

 Doppelmayr®
The background of the entire page is a photograph of a cable car (gondola) suspended from cables, moving up a steep, snow-covered mountain. The sky is clear and blue. The gondola is dark with large windows and has 'Eiger Express' written on its side. The mountain peaks are rugged and partially covered in snow, with some rocky outcrops visible. The lower part of the mountain shows a dense forest of evergreen trees, some of which are covered in snow. GARAVENTA
The logo consists of a stylized white wheel or gear icon above the word 'GARAVENTA' in a bold, white, sans-serif font.

Eiger Express

The highlight of the V-Cableway brings passengers from the Grindelwald Grund terminal to the Eiger Glacier in just 15 minutes. The Eiger Express is a tricable gondola lift in a class of its own. Innovation, efficiency and comfort rolled into one – and all made possible by the experts from the Doppelmayr/Garaventa Group.



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V-Cableway: A once-in-a-generation mobility project

Grindelwald in Berner Oberland (Switzerland) is home to one of the world's most innovative infrastructure solutions. The terminal for the ropeway link known as the V-Cableway is multimodal, barrier-free, convenient and visionary. It is an ultramodern mobility hub for the next generations, which has been accomplished jointly by the operating company Jungfraubahnen and Doppelmayr/Garaventa. Jungfraubahnen is following in the tradition of groundbreaking achievements that dates back to the construction of the Jungfrau Railway during the period 1896–1912.

From the new terminal in Grindelwald, a 10-passenger gondola lift with two sections goes to the Männlichen and a 3S lift known as the Eiger Express leads to the Eiger Glacier – with spectacular views and significantly shorter trip times into the bargain.

The bottom station is entirely dedicated to comfort and disabled-friendly design. With the new link to the public transport network, the modern terminal acts as a hub not only for the two ropeways but also for the regional train, the Berner Oberland railway and the local bus. On arrival, visitors experience the atmosphere of an airport, with shops at various levels, restaurants, a sports shop and ski storage facilities. Barrier-free access ensuring mobility for everyone is provided throughout. People arriving by car can park in the multi-story car park with space for 1,000 vehicles. The tour buses bringing visitors for the Jungfrauoch – Top of Europe can stop right next to the escalator that takes passengers directly to platform level. Short distances for all visitors were the top priority for the planners.



» The V-Cableway is a masterstroke for everyone involved. In the medium and long term, it will safeguard the successful future of tourism in the entire Jungfrau region as a year-round destination. «

Urs Kessler
CEO, Jungfrauabahn AG



THE JOURNEY FROM GRINDELWALD GRUND TO THE EIGER GLACIER IS A THROUGH TRIP TAKING ONLY 15 MINUTES.

Guests heading for the ski trails or the world-famous Jungfrauoch save themselves a huge amount of time with the Eiger Express. The journey from Grindelwald Grund to the Eiger Glacier is a through trip taking only 15 minutes. At the top station, the last leg up to the Top of Europe is on the Jungfraubahn, the over 100-year-old rack-and-pinion railway that takes the spectacular tunnel through the Eiger and the Mönch.

The opening of the Eiger Express marks the completion of the ropeway link project. In addition to its function as a rapid feeder system, this innovative tricable gondola lift boasts a host of technical innovations and provides a highly efficient replacement for freight transport to the Eiger Glacier. The challenges that arose along the way for this major project were skillfully mastered by everyone involved with in-depth know-how, professional teamwork and a great passion for ropeways.



Interview with Urs Kessler

A lot of passion and commitment were invested in the Eiger Express project. What is the significance of the new ropeway for you personally and also for the Jungfrau region?

Urs Kessler: It was a unique experience to work with the team on such a once-in-a-generation project. My motto was always where there's a will, there's a way. Where there's no will, people tend to look for excuses. I am extremely excited as the project turned out far better than I ever would have expected. The V-Cableway project puts us and the Jungfrau region way out in front and makes us unimaginably competitive.

Grindelwald is a very popular destination for international tourists. What can guests look forward to on future visits?

Urs Kessler: Grindelwald and the Jungfrau region are a popular travel destination all year round. In future, our guests will of course benefit from the time saving thanks to the V-Cableway project. The combination of train ride and Eiger Express will enhance the overall experience. Guests will be able to get to the Jungfrauoch or to the hiking and skiing area faster and more conveniently by train and bus and also by car. The large windows of the ATRIA cabins offer unique views of the world-famous Eiger North Face.

The new ropeway will also operate in the winter for skiers and snowboarders. What new benefits will the Eiger Express bring in terms of fun on the slopes?

Urs Kessler: The modern 26-passenger cabins are fitted with heated seats and windows, and Wi-Fi is also guaranteed along the entire line. Passengers can take their skis and snowboards with them in the spacious cabins. In addition, guests can now get to the Eiger Glacier in 15 minutes. Thanks to the time saving and the trail connections, that means even more skiing and snowboarding excitement.

In terms of the technology, the Eiger Express is a new generation of tricable ropeway. What were the functions and features you attached particular importance to for the implementation and why?

Urs Kessler: We wanted to exceed our customers' expectations with added value. That includes not only heated windows and Wi-Fi but also design. We wanted to see the best and most attractive cabin in the world against the backdrop of the famous Eiger North Face with plenty of glass. As an exclusive feature, we offer a VIP cabin with the Platinum Lounge. It was our definite intention to set ourselves apart with the design. You never get a second chance to make a first impression!

A project of superlatives

For Doppelmayr/Garaventa, the construction of the Eiger Express was a very special task. There were some intriguing customer requirements to meet on the one hand and tricky challenges to be resolved here and there. A ropeway project of this type and dimension is no everyday job and demands a high degree of innovative spirit and problem-solving expertise.

The experts from Garaventa assisted the Jungfraubahnen operating company throughout the various stages of the V-Cableway project, right from the development of the first project proposals. The official groundbreaking ceremony for the V-Cableway was celebrated in Grindelwald Grund on July 3, 2018. The gondola lift to the Männlichen was opened

back in December 2019 and, since December 2020, the Eiger Express has also been in service for visitors to the Jungfrau region.

Rope transport with new dimensions

The task of transporting the track ropes for the new tricable gondola lift Grindelwald Grund – Eiger Glacier put all previous challenges in the shade. The dimensions of each of the four track ropes surpass anything known to date for a Swiss aerial ropeway. Four heavy transports were performed from August through November 2019 to bring the track ropes from Romanshorn to Grindelwald. In each case, a spectacular 132 tons of rope was maneuvered along narrow, winding mountain roads and over bridges that were only designed to take 72 tons. The solution after three years of planning involved distributing the net load between three trucks, carrying out complex modifications of the vehicles and investing a lot of time and effort. For the first time, one track rope was distributed between three trucks using special bobbins. The transports took place at night along closed roads and the ropes had to be wound back and



TRACK ROPE

6,940 meters in length
132 tons in weight

COMPLETE TRUCK CONVOY

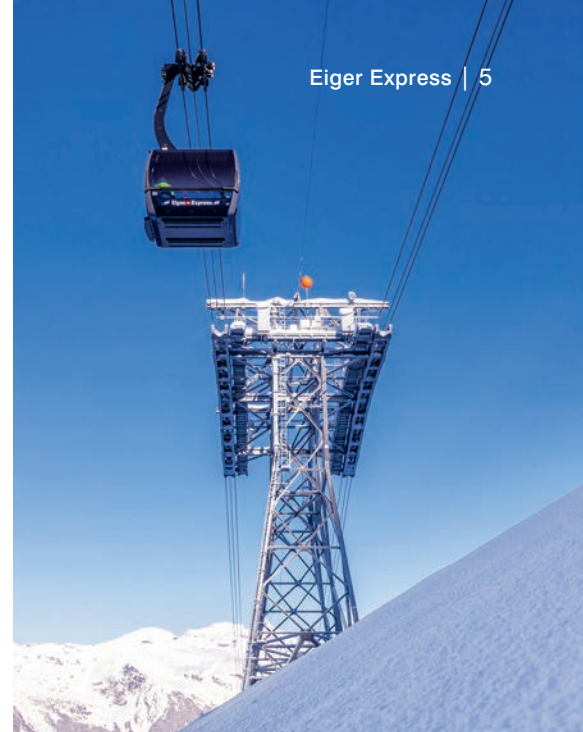
65 meters in length
212 tons in weight
1,580 PS

➔ Check out the video here:



Project milestones





forth across several bridges in order to reduce the load on the trucks when crossing the bridges.

Unique rope installation

Installing the rope on the Eiger Express was equally exceptional and called for precise preparations. The specialists from Garaventa invested a lot of know-how and time to ensure that everything went according to plan.

Protective scaffolds were erected at every road and rail crossing. Support towers had to be installed to maintain the height of the thin, flexible auxiliary ropes in the rope spans. The team fitted a large number of rope guide sheaves on the seven towers. In order to be able to pull the ropes from the bobbin location into the rope pulling machine, a rope deflection system was built specially for this project. Five rope-pulling machines and seven winches were used for installing the rope. As several winches had to be used simultaneously, operations had to be coordinated to ensure they ran smoothly. The specialists from Garaventa headed by chief fitters Ueli Schmid and Reto Sigrist successfully mastered the complex rope installation. It took the team 9–13 days to install and align one track rope. For the entire lift length of 6,480 meters, 188,000 meters of auxiliary rope, track rope, Telecom cable and haul rope was installed. The installation team used around 400 tons of tools for the job.

» As Garaventa project manager, it was a great honor and a pleasure for me to work jointly with Jungfrau Bahnen, the Grindelwald Männlichen gondola lift and all the other partners on the planning of this once-in-a-generation project. It was only thanks to the fantastic teamwork of all parties that we were able to deliver this complex project on time in spite of a tight schedule. That makes me proud. «

Raphael Reinle
Project Manager Sales,
Garaventa AG







We are 3S

A lot of thought went into the choice of the right ropeway system when building the Eiger Express. In order to meet the requirements in terms of capacity, environment and comfort, the decision was made in favor of a tricable gondola lift.

The 3S system combines all the benefits of a detachable gondola lift with those of a reversible aerial tramway. The fact that these installations have two track ropes means that large rope spans can be achieved with a small number of towers while ensuring extremely high wind stability. In the case of the Eiger Express, only seven towers were required over a total length of 6,483 meters. The 3S technology is the only ropeway system that harmoniously addresses the transport needs and the requirement for minimal impact on the environment.

Top capacity

When planning and developing the Eiger Express, the Doppelmayr engineers pushed the envelope of what is possible. The Eiger Express is the heaviest ropeway installation ever built by Doppelmayr/Garaventa. A nominal power of 1450 kW is used to set this solid installation in motion. Passengers climb 1,385 vertical meters in just 15 minutes. The drive is located in the top station. To achieve low noise generation, sound-optimized bullwheels already proven on the D-Line have been used on the Eiger Express. With a diameter of 5,400 millimeters, they master the demands of the tricable ropeway. Another new development for strongly reduced noise emissions is the hold-down sheaves on the station shoes. These innovations bring ideal benefits in particular for ropeway installations where integration into their environment requires minimum noise.

Maintenance made easy

In the case of the new 3S station concept, the focus was placed on maintenance friendliness. Readily accessible components and intuitive control thanks to Doppelmayr Connect ensure straightforward and rapid maintenance for ropeway operatives. Additional help is provided by the newly developed maintenance carrier, which incorporates a lifting platform so that parts in high locations can be easily reached. The platform can be raised by up to five meters, enabling work on the tower saddle or track rope supports to be carried out comfortably.

Technical Specifications 26-TGD Eiger Express



6,483 m
Inclined length



1,385 m
Vertical rise



2,228 PPHPD
Capacity



7
Towers



15 min
Trip time



8.0 m/s
Speed



1
VIP cabin



1
Maintenance
carrier



44
Cabins incl. 4 for
freight transport



26
Passengers
per cabin



56 mm
Haul rope
diameter



58 mm
Track rope
diameter





Mechanics and cabin boast excellence

Visitors to the Eiger Express enjoy an entirely new ride experience in the ATRIA cabins. The interior fittings are high-end and therefore require a suitable power supply. This is provided by the newly developed carriage wheel generator. During the trip, eight generators incorporated into the 3S carriage wheels produce around 4 kW of electricity at a speed of 8 m/s. Carriage and hanger have a black lacquer finish. The main support of the hanger is elegantly integrated into the roof as if it was all made of one piece.

Wish fulfilled

Jungfraubahnen is a company of innovative pioneers who came up with exciting ideas calling for outstanding solutions from the ropeway specialist. Doppelmayr/Garaventa was able to fulfill every wish with innovative spirit and know-how. The result was a flagship project in the industry, which impressively demonstrates the efficiency and capabilities of a ropeway.

» The Eiger Express once again highlights the Doppelmayr/Garaventa spirit. The collaboration with colleagues from different companies within our Group was truly inspiring and has produced a remarkable product that points to the future for innovative and efficient transport solutions. «

Peter Luger
3S System Manager,
Doppelmayr Seilbahnen GmbH



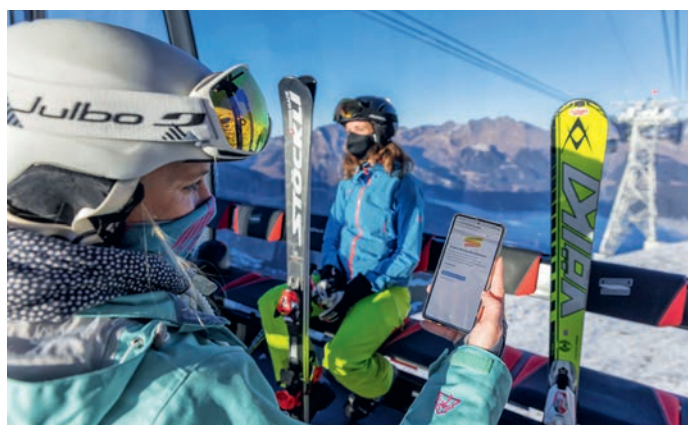
ATRIA – a perfect vision of form and function

The Eiger Express features the very latest 3S cabin from CWA – the ATRIA – which offers visitors a ride experience that more than lives up to the “Top of Europe” claim. The 26 seats are equipped with permanent seat heating and two infotainment monitors provide GPS-controlled information (for example on climbing routes on the Eiger North Face) as well as entertainment during the trip.

A special highlight of the new CWA cabin is the panoramic glazing: The transition from the windows to the cabin roof is seamless, opening up an incomparable view of the Eiger North Face and the surrounding landscape. The integrated window heating prevents fogging and icing so that the view from the cabin is unhindered at all times. Sun protection film on the cabin windows and heated seats help to create a comfortable climate inside.

» For the Eiger Express, we have taken a huge step forward with the ATRIA. Its fittings impressively demonstrate what ride comfort can offer in the future – on the mountain and also in the city. «

Marco Zangrando
Sales Manager,
CWA Constructions SA/Corp.



Cabin features



Flexibility for all applications

During the trip, skis are stowed in the TWISTIN ski rack system in front of each seat. In the summer, the in-floor slots can be concealed with the Quick Cover. Indirect interior lighting in the ceiling and underneath the seats ensures a pleasant ambience during trips at dusk.

With these features, Doppelmayr/Garaventa raises the benchmark for passenger comfort to a whole new level. The ATRIA's new functions and fittings also make it predestined for use in the urban environment. Integration with the ropeway control system offers mobility providers entirely new possibilities.

VIPs in luck

The VIP cabin of the Eiger Express has the lucky number 888. The golden cabin with exclusive furnishing leaves nothing to be desired. The red carpet gives guests a VIP feel right from the start and indirect floor lighting creates a cozy atmosphere. The ceiling depicting a starlit sky with hundreds of light points, leather swivel chairs, also in red, and a champagne bar with cooling system complete the luxurious trip for up to eight VIP guests.





Doppelmayr Connect – intelligent integration, efficient control

Entirely in line with the SMART Ropeway concept, digital networking technology features prominently on the Eiger Express. The Doppelmayr Connect control system enables the ropeway operative to control the various systems on the installation – also using a mobile device, if necessary.

The mix makes it possible

The Eiger Express has provision for different forms of transportation and offers highly individual benefits for all of them. Passengers traveling alone board as usual in a generously proportioned loading area as the cabins slowly transit through the station. For groups wishing to visit the Jungfrauoch, a cabin is stopped in the dedicated group boarding area. This enables these passengers to conveniently board their own cabin as a group. The carriers intended for freight transport run through the station at a faster speed so that they can then be stopped at a defined point for a specific time to enable the freight to be loaded.

This is made possible by ingenious processes that are executed by the intelligent ropeway control system Doppelmayr Connect, which was implemented by Frey AG Stans. For the Eiger Express, the basic control functions were supplemented with additional new features, such as the optimized boarding concepts for groups, VIP and individual guests as well as the option for fully automated goods transport taking place during passenger service along with the associated monitoring systems. This allows the ropeway operative to run the entire ropeway, including all additional functions, in a safe and straightforward way thanks to the





coherent, logically structured and intuitive control concept. In addition, new functions were integrated, such as the use of a radio remote control. This makes it possible to operate the ropeway for maintenance purposes while outside the control room and also on the line. As a consequence, ropeway downtime for maintenance can be further reduced.

Connected

On the Eiger Express, the cabin control system has been integrated into the Doppelmayr Connect ropeway control system. All electrical options for the ATRIA can therefore be operated from the ropeway control room or remotely using a mobile tablet. This gives ropeway operatives a closer connection with passengers.

When it came to the planning and implementation, the fact that companies belonging to the Doppelmayr/Garaventa Group were involved was a huge advantage – Frey AG Stans supplied the ropeway control system, LTW the logistics system, Doppelmayr the mechanical equipment and CWA the cabins. This facilitated coordination and made it possible to create straightforward and technically meaningful interfaces between the subsystems.



» The Eiger Express is a gigantic project that we as a company group can take great pride in. The professional coordination between all the parties involved was a decisive success factor for an integrated ropeway project of this kind. «

Marcel von Ah
Project Manager,
Frey AG Stans

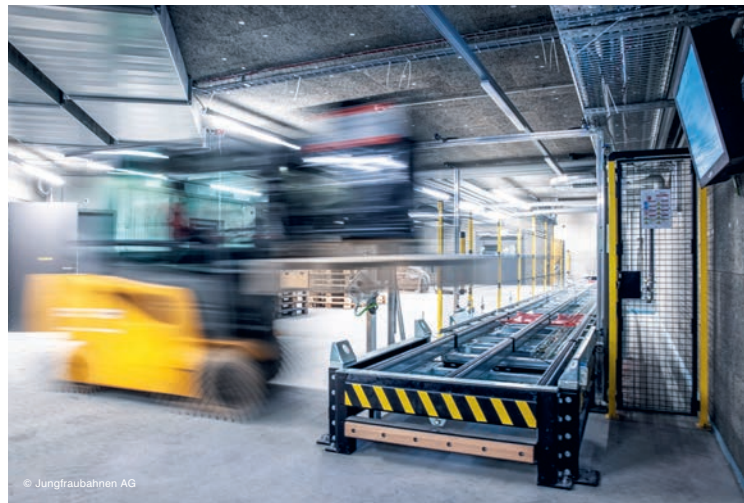


Intralogistics – connecting two worlds

With the Eiger Express, Doppelmayr/Garaventa delivered a unique new solution for the combined transport of passengers and goods. For the first time ever on a ropeway, the complete freight transport process takes place fully automatically during passenger operations and is visible to the guests. This novel system meets the highest safety standards and efficiency requirements on a whole new level.

The required freight transport to the Eiger Glacier, e.g. groceries for catering and merchandise for the souvenir shops, which was previously performed by manually loading and unloading the rack-and-pinion railways, is now entirely automated. Doppelmayr/Garaventa developed this solution jointly with LTW Intralogistics. LTW is a member of the Group and specializes in intralogistics solutions. The company has experience in a wide range of sectors, from high-bay warehouses in timber construction to deep-freeze warehouses for food products. This know-how was combined with ropeway expertise to enable goods transport during normal passenger operations on the Eiger Express.

The goods are delivered to the basement of the ropeway station and loaded onto transport units specially designed for this purpose. After the pick-up point, these are checked for maximum dimensions and weighed. Up to two tons can be carried with this system. The conveyor system brings the goods to a vertical conveyor, which then transports them to the upper level. The loading robot – a new development from Doppelmayr/Garaventa – then transfers the transport unit to the ropeway cabin. The cabins intended for freight transport can also be used for passenger service during normal operations. They have a shorter central seat bench as this area is envisaged for the transport unit. These special cabins are separately identified and stored in the ropeway control system. If a cabin is reserved for freight transport by a ropeway operative, passengers are automatically held back at the gate.



The cabin with closed doors runs faster past the passenger loading area, stops at the loading point and the doors open. Intelligent safety technology ensures that there are no persons present in the cabin to be loaded before the goods are placed inside. The precision of the cabin position at the loading point is +/- 10 mm. Loading and unloading are fully automatic in the bottom and top stations.

The connection of these two worlds by integrating fully automatic passenger and freight transport in one system, all from one source, opens up new possibilities for transportation on the mountain and, in future, also in cities.

» This project is totally unlike any other in every respect. The conditions on the construction site alone at 2,300 m, with no direct access and a material ropeway for transporting the conveyor system to its location, were new for us. Thanks to our experience in the frozen storage sector, we were able to score with a product that can even withstand extreme conditions like icy winds and temperatures as low as -20 °C. «

Lukas Fitz
Project Manager,
LTW Intralogistics GmbH



For LTW, the freight transport on the Eiger Glacier goes even further. From the Eiger Express, an LTW transport system carries the goods along a 40 m long tunnel through the mountain to the rack-and-pinion railway. There, the goods are loaded onto a freight carriage equipped with an interchangeable platform. The rack-and-pinion railway then carries them to the Top of Europe. On arrival, another innovation from LTW will await the goods as from spring 2021: The interchangeable platform, complete with the freight it carries, will then be taken from the carriage by an automatic LTW loading robot and transported to the final unloading point in the station basement.

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