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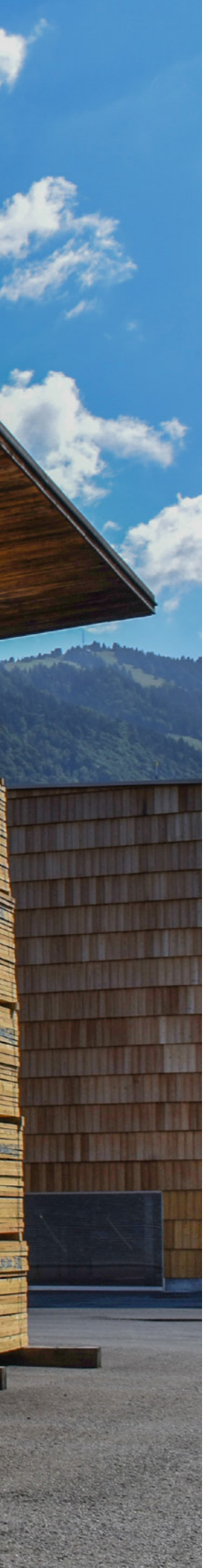
bestini

2. ESPERIENZE



To make it even better

The Vorarlberg architect Hermann Kaufmann is a pioneer of the modern timber construction with which his name is inseparably linked. In his pleasant but persistent manner, Hermann Kaufmann has never tired of pointing out the qualities of timber construction and, at the same time, developing it further with his buildings through the use of new modern products and the sounding out of new construction methods in order to make timber construction, as he himself says, even better. He has always been open to new developments. Commercial buildings seem to be a good field for trying out these new developments and new construction methods in timber construction.
As functional and practical as commercial buildings need to be, they also clearly do leave some leeway for trying out new ideas. Clients, architects, and construction companies use such buildings to experiment, to try out new joints, new material combinations and new engineered woods. By looking at a few examples of industrial developments, we can see how timber construction has changed from a traditional to an ultra-modern method, and better understand the advantages that this building material offers and how Hermann Kaufmann prepared this path with his buildings.
This text is an abridged and revised version of an article first published in «Bauband 3: Gewerbebauten in Lehm und Holz», a special edition of the journal *DETAIL – Zeitschrift für Architektur + Baudetail*.

Anne Isopp

Architecture journalist and editor-in-chief. From 2009 till 2020 she was editor-in-chief of the professional journal *Zuschnitt* (www.zuschnitt.at, publisher proHolz Austria). Since autumn 2020 she is editor-in-chief of *ARCH*. She publishes and work as an expert at architectural awards and competitions.

Acknowledgment

The article is divided into two parts. The first contains an essay written by Anne Isopp, while the second is a gallery assembled by Cristian Dallere and Matteo Tempestini, who selected the projects and went in Vorarlberg to make a photo report. Therefore, all the photos were taken in July 2022, which is why many buildings have changed from their original conception, extended or joined by new constructions.

Keywords

Vorarlberg, holzbau, Hermann Kaufmann, craft, building culture, traditional mastery.

Doi: 10.30682/aa2208f

Building with planar elements

In the 1990s, wooden commercial buildings were primarily built by timber construction companies for their own use. This allowed them to showcase the qualities of modern timber construction in their own production halls and office buildings.

So it is not surprising that it was a timber construction company that was the first to build a hall with surface-shaped timber elements. This was the Beam Assembly Hall in Reuthe, Vorarlberg, in 1990. "The hall was one of the first projects with a supporting structure consisting mainly of large-format panel materials, a construction method that became standard in the following decades", recalls structural engineer Konrad Merz.

The old carpentry hall had burnt down and a new one had to be built within a very short period of time. When designing the hall, Hermann Kaufmann Architekten therefore made sure to create a concept that was very easy to assemble and quick to erect. They used a building material that was new at the time, a special OSB board that can still be used in structural timber engineering today. The large format allowed a high degree of prefabrication and, thanks to its high strength, was both room-enclosing and load-bearing at the same time.

Today cross-laminated timber has established itself as the standard material for timber construction. The large format allows a high level of prefabrication and the material's strength makes it capable of meeting both space-enclosing and load-bearing requirements.

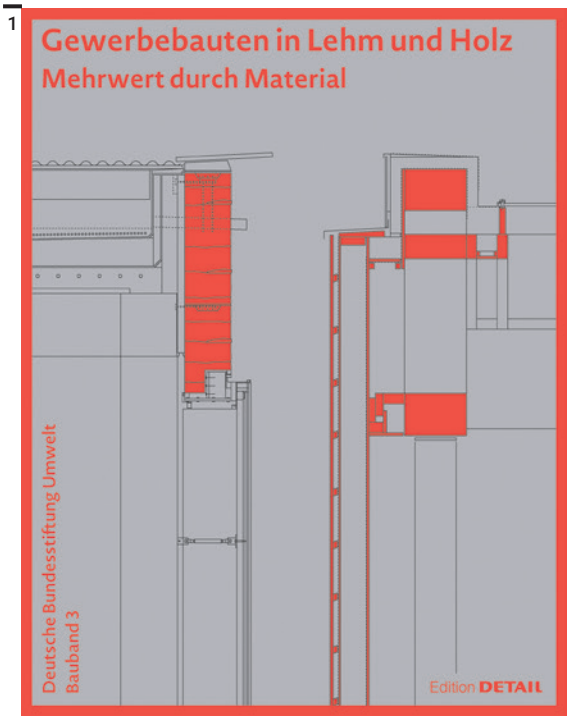
Environmentally conscious construction

Hermann Kaufmann never tires of pointing out the ecological qualities of wood as a building material. Until recently, he was a university professor at the Technical University of Munich; he is now a professor emeritus. But he also carries out this role in his capacity as an architect. He addresses building owners, decision-makers from politics and administration as well as the general public.

Around the turn of the millennium, architects and clients increasingly began to address the question of environmental impact and sustainability. One of the main arguments for building with wood is its status as a renewable resource. Wood absorbs CO2 from the atmosphere and stores the carbon permanently until the wood is thermally recycled. As a building material, wood thus benefits the climate in two ways: it stores carbon and at the same time replaces finite resources.

It is also worth remembering the exhibition "Building with Wood, Paths to the Future", initiated and curated by Hermann Kaufmann, which was first shown in Munich in 2011 and in Vienna and Berlin in the years that followed. The exhibition impressively showed the ecological advantages of wood as a building material as well as the possibilities of modern timber construction. This exhibition certainly opened the eyes of many to the potential of modern timber construction, its ecological significance and the many other advantages that characterize modern timber construction today.

1



Opening picture
Metzler-Holz KG, Bezau, Hermann Kaufmann + Partner ZT GmbH, 1995.

Fig. 1
«Bauband 3: Gewerbebauten in Lehm und Holz. Mehrwert durch Material», in *DETAIL – Zeitschrift für Architektur + Baudetail*, Detail, München, 2020.

Enormous load-bearing capacity

Up to this point we have primarily addressed the qualities of modern timber construction and the advantages of new production methods, but as of yet have barely touched on one particular quality: the load-bearing capacity of wood. This carries particular weight for commercial construction, especially for building large production halls. In contrast to other building materials, wood demonstrates a high degree of strength at a relatively low bulk density. Particularly along the grain, wood exhibits a high compressive and tensile strength, which allows it to cover large spans.

Here in particular wood is increasingly becoming more and more competitive with steel construction. Supports made of beech laminated veneer lumber have a higher load-bearing capacity than those made of reinforced concrete, at smaller cross-sections. They also have a lower dead weight, which allows for smaller foundations.

Building beautifully with wood

The choice of material for a building always also reflects the company's corporate attitude. The use of wood projects a conscientious approach to the handling of resources and the use of renewable materials, and thus positively contributes to a company's corporate identity. The growing demand for wood as a building material will lead to further developments in construction methods and building products with respect to timber construction. In the process, the possibility of dismantling and reusing wooden structures will also increasingly attract attention. Wood is the most important renewable resource available, and it is a simple fact that finite resources must increasingly be replaced by renewable ones. In addition, when planning a new building the possibility of future changes or later dismantling must be taken into account from the outset. Wooden structural elements are designed in such a way that they allow for adaptations, making them recyclable. All this can be seen in life cycle assessments, which are also gaining significance when it comes to the planning of commercial buildings. This is especially true when, alongside the supply of raw materials, the construction process, and the phase of use, the reuse and recovery potential of wood are taken into account. Today we continue to see ever more and ever higher buildings being built with wood, and timber construction is increasingly establishing itself as a legitimate building method within the sphere of commercial architecture. This comes from the fact that timber construction brings together all the qualities that a modern building requires: it is durable, sustainable, of high quality, and lends itself well to prefabrication, allowing rapid and hassle-free construction. How fast, at what quality, and at what price are some of the questions most frequently posed by clients when planning commercial buildings. Timber construction has found convincing answers to all of them, and on top of that is also able to provide positive outcomes for both the environment and the employees who will later work in these buildings.

Hermann Kaufmann and his office have not only accompanied the development of timber construction over all these years, but have also had a decisive influence on it. In conclusion, it is fitting to quote Hermann Kaufmann from the book *Limits of Hardwood*: «Our firm and I have always been interested in daring to try something new. We have never wanted to simply copy what others had already built, but always fundamentally ask ourselves: "What can we do better?"». ■

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Michael Kaufmann – Beam Assembly Hall, Reuthe, 1990

This building demonstrates the new ways and potential of modern timber construction. Great attention was paid to fine detail, which is possible through intelligent design. Only by focusing on the details does a timber construction begin to come alive. The aim was to insert a new heated assembly hall into the existing building structure and to develop an easy-to-install construction system based on a high degree of prefabrication, keeping the construction time as short as possible. This project should also provide technical proof of the efficient and modern way of thinking in the company. The design resolves conflicting constructive elegance and functionality and subverts practicable methods of production and installation. It demonstrates the possibilities of surface design as well as the combination of timber and glass, but without questioning the economic efficiency.

The construction time for the carpenters took only one week. In order to obtain as much reflected light as possible, the soffits and the lights were painted white. The construction was left natural.

Over the years, the beam assembly hall project for Michael Kaufmann has been flanked by new extensions. These have gone hand in hand with the expansion of the company and with the passing of ownership from father to son. The latest extension is the one seen behind the building designed by Hermann Kaufmann. The latter was designed by his brother, Johannes Kaufmann, in 2017 and won the second prize in the 2020 edition of Constructive Alps.

2

Text: Hermann Kaufmann + Partner ZT GmbH. All project texts are translated by Bronwen Rolls except the one about Biomass heating plant, Mellau.

Fig. 2
General view of the complex of Kaufmann carpentry and joinery.

Fig. 3
External view.

3

Fig. 4
A detail of beam assembly hall.

Fig. 5
Internal view.

Kaufmann Holz AG – Factory Hall Au, Reuthe, 1992

On 19 August 1992 a major fire at Kaufmann Holzbauwerk, in Reuthe, destroyed a 7,000 square meters hall with facilities for drying and sorting timber, as well as 7,000 m³ of dry and processed stock. It was paramount to quickly turn around a new hall and a warehouse for all sorting and drying of timber, for the company to get back to business. The design of the hall is based on a very easy-to-assemble and build concept. The new building material Intrallam LSL, which is manufactured in large-sized panels, was the most suitable product for this purpose. The large format allows a high degree of prefabrication and thanks to the high strength qualities this plate could be used not only as a space-enclosing element but also as a support. The building is divided into two sections with different widths. The design of this hall was carried out by a planning team involving engineers, builders, and architects. This interdisciplinary process was necessary for planning efficiency.

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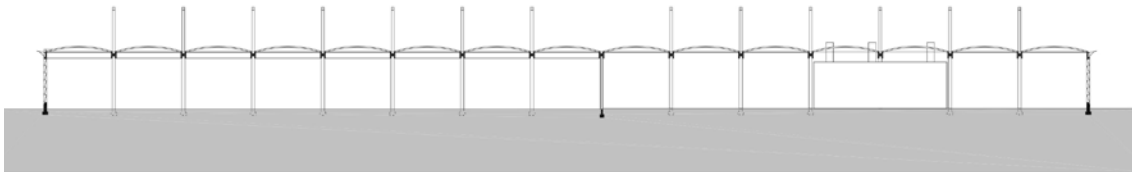

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8

Text: Hermann Kaufmann + Partner ZT GmbH.

Fig. 6
Longitudinal section.

Fig. 7
General view from the river.

Fig. 8
Internal view.

Metzler-Holz KG – Storage Warehouse, Bezau, 1995

The sawmill and timber trading company needed a 30x60 m, pillar-free hall for the storage of dried timber, as well as for the air-drying of various products. With the requirement to use solid timber for the construction as much as possible, the idea came to use fish-belly girders with a solid top chord, as well as diagonals of crossed bar boards, and a glued bottom chord developed as a drawstring. These beams lie on clamped steel columns. The purlins were coupled, with about 1.5 m overlapping on the 5-m grid. Arranged at the construction level, a glass band (clear glass with aluminum profiles clamped on timber supports) forms a slightly raised end of the massive structure. The underlying form is natural as the entire building and fits the base area in an open horizontal form-work.

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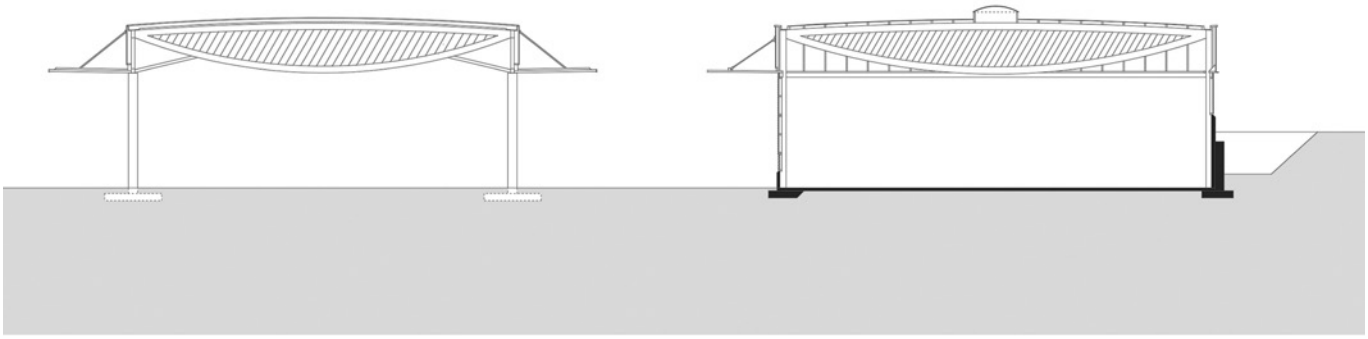

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11

Text: Hermann Kaufmann + Partner ZT GmbH.

Fig. 9
Cross section.

Fig. 10
External view.

Fig. 11
Detail of the structure.

Fig. 12
Internal view of the warehouse.

12

Wälderhaus BA 1, Bezau, 2002

Industrial and commercial parks are few and far between in Bregenzerwald, whose main source of revenue is agriculture. The design of new buildings is often left to chance, despite their impact on the natural landscape. This project, on the periphery of Bezau, benefitted from a previous intervention by Hermann Kaufmann, who had built the timber production halls in close vicinity to the new timber structure, Wälderhaus. The result of the two industrial complexes is a "timber city". The design aimed to integrate the new volumes into the landscape using balanced forms and natural timber. Similar to the existing buildings, typical features of the new structure include the strip windows below the eaves and the timber skin extending almost to the floor. The warehouses, production halls, metal workshops, and offices are knitted into the large building, marked out only by window openings in the facade. One L- and two square-shaped halls use a staggered arrangement in response to the shape of the plot. The halls are connected by vaulted shed roofs, partially glazed and made of steel to meet fire protection requirements. The vaulted roofs span between the building masses, without exaggerating the dimensions of the composition. As a result of the terrain, from the village the plant appears even lower, leaving the view of the landscape below the vaulted roofs unobstructed.

Text: Otto Kapfinger, *Hermann Kaufmann Wood Works*, Springer-Verlag, Wien, 2009.

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Fig. 13
Longitudinal section.

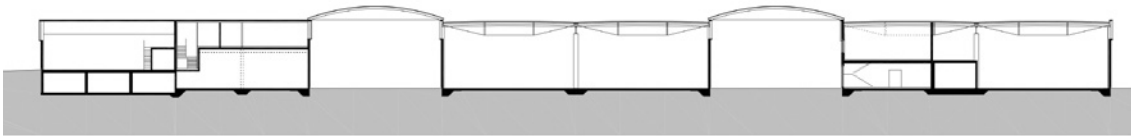

Fig. 14
General view from South.

14

Biomass heating plant, Lech, 1999 (2010)

The construction of the largest biomass heating plant in Austria in 1999 was a milestone in the history of Lech, Austria. The unusual location of the building, and its complex functional requirements, were decisive in the distinctiveness of this building at the entrance to the town. An underground fuel bunker that houses the wood boiler, with its tipper hall connected, forms the main elements of the building. It was the intention to make the heating technology visible. This building is designed to show that even so-called "functional buildings" with dedicated architectural designs can be an asset in the townscape. The use of biomass as a renewable energy source, and the use of state-of-the-art technology, have contributed significantly to the ecological development of the region.

In 2010 this plant was expanded for a specific reason. The expansion of the Stubenbach district made the heating capacity of the two existing biomass boilers in the Lech too low. After initially considering building its heating plant for the district, it was decided to expand the existing buildings in Lech to accommodate a third boiler. During these discussions, it was decided a warehouse for the biomass was also to be built. The challenge of the extension lay in the limited space of the building plot. Wedged between the Lechtalstraße and the Zürsbach, the footprint of the existing building follows the curvature of the road. For the existing building, the height is also dependent on the slope of the road. The new construction continues this slope of the road initially, and when it reaches the peak height possible in the areas of the new boiler house and then slopes back down towards the areas for the storage yard, undulating with the terrain. The spacious warehouse is designed in timber construction with a facade made of local spruce. Due to the very short construction time of 6 months, the construction had to have a high degree of prefabrication. This was achieved with the help of prefabricated wall elements which had to be arranged on-site.

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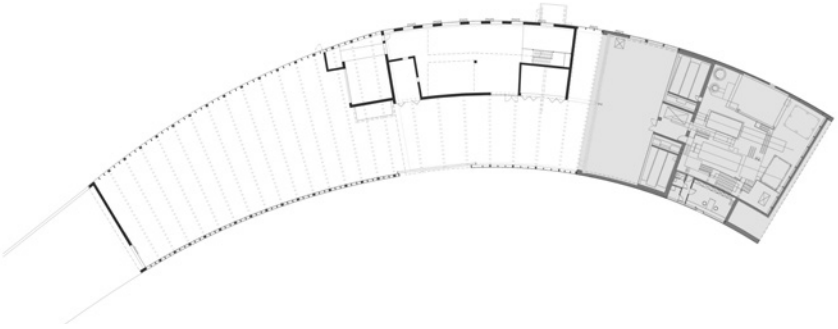

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Text: Hermann Kaufmann + Partner ZT GmbH.

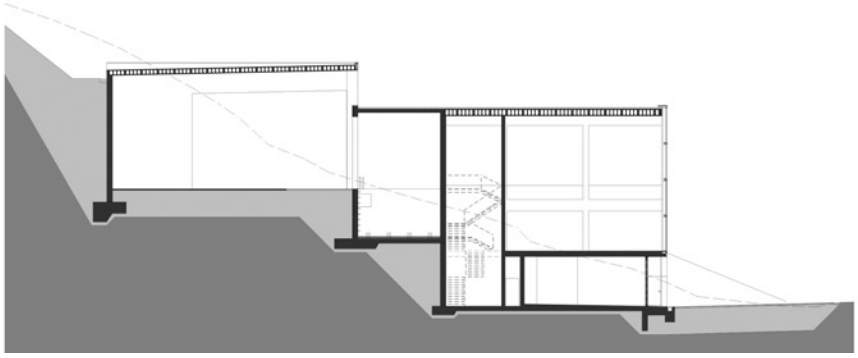
Fig. 15
Ground floor plan.

Fig. 16
External view from South.

Biomass heating plant, Zürs, 2010

The biomass heating plant Zürs is located in the countryside on the road to Lech, Austria. Integrated into an existing gravel quarry and landfill site, this area was rehabilitated by this construction project and the natural environment was partially restored. The functionality is clearly visible. The heating house is attached to the open warehouse. The topography has logistical advantages, the wood chips can be delivered to the warehouse, which is above the heating house level, and from there they can be channelled directly into the day tanks. The ash disposal takes place at the lowest point directly from the street level. The route of the bio-material can be seen in the architecture: The horizontally structured warehouse is in contrast to the downward developed heating house. To reinforce the differentiation, the warehouse is left in exposed concrete, and the boiler house in timber, as this should also be thermally insulated. The technology of the building is deliberately framed. A large glazed facade towards the connecting road to Lech shows the technical facilities. Everything seems "neat" because of the uniform color and material concept and the disciplined laying of cables and components. The color contrast between the natural timber facade of the boiler house and the exposed concrete of the warehouse will be equalized if the timber takes on the typical silver-grey color over time.

Text: Hermann Kaufmann + Partner ZT GmbH.



17

Fig. 17
Cross section.

Fig. 18
External view from South.

18

Biomass heating plant, Mellau, 2013

The Mellau biomass power plant is located on the south-eastern edge of the town near the ski lifts that lead to the Mellau Damüls ski area. The building is a compact and regular parallelepiped completely covered in wood. The cladding differs in height: at the bottom it is made of vertical slats, and completely opaque, while at the top it is formed by horizontal strips spaced from each other to allow the light to pass through. On the west side of the building, the regularity of the parallelepiped is interrupted by a small canopy that serves as a deposit for the wood chips.

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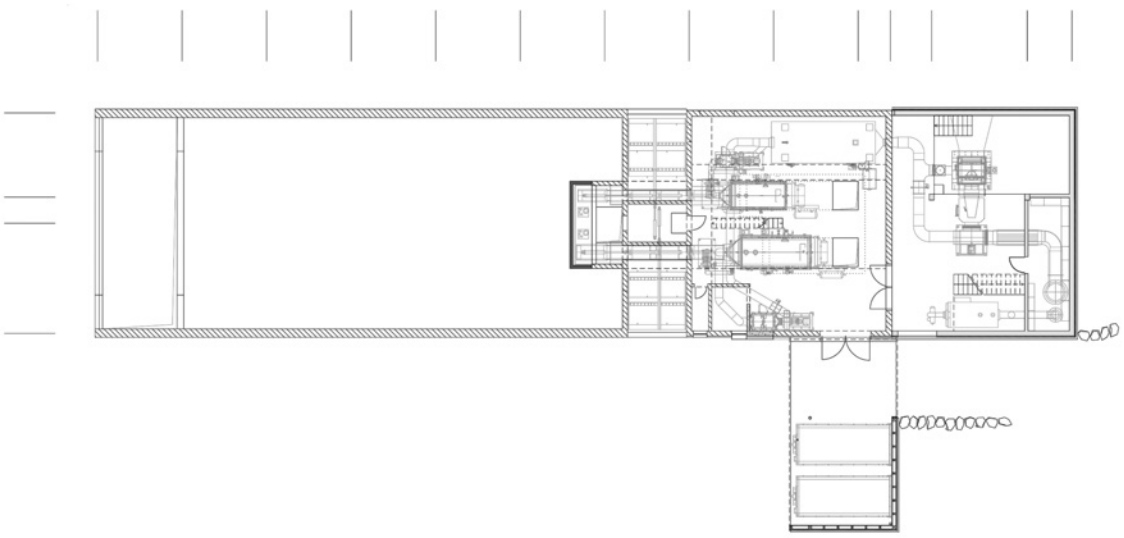


Text: Editorial board.

Fig. 19
Ground floor plan.

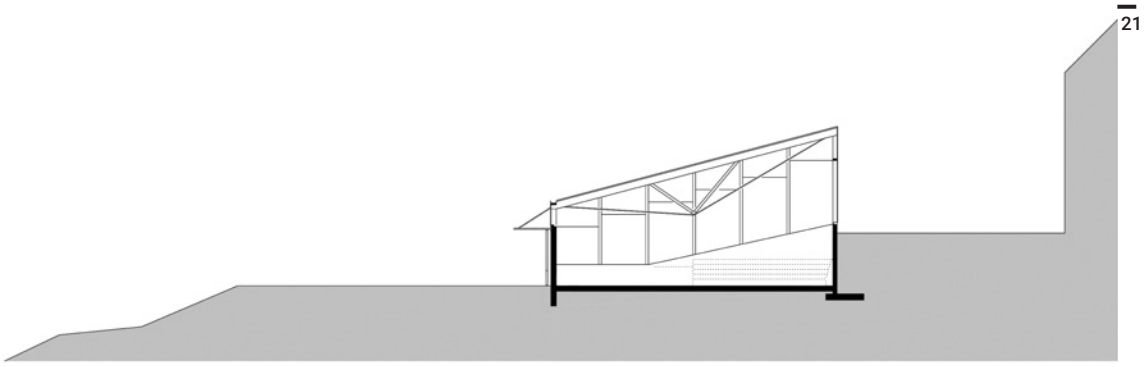
Fig. 20
General view from South.

20

Provost Residence St Gerold – Riding Hall, St. Gerold, 1997

After decades of decay, St. Gerold's Priory was carefully restored. Today it is a thriving cultural center. After the renovation of the existing facilities, it was decided to expand the complex to include a riding school for people with both developmental and physical disabilities. The new structure that houses the ridging school extends from the southwestern corner of the Priory framing the garden courtyard space. The large mono-pitched roof extends over the entire new building and gracefully follows the incline of the sloping hill. The interior of the hall is characterized by the sense of protected openness that is created by the commanding effect of the roof and the large glass panels used on three sides of the building. The visitor doesn't feel they are in an enclosed space because the building does not center around one ax, instead, it reaches outwards to the views of the surrounding trees and rolling hills.

The elegant lightness of this wooden building has been achieved through the expert, optimal use of glass, steel, and timber, working in harmony to deliver a sense of openness simultaneously with shrouded security and protection (Kaufmann, 1992). Large sliding gates open for the horses to be able to exercise and graze on a fenced paddock. The broad, projecting canopy features a skylight, giving the hall ample amounts of light, especially during the winter. Insulation was not required since the sun regulates the temperature perfectly. Timber and steel are used to their maximum effect in this project, with clear architectural intentions.



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Text: Hermann Kaufmann + Partner ZT GmbH.

Fig. 21
Cross section.

Fig. 22
External view from West.

23

Fig. 23
Detail of the structure.

Fig. 24
Internal view of the hall.

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Estate Rheinhof, Hohenems, 2006

The building is a giant timber raincoat allowing light and air to enter while keeping strong winds out. The stable for 110 animals is part of the organically farmed teaching premises of the agricultural college in Hohenems. Together with school representatives, local farmers, and agriculture officials, Kaufmann developed an efficient alternative to conventional stables with a gable roof. To allow light and air into the 46 m long and 30 m wide stable, the building envelope takes the shape, in parts, of a basilica. The pitched roof directs light into the building through vertical skylights, while providing a natural chimney effect to circulate the air. The longitudinal elevations feature un-glazed window bands under protective eaves. Translucent blinds can be lowered to protect these openings against strong wind and rain. The entire structure is built of solid timber grown locally; a new joining method is used to hold together the frame, replacing traditional glue-laminated timber. The structural system's appearance is airy and marked by a large number of unique elements. This is related to the decision to use timber from nearby forests: the length of the wood was limited to that which could be found locally. The central nave consists of pitched trusses, while the aisles are supported by simple beams. Beams made of plain-sawn timber are piled atop the primary support structure. The exterior walls were prefabricated and feature vertical sheathing and open joints, allowing air to enter without creating a draft. The office perches like a pulpit above the space, affording a view of the entire stable. In contrast to conventional stables with prefabricated metal doors that often seem stuck onto the building, here the doors have also been made of timber in keeping with the theme of the building. Altogether an exemplary teaching farm whose design has set new standards for high-quality agricultural buildings.

Text: Otto Kapfinger, *Hermann Kaufmann Wood Works*, Springer-Verlag, Wien, 2009.

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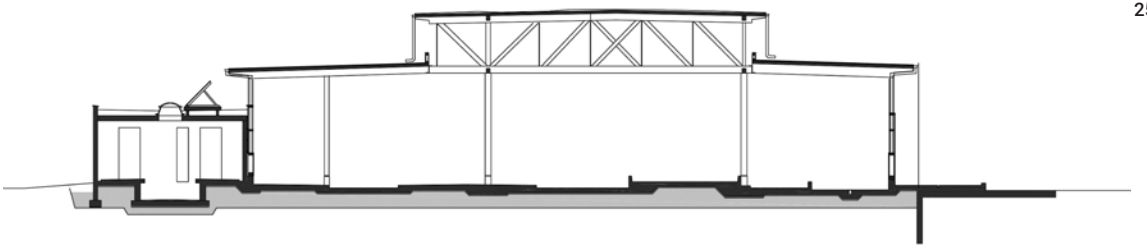

Fig. 25
Cross section.

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Fig. 26
General view from North.

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Figg. 27-28
External views.

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Recycling Centre Vorderland, Sulz, 2019
The central waste collection center in the commercial zone of Sulz enables 11 municipalities in the Vorarlberg region of Vorderland to achieve both sustainable and professional waste management. Nestled between the motorway and the main road, the basic parameters of the unit are defined by both the traffic orientation and the need for clearly structured and functional processing. The simple and concise design of the building is accessible from the south through an expansive gate. The volume has a closed facade structure against the busy traffic routes to protect against noise and emissions but opens up via the saw-tooth loading bay to the access road. It was desirable to reduce the number of materials and components used to just a chosen few, the large-scale roof construction transfers its static loads via four parallel axes. In the middle of the hall, there are three massive concrete supports, which hold the two truss girders which are made of construction standard beech with steel supports at each end. Slender glulam beams made of spruce are clamped into these, which are underpinned in the west by a filigree column construction and remaining on the opposite side, against the outer wall. The central barrel-shaped skylight strip made of laminate sheets is attached to steel profiles and lies on a timber frame. Like the foundations and the ramp elements, the problematic material stores are cast from concrete. The two office units are timber frame construction and are the only areas of the building that are thermally insulated. The closed parts of the facade are made from vertical spruce batons of differing depths, giving them a lively surface that is protected from the sun. This is accentuated by the striking openings covered in light-exposed concrete. A transparent slat wall extends on the northern side; here polycarbonate plates between the timber bars allow finely filtered light and wide views of the industrial area.

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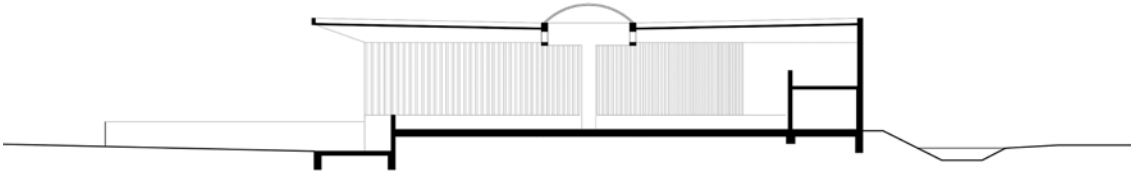

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Text: Tina Mott.

Fig. 29
Cross section.

Fig. 30
External view.

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Fig. 31
Internal view.

Fig. 32
Detail of the structure.

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