

"... then there are no limits to the triumph of timber construction"

Timber construction in Germany is booming! In an interview, managing directors and industry experts Eberhard Stegner (GRAPHISOFT), Markus Gallenberger (FRILO) and Alexander Neuss (SEMA) explain what wood can do and why it is important to dispel incorrect prejudices about urban construction. The trio also deals with the holistic BIM workflow that exists between the three software solutions.



From left to right: Eberhard Stegner (GRAPHISOFT Germany), Markus Gallenberger (FRILO) and Alexander Neuss (SEMA). The Mont-Cenis Academy in Herne is shown in the background.

Good day gentlemen. Wooden structures are sometimes highly complex and multi-layered engineering structures. Which timber construction made a lasting impression on you?

Stegner: The Mont-Cenis Academy in Herne made a lasting impression on me as a timber construction. How the glass walls merge with the wooden stand is absolutely worth seeing from the architect's point of view.

Gallenberger: I have been to Norway a lot in the past and I remember Akershus University Hospital in Oslo as a special wooden structure. Especially in the main entrance, the building material wood comes into its own in

combination with the large glass walls. The wooden slats also surround the children's hospital and form a nice contrast to the dark grey ceramic facade.

Neuss: I am generally fascinated by the multi-storey wooden house construction. In this regard, the HoHo in Vienna with its 24 floors and a height of 84 meters is an absolute showcase project in hybrid construction. Despite the bundling of several building materials, wood was clearly in the foreground when building the HoHo. With the help of three-dimensional examples, the high-rise makes it clear why wooden houses are so important today and for future generations.



That would be?

Neuss: Compared to a version made of reinforced concrete, the HoHo saves 2,800 tons of CO₂ equivalents. This corresponds to around 20 million kilometres by car. In addition to the effect of storing CO₂, wood as a building material has many other energetic and ecological advantages. For example, it has been calculated that the HoHo uses 300,000 mega-hours less primary energy than a version made of reinforced concrete. In other words, this is the energy that is required to heat a house with 32 residential units for a period of 1,100 years. Thanks to its natural insulating properties, wood helps to reduce the energy consumption of buildings.

Wood is convincing as an environmentally and energy-friendly building material. That is one reason why timber construction is currently very much in vogue. What other special features does wood have as a building material?

Stegner: In addition to its ability to store CO₂, wood is particularly climate-neutral and sustainable because it is a renewable and durable raw material. When it comes to the stability and load-bearing capacity of wood as a building material, just think of the many half-timbered houses that have stood in some regions for centuries. In addition, due to its versatility in buildings, wood can be used in an extremely versatile manner as a building material for supporting structures, facades, terraces, but also for interior cladding.

Gallenberger: Studies in hospitals and schools have shown that wood reduces stress levels and has a positive effect on people's wellbeing. Wood promotes the healing process, health and recovery of people. In addition to the aspect of healthy living, wood also conveys harmony and cosiness in interiors thanks to its cosy appearance. In addition, wood does not produce any waste. At the end of their service life, individual components are either reused or burned, thus generating thermal energy.

The multitude of advantages of wood as a building material is obvious. How do you explain that wooden buildings and constructions are nevertheless underrepresented in rural and urban areas?

Stegner: I think the traditional idea that wood burns more easily and is less stable than other building materials in case of a fire is responsible for this. But this idea does not correspond to reality. In fact, a real wooden beam maintains its stability for a very long time in case of a fire. When there is a fire, the plastics in the building are more of a problem than the wood.

Neuss: Precisely. Unfortunately, timber construction today still fights against reservations with regard to the durability of the wood, statics, fire and moisture protection. Thanks to modern, technical innovations in timber construction products such as cross laminated timber (editor's note: CLT for short), OSB panels and solid structural timber, these are completely unjustified. From my point of view, however, the greatest challenge is to remedy the shortage of highly qualified specialists and young professionals for the planning and assembly of timber construction. They are urgently needed to guarantee the quality in timber construction.

Gallenberger: Wood is a "living" raw material that is more exposed to the weather and other types of traffic than other building materials. The right choice of location is also crucial in a construction project with wood. Accordingly, the challenge will be to meet the high-quality requirements for timber construction and to find reliable partners for cooperation.

How can the prejudices against timber construction be cleared up?

Gallenberger: A rethink has to take place in many building authorities. There is currently a lack of basic building regulations and approvals, which, for example, make multi-storey construction in cities possible in the first place.



Neuss: We need targeted lobbying. Politicians, authorities and municipalities have to be convinced of the usefulness and advantages of timber construction. Others should take an example from the federal state of Baden-Württemberg. There, the use of wood in multi-storey building was made easier by state building regulations. Architects are also much more likely to come into contact with timber construction. Last but not least, awareness-raising work must be carried out with customers in order to make it clear to them that fire protection and moisture are no longer any problems for timber construction. If we can do that, then there are no limits to the triumph of timber construction.

Also in urban areas?

Stegner: Especially in urban areas! A major issue in cities is the acquisition of additional living space. In this context, adding extra timber to existing buildings makes sense, as it is simply lighter than a steel structure. In addition, the practical question of the construction time arises in cities. All the machines, cranes and building materials on the construction sites

are a major disruption in the dense urban environment. Thanks to the modular production, wood guarantees fast construction times.

Gallenberger: Exactly. If you mix the different types of construction with wood, thanks to the technologies already available today, considerably more living space could be made available for everyone in a shorter time and the price spiral could also be slowed down. Because of the scarcity in urban living space, timber construction should play a much larger role in urban housing construction in the future.

Neuss: The advancing digitization has produced machines, tools and software in wood construction that enable a high degree of prefabrication and, thanks to the high degree of automation, ensure great efficiency in production, construction and assembly. This quality and precision, which cannot be found in conventional construction, lead to those fast construction times. In addition, the aforementioned technical innovations such as CLT have made multi-storey timber construction feasible in previously unimagined dimensions.



The HoHo in Vienna is the second highest wooden high-rise in the world with 24 floors and 84 meters high (©MysteryShot - stock.adobe.com).



Digitalization in particular will therefore ensure a real upswing in urban timber construction. Also, because it guarantees the integral planning, execution and management of buildings with the involvement of all those involved in the construction. What does the smoothest possible BIM process in timber construction look like today?

Gallenberger: Because of the high degree of prefabrication, wood is a special raw material for which the course has to be set right at the beginning of the process. The later errors are noticed in the process chain, the more expensive it becomes to compensate for them. In order to be able to meet the high-quality standards, the BIM process in timber construction is digitized and automated right from the start. All those involved benefit from the joint collaboration solution, from the planner to the architect and structural engineer to the client. At GRAPHISOFT, FRILO and SEMA we offer solutions that enable this digital exchange across the various disciplines.

Neuss: Thanks to the digital solutions, the BIM process is well developed, especially in timber construction. A bilateral data exchange is already taking place between our optimally coordinated software tools in line with the BIM philosophy. This closes an efficient and precise process chain in timber construction from design to component production.

How is the workflow between GRAPHISOFT, FRILO and SEMA actually put together?

Stegner: First, an architecture model is designed with our software solution Archicad. From Archicad then the designed model is transferred to the FRILO Software for structural analysis and detailing. It is also possible to first import the architecture model into the SEMA Software to create an initial structural draft and only then transfer the components to the FRILO programs.

Gallenberger: With our FRILO Software, we ensure that the model that GRAPHISOFT came up with does not collapse afterwards. We ensure that the load-bearing capacity of the special building material wood comes into its own. In doing so, we also calculate the statics considering site-specific influences. The individual components are measured and the statically determined parameters are passed on or returned to SEMA.

Neuss: SEMA is the constructive part in the process chain. If parametric design variants defined by the user in the SEMA program are addressed by Archicad, these are automatically adapted to the current situation. Once the detailed planning and elementing in SEMA and the static analysis in FRILO have been completed, the model can be transferred to Archicad for final visualization. The process chain is reduced to the highly automated,

The interview conducted:
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Eberhard Stegner has been Managing Director at GRAPHISOFT Deutschland GmbH since February 2015. GRAPHISOFT is a leading global provider of architecture software that is distributed in over 100 countries and 25 languages around the world.

Markus Gallenberger took over as CEO at FRILO Software GmbH in December 2018. With around 100 structural engineering software solutions, FRILO is one of the leading providers of innovative calculation programs for structural engineering tasks and structural planning.

Alexander Neuss has been managing the SEMA Group as Managing Director since April 2015. SEMA is the world's leading provider of software solutions in the timber construction industry, staircase construction and the sheet metal processing industry.

