SHERPA news

MAGAZINE
05/2021

Fire protection in timber construction

SHERPA offers connection solutions with a fire resistance time of up to 120 minutes

FINANSPARKEN NORWEGEN
SHERPA deployment in the far north

SHERPA AROUND THE WORLD
International SHERPA-Partners introduce themselves

WOOD DEFIES THE FIRE
Interview with Norman Werther

WEBINARS & TRAININGS

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2. The SHERPA team will take care of all further steps! We will organize the date mailing to all participants. Upon request, you will receive an information package in advance.

EDITORIAL

Scarce wood resources, **partnership-based solutions**

With this issue of our "SHERPA News" we give you a small overview of our activities in the SHERPA know-how and development kitchen. The past few months have been shaped by the development of a new and unique system solution that enables us to ensure connections in timber construction with a fire resistance duration of up to 120 minutes with very slim cross-sections in the supporting structure. With this step, we are setting another milestone in the ability of wood to compete with steel and reinforced concrete.

Especially in times of resource scarcity and massive price increases, efficient solutions are of particular importance. It can be assumed that the challenges in the procurement of construction materials and fasteners will continue to intensify. The SHERPA team and our partners are well prepared for the still young construction season and will not only support you in optimizing and increasing the profitability of your constructions, we will also try to ensure maximum availability.
With a strong mutual trust in our partnership, the necessary respect for future challenges and a strong team, we look forward to a successful future.

I may continue to wish you all the best and look forward to an appreciative cooperation.

Vinzenz Harrer
Managing Director of
SHERPA Connection Systems GmbH

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SUCCESS STORY

Invisible & **unshakable**

Numerous SHERPA connectors of the M to XL series as well as the associated SHERPA special screws were used in the construction of the Norwegian Finansparken, one of the largest wooden commercial buildings in Europe. The crucial points were the security and invisibility of the system.

Gamle Stavanger, in English Old Stavanger, is located in the northwestern part of the Norwegian city of Stavanger, where the cityscape is shaped by a large number of historic wooden houses. Many of them are listed as historical monuments. When a bank plans its headquarters in the middle of these little fishing huts, it has to come up with something. And that's what SR Bank has done with their new corporate headquarters Finansparken - SpareBank 1 SR Bank.

Optimal embedding
In collaboration with contractor Veidekke and architects Helen & Hard and SAAHA, Sparebank 1 SR Bank decided to build its headquarters with a wooden structure. The architectural requirements were correspondingly high. It has been a top priority from the beginning that Finansparken is well adapted to the existing wooden houses in the area, which are part of Old Stavanger. Therefore, the modern wooden structure should not only fit well with the neighborhood, but also include it. Visually and personally.

Excellent working environment
In turn, it was important for the future workplaces that employees could benefit from the practical and health-promoting qualities of wood. Natural materials should not only provide a healthy and inspiring environment, they should also contribute significantly to reducing CO_2 emissions from the building process. Simply by consolidating employees from three different buildings into just one location - Finansparken - the company expected to use 75 percent less energy than before moving in.

Triangular innovation
Finansparken is a striking and innovative wooden structure that inspires a unique room experience. The building occupies the entire plot. The shape ensures that the wooden building fits into the surrounding urban context and almost completely fills a triangular plot between two streets running pointedly towards each other. On the entrance side in the south there is a small-scale single-family house development, in the east multi-storey residential blocks and in the north the green area of Bjergsted Park. The roof leans towards the small neighboring wooden houses so as not to overshadow them, opening a dialogue between the old and the new. The glass facade is contrasted by the warm, organically shaped interior made of wood.

Photos: Jan Inge Haga

SUPPLIER OF THE WOOD CONSTRUCTION PARTS:
MOELVEN LIMTRE AS

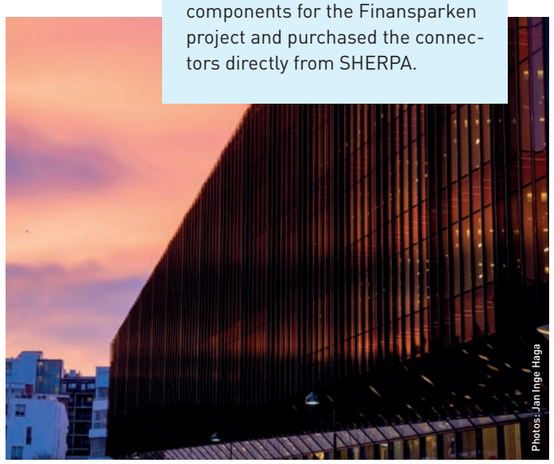
The Norwegian company is a leader in glulam manufacturing and is known for its professional execution of spectacular construction projects. It supplied the wooden components for the Finansparken project and purchased the connectors directly from SHERPA.

“I CAN'T THINK OF ANY OTHER SOLUTION FOR THIS PARTICULAR DETAIL.”

MANUEL SÁNCHEZ-SOLÍS
DEGREE OF FREEDOM

Photos: Jan Inge Haga

650 employees gather in Finansparken, the headquarters of SpareBank 1.



Photos: Jan Inge Haga

With more than 22,000 m² Finansparken is one of the largest timber commercial buildings in Europe.

Wooden heart
The choice of materials is based on a metaphor of the many layers of the forest. The lower floors represent the roots and the forest floor; like tree trunks, the laminated veneer wood columns then lead upwards over the floors, where the green roof embodies the tree crown. The most striking thing, both inside and outside, is the visible wooden structure - the skeleton in the building. The entire supporting structure is made of wood. The architectural and social heart of the Finansparken building is the atrium. The main circulation originates from and flows through this central space. The sculptural and structural wooden staircase rises upward, leading people from the entrance hall to the seven floors above. The interiors are visible through the glass facade and welcome people from the street. The laminated beech beams and the details of the wood joinery are exposed and expressed. But not only that: The 7,900 m² roof is also made of wood.

Photos: Jan Inge Haga

Photos: Jan Inge Haga

Photos: Jan Inge Haga

THAT'S WHAT THE PLANNERS ARE SAYING: **DEGREE OF FREEDOM**

Manuel Sánchez-Solís, Engineer at Degree of Freedom, provides us with insight into why they chose SHERPA connectors: "As part of the detailed design, we chose the SHERPA system and used it for numerous connections. The background to this was, among other things, the high load-bearing capacity and stiffness characteristics as well as the possibility of producing invisible connections. Based on the European technical evaluation, we were able to prove the optimal connector for each detail. We succeeded in doing the same for the internal glulam beams of the main staircase of the atrium. This is a special element due to the dimensions of the beams and the plan and elevation angles. I cannot imagine any other solution for this particular detail."

Photos: Jan Inge Haga

Here comes the film

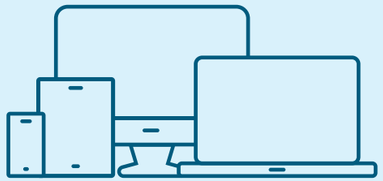
Our YouTube channel is continuously updated and offers exciting insights into the world of SHERPA.

In the previous year alone, eight product videos were created - including practical application examples and technical features. The videos are deliberately kept short with a maximum running time of 4 minutes. In this way, you can get the most important information quickly during your daily work routine and still take full advantage of it. Our technical contact Josef Kowal presents the SHERPA product range with all application possibilities. The videos are already available in English. More languages will follow soon.

In terms of content, videos are currently available on design, the CLT Connector, the Power Base C and F, the Fire Stop 2.5, the SHERPA Special Screw, and the various system connectors.

You can also find clips of the videos and ongoing information on our social media channels. So please follow us, it's worth it!

Sherpa Connector on YouTube
www.youtube.com/SHERPAConnector



SHERPA Design Guide
The best connections for the Wood construction at a glance

SHERPA CLT-Connector
The world's first standardized connector for cross-laminated timber in timber construction

SHERPA Power Base
The safe column bases and post beams with height adjustment for timber construction

SHERPA Fire Stop 2.5
The solution for fire protection in timber construction for connection joints

VERIFICATION IN TIMBER CONSTRUCTION

Fireproof?!

In the fall of 2020, SHERPA system connectors were used to conduct fire tests for 90 and 120 minutes together with Holzforschung Austria at IBS in Linz. The results are already being incorporated into ETA-12/0067.

Technical support is a fundamental pillar of customer service at SHERPA. The topic of fire protection in timber construction plays a decisive role here. Since the introduction of the XL and XXL series for highly loaded connections in the early 2010s, proof in case of fire has become the focus of planners and those carrying out the work. The main focus was on the minimum cross-section requirements and the joint design. The addition of wood material for burning could be solved at least for 30 and 60 minutes based on Eurocode 5. The clarification of a permissible design of the connecting joint proved to be more difficult. At that time, there were no test results and the standards did not provide any concrete approaches for the assessment. In the interest of a technical and, above all, economical solution, the decision was made in favor of examinations and tests for different superstructures and fire times. In 2015, SHERPA set new standards in the field of fire testing of main and secondary beam connections. Thus, for the first time, the configuration of the "cold test" was mapped onto a firing kiln on a scale of 1:1. All test specimens were subjected to constant static loading with hydraulic rams over the entire firing period. The recording of temperature curves of the connector plates ensured that there was no loss of strength and stiffness.

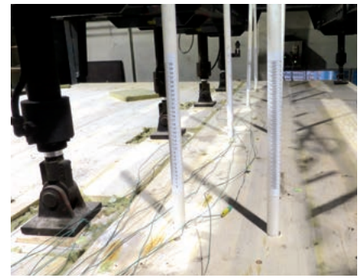
^ SHERPA Fire Stop 2.5: The fire protection laminate protects the connector from direct exposure to temperature in case of fire.

Optimum protection of the system connector

For economical connections without the requirement for visual quality, the system connector is simply screwed on. This creates a gap between the end grain of the secondary beam and the side grain of the main beam to the extent of the connector plate thickness. SHERPA has developed a patented solution for optimum protection of the system connector against direct exposure to temperature. Fire Stop 2.5" fire protection laminate is used in the joint. The 2.5 mm thick and 20 mm wide laminate can be optimally integrated into the prefabrication process in the factory. When exposed to fire, it foams up three-dimensionally and completely seals the joint. The verifications were provided in 2015 for 30 and 60 minutes and are already part of ETA-12/0067. Another milestone was the realization that joints up to 5 mm wide do not require any special protective measures. Thus, manufacturing tolerances and planned shadow gaps to facilitate assembly do not pose a safety problem.

Challenge R90 and R120

In 2020, SHERPA focused on economical connections that can withstand fire durations of 90 and 120 minutes. In this context, the minimum cross-section requirement came to the fore, as planners like to focus on the component verification when dimensioning timber. The requirements of the connection technology for the connection may thus fall by the wayside. In the worst case scenario, wood has already been ordered and projects tied off or completed. To ensure economic efficiency and to retrofit connections, SHERPA has come up with a practical solution. This is a locally applied fire protection coating that brings a cross-section reduction of approx. 10 mm per fire-facing side. As part of a feasibility study together with Holzforschung Austria and IBS in Linz, the effectiveness of the fire protection coating for R90 and R120 was investigated. The proven test configuration was used to ensure comparability with previous results. Test specimens were produced with and without fire protection coating. For the connection joint, a 5 mm gap was again taken into account or Fire Stop 2.5 was used. The results of the examinations over 90 and 120 minutes were consistently positive and can already be used for current projects. SHERPA will gladly inform all interested parties about the specific solutions within the scope of technical support.



^ SHERPA test bench: A total of 4 loading test specimens for R90 and R120 were tested and the deformations were measured.

< SHERPA Fire Test: After the test time expired, the furnace chamber was quickly opened and extinguished.

IBS LINZ & HOLZFORSCHUNG AUSTRIA

On the **fire test stand**

Building with wood can be a challenge for planners and those carrying out the work, as well as for manufacturers of building products when it comes to fire protection. Creating solutions for this issue is the task of testing institutes such as IBS Linz or Holzforschung Austria.

IBS LINZ

The Institut für Brandschutztechnik und Sicherheitsforschung Linz [Institute for Fire Protection Technology and Safety Research Linz], abbreviated IBS, as an independent, accredited testing, inspection and certification body, offers testing of building products, initial inspection and external monitoring of factory production control, certification of building products as well as inspection and approval of technical fire protection systems.

Wood construction in combination with fire protection
This subject is one of the many competencies of the experts at IBS Linz, as evidenced by numerous audits conducted, such as that of SHERPA. Interest in wood as a material has risen steadily among builders in recent years. In addition to the ecological advantages, more and more planners, contractors and investors are discovering the quality benefits and aesthetics of wood. Here, the focus is on buildings with four to eight stories in urban areas. High-rise buildings in timber construction are also considered, in this context. Implementation is often in hybrid form, with wood content of 70 to 80 percent. Thus, the advantages of different materials are combined optimally.

Institut für Brandschutztechnik und Sicherheitsforschung

IBS LINZ

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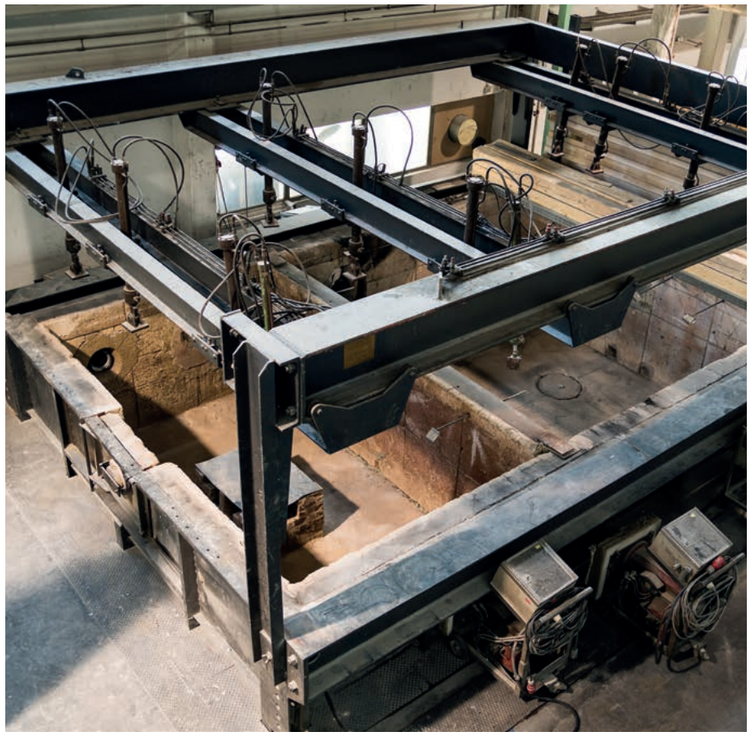

‹ Ceiling test stand of IBS Linz

HOLZ FORSCHUNG AUSTRIA

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HOLZFORSCHUNG AUSTRIA

For more than 70 years, Holzforschung Austria as a non-profit, non-university research institution has been a reliable partner for all companies in the wood industry. Thus, the practice-oriented institute deals with the entire value chain in the field of wood. The expertise ranges from wood storage in the forest to wood processing and specific applications such as glulam, windows or multi-storey timber construction. However, related disciplines such as surface technology, wood preservation, bioenergy, pulp, hardware technology, fasteners and adhesive technology are also part of the extensive range of services.

Accredited and notified
Holzforschung Austria is not only accredited and notified for all relevant testing and inspection procedures in the field of wood processing, but also recognized for all relevant certification systems in the wood sector. The topic of fire protection in timber construction is also an area that Holzforschung Austria has been working on for decades and supports the timber construction industry through national and international research work. The increased use of wood in multi-storey and public buildings is accompanied by increased fire protection requirements that must be complied with.

Cooperation IBS and Holzforschung Austria
Alternative possibilities for the fire safety assessment of timber components using validated numerical simulation models, which, however, would have a great benefit in the verification procedure due to the possibility of a faster and, above all, safer component optimization, are not available to date. For this reason, Holzforschung Austria, together with IBS, has ventured into new fire protection territory and launched the SIMBRA research project, which in the future will assess wooden components with the help of numerical simulation in addition to the classic component tests. To achieve this lofty goal, complex thermophysical, -chemical, and structural-mechanical processes that occur during the burning of wood components must first be researched and then properly represented in numerical computational models. The project, funded by ACR with the Federal Ministry for Digitization and Economic Location, has just been running for six months. The simulations that have already been carried out showed positive results throughout and are currently still being evaluated in detail. We will keep you up to date!

INTERVIEW

Wood defies the fire

Dr.-Ing. Norman Werther from the Technical University of Munich on current challenges and future developments for fire protection in timber construction

“THE DEMAND IN CONSTRUCTION, AND SPECIFICALLY IN WOOD CONSTRUCTION, CONTINUES TO BE VERY HIGH.”

NORMAN WERTHER,
TU MÜNCHEN

What measures are already being used in practice to successfully impede the spread of fire in timber structures?
In the area of preventive fire protection, the principle of compartmentalization has proven itself over generations, irrespective of the building material. This prevents the spread of fire between usage units for a legally defined period of time. In timber construction, numerous standardized and tested space-enclosing components for walls, ceilings and roofs are available for this purpose, as well as proven detailed solutions for component connections for every required fire resistance requirement. In addition, standardized solutions have been established in the DACH* region to prevent the spread of fire via the facade.

What should be taken into account when planning timber construction in terms of fire protection?
The linking of technical and building code requirements is becoming more and more of a challenge for planners and those carrying out the work. Here, the experience of recent years shows that the early involvement of specialized fire protection planners with an affinity for timber construction ultimately helps to save time and costs. Timely planning of details and the specification of proven components in particular have proven to be a key approach to solving the problem. Established holistic planning platforms, such as dataholz.eu can make a significant contribution.

What role do standardized connectors play with regard to fire protection in timber construction?
Modern engineered timber structures and multi-storey buildings are unthinkable today without innovative joining techniques and connectors. Proof of fire protection performance is essential here. Exposed metal connectors conduct heat more quickly into the wood member and typically result in severe burn-in and earlier loss of load-bearing capacity in the event of a fire. Concealed connections are clearly recommended, especially for fire resistance requirements of 60 minutes or more. Here, Eurocode 5 and, in particular, manufacturer-specific verifications provide the current basis for component connections that are safe in terms of fire protection.

To what extent have scientific findings already become established in practice?
This is a very relevant question in the course of the revision of the Eurocodes. At the chair itself, we have been involved in numerous research projects in recent years to investigate the fire protection design of bolted component connections or connections with open or concealed metal moldings. In addition to the extension of manufacturer-specific usability certificates, these findings are continuously applied in construction practice. We also see a major step in the fact that in the future, EN 1995-1-2 will allow fire resistance design of connections for up to 120 minutes.

What are the differences around the fire safety issue in industrial, special, office and residential construction in wood?
In general, I don't see any fundamental differences there, since the underlying protection goals must always be achieved, regardless of the building material. An additional aspect is the consideration of which building material is appropriate for the required use. Thus, it is plausible that a warehouse of wooden construction, as a result of its use and accessibility, can be designed with no or only 30 minutes of fire resistance. A seven-story residential building, on the other hand, is subject to more extensive requirements with up to 90 minutes of fire resistance and close consideration to limit exposed wood surfaces.

What trends do you see timber construction in the DACH region facing in the next few years?
Specifically, we will look much more at the opportunities and challenges in urban and hybrid construction, but also see new developments in timber construction in the materials sector via composite materials and composite components with integrated functional layers. Due to the continuing further development in timber construction, the area of “lifelong learning” for planners and those carrying out the work will also continue to gain in importance.

In your opinion, what consequences are emerging in the field of timber construction due to the current Covid-19 pandemic?
As far as I can assess the developments, despite the global pandemic and the associated restrictions that surround us all, demand in the construction industry and especially in timber construction remains very high. Because despite the pandemic, the global problems of climate change or the urban housing situation are not going away. At present, I take a more critical view of the supply bottlenecks that have arisen with regard to wood as a material and the resulting price increases that will accompany us in the near future. Despite everything, I continue to expect a positive development.

*Germany-Austria-Switzerland

“MODERN ENGINEERED TIMBER STRUCTURES AND MULTI-STOREY BUILDINGS ARE UNTHINKABLE TODAY WITHOUT INNOVATIVE JOINING TECHNIQUES AND CONNECTORS.”

NORMAN WERTHER,
TU MÜNCHEN

RESEARCH FOCUS OF NORMAN WERTHER

- Fire behavior of load-bearing and enclosing wood elements under standard and natural fire exposure
- Engineering methods in Fire Protection
- experimental and numerical verification in fire protection
- Building regulation law in fire protection
- detailed planning of building construction
- constructive wood protection

ANDREAS DIETZ

Tragwerklösungen GmbH, Switzerland

SHERPA is a reliable partner from consulting and design to project execution. I was particularly impressed by the support and - as far as the products are concerned - that our timber construction project managers were given the skills they need to safely connect high loads on their own.

HARRY EVERLEY

TT-Fixings, United Kingdom

We are proud to be able to offer SHERPA connectors. We are specialists in timber construction, so we appreciate the technical aspects of the range. The systems offer solid, reliable solutions for all technical application requirements in the UK timber construction market.

JAN R. SKRETTEBERG

Avance Treteknikk, Scandinavia

SHERPA perfectly fits our philosophy with its high quality products and unbeatable documentation. Scandinavia has a population of about 20 million, a lot of forest and a long tradition of timber construction. The SHERPA connectors became more and more popular here as well.

MARTIN OBERMAYR

Vinzenz Harrer GmbH, Austria

The products are simply ingenious. And ingeniously simple. Two words, but they say it all. And the whole thing is perfectly secured on the basis of tests and approvals, with competent contact persons and perfect preparation of the documents. This makes work fun!

Connected worldwide

VINCENT REMER

Tie in Timber, Canada & North America

SHERPA connectors are a well thought out system. The extensively documented approach gives engineers a tool with which they can design effective connections with a high degree of prefabrication. Real quality products with a reliable supply chain.

CHRIS FODOR

Siegware Pty Ltd., Australia & New Zealand

SHERPA is the ideal product here for the growing timberconstruction industry. Due to the large product range, best quality, personal contact persons in Austria and high customer satisfaction, we see the market for SHERPA growing Down Under.

Wood construction is not only on the rise here in Austria, but also worldwide. The processing of the natural resource wood is becoming more and more popular and planners as well as those carrying out the work are jumping on the bandwagon. This takes us straight to a resource-efficient and sustainable future. At SHERPA, we recognized the signs of the times early on and have built up a large network of partners who distribute our products worldwide. They are helped with this by an innovative product range that supports them in their daily work with wood.

Double know-how

These valuable partnerships and a functioning cooperation are our top priority. With our partner dealer network, it is guaranteed that SHERPA's quality products are available in many regions around the world, so nothing stands in the way of a quick installation. Our technical know-how, coupled with the expertise of our partners, offers customers and interested parties the opportunity to implement their construction projects with high-quality products "made in Austria".

Partnership from A-Z

Some of our partners have already come into contact with SHERPA products during their apprenticeship. Others got to know and appreciate us at one of the many national or international trade fairs and events. They all have one thing in common. They receive competent and reliable care from day one. This applies to the exchange of expertise and experience, as well as timely support to clarify various inquiries.

You would also like to become a SHERPA partner and make our products available to our customers in your country? Then contact us today at +43 3127 41 983 for a no-obligation consultation.

MAXIM KOKHOV

EuroCode5, Russia

I saw SHERPAconnectors at a trade show in Germany in 2011 The simplicity of the connector, coupled with the application possibilities have convinced me. There was nothing comparable on the Russian market. To date, we have only positive feedback from our customers.

NORBERT BAUMANN

EcoTransfer, Korea & Japan

We have been working in the wood construction market with waterproofing products since 2007. Our target groups are woodworkers, carpentry companies and architects. The great advantage with SHERPA is the ease of use, aesthetics and that the same system works from mini to XXL.

The perfect tool
for professionals

FREE & BROWSER-BASED

It can be used from any smartphone, tablet or PC for free without installation.

PROJECT MANAGEMENT MODULE & VERIFIABLE STATICS PRINTOUT

The project managementmodule allows the storage and thus backup of calculations performed. A verifiable Pdf printout serves as proof.

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The clear user interface enables quick entry of project data. Possible solutions are displayed interactively in real time.

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