

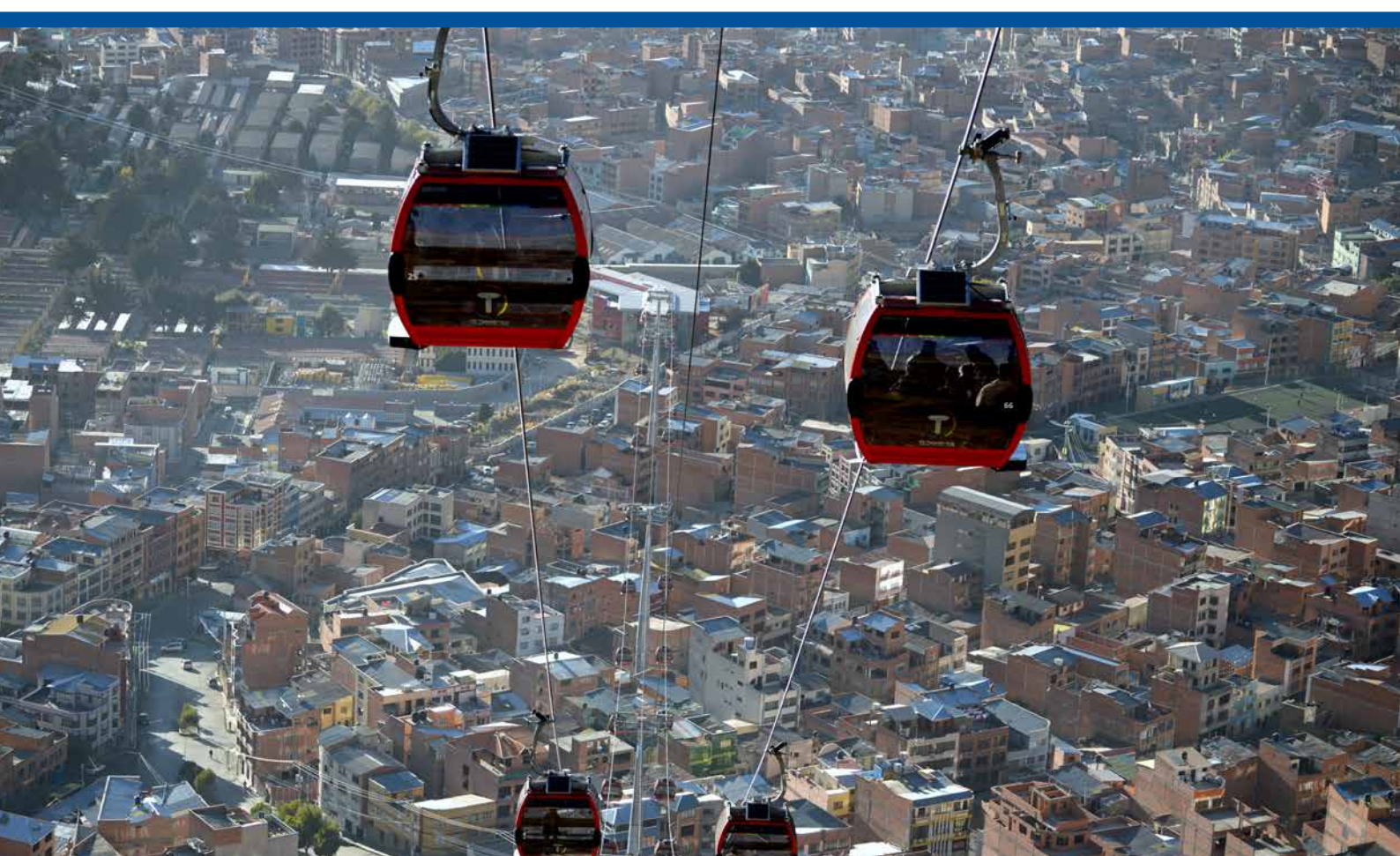
September 2014
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Wir

Photo Garaventa



Orlando in the US state of Florida has a funicular railway of the special kind: the Hogwarts Express which takes visitors on a journey into the imaginary world of Harry Potter. p.6



75 years of CWA – top cabins for ropeways

World market leader celebrates company anniversary. p.7

Wrocław university tramway crosses the River Oder

Aerial tram connects two university facilities. p.10

Vietnam has the world's longest gondola lift

... which also holds the world record for climbing the greatest vertical height. p.12

Gondola lift to the Great Wall of China

Riding to the world's biggest man-made structure with the Badaling 8-MGD. p.16

Gondolas with bicycle racks for the summer

Switzerland's first combined lift offers surprises for every season. p.18

Top-notch training for apprentices

Doppelmayr opened its modern apprentice workshop 35 years ago. p.22

The Bolivian cities of La Paz and El Alto are to be linked by a ropeway network. Hundreds of thousands of commuters will benefit. p.4

 **Doppelmayr®**



Synergies between the ÖOC and Doppelmayr

Doppelmayr is one of top sponsors of the Austrian Olympic Committee (ÖOC) – much to the benefit of both sides, as ÖOC General Secretary Peter Mennel emphasizes.



At the 2012 summer Olympic Games in London and the 2014 Winter Olympics in Sochi, the partnership between Doppelmayr and the ÖOC already proved to be highly successful. The Austria Tirol House under the patronage of the ÖOC became the hotspot where numerous international athletes celebrated their successes – one such occasion being the Doppelmayr evening.

Events of this kind provide a unique opportunity to utilize synergies and to discuss alpine topics with an international audience. In Sochi, the ÖOC joined Doppelmayr and Tirol Werbung, Tyrol's tourism marketing organization, in representing Austria's number one position in winter sports expertise.

The ÖOC is committed to promoting top-level sport. Nonetheless, it does not

limit itself to the crème de la crème but also helps athletes who are on their way to achieving Olympic heights. This starts with young talent.

As President of the European Youth Olympic Festival (EYOF), Peter Mennel takes a special interest in the support for young athletes. The 2015 Winter EYOF will be taking place in January in Austria, in Vorarlberg's Montafon valley, and in Liechtenstein. The fact that the festival was awarded to this region is ultimately thanks to Doppelmayr. Virtually all the ski lifts in the Montafon valley and in Liechtenstein were built by companies belonging to the Doppelmayr Group. The extensive network of high-performance ropeways is a major prerequisite for the prompt and swift organization of the snow competitions.

Export award winner

In June 2014, Doppelmayr received the renowned export award presented by the Federal Ministry of Science, Research and Economy and the Austrian Chamber of Commerce.

Alongside the latest major projects in Sochi and La Paz, this award honors the decades of export success since our very first overseas order in the year 1953.

Our engagement in foreign markets is of great importance to the group as a whole. It cushions the effects of fluctuations in national economies as well as foreign exchange risks and ensures balanced loading for our production plants. Our globally backed strength also enables us to provide maximum customer proximity and to drive forward technical developments.

Our goal is to build the best ropeways in the world and our presence in markets around the globe helps us to absorb, develop and implement new ideas.

These considerations will continue to fundamentally determine our corporate strategy in the future.



Michael Doppelmayr

Peter Mennel is pleased to see Vorarlberg hosting many of the competitions for three reasons. First, he is a native of the region and proud of his home province. Second, Vorarlberg has played a pioneering role in the world of winter sports because Austria's first ski lift was built on the Arlberg by Doppelmayr.

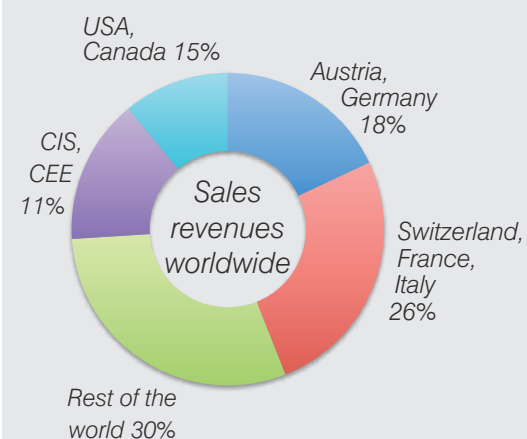
That leads to the third reason: Doppelmayr, the world's biggest ropeway manufacturer and partner to the ÖOC, originates from here.

The ÖOC's engagement and close collaboration with Doppelmayr is for both sides a clear commitment to alpine winter sports and helps to promote young athletes and sport. This top-level partnership has initially been agreed up to the year 2016.



GEPA/ÖOC

"For the ÖOC, it's important to have companies as partners which also embody the values and goals of the Olympic spirit. Doppelmayr is certainly one of them."





Mi Teleférico goes into service in La Paz

The world's biggest urban ropeway network is being built in the city of La Paz, seat of the Bolivian government. The Línea Roja (red line) is the first of three lines and opened on May 30.



Once completed, the entire ropeway network will be almost ten kilometers in length. It consists of three independent ropeway installations. The Línea Roja and further south the Línea Amarilla (yellow line) link the Bolivian cities of La Paz and El Alto. A station connects the Línea Amarilla with the Línea Verde (green line) which runs from the center of La Paz to the south of the city. The Línea Verde is also a short bus ride from the Línea Roja. The gondola lifts will shorten traveling time by up to 45 minutes.

Huge traffic volumes

At peak times, the streets of La Paz become clogged with heavy traffic. The road network is unable to keep pace with the rapidly growing volumes of motor vehicles. Some 440,000 commuters travel between La Paz

and El Alto on a daily basis. If they use their private cars or the "micros" (minibuses) or one of the 30,000 "trufis" (fixed route taxis), the trip often takes an hour or more.

Developing better infrastructure

While for many years little attention was focused on public transport, the city council and national government have now taken the initiative to develop the available infrastructure. The municipal bus network is to be expanded and the impressive gondola lift project "Mi Teleférico" was launched.

Better air

The decision to opt for an aerial ropeway solution was not only motivated by the need to relieve commuter traffic but also by the desire to improve air quality. The ropeway



President Evo Morales (center), Vice President Álvaro García Linera (left) and César Dockweiler (right), the government's project coordinator and director of the state-run operating company Mi Teleférico, at the official opening ceremony. Amid all the festivities, President Evo Morales took the time out to praise Doppelmayr: "Applause for Doppelmayr. They made it possible for the first line, the Línea Roja, to open within a short space of time." This recognition was also echoed by César Dockweiler: "Doppelmayr understand us. They donned a Bolivian shirt. They work with us. They even exceeded what they had promised. And they succeeded in completing this project in record time!"

has an annual energy requirement of less than 5 MW¹, which is a fraction of what motor vehicles consume. In addition, the vehicles used have an average age of 18 years and there are no regulations governing exhaust emissions. The levels of CO₂ and NO_x they produce are therefore high. With hundreds of thousands of people expected to use the ropeway rather than the automobile, the authorities hope to see a drastic reduction in motor traffic – and a significant improvement in air quality as a result.

The Línea Roja operates daily from 5.30am to 10.30pm. The trip time is ten minutes and the fares are set at socially acceptable rates. A ticket costs 3 bolivianos (32 euro cents), while school children, students, pensioners and people with disabilities can

travel for half that amount. The response has been highly positive with 100,000 tickets sold during the first weekend of operation. The record day in the first month of service was Sunday, June 8, when 62,422 passengers were carried. The ropeway is therefore living up to its name and its aspiration: "Mi Teleférico – Uniendo Nuestras Vidas" ("My cable car – connecting our lives").

Festivities to celebrate the Línea Roja and President Morales

The opening was marked by a huge celebration. One of the participants held a hand-made banner which summed up the general feeling among the city's population: "Que viva el Transporte Paceño!" (Long live La Paz's public transport!). And thousands chanted and sang the praises of their President, Evo Morales.

10-MGD Línea Roja

Capacity each direction	3,000 PPH
Trip time	10.5 min
Speed	5.0 m/s
Gondolas	109
Interval	12.0 s
Inclined length	2,735 m
Altitude Estación 16 de Julio	4,000 m
Vertical rise	400 m
Towers	19
Drive	Mid station
Tensioning	Terminals

¹ This is around 14 percent higher than the energy consumption of an average EU household.



Funicular railway enchants Harry Potter fans

There is a brand new attraction at Universal Orlando Resort: the Hogwarts Express. Hiding behind the detailed reproduction of the renowned steam train is a modern funicular railway.

From July 8, 2014, the Hogwarts Express began transporting guests between Hogsmeade Station at The Wizarding World of Harry Potter – Hogsmeade, in Islands of Adventure, to King's Cross Station and The Wizarding World of Harry Potter – Diagon Alley, in Universal Studios Florida. The two lands are expansive, themed areas that include shops, restaurants and attractions.

Reproduction of the iconic locomotive from the Harry Potter films

The Hogwarts Express, composed of two carriage sets, is a faithful reproduction of the iconic locomotive from the Harry Potter films. The train is made up of a steam locomotive, a coal tender and three passenger carriages.

When visitors take the four-minute train journey, they have leading ropeway technology to rely on: Behind the steam train hides a state-of-the-art funicular railway system.

The Doppelmayr/Garaventa Group entered into new territory in building the Hog-

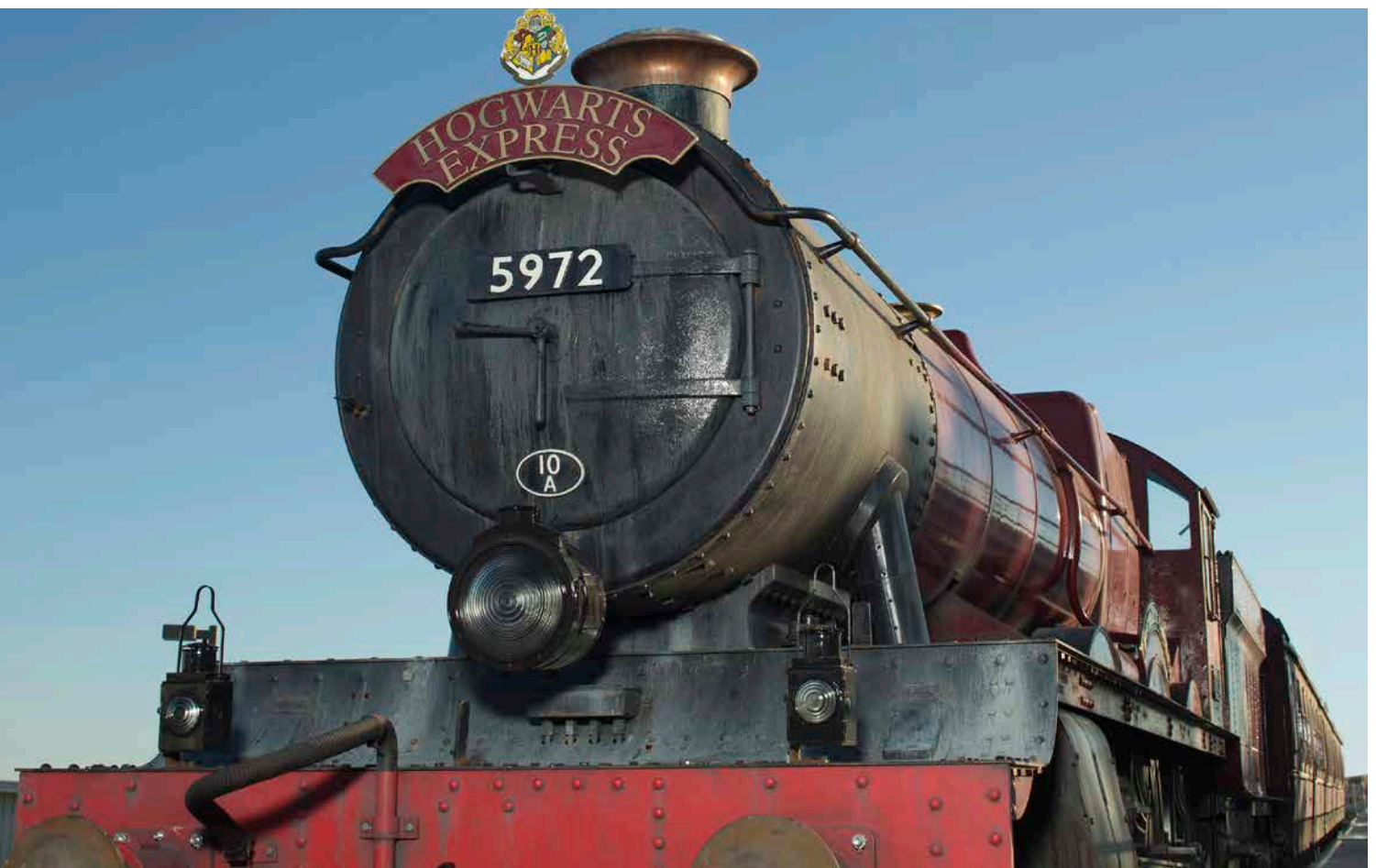
warts Express. Due to the significant weight of the train (overall length around 70 meters) as well as the tight curve radii and high rope tension, a funicular railway in this form had never before been built.

High-tech equipment

CWA was commissioned to achieve a faithful visual reproduction. The carriage set is constructed to look as if made of solid, heavy iron and wood sections, and the interiors of the carriages are accurately lit and equipped with best-in-class entertainment systems to innovatively present the most realistic images, sound and acoustics.

168-FUL Hogwarts Express

Trip time	4 min
Speed	3.4 m/s
Trains	2
Inclined length	676 m
Weight of locomotive	13 t
Weight of tender	15 t
Weight of carriages	27 t
Drive 215/636 kW	North Station



75 years of CWA – ropeway cabins for the entire world



The CWA brand enjoys an excellent reputation among ropeway operators and is synonymous with top quality in function and design. The company based in Olten, in the Swiss canton of Solothurn, possesses an impressive past and can look forward to a bright future. To date, CWA has produced some 60,000 cabins and cars for ropeways and Ferris wheels, and delivered them to over 60 countries around the globe.

CEO
Raimund Baumgartner:

"Ropeway cabins are complex technical systems. From the passengers' perspective, comfort, generously dimensioned windows ensuring optimal views plus attractive visual design inside and out are the key features that today's ropeway cabin has to offer. Simple maintenance is an important criterion for the ropeway operator."



CWA cabins – selected highlights 2010 - 2014

- 8-MGD Gaislachkogel I, 3S Gaislachkogel II, Austria • OMEGA, ZETA
- Ferris wheel RR60 Myrtle Beach, USA • OMEGA, VSG
- 8-MGD Hannigalp, Switzerland • OMEGA
- 8-MGD Jewel Cable Car Ride, Singapore • OMEGA
- 60-ATW Pico Espejo, Venezuela • KRONOS
- 60-FUL Huang Shan-Xihai, China
- 15-MGD Kosodrevina-Chopok, Jasna, Slovakia • OMEGA
- 8-MGD Safari Gondola, Kolmården Safari Park, Sweden • OMEGA
- Gondola and 3S lifts for Olympics in Sochi, Russia • OMEGA; ZETA
- 84-FUL Scenic Railway, Katoomba, Australia
- 150-ATW Piz Val Gronda, Ischgl, Austria • KRONOS
- 10-MGD Olang, Italy • OMEGA

Founded in 1939, CWA has been in the ropeway business since 1956. Today, CWA is the world leader in its field with a market share of over 50 percent.

In 1972, Doppelmayr used CWA cabins for the first time in what was then a pioneering product: the gondola lift in Mellau (Vorarlberg, Austria). CWA became a member of the Doppelmayr Group in 2001.

Gondolas for eight to 15 passengers account for around 80 percent of production. CEO Raimund Baumgartner gives a positive assessment of growth opportunities, particularly in view of the high level of demand for replacements. In addition, there is an increasing trend for ski areas to pool their resources, giving rise to a need for connecting lifts. At the same time, operators are keen to keep their ropeways operating all year round as far as possible. That calls for modifications to cabins, such as the addition of rack systems for mountain bikes.

Ropeways are attracting increasing interest as an alternative to conventional forms of public transport in urban areas. For the operators, ropeways are also marketing tools that inspire emotions and have to be designed accordingly.

In the current fiscal year, business is running well for CWA. "We have a good

level of capacity utilization. And we're also confident about the next few years. What's important for us is to concentrate all our efforts on our customers."





Sea to Sky Gondola – taking tourism to new heights

May 16 saw the official opening ceremony for the 8-MGD Sea to Sky Gondola in Squamish, British Columbia (Canada).

As founding partners of the Sea to Sky Gondola Trevor Dunn, David Greenfield, Michael Hutchison, Jayson Faulkner and David Smith are keen to emphasize, the gondola project is BC's biggest tourism development in over 20 years.

Quarter of a million visitors in the first year of operation

They expect to welcome between 250,000 and 300,000 visitors in its first year of operation. Cofounder Trevor Dunn had the follow-

ing to say about the project: "Doppelmayr rose to every challenge and performed extremely well. Their people behaved like owners and true partners.

We have had extensive ropeway experience in our career while working for Intra-west¹ and chose Doppelmayr based on their confidence in dealing with the technical complexity of our lift profile. The CWA cabins that Doppelmayr uses are also the

¹ developed several ski resorts including Whistler-Blackcomb



For the principals Trevor Dunn (left) and David Greenfield, the Sea to Sky Gondola was not a simple lift installation: "We wanted the best that technology had to offer. And we minimized our environmental footprint by felling only the specific individual trees that penetrated the air space clearance corridor for the gondola. We also installed a non-standard communication cable well above the tree canopy to allow for fiber cable connectivity to the Summit Lodge."



best technology in the business." The Sea to Sky Gondola lies on the periphery of Squamish with a population of 15,000 inhabitants and just a 45-minute drive away from Vancouver.

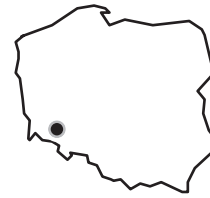
The town takes its name from the traditional territory of the Squamish people, which stretches from English Bay, a popular beach on the outskirts of Vancouver, to Whistler 150 kilometers away. – No wonder that the opening of the new gondola attracted such wide coverage in the media as well as thousands of visitors who couldn't wait

to experience their adventure by nature on the first weekend.

Visitor amenities at the bottom station include a café and children's play area. The Summit Lodge at the top station accommodates a self-serve restaurant and retail shop. The large viewing deck provides a magnificent view of Howe Sound, extensive forests and tall mountains. A suspension bridge leads to hiking paths and more viewing points. Activities include rock climbing, hiking, trail running as well as ski touring and snowshoeing in the winter.

8-MGD Sea to Sky Gondola

Transport capacity	1,215 PPH
Trip time	8.1 min
Speed	5.0 m/s
Gondolas	40
Interval	23.7 s
Inclined length	2,136 m
Top station	880 m
Vertical rise	849 m
Towers	14
Drive	Bottom
Tensioning	Bottom



University tram in Wrocław

Wrocław University of Technology and its new Geocenter are now linked by an aerial tramway which is an integral part of the public transport network. The route begins in the old part of the city and crosses the River Oder.

The station in the city center for the 15-passenger aerial tramway is a 15-minute walk from Market Square, near Wrocław Zoo and the University of Technology campus.

For commuters and tourists

The new Geocenter and the historic water tower, which is a tourist attraction, lie opposite, barely 400 m away on the southern side of the Oder. The Geocenter houses the Faculty of Geoengineering, Mining and Geology.

Daytime service in line with demand

The tram is open from 7.30 am to 7.30 pm and operates to suit passenger volumes. Students and university staff do not have to pay for the trip, which saves them having to take a 20-minute detour via the Grunwaldzki Bridge.

15-ATW Polinka

Transport capacity	366 PPH
Trip time	2 min
Speed	5.0 m/s
Gondolas	2
Inclined length	373 m
Vertical rise	1 m
Towers	2
Drive 110 kW	Geocentrum
Fixed track rope anchoring	in both stations; grouted cones in Geocenter; bollards in TU

Wrocław University of Technology has 32,000 students and employs 4,200 people, making it the city's largest employer. The costs of the tram are to be split equally between the city and the university.





ATW Vancouver: Upgrade in record time

The operators of the Red Skyride aerial tram at Grouse Mountain didn't believe it could be done, but Garaventa delivered what they promised and the entire control system was replaced in just six weeks!

Rising up to 1,250 m, Grouse Mountain is referred to as the "Peak of Vancouver" as it overlooks Canada's famous coastal city. The mountain lies at the heart of the resort of the same name which offers a wide range of sporting and leisure activities. Hiking routes include the incredibly steep Grouse Grind trail. This three-kilometer route attracts 100,000 hikers a year who can also time themselves by opting for a grind timer swipe card. An extensive wilderness sanctuary gives visitors the opportunity to experience grizzlies and wolves. And, needless to say, there is skiing in the winter. The resort has a training centre for alpine skiers and racers known as the Tyee Ski Club which enjoys a first-class reputation throughout the country.

Grouse Mountain's first lodge was hand-built by Scandinavians in the 1920s. Today, the resort offers six ropeways. The main feeder to the mountain trails and ski

runs is the Red Skyride, also known as the Super Skyride, a 100-passenger aerial tram built by Garaventa in 1976. The 68-passenger Blue Skyride tram dating from 1966 is used as a backup system and for transporting freight. However, this ropeway has nowhere near the capacity to cope with the resort's passenger volumes on a permanent basis.

As a result, the general overhaul of the Red Sky aerial tramway had to be planned in three phases. The carriages and hangers were replaced in 2013, the control system in spring 2014 and the drive units are to follow in October 2014. The crucial factor in the upgrade schedule was the outmoded control system. Replacing it in just six weeks is an outstanding achievement. Initially, the customer hadn't really believed this would be feasible, but Garaventa made it happen and the tram was able to go back into service in time for the start of the winter season.





Vietnam boasts the world's longest gondola lift

Doppelmayr has built the 10-MGD Bà Nà Big Ropeway at the Bà Nà Hills Mountain Resort which lies roughly 25 km to the west of the Vietnamese city of Đà Nẵng. This project resulted in two entries in the Guinness World Records: As well as being the world's longest ropeway, the lift climbs a greater vertical height than any other installation of its kind.



Bà Nà Hills was developed into a resort by the French in the early 1900s while the country was still under colonial rule. A village consisting of villas was created at an altitude of 1,500 m where Europeans found the climate more agreeable as it was drier and on average 10 °C cooler than in the tropical Đà Nẵng on the coast. The fortunes of Bà Nà waned after the departure of the French civil administration.

Popular tourist destination

It was not until the economic recovery of the 1990s that tourism began to flourish once again. At the end of the 1990s, Doppelmayr built a pulsed movement aerial ropeway from the old villas up to the top of the mountain. In 2007, a private investor was found to develop Bà Nà Hills into a modern tourist resort and two new Doppelmayr lifts were opened in 2009: the 8-MGD Bà Nà Cable Car and the 8-MGD Bà Nà Peak Gondola.

The Bà Nà Cable Car is the world's longest and runs virtually parallel to the two 8-passenger gondolas in a single section up to the summit. It also climbs a record vertical height of 1,369 m. Of the 86 cabins, ten are fitted with a glass floor and another ten have open windows protected by metal

grids rather than glazing to provide a pleasant breeze. The open cabins are removed from the line in the case of heavy rain.

The construction of all the lifts was a major challenge. The terrain is impassable and exposed to extreme climatic conditions. Severe thunderstorms are the order of the day during the monsoon season. For this reason, lightning protection ropes were installed above the haul ropes. Bà Nà is also a well-known tourist destination. The majority of guests come from Vietnam, neighboring countries and the US. They are enthralled by the magnificent views of the ocean and mountains during the gondola ride.

10-MGD Bà Nà Big

Transport capacity	1,500 PPH
Trip time	17.2 min
Speed	6.0 m/s
Gondolas	86
Interval	24 s
Inclined length	5,772 m
Top station altitude	1,450 m
Vertical rise	1,369 m
Towers	25
Drive	Top
Tensioning	Bottom



The first funicular railway in Vietnam

Vietnam's first funicular has opened at the Bà Nà Hills leisure resort. The 80-passenger trains are based on the vintage cabins of the UBS Polybahn funicular in Zurich.



The new funicular links the top station of the Bà Nà Peak Gondola with the Linh Ung pagoda and a 27m high white statue of Buddha which stands amid the mountain landscape of the Bà Nà Núi Chúa range. This pagoda was built by the state in 2004 as part of a tourist center.

Romantic alpine town and amusement park in the heart of the jungle

An extensive leisure resort was subsequently created following the acquisition of the site by the private Sun Group. Visitors can drive bumper cars, experience 4D and 5D cinema or enjoy the thrills of the free-fall tower in the Fantasy Park. There are plenty of attractions offering excitement for adults and children and new facilities are constantly being added.

The customer attached great importance to detail in the vintage design of the cabins which are equipped with leading-edge technology. The funicular travels through impassable jungle for a large part of the route. An article in the online version of the Saigon Times outlines the benefits of the new installation for visitors: "A trip to the pagoda or (then much smaller) Fantasy Park used to mean either undertaking a two-kilometer trek

on foot or taking one of the 16-passenger shuttle buses. Today, visitors have a much faster and more comfortable means of travel with the new funicular railway."

Garaventa was responsible for supplying the ropeway equipment. The construction work and steelwork were taken care of by the customer.

New 3S lift being built

The activities of the Doppelmayr/Garaventa Group are still ongoing at the resort. The fifth ropeway project, a 3S, is currently under construction.

80-FUL Bà Nà Hills

Transport capacity	1,600 PPH
Trip time	2 min
Stopping time in stations	1 min
Speed	5 m/s
2 trains	80 P/6,000 kg freight
Inclined length	400 m
Top station altitude	1,415 m
Vertical rise	90 m
Drive 120 kW/281 kW	Top



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Jiné Tatry
TRANSKÁ LOMNICA

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Tatranská Lomnica: New 15-passenger gondola lift

Tatranská Lomnica is one of the most traditional all-year tourist areas in the High Tatras. It has seen rapid development and expansion continues with the latest new lift: a 15-MGD from Doppelmayr.

The 15-MGD Štart – Skalnaté pleso operates all year round. It replaces the second section of a 4-passenger gondola lift dating from 1995. The first section acts as a feeder from Tatranská Lomnica and is also used for repeat uphill trips. During the winter season, these functions are also bolstered by a high-capacity 6-CLD-B from Doppelmayr (built in 2010).

The new 15-passenger cabins (CWA/OMEGA IV-15 SI) offer space for ten seated and five standing passengers and a high level of ride comfort. A wheelchair or baby stroller can easily be carried without the need to fold back the bench seats.

Doppelmayr was general contractor for the construction and installation of the lift. The top station was not accessible by truck and landscape conservation requirements prevented the building of a track for road vehicles. Materials and equipment were therefore flown in by helicopter. The only other equipment available for building the top station was a 25-ton excavator which could drive up via the ski slope and a crane arm specially developed by Doppelmayr. The crane arm was mounted on the station steelwork and manually moved as work progressed. The individual construction elements were flown to the top station, assembled to form bigger units and then brought to the required location. The towers were also installed using the helicopter.

The operating company required the old 4-MGD to remain in service for as long as possible. For that reason, a large part of the work was undertaken before the lift was closed down. This posed a particular challenge in conjunction with the bottom station. In view of the fact that part of the station building was to be used for parking the carriers on the new lift, the new station had to be built directly adjacent to the old one. This

meant that the towers were in close proximity to the 4-MGD and the work had to be carried out with the utmost caution. Particularly critical jobs were performed outside of operating hours and the 4-MGD only had to be taken out of service for five weeks.

The town of Tatranská Lomnica lies at an altitude of 850 m. It is a young municipality which was only established in 1892 but very soon became the focal point of tourism in Slovakia's High Tatras. In 1960, it became an administrative district of Vysoké Tatry. Here and in Tatranská Lomnica, visitors have a wide selection of hotels and private accommodation to choose from. Many day trippers also come to the area throughout the year with the single-track narrow-gauge railway known as the Tatra electric railway.

The Tatranská Lomnica ski and hiking region has six aerial lifts, several surface lifts and a 15-passenger reversible tramway which runs from Skalnaté pleso to the top of the 2,634 m Lomnický štít, which is a popular destination because of its panoramic views. At the base there are various hotels and apartment complexes. The ropeway operator TMR (Tatry mountain resorts, a.s.) also runs a four-star hotel, the extensively renovated Grand Hotel Praha.

The TMR investor group began acquiring and developing ski areas in 2004. Since then, Doppelmayr has built 11 ropeways in Slovakia for this company alone in Jasná, Tatranská Lomnica and Starý Smokovec: a funicular, a Funitel, two 15-MGDs and one 8-MGD, two 6-CLDs, two 4-CLFs and two platter lifts.

15-MGD Štart – Skalnaté pleso

Transport capacity	2,400 PPH
Trip time	7.1 min
Speed	6.0 m/s
Gondolas	37
Interval	22.5 s
Inclined length	2,019 m
Top station altitude	1,768 m
Vertical rise	598 m
Towers	19
Drive	Bottom
Tensioning	Bottom



A gondola lift to the Great Wall

Since April 2014, a modern 8-MGD from Doppelmayr has replaced the 26-year-old 6-MGD up to the Great Wall of China in Badaling.



Badaling, 70 kilometers north of Beijing, was built as a fortification in 1505. In ancient China, it was the strategically most important gateway to Beijing. As the routes from here lead in many directions, the fortification was given the name “Badaling” which means “reach eight directions”.

Today, Badaling is a large municipality covering an area of 96 km² and home to over 6,000 inhabitants. In this area, the Great Wall has a width of four to eight meters at the top and ten meters at the base, and ranges from six to nine meters in height.

In the 1950s, the Badaling section of the fortification was restored and opened

for tourists in 1957. Nowadays, the region attracts millions of visitors. Badaling has a good infrastructure of hotels and restaurants, and has been linked to Beijing by an expressway for some time.

Impassable terrain

The surrounding landscape is rugged and impassable, and the climb up to the fortification strenuous. An aerial ropeway was therefore the obvious solution. A private investor paved the way for the construction of a 6-passenger pulsed-movement aerial ropeway and a 6-MGD in 1988. However, as the right of use expired after 25 years



and the 6-MGD was no longer able to cope with the growing volumes of tourists, it was acquired by the local administration and replaced by a comfortable 8-passenger gondola lift offering triple the capacity as well as level access.

Cabin with heated seats for the winter and ventilation panels for the summer

The new lift follows the same route as the old one. The top station built into the rock face and accessible via a tunnel has also been largely retained, while the front of the tunnel required modification to meet the new requirements.

In view of the fact that the winter months are very cold in Badaling, the CWA OMEGA IV cabins were equipped with seat heating. For summer operation, additional ventilation panels are installed towards the bottom of the cabins; these are closed in the winter.

Demolition of the old 6-MGD went ahead in mid-October 2013 and the Chinese ropeway authorities granted their approval for public service at the end of April 2014. Installation and commissioning were completed in three months. The next project in the pipeline is an 8-MGD to replace the 6-passenger pulsed-movement aerial ropeway.

8-MGD Badaling

Transport capacity	2,420 PPH
Trip time	3.1 min
Speed	6.0 m/s
Gondolas	32
Interval	11.9 s
Inclined length	694 m
Top station altitude	894 m
Vertical rise	179 m
Towers	5
Drive	Bottom
Tensioning	Top



Combined lift with bubbles in the winter and bicycle racks in the summer

December 2013 saw the start-up of the first combined lift in Berner Oberland.

The Adelboden lift is also Switzerland's first combined installation with bubbles.



The new lift from Geils up to Hahnenmoos is a combined detachable lift incorporating 8-passenger gondolas and 6-seater chairs with blue bubbles.

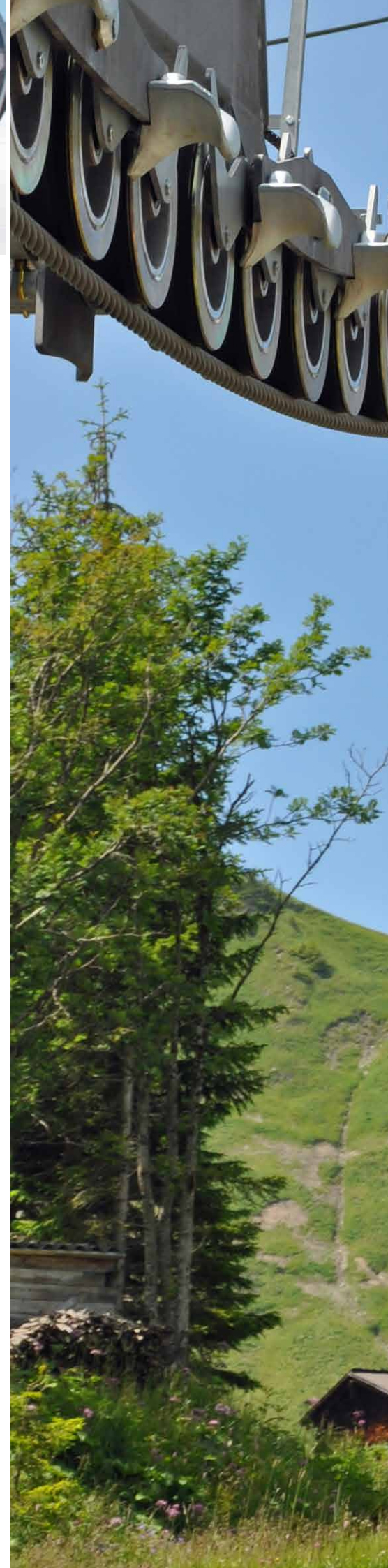
Gondolas only in the summer, chairs added in the winter

During the summer season, the lift runs exclusively with gondolas. In the winter, both carrier types are used; the cabins tend to be favored by leisurely skiers, ski schools, tobogganists and foot passengers. Up to four chairs can be sent onto the line between two cabins, depending on passenger requirements. When all the carriers are in use, there are 15 gondolas and 57 chairs on the rope.

The chairs are fitted with swing dampers as the area is prone to strong winds. The cabins are parked in the bottom station transit section, the chairs in an automatic looped parking system with feeding conveyors at the top station where they are inserted between the cabins by means of a "fast switch rail". The parking facility is housed in the top station of the old 4-passenger gondola lift built in 1974. The stations are styled with the wooden cladding which is typical of Adelboden.

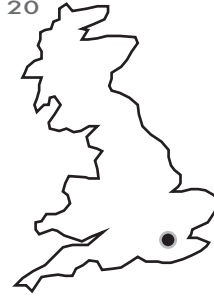
6/8-CGD Geils-Hahnenmoos

Transport capacity	2,400 PPH
Trip time	5.8 min
Speed	5.0 m/s
8-passenger gondolas/ 6-seater chairs	15/57
Interval	9.6s
Inclined length	1,413 m
Top station altitude	1,952 m
Vertical rise	243 m
Towers	12
Drive	Top
Tensioning	Bottom





7
ADELBODEN
Bergbahnen AG



Annual service for Emirates Air Line

By the end of last year, London's gondola lift had clocked up over 10,000 operating hours. Doppelmayr's after-sales team took just 7 days to complete the latest annual service and reaped praise for their speed, quality and professionalism.

The 10-MGD Emirates Air Line links the Greenwich Peninsula with Royal Victoria Dock and crosses the Thames at a height of 90 m. The respective stations are situated near the ExCeL exhibition centre and the O₂ Arena. The detachable gondola lift is fully integrated into the metropolitan transport network and operates as a section of the London underground. It carries commuters and tourists who are keen to experience the unique sensation of a "flight across the Thames".

The lift has become a popular means of transport. Since it was built to coincide with the opening of the Olympic Games in summer 2012 up until mid-2014, the installation had carried almost four million passengers.

The latest annual service had to be carried out during the closure period from March 18 to 25. This gave Doppelmayr's after-sales team just a week to inspect and test all parts of the installation and to make any replacements that might be necessary.

The maintenance program encom-

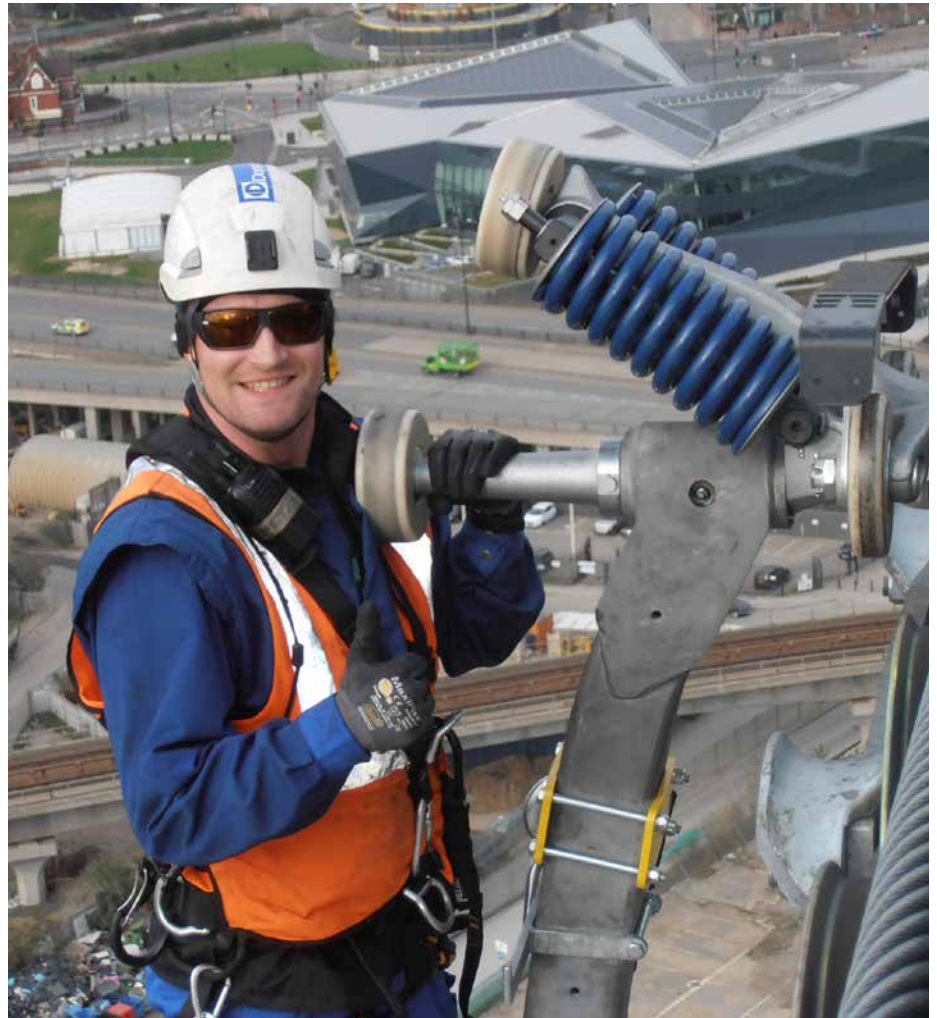
passed station equipment, sheave assemblies, switch rails, hydraulic units, gear units and torsion shaft as well as the rope and electronic system components. The work was performed by Doppelmayr after-sales engineers specializing in hydraulics, electrical engineering and mechanics, each with their respective teams, as well as an external accredited rope inspector.

The coordination on site was the task of a senior member of the after-sales team who acted as the link between the Doppelmayr service engineers and the customer to ensure that the work went ahead swiftly and smoothly.

Tight time frame

The engineering manager responsible for maintenance operations at the lift operating company Mace is Edwin Hopper. He commented on the way customer support is handled as follows: "The challenge we face within the urban environment is that

Edwin Hopper,
engineering
manager –
Emirates Air Line:
"Doppelmayr
have shown
their ability to
adapt to the
challenges of an
urban ropeway
admirably."



Working at a height of 90 m



Survey of 3S trajectory over the Rhine

the service is expected to continue operating for as long as possible, even in poor conditions. Also, the service is expected to operate all year, which means that the Emirates Air Line is closed only for Christmas Day, and one week in March. You therefore have a system subject to greater use which must be maintained in a smaller window."

Not only cableway maintenance but also all other building asset maintenance has to be performed during this time frame. "We have to work closely with Doppelmayr after-sales to ensure that our works align and complement one another," says Hopper.

He also praises the reliability of the lift installation: "We have only undertaken two shutdowns to date, but Doppelmayr have shown their ability to adapt to these new challenges admirably.

For our first shutdown, we all struggled with unseasonal snows and high winds, but still opened to the public on time. In our second year, we had additional maintenance activities. Nonetheless, we not only completed all activities on time but managed to do so a half day early! This was achieved thanks to close planning with Doppelmayr."

Meanwhile, the planning has already started for the 2015 service with the aid of the new maintenance protocols introduced between 2013 and 2014, which, with Doppelmayr's help, Mace had approved by Transport for London and the Department for Transport.

Utmost care

Two of the lift's towers stand on foundations in the Thames. When work is performed on the rope, a minimum clearance has to be maintained for shipping as well as taking the tide conditions into consideration. The river has a tidal range of up to nine meters.

Apart from water and shipping, the lift also crosses pedestrian areas, streets, parking lots and consequently people and cars. All work therefore has to be carried out with the utmost care to ensure that nothing – not even the smallest part – can fall to the ground.

The 3S lift in Koblenz crosses the River Rhine. This means that, in addition to the scheduled maintenance work, a special inspection is required to establish its actual height above the water surface.

Ropeway operating permits are subject to an annual inspection of the installation by an expert.

As part of this inspection, the clearance between the cabin and the highest navigable water level is verified. This distance has to be at least as great as the clearance beneath bridges.

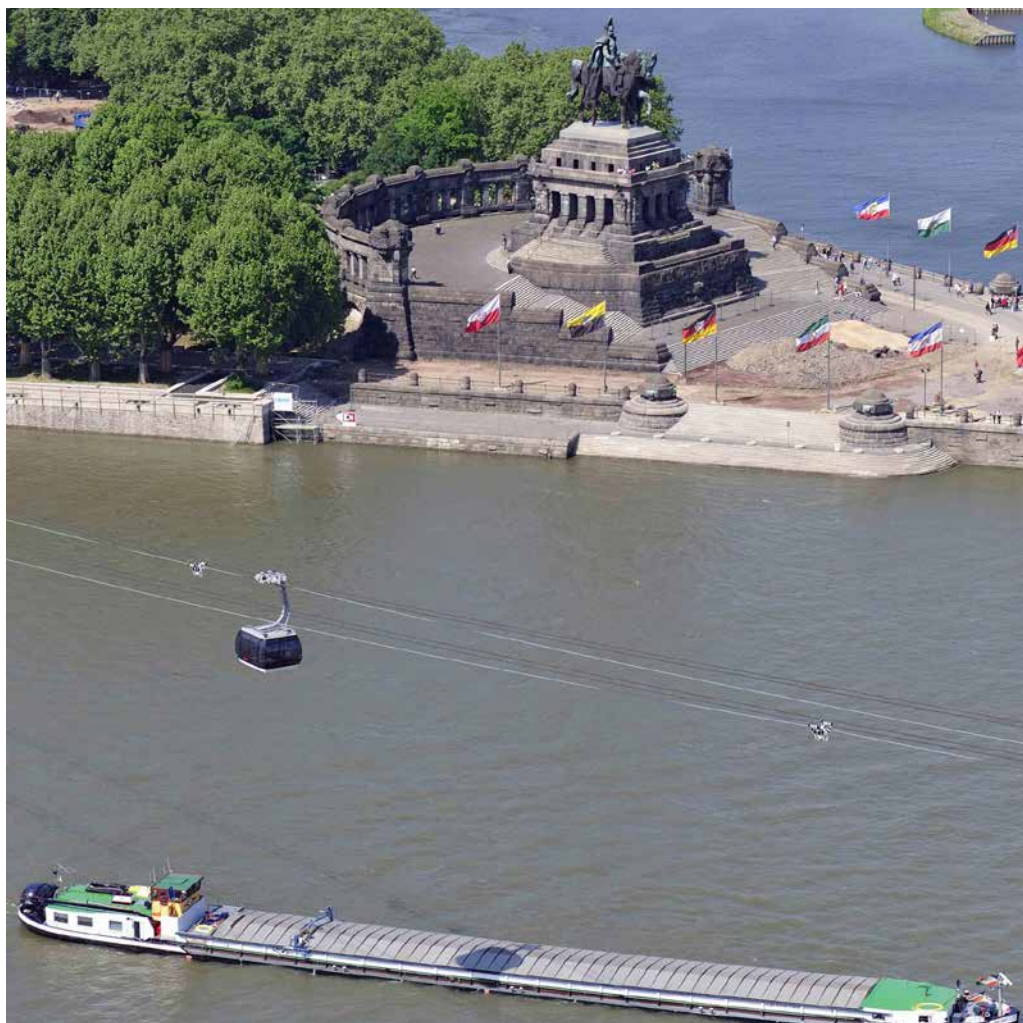
The clearance between the trajectory of the cabins and the water surface is measured by an expert from the municipal sur-

veyor's office on behalf of the lift operating company. The office forwards the results of the survey to the ropeway expert who in turn incorporates these in his report which he submits to the ropeway authority for the state of Rhineland-Palatinate. The state then decides whether to prolong the operating permit.

High tech for clearance measurement

To carry out the measurement, a cabin is loaded with 2.8 t of ballast, which is the equivalent of the maximum permitted number of 35 passengers. A prism target is fixed to the underside of the cabin. This cabin is then sent along the line at a speed of 2 m/s and a laser beam is directed at the reflector from the opposite bank of the river. The time it takes for the light beam to hit the target and return is then measured and evaluated.

With the measuring method employed nowadays, data acquisition and processing are largely automatic.



35 years of the Doppelmayr apprentice workshop



Apprentice training enjoys a long tradition at Doppelmayr and stretches back to the early days of the company 122 years ago. Since then, 594 apprentices have begun their professional careers at Doppelmayr. Today's apprentices benefit from a contemporary training concept and modern facilities.

The Doppelmayr apprentice workshop was created in 1979. Up until that date, all apprentice training took place in the factory.

The new workshop provided apprentices with their very own area within the Rickenbach section of the plant. Edwin Brüstle, himself a master fitter, became involved with apprentice training at an early stage of his career and was appointed as the head of apprentice training at the start of the apprentice year 1979/80. Back then, nine youngsters began their training at Doppelmayr to become machine fitters.

Over time, the training at Doppelmayr has been adapted in line with advances in the metal and electrical industries, new content and new technologies. New job profiles have also supplanted old ones. Steel construc-

tion, plant and machining technology within metal engineering as well as plant and industrial technology within electrical engineering are the training options currently available at Doppelmayr.

The workshop facilities have undergone a series of expansions in terms of floor space, machine infrastructure and the number of instructors as well as the introduction of state-of-the-art working processes. Doppelmayr's workshop in Wolfurt now covers an area of 770 m² and is used to teach fundamental skills for the various metalworking and electrical trades required in ropeway construction. The plant in Hohe Brücke houses another two dedicated areas, each covering 300 m², which are used for training skilled metal workers in the fields of machining and steel construction.



Apprentice workshop 1979

All the facilities are state of the art

The apprentice workshop is the first phase in the training program which lasts roughly a year. The apprentices then go on to work alongside selected skilled workers in the various production departments to develop their skills; they change their workplace at regular intervals. In the third and fourth years of their training, they specialize. This enables the apprentices to focus their knowledge, interests and skills, and to put them to targeted use. When preparing to put their abilities to the test – such as in the final apprenticeship examination or skills competitions – the apprentices return to the training workshop. The entire training program is geared to ropeway production but at the same time covers a wide spectrum of

topics. Precision manufacturing and complex tasks are the order of the day.

The training system at Doppelmayr is constantly evolving, as training director Georg Dür is keen to emphasize. The instructors make every effort to improve their methods to ensure that their protégés achieve their training goals with top marks.

All the instructors in the metalworking and electrical fields started off their careers at Doppelmayr and have been recognized, certified or awarded diplomas by the Vorarlberg Economic Chamber and the Chamber of Labor.

Doppelmayr's apprentices have also made a name for themselves with outstanding achievements. Since 2004, they have been able to claim 18 out of a possible 26 provincial victories in the skills competitions

for steel construction, plant and electrical technology. In addition to these impressive results, their valuable contribution within the company and an average mark of 1.7 over a period of years in the vocational colleges attest to the high quality of their training.

Alongside practical working skills and comprehensive theoretical know-how, Doppelmayr also places a strong emphasis on initiative, reliability and self-reliance as well as developing the ability to organize oneself and to work in a team.

All this and more is reflected in Doppelmayr's "Apprenticeship Excellence" label which it has been awarded ever since the scheme began in 1997. The title is awarded to companies for a three-year period in recognition of top standards of apprentice training.



Apprentice workshop 2014

Successful trade fair in Grenoble

Doppelmayr had a large exhibition stand at the Salon de la Montagne/Mountain Planet in Grenoble (April 23 – 25; formerly SAM).

The show focuses on products and services aimed at sustainable land use planning and development in mountain regions.

A total of 833 exhibitors took part. One quarter of the 15,000 visitors came from abroad.



New Doppelmayr website

Doppelmayr's new website went live in spring 2014. It is available in nine languages: Portuguese and Russian have been added to the usual versions in German, English, Spanish, French, Italian, Finnish and Chinese. The websites Doppelmayr International, DCC, DTT, after-sales and the apprentices' pages have been optimized for smartphone and tablet applications. Content has also been streamlined for fast access.



eMobility

To underline the energy efficiency of ropeways, the Koblenz gondola lift team took part in the WAVE Trophy 2014 with an electrically powered roadster. The WAVE (World Advanced Vehicle Expedition) Trophy is the world's biggest electric vehicle rally. Eighty teams took part in this year's event which extended over ten days and covered 1,600 kilometers from Koblenz to Lucerne. The aim of WAVE is to focus public attention on the topic of electric mobility.



Fun with Skippy

Hi kids! It's Skippy here again!

Right now we're in South America - La Paz, Bolivia, to be precise. Along with the neighboring city of El Alto, this is the highest metropolis in the world. The people here live in an area that's between 3,000 and 4,000 meters above sea level.

