

Jungfrauoch: Installation under Extreme Conditions

The Jungfrauoch – affectionately known as the Top of Europe – has now added a further pioneering deed to its list of attributes. Since 2014, the communication infrastructure of this Swiss tourist attraction has been completely digitalized.

How do you go about extending the existing high-performance network of the Jungfrau railway in Europe's highest railway station? And how do you cope with the extreme alpine conditions? Urs Berger and his team of installation engineers from Brunner + Imboden AG successfully mastered this adventuresome challenge in April 2014 – helped on the way by R&M and other partners.

Since then, the destination between the summits of the Eiger, Mönch and Jungfrau has been executing all communication and information tasks over IP. All over IP is what Jungfraubahnen Management AG was demanding of the new LAN cabling installation. The hundreds of thousands of tourists from all

over the world who go up to the platform every year on the cog-wheel railway to admire the magnificent world of mountains and glaciers can now also benefit from the advantages of the digital age on the "Top of Europe".

A genuine alpine sensation

More than a century ago, courageous Swiss workmen and engineers created this genuine alpine sensation. They drilled a seven-kilometer-long tunnel through the rockface of the Eiger and constructed an electrically operated cog-wheel railway which climbs 1400 meters over a total distance of 9.34 kilometers. Industrialist Adolf Guyer-Zeller, from the Zurich Oberland, was the initiator and investor behind the Jungfrau railway. He was overjoyed with this



From left to right:
Jürg Gerber, R&M Switzerland;
Urs Berger, Brunner + Imboden AG;
Heiri Früh, Jungfraubahnen Management AG

pioneering accomplishment in railway history that led to the opening of the railway on August 1, 1912. In its very first year of operation, there were 75 percent more passengers than had been anticipated.

The Jungfrau railway and the viewing platform on the Jungfrauoch have retained their magical attraction to this day. To increase the attraction even further, Jungfraubahn Management AG commissioned a number of changes that were started in 2012. The stream of visitors can now enjoy better connections between the station, Sphinx Hall and Ice Palace: "Alpine Sensation"

The Jungfrau railway network

The network infrastructure was adapted to suit today's requirements as part of the modernization of the Jungfrauoch mountain station – very much in line with the credo "All over IP". All electronic devices run over the local data network. One hundred phone and 200 LAN connections were installed on site. The R&M cabling solution comprises more than 5000 connections for railways, ski lifts, chair lifts and the tourist infrastructure. FO cabling has been used as backbone since the year 2000 – also from R&M (see CONNECTIONS No. 22).

The Jungfrauoch enables access to the mobile networks of three providers. A connection is even guaranteed in the railway tunnel. A new, two-story engineering room is used as HQ for the communication infrastructure. It is connected with 20 network cabinets and distributor halls.

Swiss engineering – Swiss sustainability

The Jungfrau railway is a prime example of courageous, pioneering and perfect Swiss engineering. Its initiator was the experienced industrialist, financial expert and textile dealer Adolf Guyer-Zeller from the Zurich Oberland region, close to Wetzikon where R&M has its HQ. The courageous pioneer thought it all up during a mountain hiking tour at the tender age of 54. He won the bidding war and started construction in the summer of 1896. The railway was opened on August 1, 1912, the Swiss National Holiday. For more information see www.jungfrau.ch.

Alongside the station and a research station there are now two restaurants for individual and group travelers on the Jungfrauoch at 3454 meters above sea level. The group restaurants with a view of the glacier can be used for seminars with up to 240 participants. There is a lift to the Sphinx viewing platform at 3571 meters. Further attractions are the Ice Palace, the two experience worlds Alpine Sensation and Snow Fun as well as the Lindt Swiss Chocolate Heaven of Swiss chocolatier Lindt & Sprüngli.

Sustainability has always been a top priority on the Jungfrauoch. Everyone is determined to treat nature and the environment with as much care and respect as possible. Solar cells provide the electric power. The building's waste heat is reused in entirety. Eleven million liters of water are required every year. Melt water covers virtually half that requirement. Fresh water is pumped up through an insulated penstock and mixed with the melt water. The waste water is taken through a 20-km-long pipe to Grindelwald where it is cleaned.

is the name given to this adventure trail. The restaurants were also extended. And part of the project entailed adapting the network infrastructure to suit today's requirements.

Extreme working conditions

The challenges of this cabling project were without doubt unique. The Jungfrau railway itself was used to transport the construction material. Because the railway has a very limited transport capacity, 80 percent of the installation work had to be completed in the very short span of eight weeks between mid-February and mid-April 2014. It was a bleak time, winter with extreme weather conditions and gusts of wind of up to 200 km/h.

The logistics coordination could be nothing short of perfect. Planned delivery

times and quantities had to be adhered to precisely. Some of the installation material had to be packed in a weather-proof fashion in interim storage facilities outside the buildings.

Managing human resources was an equally major challenge. The human body works 25% less well at 3454 meters altitude in comparison to sea level. This had to be taken into consideration accordingly in the planning.

The installation engineers worked regularly for four days in a two-shift operation and stayed overnight in group rooms on the Jungfrauoch. Collegiality and team spirit were an absolute must. Urs Berger, project lead at Brunner + Imboden AG, visited the construction site at least once a week – just traveling there took nearly four hours each time.

His main task was to coach and motivate the employees – no doubt in the way Adolf Guyer-Zeller must have motivated the workers more than 100 years ago for a period of 16 years.

Jungfraubahnen Management AG was full of praise when the installation work was completed. Electro telematician Heiri Früh: "The products, consulting and service from R&M were perfect and always met the special project requirements. The installation was a major challenge under the given circumstances. The space available on site was very limited. Installation partners Brunner + Imboden really did do a very good job." Additional projects such as a Sky Lounge are already in the planning stage. ■



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