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Case study.

**Sustainable combination of steel and wood**

**Cantilevered balcony construction securely fixed to solid timber structure and thermally isolated using Schöck Isokorb**

**Baden-Baden, January 23 – Building with concrete is popular. As a building material it is flexible, durable and robust, but it generates huge amounts of CO2. For this reason, more and more builders are turning to the economic and ecological advantages of wood. Scharabi Architekten are specialists in building with this natural raw material. They created a sustainable residential building called Holzhaus Linse in an urban setting in the Schöneberg district of Berlin, Germany. Cantilevered steel balcony structures meet a solid timber structure in this solid timber building. The planners were only able to solve the complex issue of thermal insulation and stop the transmission of impact noise by using a specially designed steelwork sandwich construction in combination with Schöck Isokorb T type S.**

The principal, Baugemeinschaft Holzhaus SL GbR, built the ecological building to KfW Efficiency House 40+ standards using hybrid construction methods. It contains 18 residential units including a cluster apartment, youth centre and several communal rooms. The 7-storey residential building was designed in timber with walls made of cross-laminated timber elements with a framed structure in front to form an insulation level. The façade facing the street is clad with fibre cement panels and the façade facing the courtyard is clad with untreated larch wood for reasons of durability. The floors consist of hollow-core timber elements. Only the basement, ground floor, access core, stairs and fire walls are made of reinforced concrete. The upper floors are designed as hybrid constructions consisting of load-bearing solid timber façades and a combination of timber columns and steel girders. This method results in ceiling spans of up to six metres and open floor plans that are almost free of columns. "More than 15 years ago, we made a conscious decision to build with wood. Wood not only provides additional architectural benefits, it is also in keeping with our social responsibility as architects. To build sustainably, you need buildings that are durable, aesthetically pleasing and recyclable. All of this can be achieved with wood, a renewable building material", says Daniela Galárraga of Scharabi Architekten in Berlin.

**Structural steelwork meets timber construction**

Schöck Isokorb was a crucial element in the energy-efficient and sustainable construction of Holzhaus Linse. The load-bearing thermal insulation elements are part of the structural system and thermally isolate cantilevered components such as balconies. In Holzhaus Linse, every apartment has at least one balcony which cantilevers by around 1.20 metres to 1.50 metres. Some of these on the side facing the street were enclosed with glass to create protected open spaces. The balconies are open on the courtyard side. Diagonal tie bars had to be attached to the external wall and balcony girders fixed to the wooden ceiling for structural reasons. However, as wood transmits sound very well, a solution had to be found that would separate the elements both thermally and acoustically to meet the requirements for thermal and sound insulation.

**Special solution for Isokorb T type S: Application in timber construction**

The planners from the structural engineering office ifb, Berlin, chose

Schöck Isokorb T type S. "In reinforced concrete construction, Schöck Isokorb is always our first choice for thermal separation and minimising thermal bridges. However, an Isokorb version for timber construction does not yet exist", explains civil engineer Michael Kühl, partner at ifb when discussing the challenge of this design. The advantage of Isokorb T type S is its flexibility. It is the only thermal insulation element that does not necessarily require an internal connection to the reinforced concrete. "Using the Isokorb T type S in the hybrid construction was completely new to us, but it was the only way to thermally separate the cantilevered components", says Michael Kühl. The thermal insulation element consists of a tensile force module, a module for compressive and shear forces and insulation spacers. It can be adapted for profiles of any size and load-bearing capacity requirements thanks to its modular design.

**Reliably minimising impact sound in timber construction**

The planners designed a three-part steel sandwich construction consisting of steel parts (cleats) with elastomeric bearings in between to decouple the balconies acoustically. The connecting plate rests on the wooden ceiling. The load-bearing Isokorb thermal insulation elements connect the balcony structure to horizontal steel U-profiles. These are elastically embedded between the bearing plates both vertically and horizontally using elastomeric bearings. This design eliminates any direct steel-to-steel or steel-to-wood connections and also meets sound insulation requirements.

"For structural reasons, we had to arrange two Isokorb elements one on top of the other to produce connections with flexural rigidity. In this construction, the Isokorb elements not only provide thermal separation, they also transfer the internal forces of the connected steel beams", explains Michael Kühl.

**Future-oriented construction**

In Holzhaus Linse, steel meets wood, an ingenious solid timber structure connects with a reinforced concrete core and years of experience with natural materials converge with passion and innovation. The hybrid construction merges the positive properties of the different building materials to fulfil the objective of future-oriented construction. By connecting cantilevered steel balconies to the timber structure, Schöck Isokorb T type S is a vital component in this resource-efficient and sustainable living concept.

5670 characters (including spaces)

**Project information**

Construction period: August 2020 to September 2022

Principal: Baugemeinschaft Holzhaus SL GbR

Architect Scharabi Architekten PartG mbB, Berlin, Germany

Structural engineer: ifb Frohloff, Staffa, Kühl, Ecker

PartG mbB engineering consultants, Berlin

Construction firm: Max Holzbau, Breydin OT Trampe, Germany

**Product:** Schöck Isokorb T type S

**Floor plan**

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**Section**



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**Images**

**[Schoeck\_Holzhaus-Linse\_Berlin\_1]**

**Ein Bild, das Apartmentgebäude, draußen, Gebäude enthält.

Automatisch generierte Beschreibung**

*In Holzhaus Linse in Berlin – a solid wooden building designed by Scharabi Architekten – cantilevered steel balconies meet a solid timber structure*

*Photo: Moritz Bernoully*

**Schoeck\_Holzhaus-Linse\_Berlin\_2]**

**Ein Bild, das Gebäude, drinnen, Apartmentgebäude enthält.

Automatisch generierte Beschreibung**

*Eternit fibre cement sheets were attached to the façade facing the street.*

*Photo: Moritz Bernoully*

**[Schoeck\_Holzhaus-Linse\_Berlin\_3]**

**Ein Bild, das Gebäude, draußen, Dach enthält.

Automatisch generierte Beschreibung**

*The façade facing the courtyard is clad in untreated larch wood for durability.*

*Photo: Moritz Bernoully*

**[Schoeck\_Holzhaus-Linse\_Berlin\_4]**

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*Steel balcony meets timber structure: the planners were only able to solve the complex issue of thermal separation and stop the transmission of impact noise with a specially designed steel sandwich structure incorporating Schöck Isokorb T type S.*

*Photo: Moritz Bernoully*

**[Schoeck\_Holzhaus-Linse\_Berlin\_5]**

Ein Bild, das drinnen enthält.

Automatisch generierte Beschreibung

*Two Isokorb T type S modules were arranged one on top of the other to produce connections with flexural rigidity.*

*Photo: Schöck Bauteile GmbH*

**[Schoeck\_Holzhaus-Linse\_Berlin\_6]**



*Schöck Isokorb T type S is a load-bearing thermal insulation element for connecting cantilevered steel members.*

*Photo: Schöck Bauteile GmbH*

**About Schöck:**

Schöck Bauteile GmbH is a company of the international Schöck Group that has more than 1100 employees and is active in over 40 markets. It has its headquarters in Baden-Baden at the feet of the Black Forest where the company's success story began in 1962. Company founder Eberhard Schöck used his knowledge and experience of building sites to develop products that simplify the construction process and solve the physical problems of construction work. This mission has remained the foundation of the company’s philosophy to this day, a philosophy that has allowed Schöck to become the leading provider of reliable and innovative solutions to reduce thermal bridges and impact sound, for thermally insulating façade connections and reinforcement technology. Schöck products facilitate a more rational approach to construction and safeguard the construction quality in the long term. Our focus is on the building-physical benefits and energy efficiency. Schöck is driving the digitalisation of the work flow from planning to the building site to support the construction work of tomorrow.

**For any questions, please contact:**

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