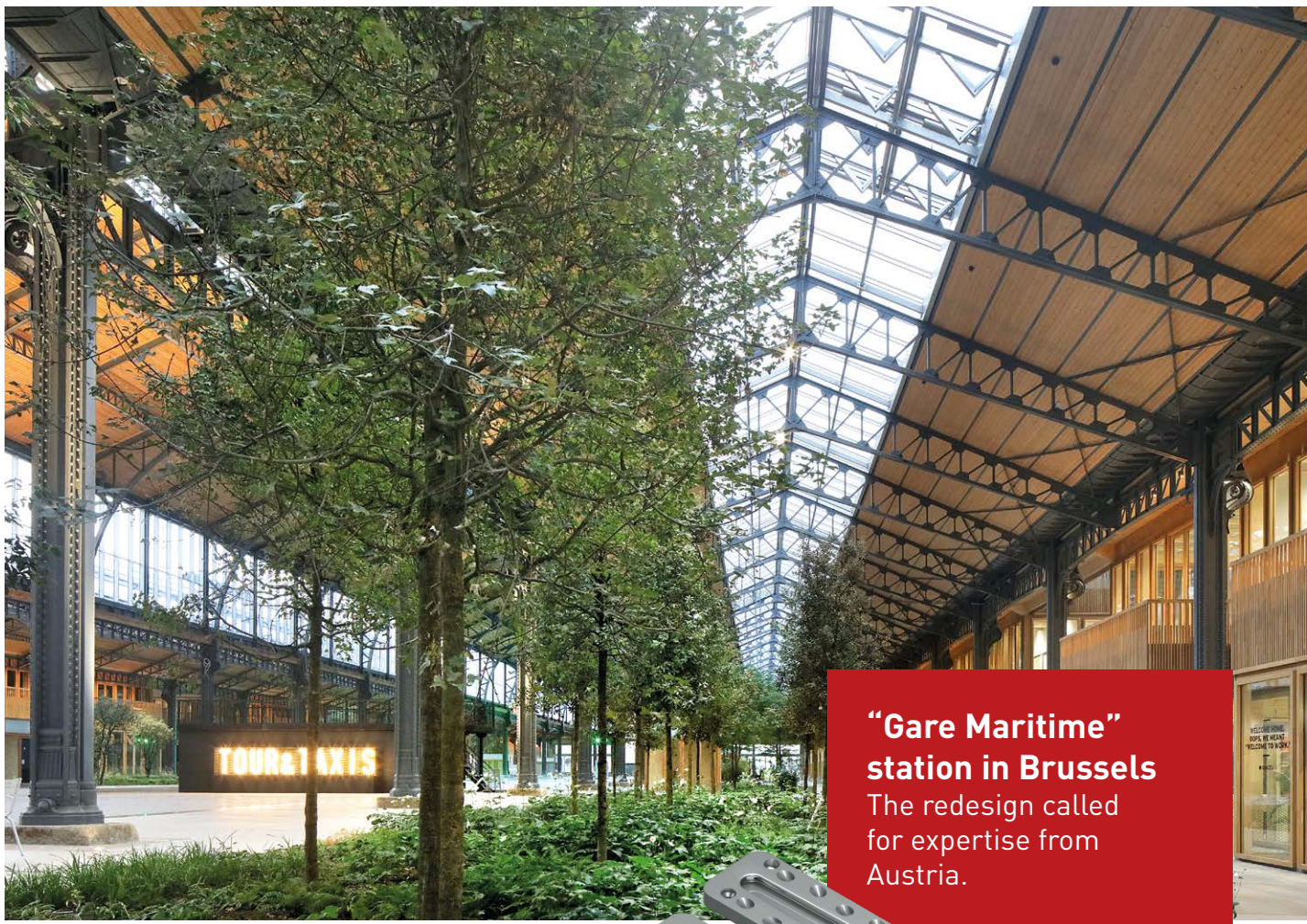
SHERPA news

MAGAZINE
4/2022



“Gare Maritime” station in Brussels
The redesign called for expertise from Austria.

MEASURE SHERPA COLUMN BASES ONLINE
Benefit from the partnership with “ingtools”!

AN INNOVATIVE SCREW
Research for just the right turn!

WHAT IS THE OIB?
Elisabeth Bata in conversation

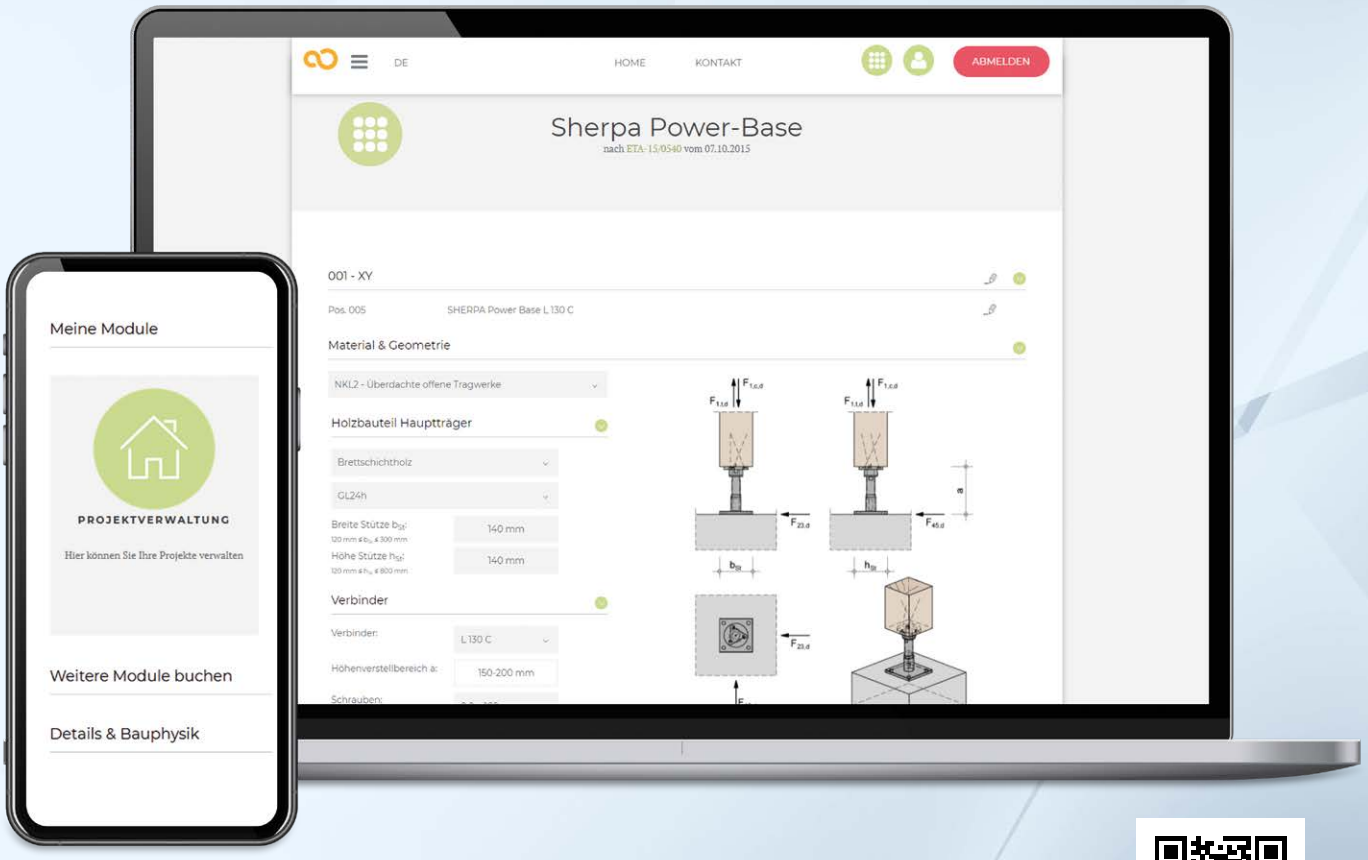
ING TOOLS

The perfect tool for professionals

In cooperation with its software partner ingtools, SHERPA is constantly developing new practice-oriented design modules. An optimal tool for dimensioning and documenting SHERPA column bases has recently become available to all planners and executing companies.

SIMPLY BRILLIANT

- Fast and efficient consideration of different effects
- Free and browser-based online dimensioning tool
- No installation required
- Legal certainty provided by ETA and standard



EDITORIAL

Safety at the highest level

As the new season begins, the SHERPA Connection Systems team is raising the bar to further advance the competitiveness of wooden support structures. Apart from the high requirements for durability and the static load-bearing capacity of timbers and fasteners, fire protection in particular places enormous demands on our building systems.

Over the course of extensive R&D projects and numerous tests we were able to extend the fire resistance of the structural and loaded nodes to 120 minutes using the SHERPA system connectors. Doubling the fire resistance rating from R 60 to R 120 opens up new markets for timber construction and creates enormous safety potential for buildings constructed from wood.

The latest issue of our SHERPA News gives you an insight into the new ETA, which is unrivalled for its level of detail. Continuous development work has made it possible to define extensive options for flexible design and sophisticated verification procedures.
Your SHERPA team can thus guarantee you competitiveness and safety at the highest level.

I would like to wish you a lot of pleasure and, above all, great success with our system solutions.

Vinzenz Harrer
Managing Director of
SHERPA Connection Systems GmbH

SHERPA Connection Systems GmbH
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SUCCESS STORY

Austrian expertise in Belgium

The historic "Gare Maritime" railway station in the Belgian capital Brussels was transformed into an architectural attraction. Involved are: The Hasslacher Group from Carinthia and the company SHERPA from Styria.

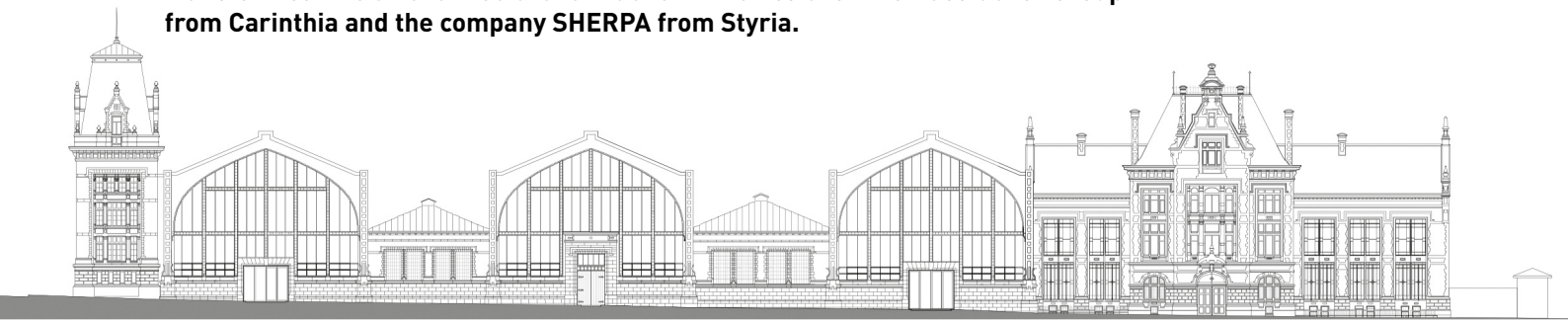


Image: Tim Fisher

^ A new and attractive district in the heart of Brussels has been created on a huge site.

Formerly the largest freight station, the "Gare Maritime" looks back on an eventful past. Now, the historic railway station in the heart of the Belgian capital Brussels is going down in history as Europe's largest glulam project of the modern era.

All-wood construction

The historical site comprises seven interconnected halls and has been converted into a large covered event complex that is home to shops, restaurants, offices and event spaces. Twelve four-storey buildings were erected on a total area of 45,000 square metres with a pure timber construction made of cross laminated timber and glulam. A large staircase and utility core were built in the centre of each building. This supply core simultaneously serves to brace the building.

"DECISIVE FOR USING OUR CONNECTORS FOR THIS PROJECT WERE TWO ADVANTAGES OF THE NEW ETA IN TERMS OF LONGER SCREWS AND FIRE PROTECTION VERIFICATION FOR CONNECTORS, VISIBLE AND MILLED IN."

JOSEF KOWAL,
TECHNICAL KEY ACCOUNT MANAGER (SHERPA)

Image: Filip Dujardin

An architectural attraction
The "Gare Maritime" station has been transformed into an architectural attraction. To achieve this, the Belgians banked on expertise from Austria: The Hasslacher Group from Carinthia contributed 5,760 cubic metres of glulam from its sites in Hermagor and Kleinheubach and 170 cubic metres of cross laminated timber from its site in Stall im Mölltal to this major project. "Larger projects are always carried out in combination with other sites from our group," explained Georg Dürregger, Managing Director of Hasslacher Holzbausysteme GmbH, based in Hermagor. The ready-to-install timber elements were delivered with the support of Hasslacher Holzbauteile GmbH (Kleinheubach) and NORITEC Holzindustrie GmbH (Sachsenburg and Stall).

SHERPA innovations
The construction also used innovations from SHERPA in Styria. A total of 1,400 pieces of the SHERPA M40 connector type with special screws (6.5 by 106 millimetres) were installed in the roof structures of the twelve building complexes. "Two advantages of the new ETA proved decisive for the use of our connectors," Josef Kowal, Technical Key Account Manager at SHERPA, refers to the "European Technical Assessments". Longer screws for the M, L, XL and XXL series (same connector price with up to 80 percent higher load-bearing capacity) as well as the R30 and R60 fire protection certificate for visible connectors and also milled-in with a remaining joint of up to five millimetres all provide these advantages.

An attractive district to live in
The completed "Gare Maritime" is more than just an ensemble of buildings: It is designed as an indoor, green quarter that offers various areas for retail, gastronomy, businesses and public events. The blend of existing cast steel trusses from the Art Nouveau era and modern timber construction technology makes the huge area a new and attractive part of the city.

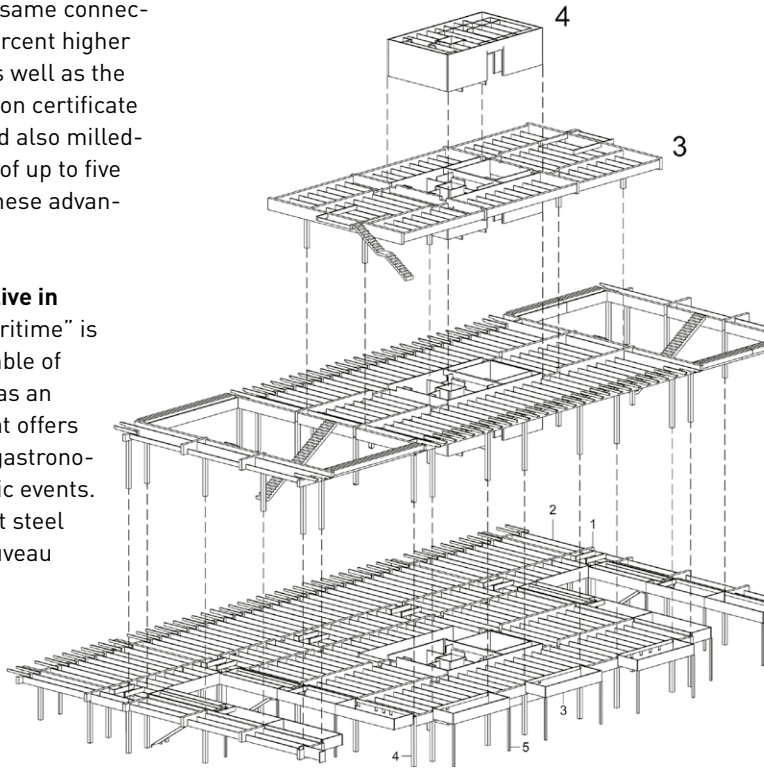



Image: Filip Dujardin


Image: Sarah Blee


Image: Filip Dujardin

^ All-wood constructions also for the interior

SHERPA CONNECTS

Always in **your pocket**

Through our social media profiles, we keep you up to date on new products, events, promotions & goodies as well as product videos and SHERPA projects.

INTERVIEW

The Institute of Construction Engineering

The Austrian Institute of Construction Engineering (OIB) is a non-profit association with headquarters in Vienna, to which all federal provinces belong as members. Elisabeth Bata from the "Structural Engineering" department explains what this has to do with building products and construction technology.

THE TASKS OF THE OIB

- Guidelines for the standardisation of technical building requirements in building regulations
- Regulations of the Building Materials Lists ÖA and ÖE
- European Technical Assessment Body and national approval body for construction products
- Product information centre for applicable technical requirements for construction products
- Monitoring the market for construction products in Austria as an authority (legal requirements, health and safety)

www.oib.or.at

In a nutshell: What is the Austrian Institute of Construction Engineering (OIB)?
The OIB is a non-profit association with its headquarters in Vienna, to which all federal provinces belong as members. It works at the interface between construction technology and construction law and fulfils five specific tasks as the coordination platform of the federal states for construction products and construction technology (see left).

You work in the "Structural Engineering" unit. What are your tasks?
The structural engineering focal points in the "Structural Engineering" section focus on the Eurocodes as well as matters concerning accredited and notified bodies. Apart from that, "European Technical Assessments" (ETA) as well as "Building Approvals" (BTZ) are issued. My area of responsibility primarily includes the preparation of these assessments and approvals in the following areas: Structural timber products and wood fasteners, chipboard and wood elements, building adhesives and gypsum products.

Can you elaborate on the preparation of a "European Technical Assessment" in relation to timber construction and joining techniques?
"European Technical Assessments" can be issued for construction products that are not covered or not fully covered by a harmonised standard on the basis of a European Assessment Document (EAD). A number of assessment documents are already available for structural timber products and wood fasteners. If one does not exist, it must be worked out in advance.

A specific example?
An example for the assessment of wood fasteners is EAD 130186-00-0603

("Three-dimensional nailing plates"). To this end, we check the manufacturer's technical documentation in advance. Provided the scope of application and the intended use are in accordance with the EAD, the application can be submitted. We then establish a test programme for the essential features requested by the applicant. This specifies, among other things, the number of test samples, the load directions as well as the dimensions of the connectors and the timber components. The applicant has to carry out the tests and prepare a test report and, if necessary, an expert opinion. Upon submitting the complete documentation to the OIB, an assessment report, an ETA draft and a factory production control test plan are prepared and the relevant consultations at European and national level are initiated.

SHERPA ETA-12/0067 is presently being extended to include fire resistance R90 and R120 (120 minutes). What is the big challenge here?
Based on an FFG project on the optimisation of main and secondary beam connections in timber construction using innovative fire protection measures, the fire resistance R30/R60 already included in the ETA is extended to include R90 and R120. This requires that the extensive test reports and calculation models are presented in a clear form in the assessment report and that the results are integrated into the ETA draft in a way that is as practical as possible. In addition, provisions must be made in the test plan that include innovative fire protection measures and thus start at the interface between manufacturer and user.

"WE WORK AT THE JUNCTION BETWEEN CONSTRUCTION ENGINEERING AND CONSTRUCTION LAW."

ELISABETH BATA,
AUSTRIAN INSTITUTE OF CONSTRUCTION ENGINEERING (OIB)

The OIB, as the product information centre for the construction industry, provides information on the technical requirements applicable to construction products in Austria. Where do the current challenges lie for products made of construction timber for load-bearing purposes and wood fasteners?
The product information point provides information on CE marking and the declaration of performance for construction products, as well as on the obligations of manufacturers, distributors or importers, among other things. Regardless of the products made of structural timber and wood fasteners, there is always the question of which construction products must be CE-marked - and the responsibilities of the individual players.

FIRE PROTECTION

New ETA facilitates planning

ETA-12/0067: Special fire protection solutions for verifications up to R120 allow for the use of SHERPA system connectors in the most demanding constructions.

As of February, planners and contractors in timber construction have been benefiting from the innovations of ETA-12/0067 (see "Special features" above right). In particular, the fire protection solutions for verifications up to R120 enable the use of SHERPA system connectors in demanding constructions.

Cross section or load bearing capacity
The basis for the verification is a sufficiently dimensioned timber cross-section. The calculation is made by adding the respective table value to the minimum cross-section of the cold design. For the first time, a distinction is made between the requirements for torsionally rigid and torsionally soft connections in case of fire. For both connection cases, two factors are available for the residual load capacity: The planner can freely decide whether to focus on a minimum timber cross-section or a maximum residual load-bearing capacity. The drawings on page 143 allow a clear assignment of the individual table values. It should be noted that for R90 and R120 a minimum length of 100 millimetres is required for the special screws.

Fire protection coating "Fire Shield"
An innovative solution is now available for connection applications where the timber cross-section is not sufficient, or for constructions that have already been executed and for which a fire protection certificate is subsequently required: By locally applying the intumescent fire protection coating "Fire Shield", the timber component can be reduced by 10 millimetres per side exposed to fire. The application is done with brushes, rollers or airless equipment, whereby the minimum application quantity of 1,245 grams per square metre must be observed.

Three strips, each 20 millimetres wide, for fire resistance R90 ⌄

Safe connection joint width
In the case of timber construction connections, the joint design also plays a decisive role in the event of fire. In visible-quality constructions, fasteners are usually milled in, thus they are optimally protected from the effects of temperature in case of fire. Depending on the size of the components, a shadow gap may be required to ensure smooth assembly. In order to be on the safe side even in these cases, joint widths of up to 5 millimetres can be made.

“THE NEW ETA COMBINES THE LATEST R&D FINDINGS WITH PRACTICAL DESIGN RULES.”

GEORG FLATSCHER,
FREIRAUM ZT GMBH -
R&D PARTNER OF SHERPA

“Fire Stop” for joints
For economically optimised constructions, where the connectors are merely screwed on and are therefore visible, the proven fire protection laminate “Fire Stop” is used. Whether it’s R30, R60, R90 or R120: Up to four strips with a width of 20 millimetres are glued and/or stapled side by side along the connector contour. It is fixed to the side timber of the main beam or to the end timber of the secondary beam. In case of a larger quantity requirement, there is also the possibility of producing the necessary width with a single strip (with a width of 40, 60 or 80 millimetres).

Connect hardwood with ease
Raw density correction factors are available for calculating the load-bearing capacity values for different hardwood materials. Distinctions are made between ring-porous (ash, oak and chestnut) and scattered-porous hardwoods (beech, birch and poplar). In all hardwood applications, pre-drilling of the special screws is only mandatory for the torque screws in the end grain that are aligned parallel to the wood grain.

SPECIAL FEATURES

- At the heart of the extension of ETA-12/0067 is the newly created Annex 6 starting on page 141.
- This annex is dedicated exclusively to the fire resistance of the M, L, XL and XXL series.
- A clear presentation on only three A4 sheets
- Overview: What conditions must be met for each connector to withstand a fire exposure of 30, 60, 90 or 120 minutes?

ETA12/0067

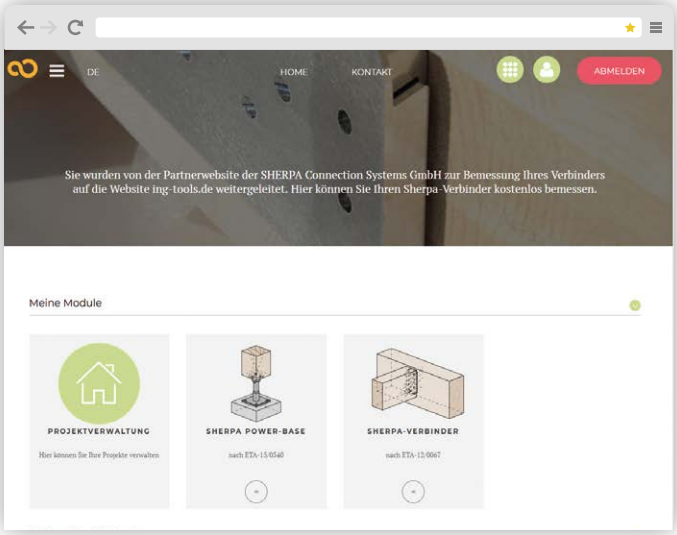
^ Application of the fire protection coating “Fire Shield” on the secondary beam

^ All SHERPA connections have withstood a fire exposure of over 90 minutes

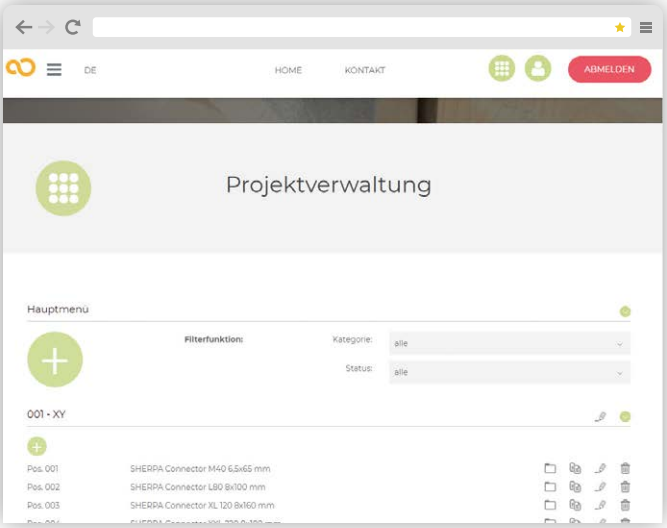
SOFTWARE

Measure for free with “ingtools”!

The “ingtools” online software enables verifiable structural analysis of connectors and “Power Base” types from SHERPA.



^ The modules from SHERPA in the free “ingtools” online measurement software



^ Individual items can be assigned to a project and given a status.

The customers benefit from the partnership between SHERPA Connection Systems and the online dimensioning software “ingtools”: You can access all the functions for measuring SHERPA products free of charge (without the need to install or update) on the SHERPA website, and more recently also for the “Power Base” column bases in addition to the connectors. The online measurement software can be used with any playback device (smartphone, tablet or PC). The user interface individually adapts to the screen size. All that is required is a (free) registration. The submitted data is transferred together with the measurement results to the verifiable structural analysis verification in pdf format.

Built on modules

The user interface makes use of individual modules and thus provides a perfect overview. Users also have access to a project management system. Individual items can be assigned to a project and given a status. That allows saving and calling up with the last editing status.

With fire proof

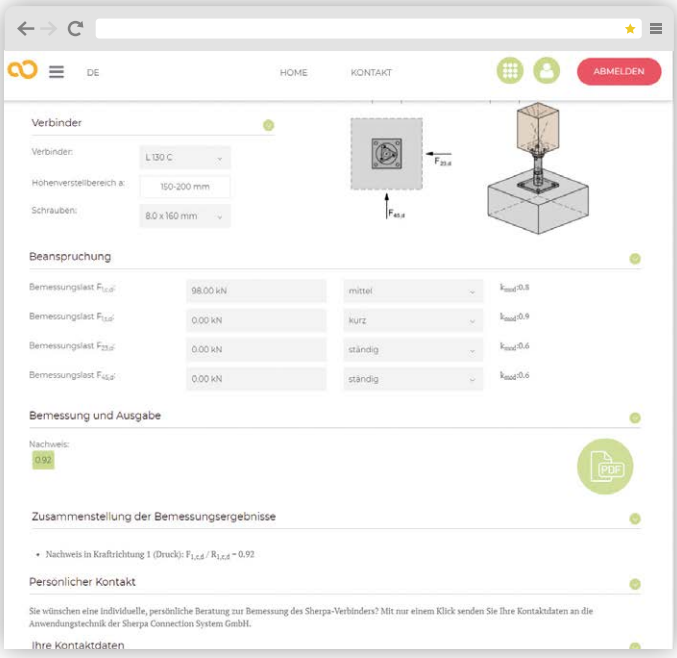
The module for the connectors of the XS to XXL series is characterised by a high level of detail. A differentiation can be made between the design variants “milled into the main beam”, “milled into the secondary beam” and “visible mounting”. Soon it will also be possible to consider R90 and R120 fire resistances in addition to R30 and R60. The basis for this is the new ETA-12/0067. The user is continuously supported

when entering the connection data. For example, only those connectors that can actually be used with the available timber cross-sections are displayed for selection. This applies to solid wood and glulam made of softwood as well as to beech. When entering the load values, the load factor for the selected connector-bolt combination is displayed instantly.

Powerful column bases
Meanwhile, the seven "power base" types can be measured as well. A separate module was developed for this purpose. All that is required is the entry of the service class according to EN-1995-1-1, the wood quality used with the corresponding wood cross-section and the load values.
If you have any questions, you can always contact SHERPA technical support. The contact details are stored in the user interface of the individual modules under the navigation item "Contact".

^ SHERPA support: The contact details can be found in the user interface of the individual modules.

The seven "Power Base" types of SHERPA can also be measured in the online tool "ingtools". >



"IN A CONTINUOUS EXCHANGE WITH SHERPA, INGTOOLS DEVELOPED PRACTICE-ORIENTED DIMENSIONING MODULES."

MARKUS REIMANN,
MANAGING DIRECTOR OF INGTOOLS

TU GRAZ

Research for timber construction and wood technology

With the share of hardwood in Europe's forests, there is also an increasing need to look more intensively at possibilities for the load-bearing use of hardwoods in construction. This is one of the focal points of the Institute for Timber Construction and Wood Technology at Graz University of Technology.

The Institute for Timber Construction and Wood Technology at the TU in Graz has devoted its research activities to high-performance screw connections in hardwood for years. How does the use of hardwood differ from that of softwood? One of the characteristics is a significantly higher strength property in and across the fibre, while only a moderate increase is present with regard to the stiffness properties. Therefore, the use of innovative hardwood products such as glulam or laminated veneer lumber (LVL) is predestined to be used for dissolved load-bearing structures such as trusses.

Compact connections

The resulting combination of a construction product with high load-bearing potential (with reduced cross-sectional dimensions) and a structurally high number of nodes requires a new approach to connection solutions. With the objectives of maintaining high performance in the connection area as best as possible and positively shaping the failure behaviour of the load-bearing structure through targeted plastic deformations at neuralgic points, it is necessary to develop compact, high-performance, reliable and economical connections.

Optimise connections

These new challenges in connection development have led the Institute for Timber Construction and Wood Technology to carry out a series of funded research projects with a corresponding focus for some time now. Driven by the advantages over adhesive connections (full load-bearing capacity after installation, use of independent climatic conditions and simplicity of application), the focus is placed on screwed connection solutions.

RAPID® Hardwood

In the "hardwood_SCREWS" project, a consortium, led by Schmid Schrauben Hainfeld GmbH, developed a wood construction screw optimised for hardwood products, the RAPID® Hardwood, which has a 36 percent higher steel tensile load capacity and a 52 percent higher torsional load capacity with almost the same pull-out load capacity as conventional screws.

The load bearing behaviour

Based on extensive experimental investigations, a method for determining the pull-out strength of wood screws in softwood could be extended for hardwood products. The proposal in this regard has not only been part of

‹ Testing framework for long-term tests at the Technical University

the European Technical Assessment ETA-12/0373 by Schmid Schrauben Hainfeld GmbH since 2020, but has also been included in the draft of the design standard for timber construction (Eurocode 5).

^ Doctoral Initiative Connecting Technology in Hardwood (from left): Reinhard Brandner (dissertation supervisor), Ursula Mahlknecht (dissertant), Andreas Ringhofer (laboratory supervisor), Michael Gstettner (dissertant)

^ Typical cracking: Failure pattern during block shearing of axially stressed screw assemblies

^ Screw group set in end-grain of beech glulam: compact connections with high efficiency

^ Tension plate joint: external plates made of laminated beech veneer lumber including screw arrangement

^ Tension plate joint: Experimental determination of the performance potential

SCHMID SCHRAUBEN

The **right turn**

“Schmid Schrauben” from Hainfeld in Lower Austria is a company with a long tradition on the European market. The company was founded in 1842 and produces high-quality screws and fasteners.

Schmid Schrauben Hainfeld GmbH from Lower Austria is an internationally renowned traditional company that was founded in 1842. The majority of products consist of fully and partially threaded screws for structural timber engineering with diameters of three to twelve millimetres and lengths of up to 1,500 millimetres.

Screw specialist

At first, screws, nails and DIN parts were produced at the Hainfeld site. The strategic and then necessary step towards becoming a specialist for screws with technical approval (ETA) took place in the mid-1990s. Ever since, the main focus has been on the production of timber construction screws for structural timber engineering. The own brands RAPID© and StarDrive GPR© are at the centre of the current range. It is supplemented by a commercial line in the DIN and standard parts sector as well as a wide range of cold forming products for special industrial requirements.

The own premium brands

With the premium line RAPID© and the StarDrive GPR© as the standard line, “Schmid Schrauben” offers the perfect solution for almost all challenges. In addition to various surfaces with a resistance of up to 700 hours in the salt spray test and special head shapes such as the RAPID© Dual with hexagon and T-drive or the RAPID© SuperSenk-Fix with a combination of countersunk head and a head that can be used with sheet steel, the RAPID© line also offers special geometries and solutions for special screw cases.

The special solutions

“Schmid Schrauben” already presented the RAPID© Hardwood in 2017, a special solution with approval for screwing hardwoods without pre-drilling. Initially, this solution was only available as a partial thread, but the range has now

‹ Location: "Schmid Schrauben" produces high-quality screws and fasteners at its site in Hainfeld (Lower Austria).

been extended to include a fully threaded variant, which also makes the screw interesting for use with connectors. In addition to the Hardwood, "Schmid Schrauben" also offers RAPID T-Con, a special solution for timber-concrete composite systems, and RAPID T-Lift, a lifting and transport system for large timber elements.

RAPID full thread

Another core part of the RAPID screws is the RAPID full thread, which has a special position on the market with its exceptionally good technical values and the small screw spacing and thus enjoys great popularity. Particularly worthy of mention is the patented half-point, which ensures that the screw does not go too far into the wood. The RAPID full thread is available as a countersunk head as well as a cylinder head and is thus considered the ideal solution for almost all screwing cases.

Specific request metal-wood

Metal-wood connections require special screws. This is where "Schmid Schrauben" has screws ready with the RAPID© Dual, the RAPID© SuperSenkFix and the StarDrive GPR© PS, which guarantee perfect centring of the screw and a secure fit thanks to a special underhead shoulder - a clean solution for 90-degree screw connections in engineered timber construction. Furthermore, the "Schmid Schrauben" range includes interesting products for robust steel connections with the RAPID© full thread countersunk head and the further developed RAPID Ductile, which can also be used for column bases.

WORTH KNOWING

Local production in Europe and close proximity to partners means that Schmid Schrauben Hainfeld GmbH from Lower Austria can also solve special customer requirements. Special coatings with zinc-nickel or products in A2 and A4 stainless steel can be manufactured.

RAPID© HARDWOOD

Innovation from Hainfeld

The RAPID© Hardwood is an innovation from "Schmid Schrauben" from Hainfeld in Lower Austria. The first screw approved in hardwoods and beech without pre-drilling was developed in cooperation with the Technical University in Graz.

The RAPID© Hardwood is an efficient screw that is approved for use in European hardwoods and beech without pre-drilling. This innovation is a co-production of the traditional company "Schmid Schrauben" from Hainfeld in Lower Austria and the Technical University in Graz. This was based on more than 4,000 tests as well as long-term tests that were carried out for the first time – and only with these screws.

Countersunk or disc head

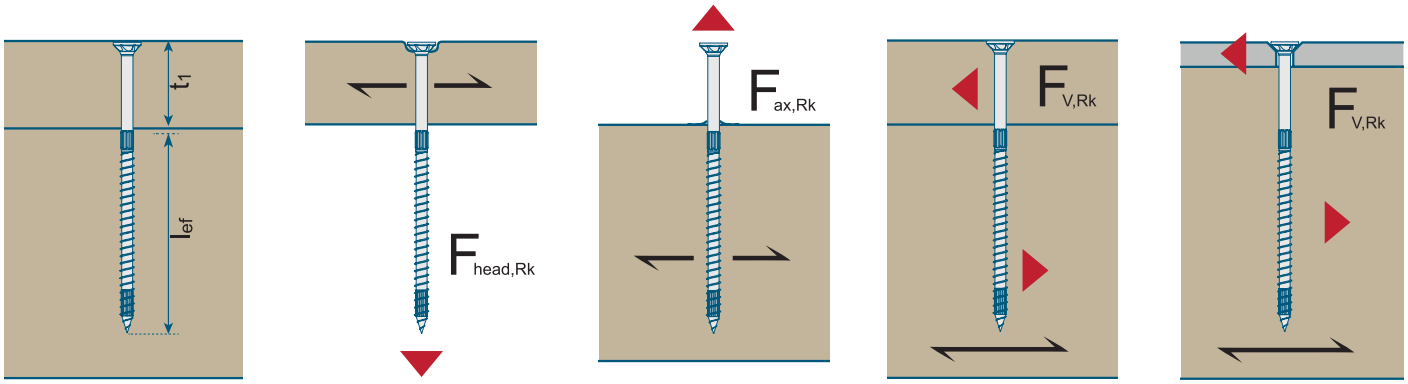
The RAPID® Hardwood construction screw is specially hardened and slide-coated. Pre-drilling with the same behaviour is permissible up to a drill diameter of 6.5 millimetres. With the advantage of reducing the insertion torque by around two thirds. The screw is available with a countersunk or washer head. In the countersunk head model, it is provided with underhead milling pockets, which allows the screw to be countersunk and anchored smoothly in both the wooden component and in metal fittings. The optimised frictional part significantly reduces the screwing-in resistance, thus reducing the force required for screwing in, increasing the battery life of the screwing-in device and preventing the wood construction screw from tearing off during screw application without pre-drilling.

Patented compressor tip

The 8 millimetre screw has tensile load-bearing capacities comparable to a conventional 10 millimetre wood con-

"TOGETHER WITH SHERPA, WE FOCUS ON HIGH PRODUCT QUALITY WITH LOCAL PRODUCTION."

ANDREAS GEBERT,
MANAGING DIRECTOR AT SCHMID SCHRAUBEN HAINFELD



Pictograms for the properties and values of the RAPID® Hardwood (partial thread countersunk head)

struction screw. The entry thread with a stronger core diameter enables fast screwing and high pull-out values. The newly developed, patented compressor tip also guarantees better biting of the screw and reduces the explosive effect. The "RAPID® Hardwood" wood construction screws all have a Cr(VI)-free "BlueWin 700+" surface. For further technical information, including installation and corrosion protection, please refer to ETA-12/0373.

Calculation tips

The brochure "Solutions for timber construction" contains calculation tips. These provide the parameters (axial, shear) essential for the basic verification in softwood C24 as well as in structural beech and required for the calculation. "Schmid Schrauben" summarised the timber construction special knowledge from standards and the approval ETA-12/0373 as well as from recognised publications in a screw manual. It is a "tool" for the simple application of screws for complex and challenging fastening solutions.

				AXIAL		SHEARING		
				pull through	pull out	Wood - Wood	Metal - Wood	
	Ø	L/b	$t_{1,min}$	$F_{head,Rk}$	$F_{ax,Rk}$	$F_{v,RK}$	$F_{V,RK,thin}$	$F_{V,RK,thick}$
	mm	mm	mm	kN	kN	kN	kN	kN
	FSH beech ρ_k=730kg/m³							
Ø 8.0	8.0	80/60	-	10.35	23.52	-	7.39	13.50
	8.0	100/80	-	10.35	31.36	-	9.44	15.25
	8.0	120/100	-	10.35	32.80	-	10.78	15.25
	8.0	140/100	40	10.35	32.80	7.23	10.78	15.25
	8.0	160/100	55	10.35	32.80	7.98	10.78	15.25
	8.0	200/100	55	10.35	32.80	7.98	10.78	15.25
	8.0	240/100	55	10.35	32.80	7.98	10.78	15.25
	8.0	280/100	55	10.35	32.80	7.98	10.78	15.25
	8.0	320/100	55	10.35	32.80	7.98	10.78	15.25
	8.0	440/100	55	10.35	32.80	7.98	10.78	15.25

The parameters (axial, shear) for the verification and calculation

Unique properties

In summary, the unique properties of Rapid® Hardwood are due to the patented compressor tip, special coating for reduced insertion torque and straight friction part for partially threaded screws. Screwing in side and end grain wood (90° to 0°) as well as in narrow sides of laminated veneer lumber (LVL, FSH beech) is possible. Regardless of whether pre-drilled, the RAPID® Hardwood allows full loading. If screws should be pre-drilled with a maximum of 6.5 millimetres, the insertion torque will be reduced. The screw spacing is also significantly reduced.

The Innovation Award

The tension load capacity of 32.8 kN, similar to conventional 10-millimetre wood construction screws, is particularly noteworthy. The comprehensive test series in softwood C16 to C30 as well as seven hardwoods and beech allow for a finely tuned calculation. Screws up to a length of 400 millimetres are allowed in hardwood without pre-drilling.
In recognition of its development achievements, this product was awarded the Lower Austrian Innovation Prize.

SHERPA **Top 3**

Spring 2022 is all about the news around the ETA-12/0067, the Power Base Module in intools and the free NEWS magazine subscription.

SHERPA®

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