

# HÖRNLIHÜTTE

MATTERHORN – CH





The ecosystem in the High Alps is delicate and has to be handled with great care. Constructing a building here posed a special challenge for the architects. The conversion and the renovation of the Hörnli Lodge in the Valais Alps were supposed to accomplish exactly what careful mountaineers do: Efficiently and robustly navigate a challenging terrain under difficult climatic conditions while always treating nature with great respect. The Zermatt-based architects of arnold perren zurniwen faced this challenge and created a trailblazing, exemplary lodge design.



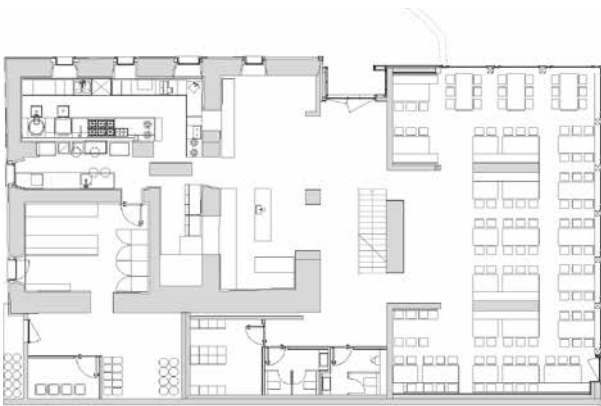
↑ The annex radiates a pleasant warmth and openness in the rough high mountain terrain.

# TRAILBLAZING LODGE DESIGN

Amidst the Valais Alps, between Zermatt and Breuil-Cervinia, the Matterhorn towers above its surroundings as one of the Alps tallest mountains (4,478 metres above sea level). Due to its striking shape and its history, it is one of the world's most famous mountains. Edward Whymper managed the first ascent of the Matterhorn on 14 July 1865. The Hörnli ridge turned out to be the simplest and most popular route for the ascent, which is why the first lodge was built there in the current location in 1880 as a base camp. The lavish Hotel Belvédère followed in 1909. The Swiss Alpine Club had the lodge torn down and rebuilt in 1964.

Over the following decades, the building was rebuilt, renovated and expanded multiple times to meet the increasing requirements. From 1982, it has provided room for 170 mountaineers. Still, time has left its mark and the accommodations had to be adapted to modern standards regarding safety, hygiene, environmental compatibility and functionality. That is why, on the occasion of the 150th anniversary of the first ascent, the building was converted and renovated completely – the goal was to merge the lodge and the hotel into a state-of-the-art ensemble bearing the name “Hörnli Lodge”.

Floor plans  
(ground floor and 1st floor)



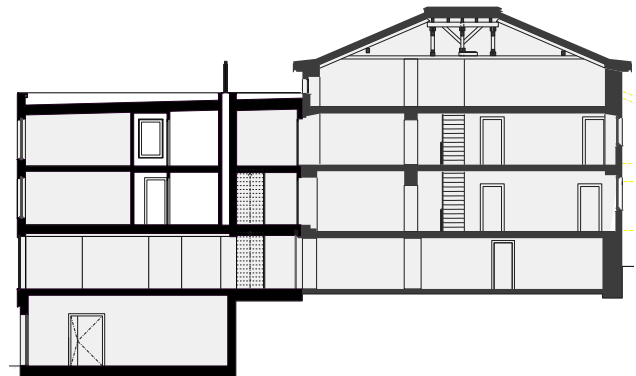
Construction at 3,000 metres  
above sea level



Hans Zurniwen and his Zermatt-based architecture office arnold perren zurniwen were directly tasked with the modernisation job. “A mountaineer served as the model for the renovation of the Hörnli Lodge”, said Zurniwen. “They are a symbol of something whole that works as an efficient system”. A mountaineer is a robust fellow who reaches his destination in challenging terrain and difficult climatic conditions and returns to his starting point. In that spirit, it wasn’t the individual components of the building – its envelope, the building services or the energy generation – that were pushed



The dark aluminium facade of  
the annex blends into the col-  
our scheme of its surroundings.





## MOUNTAINEERS SERVE AS A MODEL FOR THE OPTIMISATION OF THE OVERALL SYSTEM

to the limits. Instead, the goal was the optimisation of the system as a whole while taking into account all interdependencies and dependencies between the individual elements”.

The design for the new Hörnli Lodge envisaged the demolition of the historic lodge and the careful renovation of the Hotel Belvédère, which would be connected to a state-of-the-art wooden building. The construction of the more-than-100-year-old hotel was retained and integrated into the conversion. The annexes and auxiliary facilities, which had been built

nearby since 1911, such as the external lavatory and generator buildings, the dining hall on the western side, the lodge maintenance area that faces the mountain and the wet cells in the east, were demolished. The foundation of the historic lodge serves as a helipad.

In order to preserve the lodge’s history, the old quarry stone walls were partially laid bare. The new Hörnli Lodge is an interplay of the past and modern technology. The newly constructed part of the lodge exemplifies a trailblazing lodge design.



# UNTREATED SPRUCE WOOD DOMINATES THE INTERIOR OF THE LODGE

The ageing Hotel Belvédère received a complete makeover. The reception area and the kitchen are located along the large terrace on the ground floor while the upper floors house the guest rooms and wet cells. The four-storey building was given a pre-fa-aluminium facade. The building services are located in the concrete basement, the 130-seat dining room with a 180° panoramic view on the ground floor, and the bedrooms on the top two floors. The ground floor of the annex, which was given an open design,

is home to a construct made of untreated spruce. Even though the material radiates warmth and creates a sense of well-being, it was selected for more pragmatic reasons. The robustness, simplicity and light weight of the wooden construction are owed to the fact that all materials had to be flown to the construction site piece-by-piece by a helicopter. That is why sturdy spruce supports frame the exterior walls of the dining hall, while binder beams and reinforcing wall elements structure them.



# AUTONOMOUS WATER AND POWER SUPPLY OF THE HÖRNLI LODGE

## Client

Hörnlihütte foundation (civil community of Zermatt)

## Architects

architektur + design, arnold perren zurniwen,  
Zermatt, CH

## Civil engineer

Labag AG, Zermatt, CH

## Wood construction engineer

Indermühle Bauingenieure, Thun, CH

## Construction company

Sulag AG, Zermatt, CH

## Location

Matterhorn (3,260 metres above sea level),  
extension of the Hörnli ridge

## Completion

2015

## Floor space

1,421 m<sup>2</sup> (annex: 785 m<sup>2</sup>, existing: 636 m<sup>2</sup>)

## Schöck products

Schöck Sconnex® Typ W

## Photos

Photographie Michel Bonvin

Since the Hörnli Lodge is not connected to public utilities, its operation has to largely rely on an independent water and power supply. Sustainability was the focal point of the reconstruction. Therefore, resources like solar energy and water naturally had to be used intelligently, pollution had to be reduced and new fire protection measures implemented.

There is no source of water near the Hörnli Lodge that can be used year-round. Prior to the reconstruction, meltwater was collected in three different spots and transported to the lodge with the help of a petrol-operated pump. Now, there is only a single collection location in the south, which is also where a natural meltwater pond can be found. The water is stored in an underground tank. From there, it is pumped to the lodge, where it is filtered and disinfected. The Hörnli Lodge now also features a state-of-the-art sewage concept: Unlike before, the sewage no longer reaches the northern flank untreated. Instead, the cleaned water from showers and the kitchen is used as grey water for the toilets. Then, the sewage from the lavatories is routed to the sewage treatment plant in Zermatt.

Prior to the conversion, the Belvédère was not fully insulated and a wood stove was used to heat the common room. A diesel generator supplies the electric power, liquid gas was used for cooking and the water heater, and car batteries operated the radio and the phone. Today, the tilted hotel roof has been equipped with solar panels. At the same time, the masonry of the building envelope, which has an exterior insulation, serves as a thermal storage unit that transfers the solar energy absorbed during the day to the interior at night. In addition, a pellet oven was integrated to provide warmth on cold days. The supplied energy per overnight stay has been cut in half following the renovation.





## HIGH CONSTRUCTIONAL AND STATIC DEMANDS IN THE HIGH MOUNTAINS

The visible base level of the auxiliary building, which was constructed using poured in-situ concrete, rests on geologically formidable rock formations. Special care had to be taken to ensure that the valuable warmth used for heating the building interior does not reach the cold ground unimpeded. The goal was to reduce thermal bridges to a minimum. Schöck Sconnex offered an optimal solution because it innovatively closes the last major thermal bridge of buildings and directly and sustainably insulates reinforced concrete walls.

The entire basement of the new building was designed as concrete tanking with static and reinforcing concrete elements on the

inside. Schöck Sconnex was used for the wall connections at the transition from warm to cold building parts. These connections between concrete elements met the highly challenging static demands found in the high mountains as well as the required optimal thermal separation between building elements.

At the same time, Schöck Sconnex ensures a healthy interior climate and significantly reduces the risk of structural damage, which is extremely important in this delicate terrain.

With the renovated and converted Hörnli Lodge, the architects created a very well-executed building ensemble that is raising the bar in all areas of lodge design and could serve as a model for additional buildings.



The old stairs on the top floor of the hotel were retained with a slightly adapted look.



### **SCHÖCK SCONNEX®**

The new Schöck Sconnex family of products insulates reinforced concrete walls and supports directly in the connection detail to the base plate and the ceiling. By using Schöck Sconnex, the problem of thermal bridges can be solved in a manner that is constructionally optimised and visually appealing. This reduces thermal bridges and allows for an uninterrupted design of the thermal insulation layer – and in many cases even at lower costs. The Schöck Sconnex Type W insulating element for reinforced concrete walls was used in the Hörnli Lodge. Schöck Sconnex Type P is used for reducing the thermal bridge at reinforced concrete supports. The third product of the Sconnex family is the thermal insulation element Type M for masonry walls.