



PROJECT REPORT NO. 1/2015

FRIALEN – for a reliable supply of water
on the “King of the Alps”

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EXPEDITION TO THE MATTERHORN **THE NEW SUSPENDED LINE TO THE FAMOUS HÖRNLI HÜTTE**

On 14 July 2015, exactly 150 years after the first ascent of the Matterhorn, the Hörnli Hütte will be reopened after extensive renovations and will again offer mountaineers accommodation at the foot of the “King of the Alps”.

In cooperation with FRIATEC AG of Mannheim and assisted by its products FRIALEN, FRIAMAT, and FRIATOOLS, Aliaxis Utilities & Industry AG is making an invaluable contribution to the extensive modernisation of this historic hut.

Measure: Construction and routing of a hard-to-service suspended line for the supply of water and collection of waste water as part of the complete renovation of the Hörnli Hütte, Zermatt

Place: Hörnli Hütte on the Matterhorn, Zermatt, Switzerland

Installation and assembly work:

Ch. Brantschen AG, Zermatt, Switzerland
Lauber IWISA AG, Naters, Switzerland

Developer: Stiftung Hörnlihütte 2015, Zermatt, Switzerland

Project Manager: Pascal Zenhäusern

THE MOUNTAIN OF MOUNTAINS

THE MATTERHORN

The Matterhorn is a legend. Towering 4478 metres into the air, this impressive mountain and its extraordinary shape are the symbol of Switzerland, a tourist attraction, and a unique challenge to mountaineers.

150 YEARS AFTER THE FIRST ASCENT

The Matterhorn is a mountain for conquerors. Virtually no other entrance to the Alps is more difficult, more dangerous, or more spectacular.

It demands courage, skill, and endurance. Zermatt and the whole of Switzerland will be celebrating in 2015 the 150th anniversary of the Matterhorn's first ascent on 14 July 1865. Until this historic date, the Matterhorn was renowned as the unconquerable "King of the Alps". Also the first ascent took its toll of lives. Even today, the ascent to the peak remains a great challenge.

THE HÖRNLI HÜTTE

At 3,260 metres, directly at the foot of the Matterhorn, the Hörnli Hütte serves mountaineers as a starting point for their ascent and as a refuge from sudden changes in the weather. It was named after the Hörnli ridge, the route taken most often for the ascent to the Matterhorn peak.

The Hörnli Hütte was built in 1880 as simple accommodation with seventeen sleeping berths. In 1911, the citizens community Zermatt Burgergemeinde built further accommodation directly nearby, the Berghaus Belvédère.

GROWING DEMAND ON THE MOUNTAIN

The last few decades have seen a continuously growing number of mountaineers on the Matterhorn and a corresponding growth in their needs for suitable infrastructure. In order to cater to these, both huts were converted several times, and since their last renovation and expansion in 1982 now offer room for 170 mountaineers.

ANCIENT STRUCTURES

Over thirty years after the last renovation work, both the Hörnli Hütte and the Berghaus Belvédère no longer fulfilled modern environmental, energy, and sustainability standards - nor the needs of modern day mountaineers.

STATE OF THE ART FOR THE ANNIVERSARY

In the anniversary year 2015 celebrating the first ascent of the Matterhorn, the Zermatt Burgergemeinde will be taking this occasion to join forces with the Stiftung Hörnlihütte 2015 and merge the Hörnli Hütte and the Berghaus Belvédère, convert and renovate them thoroughly according to modern guidelines, and

elevate them to the state of the art. Starting in 2013, the conversion work focuses on sustainability and reliability. Priority was given to a good energy balance, minimised pollution to the environment, and specifically the realisation of an eco friendly concept for water supply and water disposal.

From 2015, the Hörnli Hütte will be able to provide most of its water and energy itself. The total renovation costs will amount to about eight million Swiss francs.



Kurt Lauber, the keeper of the Hörnli Hütte - the man for all seasons

ARDUOUS COLLECTION OF WATER

Near the Hörnli Hütte, there is no source that could safeguard the year round supply of water. All water needed must be collected laboriously from three places on the Matterhorn:

directly at the entrance to the Matterhorn, north of the entrance, and to the north on the Matterhorn Glacier 3,100 metres above sea level. In addition, there are melting facilities that the hut keeper has to fill manually with snow. The collected water is then conveyed with petrol fuelled pumps through a suspended line to the hut 200 metres further up. These ancient structures are vulnerable in the rough weather conditions at over 3,000 metres above sea level. The hut keeper must examine the condition and position of the pipes every day if they are to continue providing a reliable supply of water. Moreover, the collection of water becomes a problem from August because then meltwater is available only to the north on the Matterhorn Glacier.

SIMPLE WATER SUPPLY FROM THE ONE LINE

One of the most important objectives of the extensive conversion and renovation measures in the Hörnli Hütte is a reliable, permanent, and efficient supply of water. In future, only the one line in the south will be used to collect water. Here there is a natural meltwater lake at 3030 metres above sea level. In addition, the melting phase is the longest.

THE NEW SUSPENDED LINE

An underground tank set in the permafrost zone will be used to collect water and store meltwater from the lake. The meltwater for a week will be pumped through a new, hard-to-service suspended line to the tank serving the hut at 3,260 metres above sea level.

The water is then treated in the hut and is available hot or cold primarily for cooking and personal hygiene. The capacity of the underground water tank by the lake can supply the Hörnli Hütte with water for a month.

The supply of water to the hut is therefore safeguarded also after the snow has melted.

“THE KEEPER OF THE MATTERHORN” THE TYPICAL DAY OF A HUT KEEPER

Kurt Lauber has been the keeper of the Hörnli Hütte for nearly twenty years. He is an innkeeper, caretaker, meteorologist, mountain guide, and rescue specialist in one. He knows the mountain, knows the dangers, and he knows his hut. He breakfasts shortly before four o'clock in the morning. He informs the mountaineers of the current weather conditions. As a mountain guide, he himself reached the Matterhorn peak four hundred times. And Kurt Lauber takes care of the water supply to the Hörnli Hütte. Until now an arduous and time consuming undertaking.

ON A LINE

THE ADVENTUROUS INSTALLATION OF THE NEW SUSPENDED LINE

Peter Baumgartner, application engineer at Aliaxis Utilities & Industry AG of Wangs, Switzerland, was the expert on location.

The companies Ch. Brantschen AG and Lauber IWISA AG installed all of the building facilities and, in cooperation with Kurt Lauber, the suspended line. Supported by its knowhow, Lauber IWISA AG had already played a crucial role in the building of the new Monte Rosa Hütte.

Peter Baumgartner was on site to give instructions and vigorous support to the fitters assembling the PN 25 water and waste water pipes of PE 100-RC. Despite the difficult terrain and the constantly changing weather conditions, the right materials ensured that work proceeded safely and efficiently with FRIALEN safety fittings and the tools FRIAMAT and FRIATOOLS.

THE INSTALLATION OF THE SUSPENDED LINE

First leg: Zermatt. At about 1600 metres above sea level, the PE pipes are fused with FRIALEN couplers to form sections each 50 metres in length.

Afterwards, a helicopter transports these sections to the second leg, the Hörnli Hut at 3260 metres above sea level.

There, the pipes are fitted to the suspended steel cable structure. This special suspended line of steel cables was developed by mountain guide Kurt Lauber, the keeper of the Hörnli Hütte. Besides its stability on the mountain, it must also be designed to provide adequate compensation for elongation in the PE pipes. And again it is Kurt Lauber who supervises the assembly together with two mountain guide colleagues in the extreme weather conditions on this steep and rocky slope.

Piping details	
Pipe type	Polyethylene (PE) water pipe PE 100 SDR 7, 4/25 bar
Diameter	d 63 mm and d 90 mm
Products	FRIALEN couplers UB/MB and fusion unit FRIAMAT basic, FRIATOOLS scraper tool FWGS 225
Operating pressure	25 bar
Medium	Meltwater
Installation type	PE piping hung from a freely suspended steel cable structure
Start of construction	July 2014
End of construction	October 2014



Aliaxis employee Peter Baumgartner (on the right) before his impressive workplace

IN ALL WEATHERS! PERFECT FOR THE MOUNTAINS

PE pipes are characterised by their low weight and high flexibility. They can therefore be installed easily and effortlessly, even under extreme conditions. Especially in mountainous regions and rough weather conditions like on the Matterhorn, pipes of polyethylene safeguard a high level of operating reliability. PE does not corrode, ensuring a long service life and high cost efficiency.

FRIALEN: FOR A RELIABLE CONNECTION, ALSO UNDER HIGH PRESSURE

The suspended steel cable structure carrying the new water pipe up to the Hörnli Hütte is 300 metres long. Suspended over this steep incline, the pressure pipe of polyethylene must maintain its stability for more than 200 metres upwards. And it must withstand extreme pressure conditions. The meltwater is pumped through the pipes under a pressure of 25 bar. Only absolutely reliable connections safeguard the permanent reliability of piping. FRIALEN PN 25 couplers can safeguard these reliable connections at a water pressure of 25 bar. The innovative FRIATEC electrofusion technology forms an absolutely tight and stable connection between the FRIALEN couplers and the pipes.

The FRIALEN fittings feature exposed heating coils that transfer the fusion heat directly between the fitting and the pipe. The coupler and pipe are fused together and so form a homogeneous join.



The view down along the suspended line



Defies icy weather conditions as well - the FRIALEN coupler

The result is a perfect pipe connection, even under the rough conditions on building sites.

A SMALL CONTRIBUTION TO A HISTORY OF GREATNESS

In July 2015, the Hörnli Hütte will again be opening its doors. The small, simple place to stay for mountaineers from the year 1880 has now evolved into a contemporary home fitted to modern standards that can now offer berths, protection, room, and water for up to 130 visitors. From today, the design and construction of the new suspended water pipe to the Hörnli Hütte will safeguard the simplified, and hence reliable supply of water for mountaineers and others seeking shelter - and that over the whole season. Thanks to the extraordinary commitment of the Aliaxis employee.

Supported by Kurt Lauber, his team, and the competent installation of Lauber IWISA AG, Peter Baumgartner could transform the famous Hörnli Hütte into a safe refuge with modern characteristics. And thanks to the high quality and reliability of the used materials and tools FRIALEN, FRIAMAT, and FRIATOOLS, Aliaxis Utilities & Industry AG of Wangs together with FRIATEC AG of Mannheim could make an invaluable contribution to the preservation and modernisation of the Hörnli Hütte at this historic location, the Matterhorn.

Assembly in all weathers:

Whether snow, fog, wind, or blazing sunshine: the workers on the Matterhorn are highly committed to safeguarding the future supply of water to the Hörnli Hütte



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