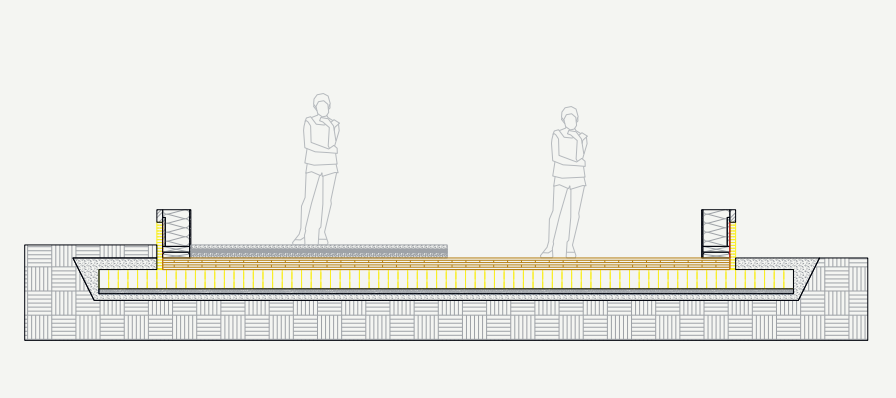
CLT Cross-laminated timber
Schilliger Holz AG

Innovation is the answer to every need

Timbase can help you find the right timber basement for your construction project, with both standard solutions and customized approaches for individual basements.

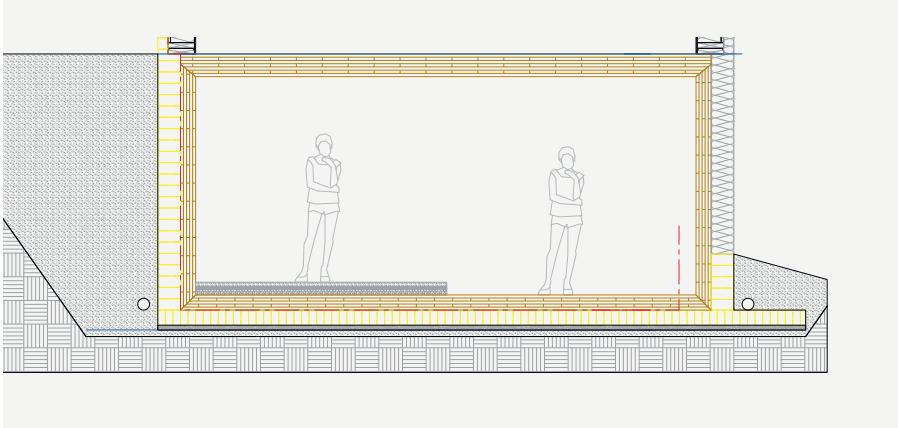
Slab-on-grade

The slab-on-grade is the perfect solution for shallow foundations in houses, garages or extensions. The design uses TS3 technology to create a rigid plate. A robust construction and high durability are guaranteed through the technological process of waterproofing with integrated monitoring.



Basement

The timber basement provides an entire floor plan with a floor slab and walls made from cross-laminated timber. The combination of TS3 technology and prefabricated EPDM waterproofing creates a monolithic structure. With sufficiently insulated living spaces, you can achieve quality living without requiring any additional effort.



Timbase AG is a subsidiary of Timbagroup Holding AG

One group, one goal

The Timbagroup is a group of companies that share a common objective of increasing the market share of timber construction in the building industry. Each company contributes to this.

Timbagroup
Timbagroup Holding AG

The Timbagroup is a group of companies focused on expanding the market share of timber construction. Stefan Zöllig is the proprietor and originator of all entities, and he is also a co-creator of Timber Finance.

www.timbagroup.com/timbagroup-en/

Timbatec
Timber and Technology

Timbatec founded the group and is an innovative engineering company that has been advocating for the use of wood for over 25 years. Modern timber construction in cities is a result of our constant development of new technologies.

www.timbatec.com/en/

TS3
Timber Structures 3.0

TS3 technology enables the construction of timber columns and slabs in a manner that was previously only possible with reinforced concrete. TS3 has the potential to open up new markets and eliminate steel and concrete from building construction on a long-term basis.

www.ts3.biz/en/

Timbase
Timber Basements

Timbase
The next step is to eliminate steel and concrete by building wooden basements. Timbase has the expertise in timber components in contact with the ground and, as a total contractor, offers planning, manufacture, delivery, assembly, and guarantee for timber basements.

www.timbase.com/en/

Scrimber CSC
Carbon Sink Concrete

Scrimber
The construction market requires more efficient products to meet the large demand for wood building products. Full-value building materials can be produced from wood by-products using Scrimber technology. This contributes to climate protection.

www.scrimber.com/en/

TIMBER FINANCE INITIATIVE

Timber Finance Initiative
Investing in the forest and timber industries is made possible by the initiative. The timber industry is still growing as a result of the timber construction mega trend. By creating a financial index, the timber industry is made visible to the financial world.

www.timberfinance.ch/en/

Timbase | Total contractor

A single source for timber basements

In order to plan basements, we work closely with engineers from our sister companies Timbatec and TS3, as well as selected partner companies. Take a look at how a basement would be a suitable foundation for your timber construction project. We provide an all-inclusive package from one source.

1. Planning
The entire basement is being planned by Timbase with load-bearing components. Expertly solving fixtures like through-passages or windows requires the use of proven details and coordination with the respective trades.

2. Manufacture
Timbase is in charge of the production of all components for a timber basement. Timbase collaborates closely with your trusted partners.

3. Delivery
Timbase manages the coordination and scheduling of the delivery at construction site. Therefore, the site management has a single contact person.

4. Installation
The Installation process of the basement with all the contractors involved is managed and controlled by Timbase. The owner and construction management have one competent contact person.

5. Guarantee
The durability of the basement and the services delivered are guaranteed by Timbase. Our built-in monitoring system ensures that we check the water tightness at all times.

«Are you interested in building a timber basement? Please get in touch. We are happy to lend a hand.»

Richard Wüthrich
Project leader, Member of the Executive Board
Timber Construction Technician HF
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holzbauschweiz
Leistungspartner

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printed in switzerland
Editor: Bettina Franke Layout: Barbara Bissig Print: merkurmedien.ch, Langenthal