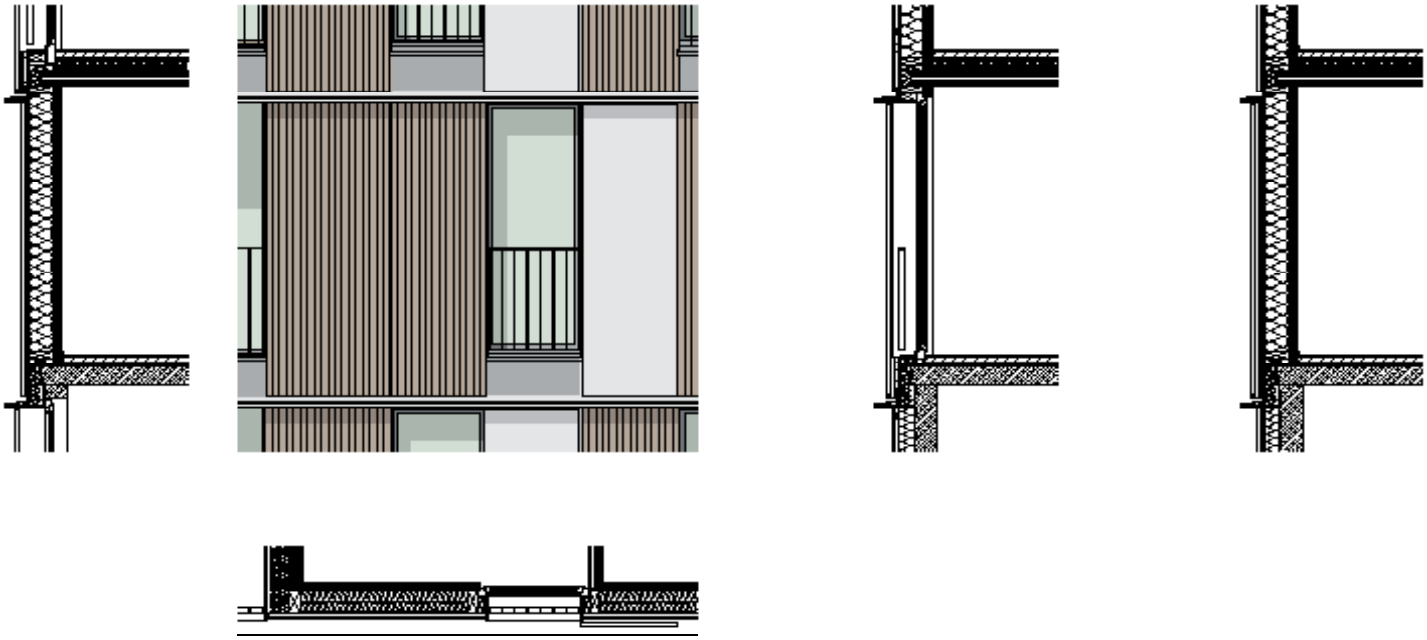


04_17

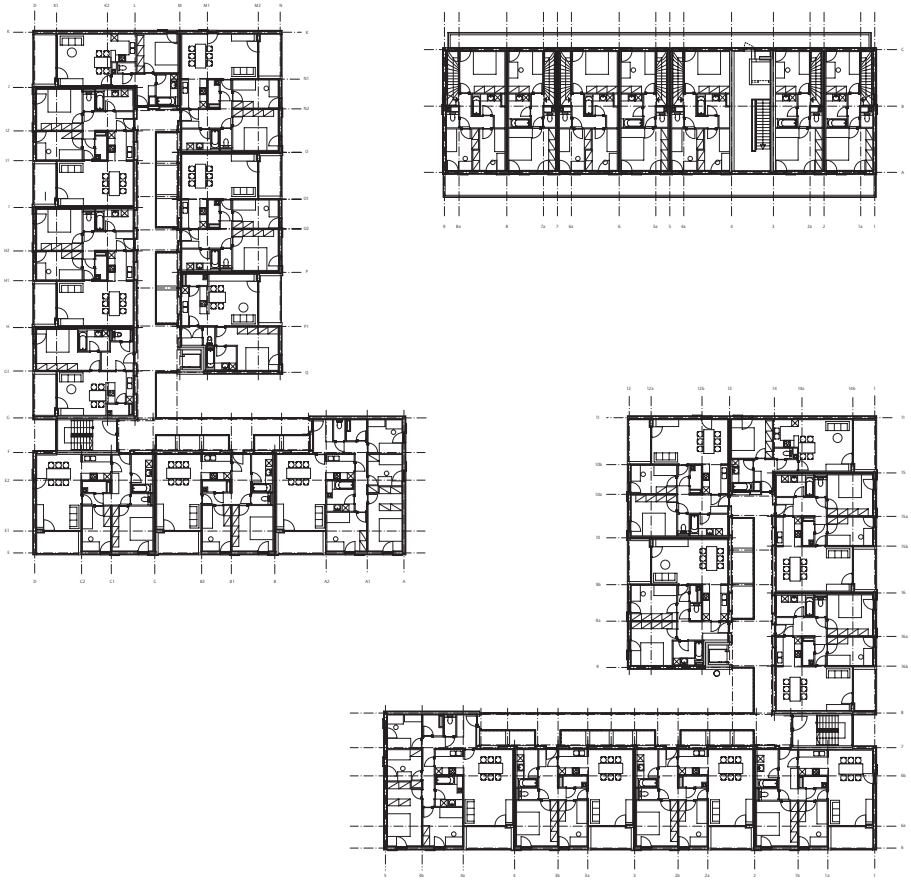
Musterelement Fassade

A project whose scale is unique in Europe; modern timber engineering's potential for complex, site-specific urban and residential design is showcased.

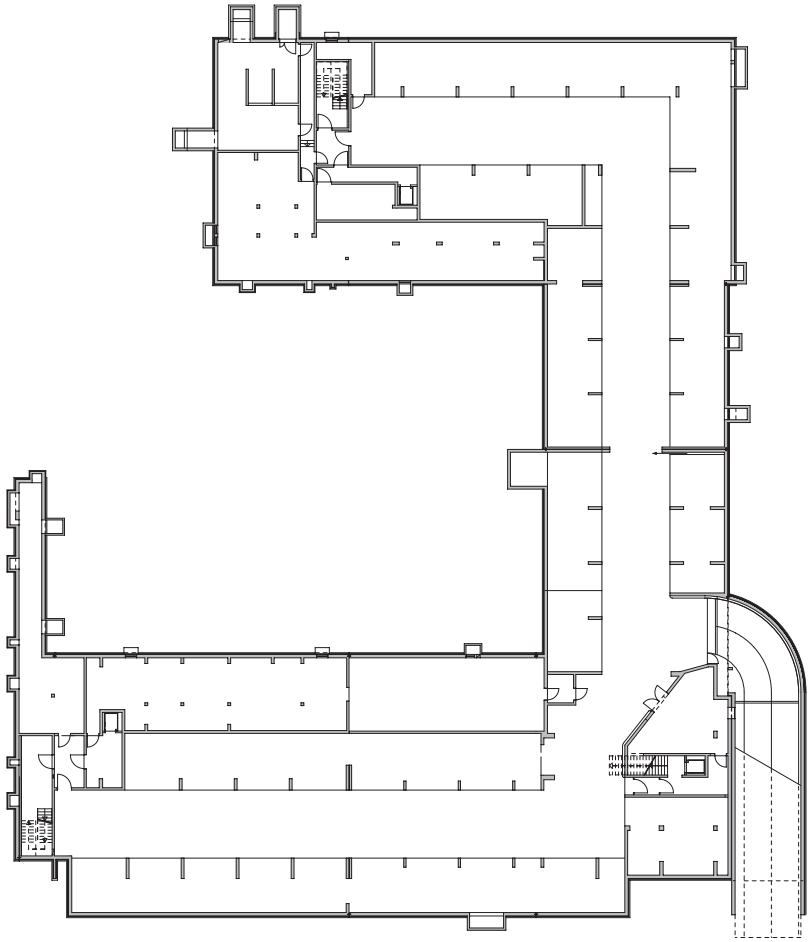
In 2003, the Vienna Land Procurement and Urban Renewal Fund invited tenders for the "timber and mixed-timber construction" of a residential complex with 250 apartments. In the context of the "Climate Protection Program of the City of Vienna", the city intended to demonstrate the feasibility of energy efficient timber structures built as affordable housing for urban settings. Only recently, the amendment of the local building regulations had paved the way for multi-story timber structures to be subsidized within of the city's social housing program. Selected from the public competition was – in a addition to projects by Hubert Riess and Dietrich/Untertrifaller – the proposal authored by Johannes and Hermann Kaufmann. Their design provides for a clearly structured, spatially sitespecific and highly differentiated link between the west-facing residential buildings from the 1960s and the adjacent green space to the east. The proximity to the plot boundaries and the arrangement of the volumes provide for an inner courtyard area which, despite its clear structure, is open to its environs. Thus, the transition to the landscape of the surrounding Marchfeld area of Vienna is not strictly delineated. The open space flows evenly through the residential complex and forms a tranquil, sunlit playground which benefits the existing houses on the opposite side as well. The apartments – oriented to the south and the west – are housed in four-story wings and feature large loggias that provide for privately used spaces. To keep with the scale of the surrounding structures, the architects refrained from building an additional rooftop level. The circulation typology is suprisingly rich in texture: two apartment wings are placed at differing angles, whereas one wing in each is double-loaded. The third building on the north edge is an elongated block-type structure which houses duplex apartments. The building entrances connect the courtyard to all sides. All three upper floors are made of large prefabricated, laminated timber panels, while the basement is built of concrete and brick. The vertical loads are carried by insulated apartment partition walls and by the interior walls. Sound-absorbing floorplates are designed as continuous beams and extend above these transverse walls; their underside forms the finished ceilings. The longitudinal facades, which are broken by numerous openings, are constructed out of highly insulated framed panels, on the inside sheathed in plasterboard and on the outside with rear-ventilated, larch board cladding. The un treated facades are the external expression of the pure wooden structure of the building, and are combined with colored shutters. Thanks to the flush mounted surfaces, the timber facades will weather evenly, turn gray and, together with the shutters and loggias, offer an even more intense play of colors. In order to meet the required fire safety standards, fire tests were conducted using prototypes of the timber facades. Instead of using expensive hard oods, through the use of a 15 cm fire protective overhang between floors, it was possible to achieve the requisite fire rating using larch. These horizontal, wooden string courses are sheathed in sheet metal and serve as the supports and guides for the sliding shutters. The wooden cladding of the loggias is not carried around the corner to cover the surfaces of the walls, as experience has shown the weathering of such details produced extreme contrasts on the exterior surfaces. Another novelty is the use of weatherproof, prefabricated, laminated timber elements, in order to ensure the construction quality on the building site. The exterior access balconies are designed as steel structures and are positioned in front of the timber structure. They are equipped with non-flammable decks, made of precast concrete. The projected heating energy consumption of 36 kWh/m2 a per annum conforms with energy efficiency guidelines. About half of the hot water is produced using a solar heating system. The generated energy savings correspond to the heating energy consumption of nine highly insulated single family houses.

04_17

Grundriss Erdgeschoss



Obergeschoss



Untergeschoss

04_17

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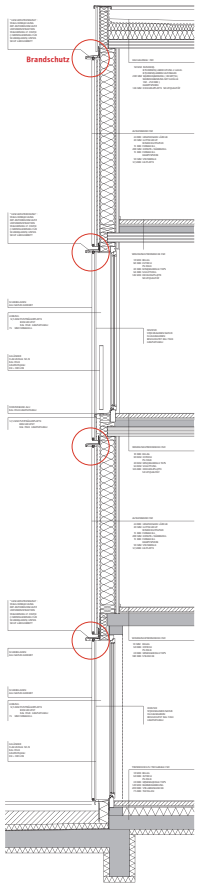
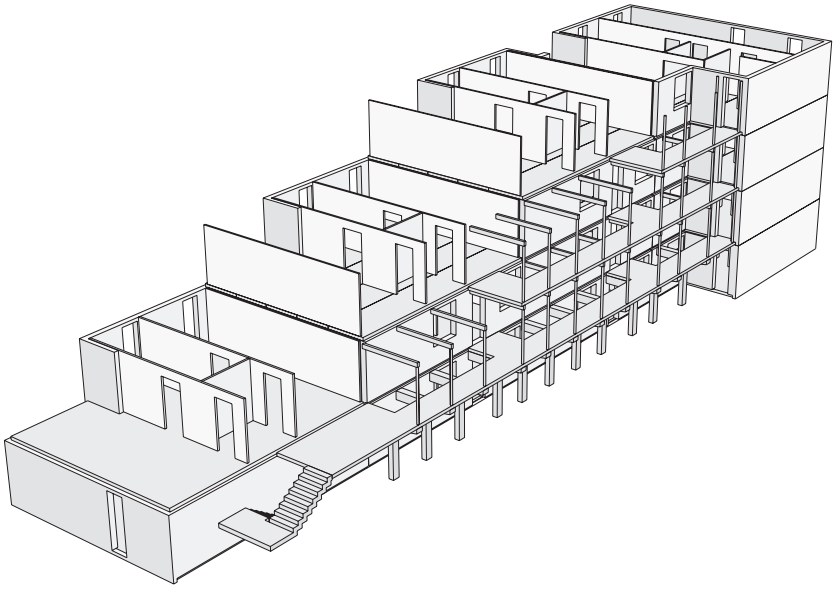
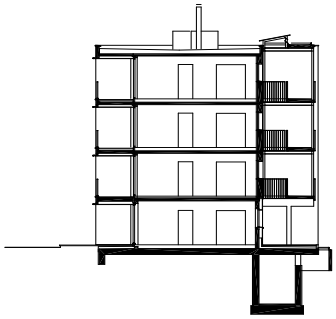


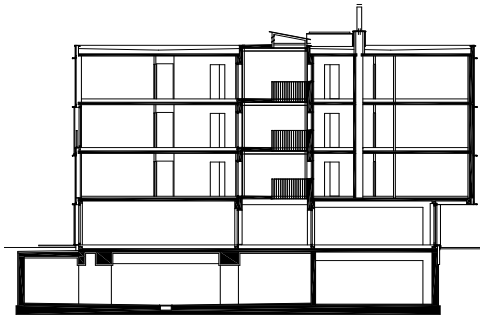
Fassadenschnitt



Konstruktionsperspektive



Schnitt A2



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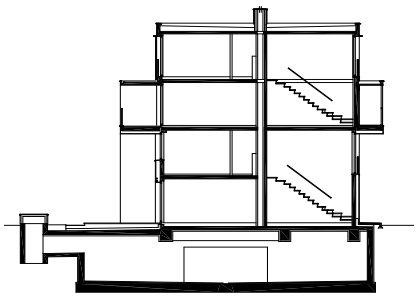


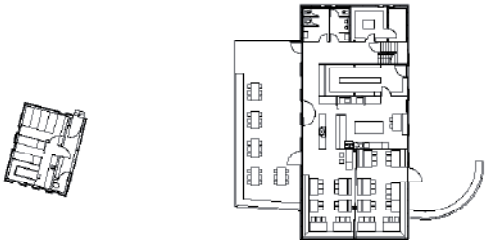
Schnitt L

Mountaineer lodge located at an altitude of 2400 meters, constructed from prefabricated glue-laminated timber; 350 items delivered by helicopter, erected in three days.

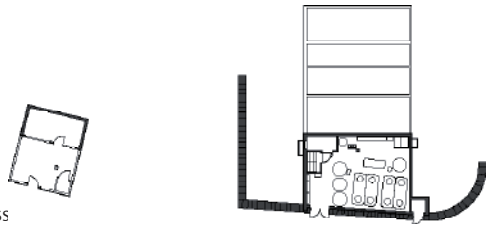
For more than a hundred years, a shelter had been standing at this exposed location high above the "Schlegeisspeicher" reservoir; opposite it were the glaciers and the mountain tops of the Zillertal Alps. Since refurbishment of the old building was impossible, in 2005 the decision was made to build a new one. The architect's office Kaufmann, with its motto of "innovation through simplicity", won the invited architectural competition. Hermann Kaufmann: "High elevation construction did and still does depend on the availability of transportation. The old hut was made of stones from the surrounding area. The transport of large quantities of construction material from the valley was not feasible in those days; the labor-intensive stone masonry was cheaper. Modern means of transportation, such as the helicopter, have changed things. Prefabricated construction materials, together with the new possibilities provided by glue-laminated timber allow for easy transport. Furthermore, they can be quickly assembled, which is an important aspect in high elevation construction. In addition, the physical qualities of timber allow for direct and optimal ecological construction: The glue-laminated timber panels have both load-bearing and insulation properties. Extra insulation – the hut is only open in the summer – was not required. This pure timber structure without insulation materials, cladding etc. can – plainly spoken – just rot up there. Due to the harsh weather conditions, we have shingled the outer surfaces and in a few years, the grayed wood will have entered into dialog with the surrounding world of stone."
Kaufmann deliberately designed the hut as a refuge and not as a hotel. It is a summer hut; the comfort is commensurate with the expectations reasonable for such a location. The entrance and bedrooms are unheated. The building utilities are limited to a minimum; a tiled stove and the waste heat of the photovoltaic and canola oil powered CHP used for water purification both supply the building with heat. The motto of "innovation through reduction" is already reflected in the typological approach. A compact structure with a pitched roof, cantilevered over a retaining wall towards the reservoir, has replaced the old building. The concrete base, which has been clad with stone from the surrounding area, has been backfilled with rubble from the demolition, the house itself consists of glue-laminated spruce timber. The outer walls of the ground floor act as support plates and are, in order to reduce the load on the cantilever, hinge jointed to the base. Mounted to these cantilevers is the large-format picture-window on the gable wall. Suspended from this are the floor plates of the restaurant. The bracing is provided by the floor plate and by the roof, which also acts as a slab. A small, thermally insulated auxiliary building serves as winter shelter and accommodation for selfcaterers.

05_28

Obergeschoss



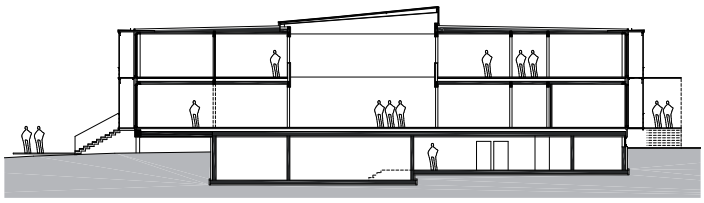
Erdgeschoss



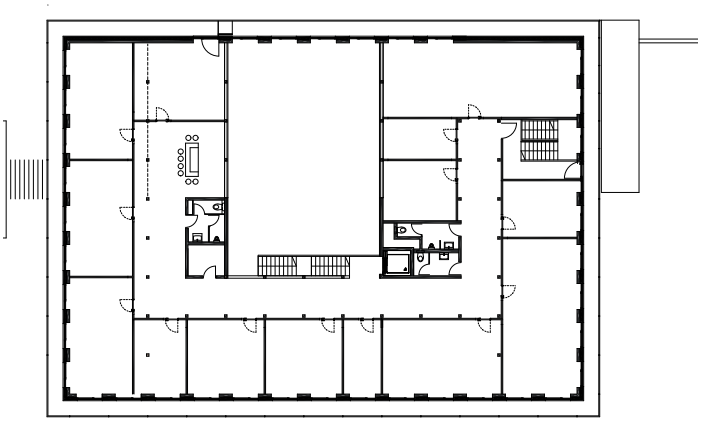
Untergeschoss

Un refuge alpin pour randonneurs, à 2400 m d'altitude, construits d'éléments en contrecollé-croisé prédécoupés, 350 éléments livrés par hélicoptère, assemblés en 3 jours.

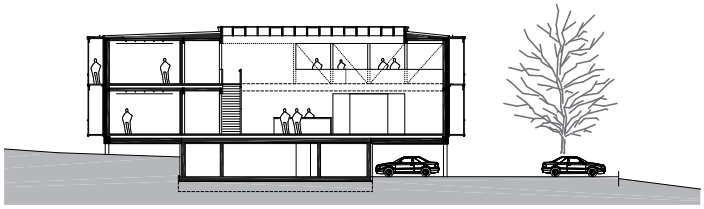
Depuis près de 100 ans un refuge était dressé ici en un endroit très exposé au dessus du lac de barrage « Schlegeisspeicher », face aux glaciers et sommets des Alpes du Zillertal. Comme il n'était plus possible de rénover ce bâtiment ancien, on décida en 2005 de le construire à neuf.
L'agence Kaufmann gagnèrent le concours d'architecture avec la devise : « l'innovation par la simplicité ».
Hermann Kaufmann : « Construire à cette hauteur était, et est toujours d'abord une question de transport. Le vieux refuge était bâti avec les pierres des alentours, les gros transports depuis la vallée étaient autrefois impossibles, et l'ouvrage maçonné était laborieux mais moins cher. Les moyens de transport modernes comme l'hélicoptère ont inversé cela, et la construction préfabriquée avec les nouvelles possibilités du bois contrecollé-croisé, avec sa facilité de transport hors concurrence et la rapidité de montage, ce qui est important à une telle altitude. Les qualités physiques du bois permettent une construction directe, écologiquement optimale : les éléments en panneaux de contrecollécroisé sont à la fois porteurs et isolants – une isolation supplémentaire n'était pas nécessaire, le refuge ne servant qu'en été. Cette construction pur bois, sans isolants ni matériaux d'habillage etc., peut – franchement – pourrir là haut sans problème. A cause des intempéries extrêmes, nous avons fait protéger toutes les façades en bardeau, et en peu d'années le bois grisonnant aura établi son dialogue avec le paysage de pierres ».
Kaufmann a délibérément fait de ce chalet un refuge, pas un hôtel. C'est un refuge d'été, le confort offert est proportionnel aux attentes à cet endroit, les circulations et les dortoirs ne sont pas chauffés. L'installation technique est réduite au minimum, le chauffage se fait par un poêle de masse en faïence et les excédants thermiques produits par l'assainissement de l'eau alimenté par un couplage chaleur-force par photovoltaïque et huile de colza. La devise « l'innovation à travers la réduction » apparaît déjà au niveau de l'approche typologique. La nouvelle construction pose un volume compact à pans de toit raides à la place du vieux refuge, avec un important porte-à-faux côté vue sur la vallée, dépassant de loin le mur de soutènement. Le socle de béton, camouflé avec des pierres des environs, est rempli de débris de la démolition, la bâtisse ellemême est faite de panneaux de contrecollé-croisé d'épicéa. Les murs extérieurs au rez-de-chaussée forment des plaques porteuses, qui soulagent le porte-à-faux par leur ancrage au socle. Sur ces plaques est fixé l'allège de l'énorme baie vitrée du mur pignon, et l'allège retient les éléments plancher de la salle du refuge. Le plancher d'étage et le toit à effet de plaque contribuent au contreventement de l'ensemble. Une petite dépendance qui, elle, est bien isolée du froid sert de d'hébergement sans services en hiver.



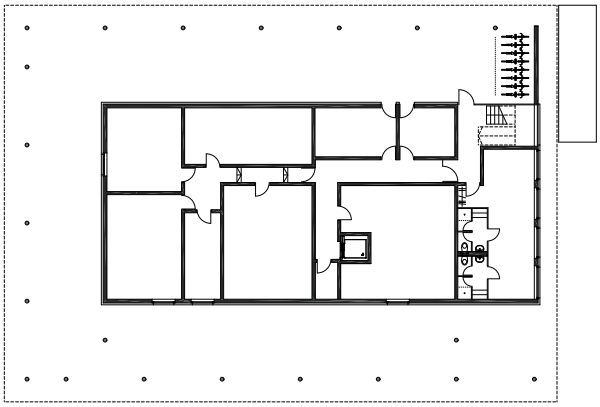
Schnitt 1-1



Obergeschoss



Schnitt A-A



Untergeschosss

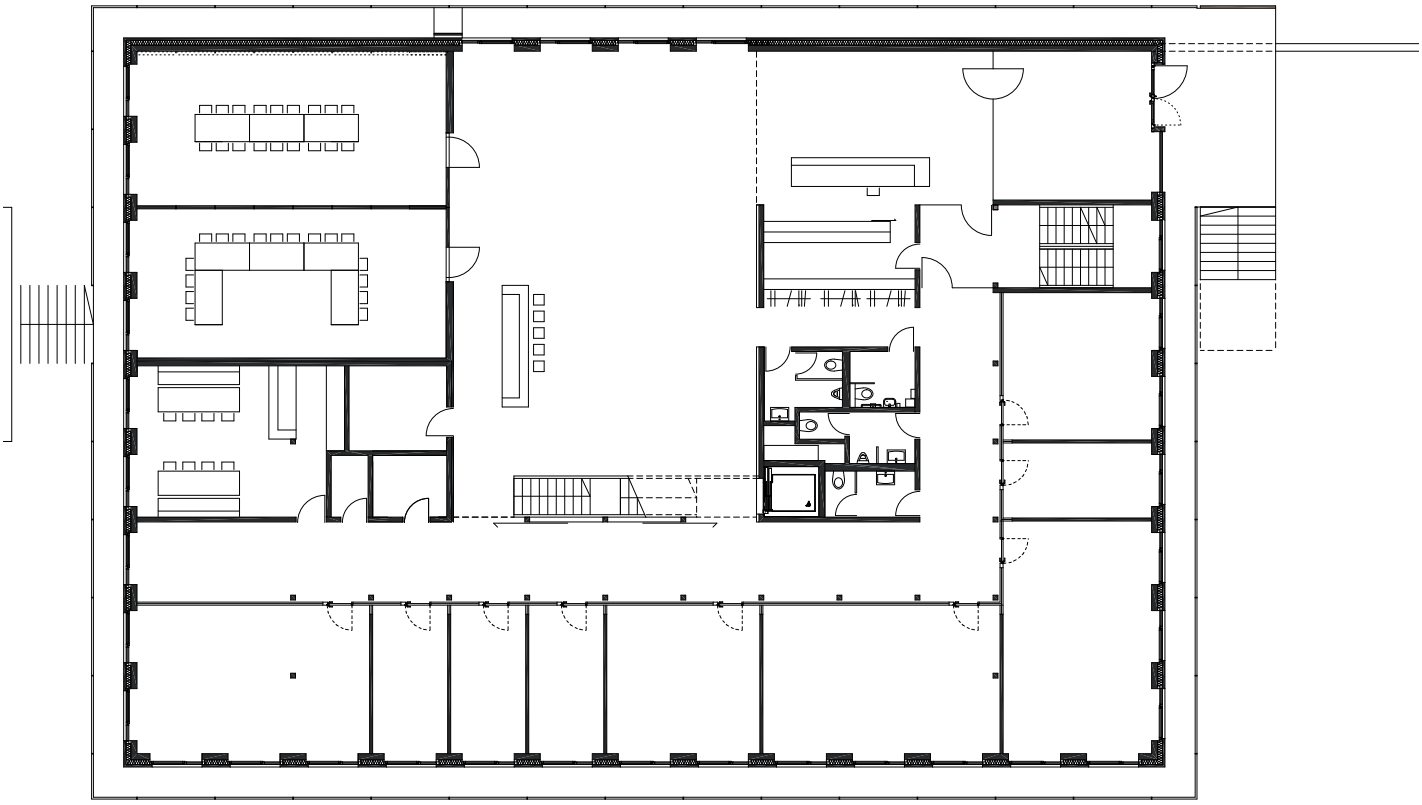
Matériaux bois issus de la propre production, transformés en structures porteuses massives ne nécessitant aucun revêtement.

Le siège de cette entreprise de transformation du bois implantée en Autriche, en Suisse et en Allemagne, fait démonstration d'une construction innovatrice, extrêmement économique et flexible, en lamellé-collé d'épicéa de sa propre production. L'architecture est conçue de façon à ce que d'une part il y ait un minimum d'éléments constructifs différents, et que d'autre part on obtienne une optimisation des éléments en bois massif. Le but était un bâtiment « simple », avec peu de couches dans le mur de façade, tout en optimisant la capacité d'emmagasinage thermique de la construction bois, et sans gêner la polyvalence spatiale et fonctionnelle. Un bâtiment principal de deux étages à larges porte-à-faux est posé sur le socle de béton. Une trame structurelle de 2,58 m met les critères constructifs et fonctionnels en accord. À l'intérieur, suivant cette trame le long de la « périphérie » des murs extérieurs, se dressent des poteaux plats de bois lamellé-collé de 86 cm de large (un tiers de la mesure de la trame) avec une isolation en fibre de bois. Des poutres en bois lamellé-collé y viennent en appui et reçoivent des éléments de plancher en bois lamellé-collé, eux aussi en 86 cm, qui tendent une portée au double de la trame. La salle de réunion sans appuis intermédiaires (quatre sur quatre mesures de trame) à l'étage principal est tendue d'une structure à hauteur d'étage. Le toit d'une seule pente de l'atrium central de deux étages est à nervures en lamellé-collé, (8 cm sur 1,80 m). L'architecture, simple et archaïque, composées de grands éléments de bois d'aspect homogène, est enveloppée d'un « manteau » d'auvents et de balcons en contrecollé-croisé, suspendus dans la trame par des tirants d'acier. Cette enveloppe extérieure constitue un tampon face à la rue, porte les stores mobiles, protège les façades de bois non traitées tout en offrant un accès à l'air libre depuis chaque espace.

The company's own products were used for a prefabricated framework of solid timber that needs no further sheathing.

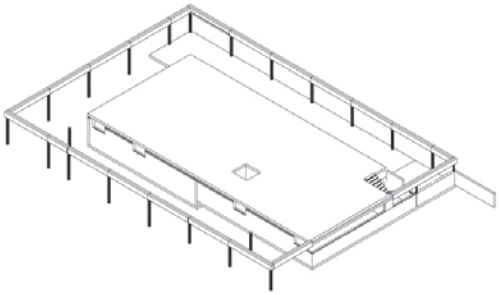
The headquarters of this woodprocessing enterprise, with offices in Austria, Switzerland and Germany, features a novel, extremely economic, flexible construction made of spruce gluelam from the company's own production. The architecture was designed using only a minimum of different building materials, while employing an optimal amount of solid wood elements. The objective was to build a very simple structure with minimal wall assembly, while maximizing the heat storage capacity of the wooden structure and improving the spatial and functional qualities of the building. The cantilevered two-story main structure sits atop a concrete base. 2.58m was used as structural module to meet both constructive and functional needs. On the inside the glue-laminated wood supports are dimensioned according to this module, while 86 cm wide slab-type gluelam supports (one-third of the structural module) with wood-fiber insulation were arranged along the exterior walls. Glue-laminated wood girders rest atop the structure, carrying 86 cm wide laminated wood ceiling elements that span the double unit spacing.
The conference room on the main level is column-free. The monopitch roof of the central, two-story atrium features gluelam ridges, which are only 8 cm wide and up to 1.80 m long. The archaic and simple architecture consists of large-scaled volumes with homogenous wooden finishes and is cloaked in cross-laminated timber canopies and balconies, mounted with steel strips within the structural module. This exterior layer forms a protective barrier against street noise; it carries mobile solar-shading elements, and protects the untreated wood facade, while letting you step outside from every room in the house.

07_20

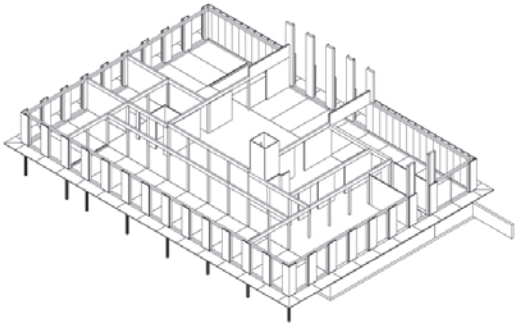


07_20

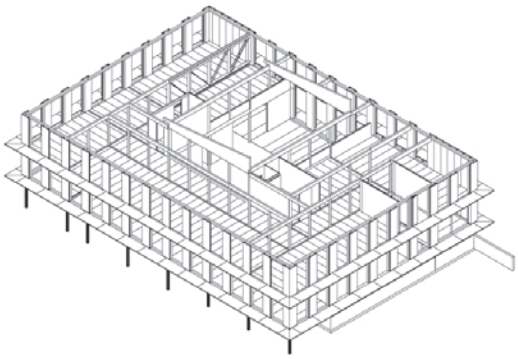
Erdgeschoss



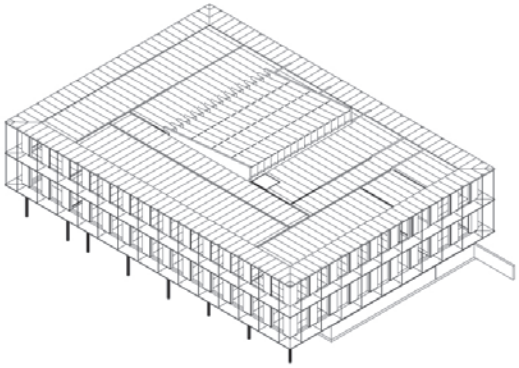
UG - Unterzüge



EG - Konstruktion

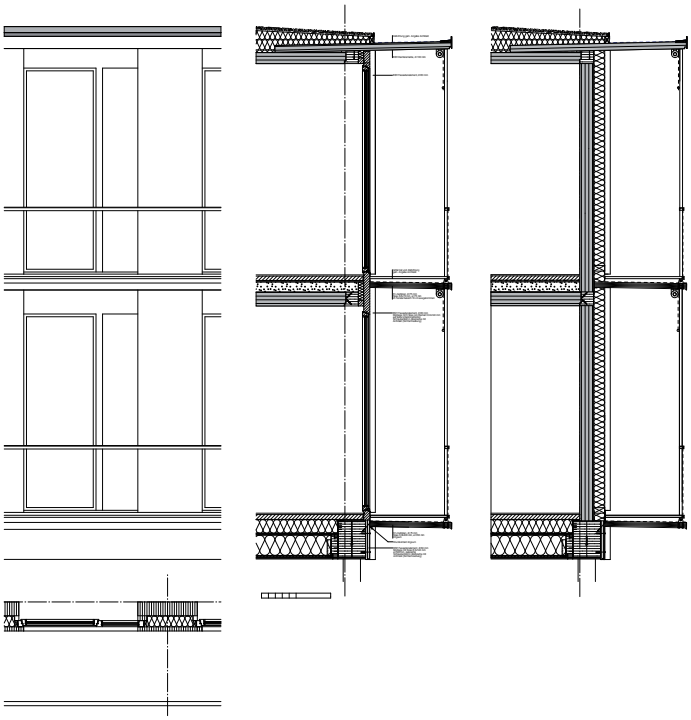


OG - Konstruktion



Gesamtisometrie

Axonometrien



Fassadenschnitt

Description
Sohm Holzbau Expansion ("Sohm Timberwork" Company)

The company Sohm in Alberschwende, Bregenzerwald – an innovative and growing enterprise for timberwork – had the possibility to expand on newly–purchased land. The strongly sloping land allowed for the integration of storage space and a new heating installation in the basement and for the construction of a covered, but open, multi-purpose hall with associated two-floor office area on the ground floor.

The challenges when elaborating the design were, on the one hand, the formal adaptation to the irregular land and, on the other hand, the architectural connection of the extensive, open factory workshop with the small office building.

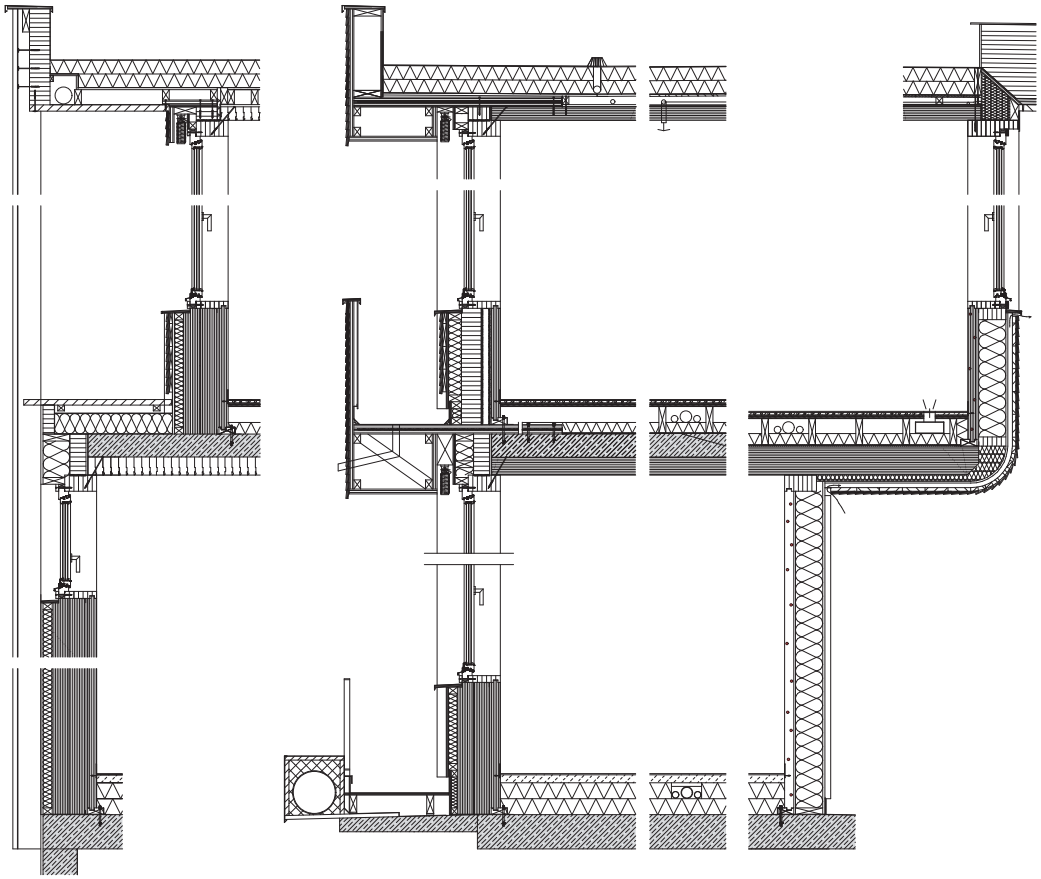
A shell of standing wood slats with clamped Plexiglas calms the whole ensemble and reacts precisely to the predetermined geometry of the land.
The rounded edges enhance the concept of enveloping.

The roof of the open hall rests on the office building, which is made completely out of wood and which is placed on a massive elevated ground level.
The company Sohm produces so-called anchor wood elements, meaning solid wood elements which are not bonded, but connected with diagonally drilled beechwood anchors. The office building is completely constructed with such elements which form the overall impression of the interior rooms. The natural finished wood without bonding guarantees a healthy working atmosphere.

This is an example of a modern timber construction on the technological level of our times which puts innovative approaches to the traditional solid wood construction in a new perspective.

07_43

Grundriss EG + OG



Detailschnitte