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5-COUNTRY SPECIAL



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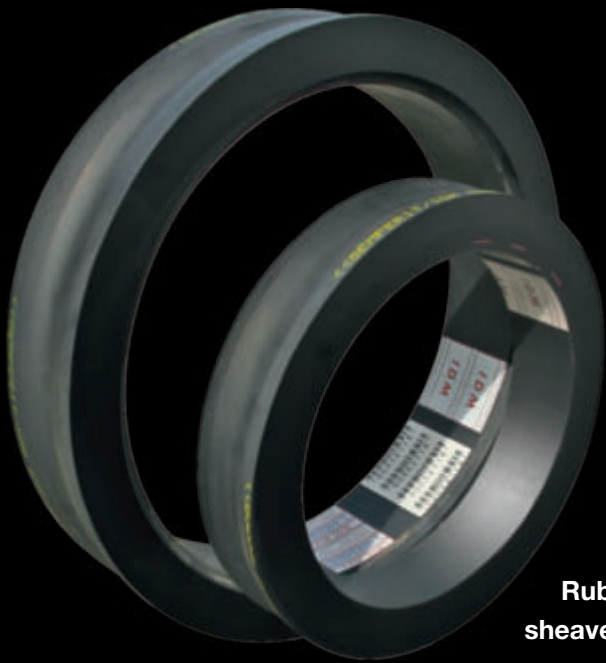


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ENGINEERING
LOADS IMPOSED ON ROPEWAY ROPES

ROPEWAYS
NEW PROJECTS

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SLOVAKIA, POLAND



Rubber sheave liners



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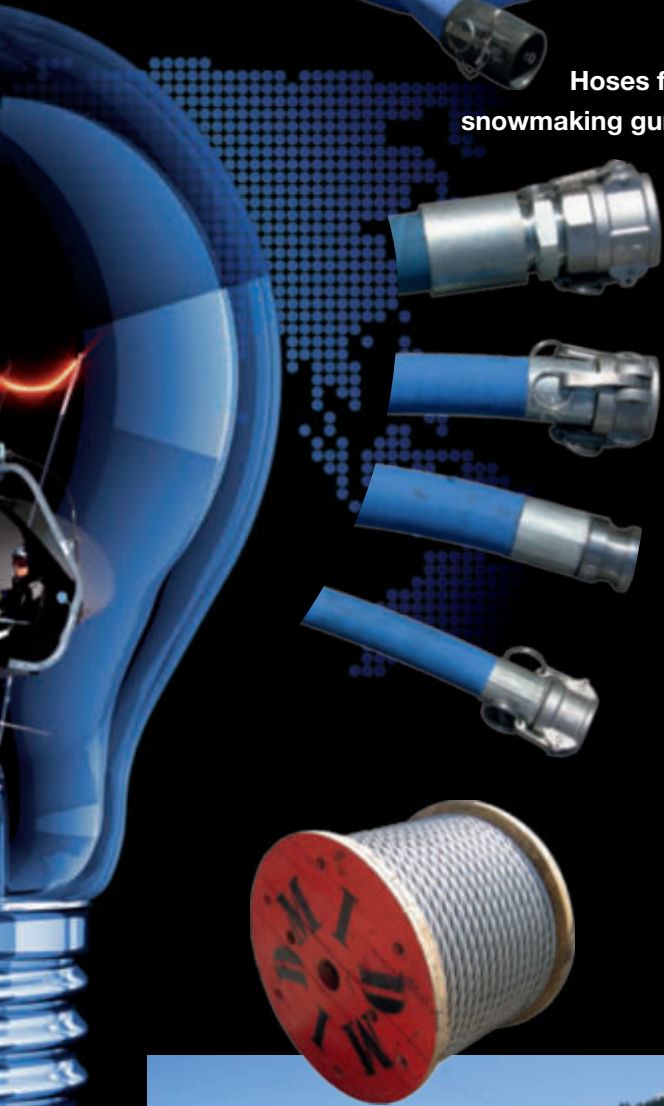




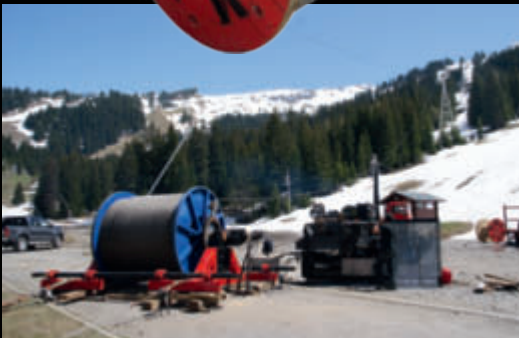
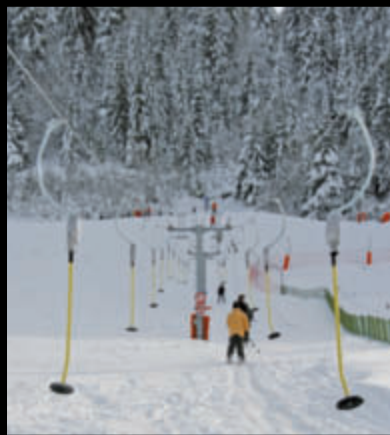
Hoses for snowmaking guns



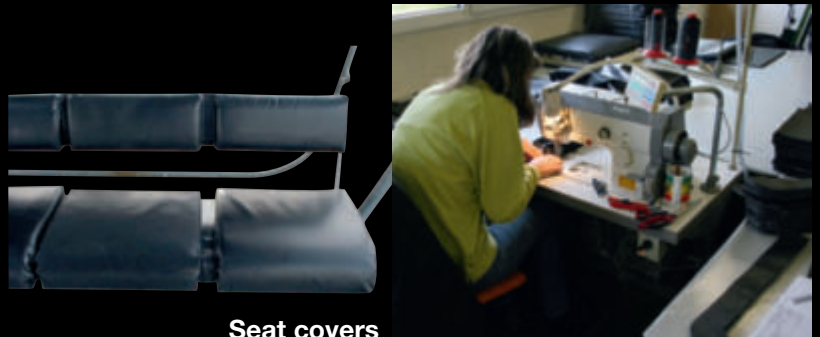
Spare parts for snow groomers



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Cables and installation



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SAFETY BY COMPETENCE



CHRISTIAN AMTMANN

Executive Editor

EDITORIAL

EXCHANGE OF KNOWLEDGE

For over 55 years ISR has been providing global coverage on everything of interest to the ropeway industry. We deliberately use the more general term “ropeway industry” because this fascinating scene has long comprised more than just winter tourism; in addition to the classical winter mountain applications, summer mountain tourism and rope-hauled urban transportation systems are now playing increasingly important roles, too.

A continually growing role is also being played in this context by five countries with exciting market potential, which brings us to the subject of this ISR special. The many new ropeways built in Bulgaria, Romania, Slovakia, the Czech Republic and Poland in the last few years are indicative of the potential and the opportunities presented by these attractive future markets.

In view of the large numbers of ropeways involved, however, we decided to revise our plans for this special number of ISR. The original intention was to present new ropeways from all five countries, but we soon realized that we had underestimated the sheer scope of resort development and ropeway construction work taking place there. As a result, we decided to divide this special edition of the International Ropeway Review onto two separate numbers.

This ISR special is devoted to new ropeways in Slovakia and Poland, while a second special planned for 2014 will focus on Bulgaria, the Czech Republic and Romania. This edition is naturally being sent to all five countries as a contribution to the exchange of knowledge between Bulgaria, Romania, Slovakia, the Czech Republic and Poland on recent and future ropeway activities in those countries.

We would like to take this opportunity to express our gratitude to Roman Gric, our walking encyclopedia of the ropeway industry, whose excellent locally researched articles have made this edition of ISR possible. Thank you, Roman!

We feel we have a duty towards our readership around the world to provide not only ropeway business information but also technical and theoretical background knowhow.

For this number of ISR, we have accordingly chosen an interesting article on the loads imposed on the ropes of ropeway installations (page 8), which we think will be useful for all ropeway operators and the technically minded reader.

We hope you enjoy reading this first part of our 5-country special and look forward to receiving your feedback!

Christian Amtmann
amtmann.zv@bohmann.at

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Martin Leitner,
President of OITAF

OITAF is the international organization that brings together ropeway operators, manufacturers and authorities as well as universities and research institutes. The OITAF congresses and seminars are always very special events.

The 2012 seminar in Grenoble had a twin focus on “Transportation of children and communication with young people to improve safety” and “Safety of transportation by rope: legal issues and practical experience”.

This year, the OITAF seminar was held Innsbruck on the subject of “Operation of ropeway installations in exceptional operating conditions: experience and measures” – a practical topic with a focus on the phase before evacuation becomes necessary. The next seminar, to be held in April 2014, will be devoted to the subject of ropes. As always, admission to the seminars is free.

URBAN ROPEWAYS ARE NOW BECOMING INCREASINGLY POPULAR

Our 2011 OITAF Congress in Rio certainly made a significant contribution. Since then contracts have been awarded for various attractive projects worldwide. So we are now paying more attention to this topic. In Central and Eastern Europe, too, a number of interesting systems have been built, as in the Georgian capital Tbilisi and the Russian city of Nijni Novgorod. Work Committee no. I (Ropeway Engineering and Technical Recommendations) and Work Committee no. VI (Optimization of Ropeway and Ski-Tow Operation) will continue to address the subject, and invitations will be sent out to urban ropeway operators so that we can benefit from their experience. It is my personal wish that we should move forward in this field.

We are giving a strong priority to recommendations for the operation of ropeways and operating regulations in countries which do not yet have any standards in this field. The matter is currently being addressed by six work committees meeting

twice a year on average. Work Committee no. IV, for example, is responsible for Juridical, Administrative, Economic and Statistical Matters. It is currently working on the following: legal framework (EU directives and national codes), economic development, business ratios, relevance for national economies, marketing, operational aspects, trends, and stand-alone lifts and small ski areas. These topics are being discussed and analyzed by the committee with reference to specific examples.

OITAF was founded because of the need for communication and cooperation between the three main groups within the ropeway industry:

- the ski area operators or ropeway companies,
- the ropeway manufacturers, and
- the supervisory authorities (as representatives of both government and users).

There are the national associations of operators, which are fairly active in sharing information and hold regular discussions in the framework of FIANET. Of course, it is not always easy to find a common denominator. Take the case of Switzerland, for example, which is simply not affected by certain problems created by Brussels. Or think of the very considerable national differences on the subject of who owns what. The current debate relating to the EU Directive on Concessions shows how great the differences can be within Europe alone. At all events, the representatives of the operators have a strong voice in the various OITAF bodies and Study Committees.

As far as the manufacturers are concerned, they coordinate their interests in the framework of the IARM, which tries to find a common denominator with regard to proposals made by the national organizations like ACIF in Italy.



The representatives of the technical supervisory authorities have been holding their annual meetings in the framework of ITTAB for

63 years now. That provides a platform for discussing and analyzing accidents and current technical issues. These meetings are important in that they generate an exchange of information in the interest of improved safety.

The authorities are increasingly interested in finding common solutions with regard to international codes and regulations. To that extent, this is an important instrument for communicating European standards to the new ropeway markets in South America and Eastern Europe, for example, so that we can be sure of finding safe reference installations in those regions in the near future.

I think that we have a good working climate in the various bodies of OITAF, and that the groups within the ropeway industry are communicating effectively and working well together.

The world is constantly changing, and it is impressive to see so many ropeways now being built around the world in such a short space of time, including countries which have no experience of modern ropeway systems. In this field, OITAF can increase its standing still further by providing professional assistance in these new markets. We have a duty to make useful suggestions to optimize the construction and operation of the installations and thus make a further contribution in terms of improved safety and reliability.

As President of OITAF, I am of course keen to recruit members for our international organization on these new markets, which for me include many countries in Central and Eastern Europe.

For more information, please visit our website at www.oitaf.org.

The President

Martin Leitner



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ropeways

Loads on ropeway ropes



For the technically interested readers of ISR, Professor Josef Nejez describes the forces acting on ropeway ropes, the resulting stresses in the ropes and the rules for calculating the ropes.

Univ.-Prof. Dipl.- Ing. Dr. techn.
JOSEF NEJEZ

The functions of ropeway ropes – supporting, moving and guiding the carriers – involve forces that act on them in different ways and impose various loads.

In order to understand that, we need to know what a force is and the properties and magnitudes with which forces can be described. For those readers who have forgotten these basic facts of physics or were never taught them, they are summarized in the box (page 14).

1 FORCES ACTING ON ROPEWAY ROPES

In fulfillment of their functions for ropeway operation, the ropes are subjected to forces that create two kinds of stresses:

- Forces acting along the axis of the rope create tensile stresses.
- Forces acting across the axis of the rope create bending stresses.
- Another form of bending stress is created in ropeway ropes on rope sheaves and saddles and on anchor drums.
- Depending on their function, we distinguish between track ropes and haul ropes:
- Track ropes support and guide the carriers (bicable system).
- Haul ropes move the carriers (bicable system) or support, move and guide the carriers (monocable system).

Fig. 1 shows the cross-section of a full-locked track rope on the left and that of a round strand rope as used for haul ropes on the right.

Full-locked track ropes are a compact type of construction with a smooth surface. They therefore make a good track for the wheels of ropeway cabin carriages. Round strand ropes with a soft core are relatively pliable. That makes them suitable for running over rope sheaves, and they can be spliced to form continuous rope loops. That is why they are used as haul ropes.

2 TENSILE STRESS

Tensile stress is caused by a tensile force acting in the axis of the rope. Rope tension is comprised of five individual tension forces:

- the basic tensioning force created by the tensioning

- system or fixed rope attachment,
- vertical tension resulting from the weight of the rope,
- the pull of the carriers resulting from the component forces of carrier weight acting along the axis of the rope,
- frictional force resulting from frictional losses on the rope sheaves, bullwheels and rope saddles, and
- inertial force, i.e. the forces generated on starting and stopping the installation.

2.1 BASIC TENSIONING FORCE

Ropeway ropes must be sufficiently tensioned to enable them to support the carriers on the line. Without that tension, the ropes would sag to the ground. The tensile force required to tension ropeway ropes is called basic tensioning force.

For haul ropes, basic tensioning force is produced almost exclusively by the piston of a hydraulic tensioning system or by the weights of a counterweight system. In the case of track ropes, basic tensioning force is produced either by a counterweight or by permanent anchorage of the rope on a tension drum (anchor bollard).

2.2 VERTICAL TENSION

Vertical tension is the increase in rope tension with increasing height as a result of the deadweight of the rope. This component force of rope tension can be il-

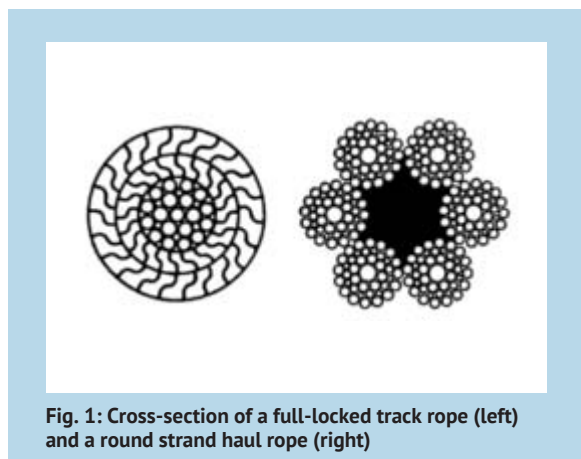


Fig. 1: Cross-section of a full-locked track rope (left) and a round strand haul rope (right)

GRAPHIC: J. NEJEZ

London and Sochi trust in Doppelmayr



Doppelmayr is putting in a strong showing at the venue for the Winter Olympic Games 2014 in Sochi.

A total of 40 ropeways are to be completed. The showcase projects among them are two large tricable gondola lifts. As well as incorporating various world firsts, these installations break several world records. One of the 3S lifts can even be used to transport automobiles.

London hosted the Summer Olympics in 2012 and saw the opening of the UK's first urban ropeway shortly before the start of the Games. The gondola lift across the Thames is 1,100 m in length and can carry 2,500 passengers an hour in each direction. It links the Greenwich Peninsula with the Royal Victoria Dock and forms an integral part of the public transport network.



www.doppelmayr.com

lustrated with the example of a free hanging rope. At the lower end of the rope, vertical tension is zero; at the upper end, the rope is subjected to the pull of the full weight of the rope. Along the rope, vertical tension increases linearly with height. As can be shown with the help of calculation methods used in statics, that applies to tensioned ropeway ropes extending from the lower to the upper terminal at any angle of inclination.

2.3 PULL OF THE CARRIERS

For simplicity, only the case of a circulating ropeway is considered here. If a ropeway carrier is attached with a rope grip to an inclined haul rope, the downhill component of carrier weight (downhill force) must be absorbed by the haul rope (Fig. 2). This component of carrier weight increases the tension in the haul rope at every rope grip.

The sum of the downhill forces of the carriers on a section of haul rope is called carrier pull.

The pull of the carriers depends on the number of carriers, their deadweight and load, and the angle of inclination of the rope; the greater the number of carriers, the greater their weight, the heavier their loads, and the steeper the line of the installation, the greater the pull.

2.4 FRICTIONAL FORCE

At the points of rope support and deflection, i.e. on rope sheaves, bullwheels and rope saddles, various frictional forces are generated. They act in the opposite direction to the direction of movement of the rope. Depending on the direction of movement of the haul rope (uphill or downhill), these frictional forces increase or reduce rope tension.

2.5 INERTIAL FORCE

When an installation is started (accelerated) or braked (decelerated), dynamic forces derive from the inertia of the masses moved (carriers, haul rope), which act

against the direction of movement on acceleration and with the direction of movement on braking (cf. an automobile). On starting (accelerating), the inertial force increases rope tension on the uphill side and decreases rope tension on the downhill side; on braking (decelerating), ropeway tension is reduced on the uphill side and increased on the downhill side.

The inertial force depends on the mass of the carriers including their loads and that of the haul rope and also on the rate of acceleration or deceleration on starting or braking the installation

2.6 MINIMUM AND MAXIMUM ROPE TENSION

In order to perform design calculations for ropeway ropes and many other components, minimum and maximum rope tension must be known. These two extremes of rope tension in every rope loop derive from the lowest and highest totals for the five component forces. Due to vertical tension and, in the case of haul ropes, the pull of the carriers, minimum rope tension always occurs in the lower terminal and maximum rope tension in the upper terminal.

3 BENDING STRESS

Ropeway ropes are affected by bending stresses in two ways: as a result of forces acting on the rope transverse to its axis (transverse forces) and as a result of bending on rope sheaves (haul ropes) or rope saddles and drums (track ropes). In both cases, a bending moment is produced in the ropes.

The various types of bending stress are discussed below for the case of a haul rope on a monocabable circulating ropeway. The situation is similar in the case of track ropes.

3.1 BENDING STRESS PRODUCED BY TRANSVERSE FORCES

The haul rope is subjected to the following transverse forces:

At the carrier grips, the carrier weight component

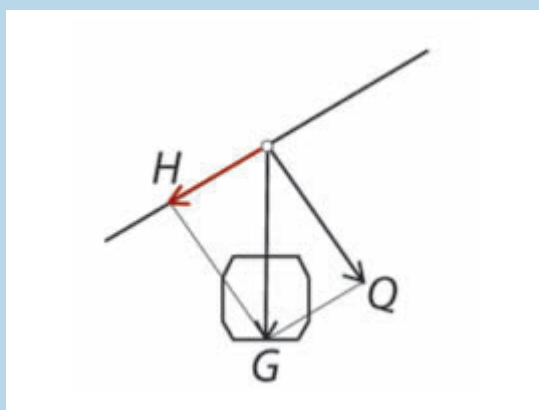


Fig. 2: Pull of a ropeway carrier
 G ... Carrier weight
 H ... Component force in the direction of the rope (downhill force)
 Q ... Transverse force

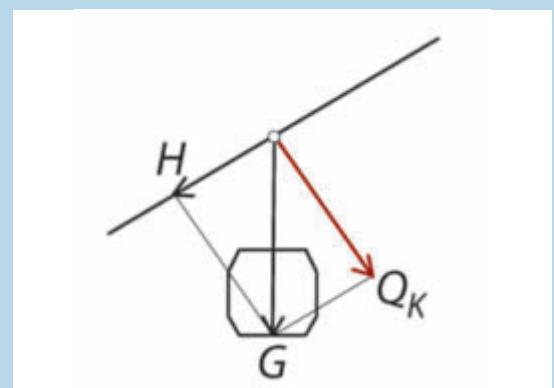


Fig. 3: Bending stress on the haul rope at the grip of a ropeway carrier
 G ... Carrier weight
 H ... Component force in the direction of the rope (downhill force)
 Q_k ... Transverse force at grip

GRAPHICS: J. NEJEZ



CH – Laax, 2012

aerial tramways

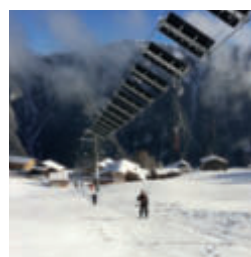
chair lifts

gondola tramways

ski lifts

funitels

inclined lifts



force is active normal to the axis of the rope as a transverse force (transverse force at grip, Fig. 3).

At the haul rope sheaves on the towers and in the terminals, the sheave loads create a transverse force (transverse force at the sheaves, Fig. 4).

The effect of the bending stress on the haul rope depends not only on the transverse force but also on rope tension at the point of application of the transverse force. The greater the transverse force relative to rope tension, the more problematical the effect of the bending stress in the haul rope.

3.2 BENDING STRESS AT THE BULLWHEELS

Rope deflection at the bullwheels and return sheaves subjects the rope to bending stresses. The critical factor here is the ratio between the diameter of the sheave and that of the rope (Fig. 5).

The smaller the diameter of the rope sheave relative to the diameter of the rope, the greater the bending stress in the haul rope on the sheave. Bending stresses in the haul rope on the bullwheel and return sheave are the main cause of wire breaks in the rope and thus a critical factor for rope life.

4. CALCULATING THE HAUL ROPES

In order to provide reliable protection against rope failure and guarantee an economically acceptable rope life, the ropeway standards lay down safety factors for the above load cases: tensile safety factor for tensile stresses, transverse force factor for bending stresses from transverse forces, and diameter ratio D/d for bending stresses on rope sheaves.

4.1 TENSILE SAFETY FACTOR

The tensile safety factor is defined as the quotient of the rope's minimum breaking stress and rope tension. For a haul rope:

- The tensile safety factor must be at least 4.0.
- The smallest tensile safety factor occurs at the point of maximum rope tension, which is always the upper

terminal.

- For haul ropes with a long splice, the tensile safety factor may not be higher than 20.
- The greatest tensile safety factor occurs at the point of minimum rope tension, which is always the lower terminal.

4.2 TRANSVERSE FORCE FACTOR

The transverse force factor is defined as the quotient of rope tension and the transverse force.

For a haul rope, this means transverse force at the grip or rope sheave.

- In the case of a haul rope, the transverse force factor may not be less than 15 for transverse force at the grip or rope sheave.
- The smallest transverse force factor occurs at the point of minimum rope tension, which is always the lower terminal.
- Transverse force at the grip: For a ropeway carrier with a total laden weight of 5.0 kN, rope tension in the lower terminal must be at least 75 kN.
- Transverse force at the rope sheave: At every tower on the line, maximum sheave load may not be more than 1/15th of minimum rope tension at this point.

4.3 DIAMETER RATIO

The diameter ratio is defined as the quotient of rope sheave diameter and haul rope diameter.

- In the case of haul ropes, the diameter ratio may not be less than 80.
- Example: For a haul rope with a diameter of 50 mm, minimum bullwheel and return sheave diameter is 4.00 m.

5 SUMMARY

The various types of load imposed on ropeway ropes were discussed in sections 1 to 3 and the relevant calculation rules for the case of a haul rope on a monicable circulating ropeway presented in section 4. Similar rules apply to track ropes. For the details, you are referred to the relevant ropeway standards.

Josef Nejez

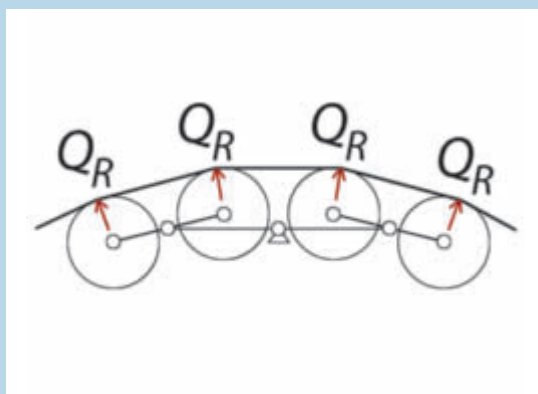


Fig. 4: Bending stress on the haul rope on the sheaves of a sheave train
 Q_R ... Transverse force at the sheaves

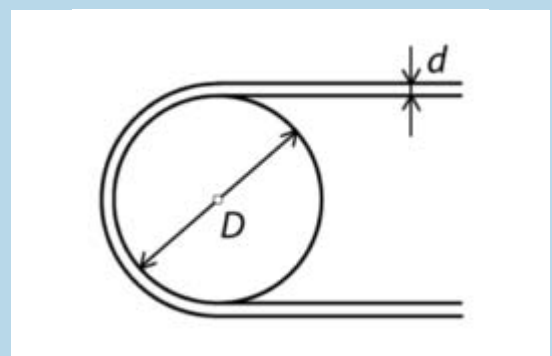


Fig. 5: Bending stress in the haul rope on the bullwheel or return sheave
 D ... Diameter of the rope sheave
 d ... Diameter of the haul rope

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OVERVIEW

Fundamentals of the concept of force in statics

A force is a physical concept. The effect of a force is to impart movement to a freely moveable body. The force is defined by the following parameters (Fig. 1):

- magnitude in Newtons (N),
- direction as indicated by the line of action,
- direction of movement in the line of action,
- point of application.

The letter 'F' is usually used as the symbol for a force. An arrow is used for graphic representation of a force (vector).

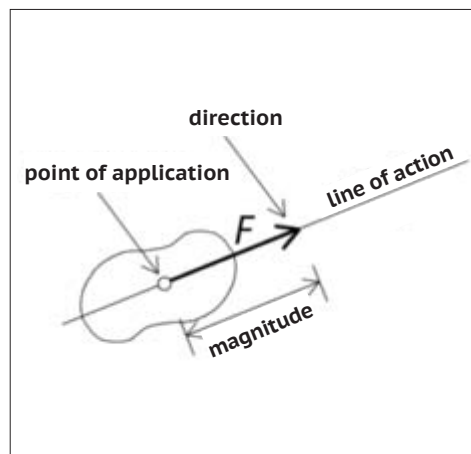


Fig. 1: Determinants of force F

Force combinations

Where more than one force is applied to a body, their combination is known as the resultant force. Forces acting in the same direction on the same line of action are added together, while forces acting in the opposite direction on the same line of action are subtracted, and forces with different lines of action are combined using their vectors to form a force parallelogram (Fig. 2).

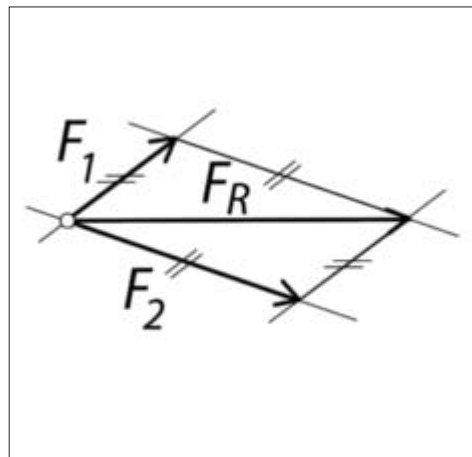


Fig. 2: Combination of two force vectors in a force parallelogram

F_1 ... Force 1
 F_2 ... Force 2
 F_R ... Resultant

Resolution of a force

Where a force can be resolved into two forces (opposite of a combination of forces), we speak of two component forces. The sum of the components is equal to the original force and has the same effect. The weight of a body on an inclined plane, for example, can be resolved into a downhill force and a normal force (Fig. 3).

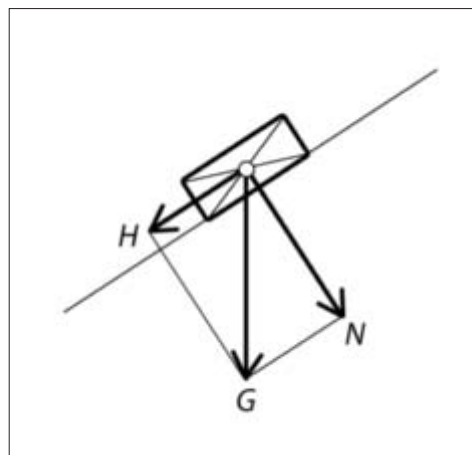


Fig. 3: Body on an inclined plane
G ... Weight
H ... Downhill force
N ... Normal force

Further concepts and methods used in statics

In addition to the combination and resolution of forces, there are other concepts and methods that are used in the context of the statics of ropeway ropes, which cannot be dealt with here, for example:

- The law of action and reaction: Every force corresponds to an opposed reactive force on the same line of action.
- Conditions of equilibrium: The sum of all forces acting on a body must be zero for the body to remain at rest).
- Method of sections: method for determining the internal forces acting on a body.



The Funitel cabin in Jasná can carry up to 24 passengers.

Three new installations in Jasná

DOPPELMAYR With the opening of three new high-capacity ropeways in time for the 2012/2013 winter season, a new era began for Jasná in the Lower Tatra, the biggest ski area in Slovakia.

As reported in ISR 4/2011, the history of Jasná resort and ski area on the slopes of Mount Chopok (2024 meters) at the end of the valley of Demänovská Dolina started after the end of the Second World War. A chain of four detachable double Von Roll chairlifts was built to access the summit from both the south and the north slopes, thus linking the two valleys of Demänovská and Bystrianská. These obsolete installations, which had always had problems with high winds, were finally closed in 1997 and temporarily replaced at the higher levels with surface lifts.

Tatry Mountain Resorts a. s., the ski area operating company, has now provided a permanent solu-

tion in the form of three high-capacity high-tech installations offering good stability in windy conditions, which greatly improves accessibility within the area.

MODERN FUNITEL WITH ELEGANT LOOKS

Unlike the slopes only a few hundred meters further down the mountain, the summit area of Mount Chopok gets a lot of wind. For the new installation on the north side, from Priebyba to the summit, the operating company therefore chose a Funitel as the best aerial tramway system for windy locations. The schedule provided for a two-year construction period in view of the difficulty of the terrain and lack of road to the

summit. In 2011 the footings were poured for the two terminals and all eleven towers, and in 2012 the terminals were built and the various ropeway system components installed. Twenty-two Zeta cabins were supplied by CWA with an improved seating configuration and an elegant black design with the Jasná sun logo. They travel the 2 km between the two terminals at a speed of 7.0 m/s for an hourly transport capacity of up to 2,480 persons per hour and direction.

The drive in the lower terminal is located on a hydraulically tensioned inclined tensioning carriage. For reasons of space at the lower terminal, the drive was positioned between the terminal and the first depression tower. This



Jasná's modern Funitel to the summit of Mount Chopok opened in December 2012.

unique solution can be admired from outside through the glazed roof of the motor room. The upper terminal has a conventional fixed return sheave.

The operating company also invested in the architecture. The result is an elegant, fully galvanized steel structure with glazed facades. The lower terminal at Priehyba is located so as to provide a direct link with the upper terminal of the Twinliner inclined elevator, and there is also an après-ski bar called the Funibar. This high-end installation is the 22nd Funitel to be built worldwide and has already become a new hallmark for Jasná.

UNIQUE 15-PASSENGER GONDOLA LIFT FOR THE SOUTH SLOPES

For the resumption of services to the Chopok summit from the south side, it was decided after lengthy debate to operate the upper stage from Kosodrevina to Chopok with a 15-passenger gondola lift with enhanced stability in windy conditions. Instead of the conical cabins that are normally used for such 15-passenger installations, the operating company selected elegant cabins from CWA's Omega series which were developed specially for Jasná. Code-named Omega-IV-15-LWI, the cabins offer comforta-

ble seating for ten passengers, with five more standing. They also have room for strollers and wheelchairs between the two bench seats with the seats down. The considerable deadweight of the cabins and the use of double grips combine to provide extra wind stability. To guarantee the required level of operating safety up to the maximum permitted wind speed (25 m/s or 90 km/h in the direction of the line), rope position on the sheaves is monitored with an RPD system. The primary mover is a 647 kW underground drive unit located in the upper terminal, with the hydraulic tensioning system in the lower terminal.

In view of the difficult weather conditions often encountered at the summit of Chopok and the resulting restrictions on working there, a unique solution had to be found to permit the lift on the south side to go into service at the same time as the Funitel: For the first winter season, the terminal structures for the 15-passenger gondola lift were only completed up to platform level and temporarily fitted with standard UNI-G enclosures. Also, the system was only operated with eighteen cabins, which were parked on the turnaround of the lower terminal. After the end of the winter season, the temporary enclosures were re-



Particular importance was attached to the architecture of the lower terminal. Between the terminal and the first tower, visitors can observe the underground drive through the glazed roof. The red roof to the left belongs to the upper terminal of the Twinliner.

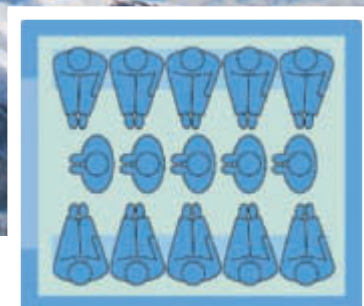


The fully galvanized structure of the upper terminal of the Funitel on Chopok with its dark glazing matches the black design of the cabins.

PHOTOS: R. GRIC



The new 15-passenger cabins on the Kosodrevina – Chopok ropeway near the upper terminal



Passenger dia-gram of the new 15-passenger cabin (Drawing: Doppelmayr).

PHOTOS: R. ERIC

moved, and construction work on the terminal structures continued in the summer of 2013. In addition to the final enclosure structures and cladding, a new restaurant was also built at the summit between the upper terminals of the Funitel and the 15-passenger gondola lift. As of the coming winter season, all 34 cabins will be parked on the turnarounds of the two terminals. The surplus UNI-G enclosures will be used for an identical 15-passenger gondola lift linking Štart with

Skalnaté Pleso, which is being built this year for the same operator in the Tatranská Lomnica ski area in the High Tatras.

INCLINED ELEVATOR FOR AN INTEGRATED NETWORK

To carry passengers from the upper terminal of the Biela Púť quad chairlift to the lower terminal of the Funitel, a 360 m long inclined elevator with a 50-passenger cabin was built by ABS Transportbahnen of the Doppelmayr Group. The sin-

gle track guideway is located on a continuous steel girder structure, which includes a bridge across a trail in the lower section. The elevator is a fully automatic self-service system with a self-leveling cabin for track gradients of between 10° and 25°.

2012: TOTAL INVESTMENT OF 44 MILLION EUROS

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the three new ropeway installations for Jasná and the Chopok south slope, the company also upgraded the snowmaking system in 2012, adding a further 4 km of lines, several pump stations, 80 docking stations and new snow-guns from MyNeige. Snowmaking is provided above all for the Kosodrevina – Chopok and Rovná Hoľa – Chopok summit trails. The fully automatic snowmaking installations for the north and south slopes now form one combined system and are operated with the same software.

The next step is to build a 15-passenger gondola lift for the lower stage of the Chopok south slope from Srdiečko to the mid-station at Kosodrevina as a replacement for the quad chairlift, which is almost twenty years old. The new lower terminal will be moved further down the valley to Krupová, where a big car park is also to be built. That will provide a second point of entry into the ski area from the south and will save visitors arriving from the south about one hour's driving. A number of Jasná hotels owned by Tatry Mountain Resorts have also been refurbished. In summary, Jasná now has three cable cars (a Funitel, a 15-passenger gondola lift and an 8-seater gondola lift), an inclined elevator, seven chairlifts, 15 surface lifts and three conveyor lifts serving trails with a total length of 36 km (including 26 km with snowmaking).

Roman Gric

TECHNICAL DATA

50-passenger inclined elevator: Jasná - Priehyba

Elevation lower terminal	1,225 m
Elevation upper terminal	1,349 m
Line length	360 m
Vertical height	124 m
Drive	upper terminal
Output	90 kW
No. of carriers	1
Line speed	2.0 m/s
Transit time	3.0 min
Transport capacity	324 P/h
Ropeway manufacturer, year	ABS Transportbahnen, 2012

TECHNICAL DATA

24-passenger Funitel: Priehyba - Chopok

Elevation lower terminal	1,348 m
Elevation upper terminal	2,003 m
Line length	2,130 m
Vertical height	655 m
No. of towers	11
Haul rope diameter	54 mm
Drive	lower terminal
Tensioning system (hydraulic)	lower terminal
Output (start/continuous)	1,566/1,232 kW
No. of carriers	22 + 1 maintenance car
Carrier interval	34.8 s
Line speed	7.0 m/s
Transit time	6.4 min
Transport capacity	2,480 P/h
Cabin manufacturer	CWA Olten
Rope manufacturer	Fatzer
Ropeway manufacturer, year	Doppelmayr, 2012

TECHNICAL DATA

15-passenger gondola lift: Kosodrevina - Chopok

Elevation lower terminal	1,488 m
Elevation upper terminal	2,004 m
Line length	1,432 m
Vertical height	516 m
No. of towers	13
Gage	6.1 m
Haul rope diameter	54 mm
Basement drive	upper terminal
Tensioning system (hydraulic)	lower terminal
Output (start/continuous)	857/647 kW
No. of carriers	34 + 1 maintenance car
Carrier interval	19.3 s
Line speed	6.0 m/s
Transit time	5.4 min
Transport capacity	2,800 P/h
Cabin manufacturer	CWA Olten
Rope manufacturer	Fatzer
Ropeway manufacturer, year	Doppelmayr, 2012



The Funitel drive, with 1,216 kN hydraulic tensioning, is angled against the inclination of the line and can be observed through the glazed roof.

PHOTOS: R. GRIC

All-round platform

BOZEN The three trade shows **Alpitec, Alpitec China and Prowinter** make the **Bolzano Exhibition Center** the top industry venue in Italy.

The Bolzano Exhibition Center at the heart of the Alps hosts Prowinter, the international trade show for ski rentals and service providers, in a double billing with Alpitec, the international trade show for mountain and winter technology, every two years in even years (in 2014 from 9 - 11 April). In 2012 this three-day double act featured 365 exhibitors from fifteen countries and was attended by a total of 9,300 visitors from 24 countries.

The Alpitec/Prowinter duo is a successful symbiosis involving two related market segments, namely mountain and winter infrastructure and systems on the one hand, and rentals and services in winter sports on the other. The Alpitec offering covers downhill and cross-country ski trail grooming and maintenance, snow-making systems, lifts and cable cars, visitor services, work clothes and protective clothing, winter service equipment, safety on the mountain and rescue services, while the focus at Prowinter is on equipment and

accessories for winter sports, functional clothing for ski schools and ski clubs, ski rental machines and equipment, winter mountain services and ski patrol equipment. From slalom flex-poles and ski base grinders to ticketing systems, the double event has a lot to offer.

While Europe is confronted with declining numbers in winter sports, especially in the case of young people, skiing in China is booming. In collaboration with Messe München International, the same double trade fair opened its doors there in 2009 in response to the needs of the fast developing Asian market in the field of winter sports. The fourth edition of this successful Asian double fair will take place from 19 - 22 February 2014. The Ispo Beijing/Alpitec China trade show in Beijing will be accompanied by the Asia Pacific Snow Conference (APSC) and other industry events, which make this double trade show one of the most important communication and network platforms for winter sports on the Asian market. Further information: www.prowinter.it



PHOTO: MESSE BOZEN



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Successful projects on both sides of the High Tatra

LEITNER Chairlifts with blue canopies have greatly enhanced the famous ski areas of Tatranská Lomnica (Slovakia) and Białka Tatrzańska (Poland).

TATRANSKÁ LOMNICA

The fast pace of development in the Tatranská Lomnica ski area with the majestic backdrop of Slovakia's second highest mountain, Lomnický štít, which is served by a reversible, was the subject of a report in ISR 3/2011 (pp. 17-18, in German). The impressive range of lifts and cable cars (two gondolas, a reversible, a double, a quad and a six-seater chairlift, a children's ski tow and two conveyor lifts) was increased in time for the 2011/2012 season by the addition of an 8-seater Leitner chairlift from Tatranská Lomnica to Buková Hora (see ISR 1/2012, p. 17, in German). With a line length of 683 m and a vertical height of 134 m, this chairlift provides direct access from the car park to a new family trail offering blue and red variants. It is one of the first chairlifts with blue canopies worldwide.

"For such a short line, we naturally considered a fixed-grip quad chairlift, which would also have been able to deliver the required transport capacity of 2,400 P/h. But the advantages of a modern detachable with padded chairs are appreciated by beginners in particular, and to ensure safe carriage with small children we fitted the chairs with the Kidstop system. Apart from the attraction of having a system that is unique in Slovakia, one of the reasons why we decided on the 8-seater chairlift with blue canopies was that, even at the required transport capacity, all 27 chairs can be parked on the turnaround in the lower terminal. The results for

the first two seasons confirm the wisdom of that choice," says Dušan Slavkovský, Technical Director at the ski area and Board Member of Tatr Mountains Resort, a. s.

BIAŁKA TATRZAŃSKA

Thirteen years ago, few people had even heard of what is now one of the biggest and best known ski areas in the whole of Poland. In 2000 a group of enterprising locals came together to establish a kind of limited company and erected on the slopes of Kotelnica Białczańska a second-hand triple chairlift they had bought cheap in Italy. Much has changed in the meantime: Białka Tatrzańska now has seven chairlifts and eleven surface lifts (mainly practice lifts) serving 12 km of trails, including 10 km with snowmaking.

The Pasięka Express six-seater chairlift built by Leitner Ropeways in time for the 2011/2012 winter season now gives access to slopes on the neighboring mountain by the name of Jankulakowski Wierch (see ISR 1/2012, p. 17, in German). This, the most modern ropeway in Białka has a line length of 1070 m for a vertical height of 172 m. The chairs are a heated and padded model from Leitner and are fitted with Kidstop and blue canopies. The upper terminal houses an economical 300 kW direct drive and has un-



Dušan Slavkovský, Technical Director at the ski area and Board Member of Tatr Mountains Resort, a.s. is clearly interested in ISR's article on Tatranská Lomnica.

derground parking for all 66 chairs. "With our illuminated slopes, we are open thirteen hours a day. The new chairlift met with a keen response from visitors right from the start. On 30 December 2012 a total of 30,191 passengers were carried, possibly a record for a six-pack with a transport capacity of 3000 P/h. Currently operated as a repeat-ride installation, the chairlift will in future be used in conjunction with two more chairlifts as a link to the Kaniówka ski area, which belongs to Białka Tatrzańska," says Piotr Czaja, Technical Director of Białka Tatrzańska.

Roman Gric

PHOTO: R. GRIC



Upper terminal of the 8-seater chairlift from Tatranská Lomnica to Buková Hora, with the unique panorama of Lomnický štít and Kežmarský štít



Thanks to the Leitner six-seater chairlift with blue canopies, the trails in Białka Tatrzańska are always busy.



The chairs parked automatically in the lower terminal are additionally immobilized with spacer bars.



The Pasieka Express six-seater chairlift in Białka Tatrzańska operates with a 300 kW direct drive.



The 8-seater padded chairs provide a comfortable ride and, with their tinted canopies, guarantee blue skies.



With over 30,000 passengers on 30 December 2012, the six-seater chairlift in Białka Tatrzańska possibly set a new world record.

PHOTOS: R. GRIC

Innovative drive technology

LEITNER LeitDrive frequency converter from LEITNER sets new standards in drive technology.



Reference project: Walde 6-seater chair lift in Kitzbühel

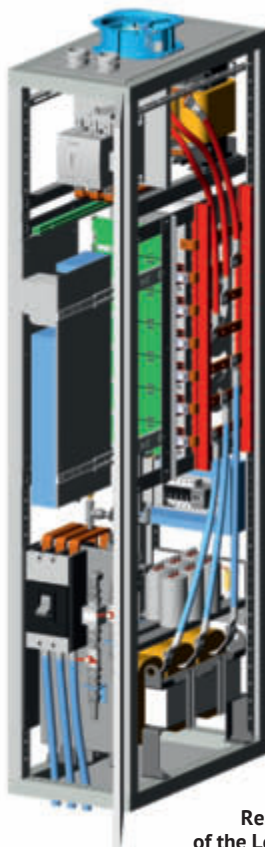
The LeitDrive frequency converter is the result of Leitner's consistent development work in the field of innovative drive technology. It is to be implemented on the company's ropeways gradually from 2013 onwards. Thanks to its cutting-edge technology and modular design, the LeitDrive frequency converter offers the best possible results in terms of cost effectiveness and flexibility. The new technology is especially quiet and environmentally friendly. The waste heat can be used to heat buildings and provide hot water. As the direct drive has been specially developed by Leitner, customers can rely on op-

imum service and support from the manufacturer.

Today's demands on ropeway installations are higher than ever before. Especially with regard to cost effectiveness, reliability and environmental protection, expectations are now very high. Leitner fulfills them with innovative high-tech solutions. The new LeitDrive frequency converter marks a new

years of experience and technological expertise, the new system can be tailored precisely to the needs of ropeway operators. Following a 15-month development period, during which an interdisciplinary team worked intensively on the new technology, the first prototypes are now performing well on the Walde 6-seater chairlift in the Kitzbühel ski area.

A big advantage of the LeitDrive frequency converter is its modular and unusually compact design. Individual modules, each with a power of 250 kilowatts (kW), can be connected in parallel. The system's power range goes from 250 kW up to the high megawatt range. Thanks to its narrow dimensions of just 400 millimeters per module, the system can be set up in a very compact and space-saving configuration and tailored precisely to the needs of the individual ropeway operators. A liquid cooling system ensures optimum temperature management of the IGBT power electronics.



Rendering of the LeitDrive

CONFIGURABLE FROM 250 UP TO THE HIGH MEGAWATT RANGE

The modular design and in-house production permit each system to be built and configured according to the customer's needs. In addition, the converter software and electronics developed by the company contribute to effective customized solutions. Key components such as power stacks and controller modules are produced in-house.

EFFICIENT AND COST-EFFECTIVE

Cutting-edge technologies are employed to perfect interaction between the converter and the motor. The powerful controller soft-

quality standard in drive technology and is a further successful development building upon the Leitner direct drive. It converts the mains voltage and regulates motor speed as required, be it a direct drive or a conventional drive. This ensures that the installation receives the amount of power it needs. Thanks to Leitner's long

TECHNICAL DATA

LeitDrive 250 kW mod. Liq.

Converter type:	AFE (active front end)
Nominal power:	250 kW
Nominal voltage:	3-phase 400 V
Nominal frequency:	50 Hz
Cooling:	liquid cooled

Dimensions (per module)

Width:	400 mm
Depth:	800 mm
Height:	2,200 mm
Weight:	260 kg

ware ensures that the motor runs economically and efficiently in all load ranges. In combination with the Leitner direct drive especially, the LeitDrive achieves a very high degree of overall efficiency. Thanks to the use of standardized power modules, spare parts can be supplied more quickly and at lower cost. There are additional advantages in the area of maintenance: The cabinets are highly maintenance-friendly and all components are easily accessible. All the components come from Leitner, so third-party expertise is no longer required; the entire support service is provided quickly and reliably by Leitner.

QUIET AND VERY ENVIRONMENTALLY FRIENDLY

The new converter offers all the advantages of an AFE (active front end) frequency converter as well as improved power quality at the feeding point and the avoidance of reactive power. This enables ropeway operators to use their power supply much more efficiently. The liquid cooling system allows waste heat to be processed through heat exchangers in order to provide heating and hot water for buildings. Liquid cooling of the drive components also considerably reduces noise emissions. This avoids any feeling of discomfort and strengthens acceptance of the whole ropeway installation.

“The knowhow acquired in the development of DirectDrive and LeitDrive opens up lots of future possibilities for Leitner,” says Günter Tschinkel, Head of Electrical Engineering. “Ropeway operation can be optimized by finely adjusting coordination between the motor, the frequency converter and the control system. This is especially the case with interplay between the direct drive motor and the frequency converter, where the advantages of direct drive technology can be fully exploited.” And he adds: “As the new LeitDrive has been developed and is built completely by Leitner, customers can always be sure of perfect service.”

Impressive Demonstration

LEITNER 10-passenger gondola ropeway opening in Ankara in 2014



The urban ropeway project in Ankara with 10-passenger gondolas is an impressive demonstration of the advantages of aerial ropeways in large cities. In the Turkish capital, Leitner Ropeways is to build a gondola ropeway that is exceptional and a new benchmark in many respects. Opening in the spring of 2014, it will connect the suburb of Şentepe to the Yenimahalle metro station and hence to the city's main pub-

lic transport services. The 10-passenger gondola ropeway with a total of four stations and a line length of 3,204 meters will have a transport capacity of 2,400 people per hour.

This efficient solution for a neighborhood link to the municipal transport system will greatly reduce the amount of traffic on the roads. A significant reduction in emissions also makes it a highly environment-friendly system.

Modern design and exciting architecture

Special LED systems create striking light effects in the dark.



6-seater chairlift for Złoty Groń

BARTHOLET A new detachable 6-seater chairlift supplied by Bartholet (BMF) is now an added attraction at this Polish family ski area.



The upper terminal with the fixed return sheave is the first to be built by Bartholet with a low enclosure.

na near the conjunction of the borders of Poland, the Czech Republic and Slovakia. It lies in the valley of the Olza and has a microclimate that brings slightly lower average temperatures than in the surroundings. It has natural snow cover for between a hundred and 130 days a year, and the climate is also good for snowmaking. Together with the neighboring villages of Koniaków and Jaworzynka, which lies right on the intersection of the three borders, the mountain community of Istebna forms what is historically known as the Beskidy Triple Village. There is private accommodation in the three villages for about 5,000 visitors. The quiet and highly picturesque hilly countryside attracts visitors from the town of Wisła, which has 12,000 inhabitants and is just 20 km away.

NEW DETACHABLE 6-SEATER CHAIRLIFT SUPPLIED BY BARTHOLET

As a replacement for an obsolete surface lift in the Złoty Groń ski area, the BMF company began construction of a detachable 6-seater chairlift in the autumn of 2012, and the work went so well that it was ready for the official opening on 22 December 2012. The drive and the hydraulic tensioning system for the chairlift are located in the lower terminal. The upper terminal with the fixed return sheave is the first to be built by Bartholet with a low enclosure. The chairs are parked on a parking rail on one side of the upper terminal, to which an en-

TECHNICAL DATA

6-seater chairlift: Złoty Groń, Istebna (detachable)

Elevation lower terminal	561 m
Elevation upper terminal	712 m
Line length	765 m
Vertical height	151 m
No. of towers	7
Haul rope diameter	46 mm
Drive	lower terminal
Tensioning system (hydraulic)	lower terminal
Output (start/continuous)	332/224 kW
No. of carriers	34
Line speed	5.0 m/s
Carrier spacing	44.20 m
Carrier interval	8.8 s
Transit time	2.55 min
Transport capacity	2400 P/h
Manufacturer	BMF
Year of construction	2012

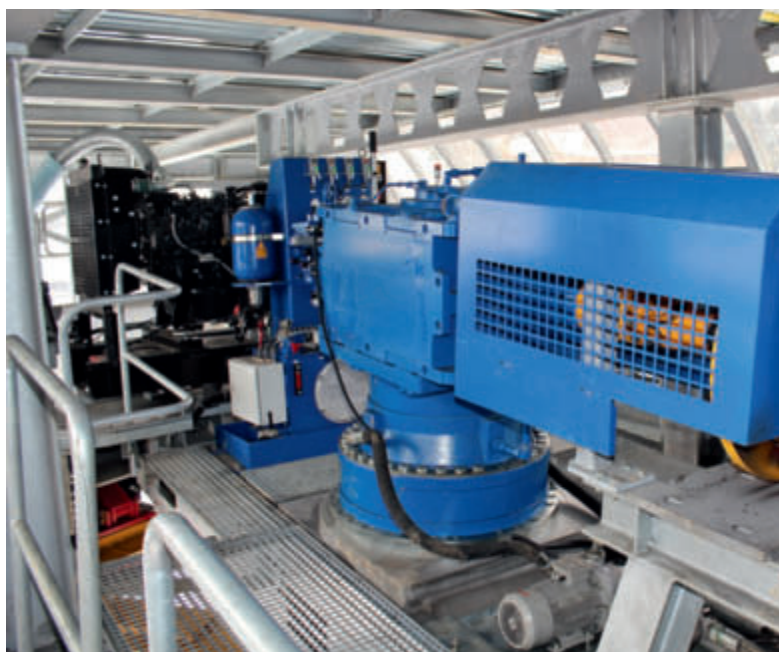
In addition to the Alpine countries, the Swiss manufacturer has a growing presence in the countries of Central and Eastern Europe. Bartholet has rightly recognized Central and Eastern Europe as markets of the future. In 2010 a fixed-grip quad chairlift went into service in an indoor ski center in Druskinikiai (Lithuania) and a reversible was built to carry visitors to the top of Vėtruše in Ústí nad Labem (Czech Republic), while in 2011 a Bartholet fixed-grip quad chairlift opened in the Telegraf ski area in Kielce (Poland). Złoty Groń is a small ski area in the municipality of Isteb-



Lower terminal of the Złoty Groń 6-seater chairlift with the drive and hydraulic tensioning system

closure was added at the end of the first winter season. The chairlift has a current transport capacity of 2,400 P/h, with a final design capacity of 2,800 P/h. With the addition of this detachable six-pack, Złoty Groń has positioned itself as a modern family skiing area – and one that has been developed without the use of public funds. Thanks to its illuminated trail, the area is open for skiing in the season from 8 a.m. to 9 p.m. Złoty Groń also attracts school kids during their winter holidays. The ski area is set to become even more popular with the planned construction of a hotel near the upper terminal. For 2013, Bartholet's order books for chairlifts are full of projects in Central and Eastern Europe, including detachable 6-seater chairlifts with chairs in the Porsche look for Andermatt in Switzerland (Oberalp-Calmut), San Domenico in Italy, Bukowina Tatrzańska in Poland (Rusiń-Ski) and Ilgaz in Turkey, plus fixed-grip quads with conventional seats for Poniviec and Karpacz (Lusty) in Poland, Kirovsk in Russia, Ilgaz in Turkey and the Bocksberg in Hahnenklee, Germany.

Roman Gric



The compact 224-kW drive in the lower terminal



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Demonstration of competence in Alaska

CWA At the beginning of the year, CWA received an urgent call for help from far-away Alaska. A strong gust of wind had caused severe damage to one of the two CWA Delta cabins (built in 1993) on the Alyeska Aerial Tram. A fast response was called for.

The Delta cabin of the Alyeska Aerial Tram back in service





A strong team! CWA serviceman Martin Moser and Garrett Swigman, Supervisor for the Alyeska Aerial Tram, on his visit to CWA in Olten

Last New Year's Eve, a serious incident occurred on the Alyeska Aerial Tram in Alaska's famous ski area. One of the cabins was hit by a strong gust of wind 150 meters from the upper terminal and pushed against the top tower so that it caught on the guide rail, causing damage to the front and one side. The cabin and hanger were consequently forced under the rope saddle, which damaged the top of the hanger and also the rear of the cabin. As the weather conditions were bad with poor visibility at the time of the accident, the five passengers had to be evacuated by abseiling down to the ground. By great good fortune only one person suffered a minor injury.

FAST RESPONSE

Only three days after the incident, a CWA service team from Switzerland was in the ski area in Alaska! After the incident, a fast response was essential so as to get the cabin back on the line as soon as possi-

ble. Only three days later, service engineers from CWA and Doppelmayr USA were on the site and ready to lower the cabin down to the bottom terminal for a thorough analysis of the damage. The assessment showed that the hanger in particular had suffered. As far as the actual cabin was concerned, no load-bearing components were affected and a repair was therefore considered possible.

GOOD TEAM-WORKING AND COMPETENT ENGINEERS

The ropeway operator wanted to have the repairs done locally, so the cabin was detached from the hanger and moved to the customer's own workshop. The necessary replacement parts were fabricated in Switzerland, shipped to Alaska and installed on the cabin. With good team-working and competent engineers on site, the cabin was soon ready for the official inspections and was back in service before the end of spring.

VERDICT

Here is the verdict on CWA's performance from Garrett Swigman, Supervisor for the Alyeska Aerial Tram:

"CWA responded to our tram cabin repair needs in a very timely and professional manner. The repair technicians quickly assessed the damage and had a repair plan in place to begin fabrication of new parts. The repair work on our cabin was done with care and is of exceptional quality. Our installation never looked better!"

Reliable partner for park events

KÄSSBOHRER Perfectly groomed fun parks with the PistenBully Park



For the Burton European Open, a PistenBully 400 Park prepared the fun park and the halfpipe for the Slopestyle contest, creating a perfectly shaped pipe.



For the O'Neill Evolution Days, perfect conditions were created by a PistenBully 400 Park.

The PistenBully Park success story began in May 2000 in the USA. That's when the first eight PistenBully 200 Parks were sold to American ski resorts. Since then, Kässbohrer Geländefahrzeug AG has achieved consistent growth, and the Laupheim company has sold over 1,000 vehicles to its countless national and international customers. Today, with the PistenBully 600 Park and PistenBully 400 Park, absolute professionals are at work, ensuring perfect competition conditions worldwide.

PISTENBULLY 400 PARK AT FLACHAUWINKL-KLEINARL

Kässbohrer Geländefahrzeug AG provided an additional PistenBully 400 Park to support the Flachauwinkl-Kleinarl ski resort. The ParkBully created perfect competitive conditions for the international field at the various events held in the Absolut Park.

The Jib King was the first event of the winter, opening the annual competition season in the Absolut Park. Eighty-two participants lined up to take part in the Freeski event, divided into the categories Men, Women and Rookies. The ten most successful competitors from the men's heats battled it out in the final to decide the ultimate victor. The best two out of four jumps were counted. In order to increase the levels of difficulty and excitement, the finals were held in a different area of the park.

There were a total of 51 participants in the Snowboard discipline, and the winners were chosen in the same way.

PARKBULLY – PARTNER AT THE O'NEILL EVOLUTION EVENT IN DAVOS

The second big park event in the PistenBully winter season took place in Davos. A PistenBully 400 Park prepared the fun park and the halfpipe for the Big Air Contest at the O'Neill Evolution Days, creating ideal competition conditions. The world's best snowboarders met at the six-day O'Neill Evolution Event to battle it out in the Big Air and Halfpipe disciplines. The Big Air contest consists of a big kicker, several small kickers and various obstacles that have to be tackled as spectacularly as possible. Competitors had to get through four elimination rounds to be one of the last four in the big final. Maxence Parrot and Miyabi Onitsuka were the winners of this year's final. Twelve out of a total of fifty starters in the halfpipe competed to produce the winner in the final. Jan Scherrer and Verena Rohrer impressed the jury by performing the most spectacular jumps.

The international field comprised 128 competitors, who fought it out for a total prize money of USD 125,000 in the Men and Women categories.

PARKBULLY – PARTNER AT THE BURTON EUROPEAN OPEN IN LAAX

The next park event in the PistenBully winter season was held in Laax. At the Burton European Open, a PistenBully 400 Park prepared the fun park and the halfpipe for the Slopestyle contest, producing a perfectly shaped pipe.

Every year, the six-day Burton European Open attracts the world's best snowboarders, who compete against each other in the Slopestyle and Halfpipe disciplines. The Slopestyle trail features several kickers and various obstacles which are to be handled in spectacular style. As the weather was very bad on the day of the final, the results of the semi-finals were declared final for the men, which left Torstein Horgmo as the winner. The women's event unfortunately

had to be cancelled completely. In the Halfpipe, twelve out of a total of eighty starters competed to produce the winner in the final. The old hands found themselves sidelined by two young newcomers: 14-year-old Ayumo Hiranound and 16-year-old Arielle Gold, who achieved the best scores with highly spectacular jumps.

After that it was the turn of the juniors. The winners among the under-14s were Chloe Kim and Jake Pates.

All together, this year's Burton European Open attracted no fewer than 300 entries, who competed in the Men, Women and Juniors categories for a total prize money of USD 125,000.

PISTENBULLY 400 PARK DEPLOYED FOR THE AUDI FIS SKI CROSS WORLD CUP IN GRASGEHREN

Kässbohrer Geländefahrzeuge AG supported the Grasgehren Ski Area with an additional PistenBully 400 Park for its Ski Cross World Cup event. In spite of the bad weather and heavy snowfall, the ParkBully provided perfect conditions for the event.

On the Saturday, the first rounds of the World Cup had to be cancelled because of strong winds and heavy snowfall but on Sunday, after a truly impressive night shift worked by the trail grooming crews, the complete event could be held. The world's best elite boarders were confronted by an almost 1,000 m long trail with several jumps that had to be completed in the shortest possible time. Of the forty women and seventy men in the original line-up, the 16 fastest women and 32 fastest men went forward into the k.o. rounds, where four ski crossers were lined up against one other each time, with the two fastest reaching the next round. The winners in the big finals were Ophelie David of France and Tomas Kraus of the Czech Republic. The spectacular races attracted 2,800 spectators and were also broadcast on television.

Great response to the 11th Professionals' Camp

KÄSSBOHRER Gathering of the shapers on the Corvatsch in Silvaplana – St. Moritz (CH)



The participants were delighted with the 2013 camp.

Around 70 park shapers from 13 countries met for a week from 29 April to 4 May for this year's PistenBully Professionals' Camp on the Corvatsch for some practical training and to share their knowledge and experience.

There was so much interest in the event this year that the camp had to be divided into three groups. Even so, there was not time to cover all the questions. The focus of the two training days for all the groups was on shaping practice for snow parks, pipes and border cross. The participants from all over the world were a great mix and generated a lively cultural exchange. The shapers from Azerbaijan and the USA had definitely travelled the farthest.

Everyone was greatly impressed by the excellent organization of the PistenBully Professionals' Camp. That was the work of Wolfgang Lutz from Kässbohrer Geländefahrzeuge AG and Reto Sporrer,

who is very experienced and has been a partner of Kässbohrer for fun park construction and knowledge transfer for many years now. Markus Moser's snow grooming team also worked tirelessly behind the scenes to support the event in Corvatsch.

Like the participants, the team of coaches was also international and included John Melville from New Zealand, who will be grooming the pipes for the Olympic Games in Sochi.

Alongside two PistenBully 400 Park and a PistenBully 600 Park, participants had a PistenBully 600 W, a PistenBully 400 W and a PistenBully 300 with attached PipeMagician at their disposal for park shaping practice. The PistenBully 100 SCR also showed what it can do at an altitude of 3,000 m. Another star of the camp this year was the PistenBully 600 E+. The first PistenBully with diesel-electric drive naturally attracted a lot of interest.

Big player in the snowmaking industry

MND MND Group takes over the snowmaking specialists Sufag and Areco.

Following the acquisition of the companies and assets of the Austro-Swedish Snownet group, Montagne & Neige Développement (MND), a leading company in the field of ski area safety, equipment and development has now established itself as one of the world's major providers of snowmaking solutions.

The Snownet group, a world market leader in snowmaking solutions, comprises the two companies Sufag and Areco.

Sufag – the brand with the green snowguns – was founded in Austria in 1983. Sufag offers tailored snowmaking systems for customers worldwide. A partner of the International Ski Federation (FIS), the Austrian company enjoys a first-class reputation, thanks especially to a range of fan guns that combine excellent reliability with top-quality snow. A few years ago, the company also acquired the Gemini brand.

Areco – the brand with the red

snowguns – was established in Sweden in 1985. As a specialist in snowmaking technology, the company has built up a fine reputation for energy-efficient snowguns. Areco's products are noted for their reliability, user-friendly operation and an excellent price-performance ratio.

NO REDUNDANCIES

MND has taken on all of Snownet's 70 employees, the majority of whom are based in Austria and at the group's Swedish production plant. Employees located in Sweden, Austria, the United States, Switzerland and Italy will be integrated in the local MND operations there.

The MND Group is continuing the strategy adopted by the previous shareholders to bring together production and R&D operations for both brands in Sweden and to reinforce the sales and service teams in Austria.

Johan Erling has been confirmed as



PHOTO: MND

New big player in the snowmaking industry: Xavier Gallot Lavallee, President of the MND Group

CEO at Areco AB and will join the MND Group's management board. Roderich Urschler, who already manages MND's Austrian companies, will take over the management of Sufag GmbH, with Günther Praxmarer as sales director and authorized signatory.

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MND'S INTERNATIONAL PRESENCE

The acquisition is an important step in the MND Group's program of international expansion; it reinforces its expertise in the field of snowmaking deriving from the merger with the Italian Snowstar company in July 2011.

It gives the group a critical size with its snowmaking cluster, with about one hundred employees and three recognized brands with shared values (environmental protection, innovation, quality, customer focus, etc.) and complementary offerings in the following areas:

- Technologies: Snowstar mainly sells high-pressure snowguns while the expertise of Sufag and Areco historically lies with low-pressure fan guns.
- Market presence: Incorporation of the two new brands gives the group a global momentum in sales, especially in the German-

speaking and Scandinavian countries.

- Customer service: additional consulting and service capacities and support.
- investments in R&D and marketing in order to further strengthen these strong brands.
- Turnkey project management with global support available from the group.

With this acquisition, the MND Group has moved up to position itself as a major player in snowmaking worldwide.

OVERVIEW

The MND Group

MND (Montagne & Neige Développement) is a group of leading companies active in natural hazard prevention and in development, equipment and safety solutions for ski areas, leisure facilities and mountain infrastructure. It currently has more than 300 employees worldwide. From R&D to manufacturing, and from sales to installation, the Group offers a complete range of innovative top-quality products and services.

Meet the winter industry



PROWINTER 2014

April 9th - 11th, 2014 | Bolzano/Bozen, Italy
International Trade Show for Rentals and Services for Winter Sports



ALPITEC 2014

April 9th - 11th, 2014 | Bolzano/Bozen, Italy
International Trade Show for Mountain and Winter Technologies



ALPITEC CHINA 2014

February 19th - 22nd, 2014 | Beijing, China
International Trade Show for Mountain and Winter Technologies

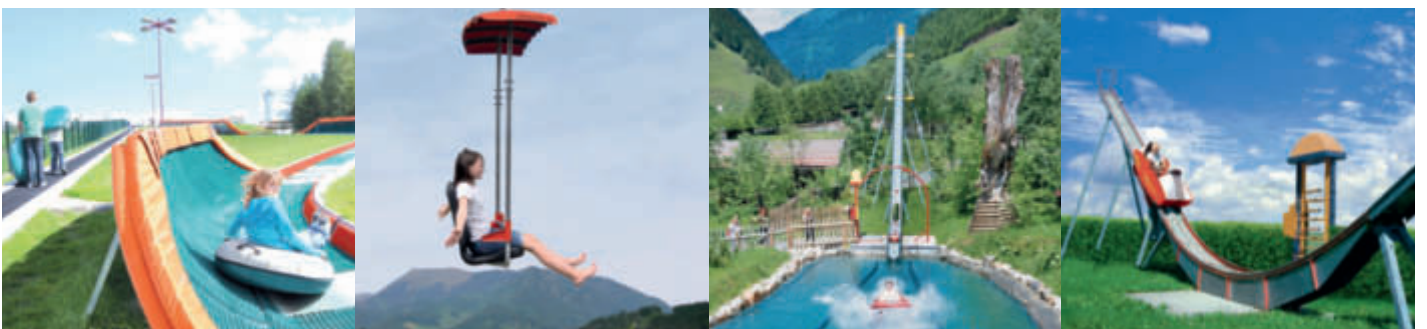
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The Sunkid **Moving Carpet** conveyor belt is an innovative climbing aid with countless applications in winter and summer.



As a complete provider of innovative logistics solutions, Sunkid offers **small ski lifts** as well. Furthermore among the numerous products Sunkid offers the **Rotondo ski and tubing carousel**, a range of funky and colourful **shapes and figures** manufactured out of high-quality foam plastic and the **summer and winter tubing facilities**.



In addition, Sunkid can point out its competency in the **design of theme parks**. From simple toys and summer tubing to spectacular ride attractions: Sunkid also provides unique possibilities for increasing the attractiveness of alpine tourist destinations in summer.

Specialist for snowmaking

MYNEIGE The MyNeige company (formally known as York Neige) has been a specialist in snowmaking solutions for ski resorts since 1976.

The French manufacturer, which has subsidiaries in Italy, Austria and North America, was the pioneer in low-pressure snowmaking and automated systems in the early 1980s. With an extensive network of distributors, Myneige can respond to ski area requirements from all over the world. Over the years, MyNeige has developed a strong expertise in servicing ski resort operators around the world to address their challenges in the production of man-made snow. This knowhow is based on three pillars: research and development, project management, and contracting and maintenance. MyNeige offers a complete range of snowmaking solutions, from the most simple (mobile snowmaking equipment, manual installations without machine room management) to the most complex (multiple trail automation, full machine room and process control automation), taking numerous variables into consideration such as water supply, power supply, machine management, network control, valves and snow guns, and the availability of production data, etc.

FOCUS ON OPERATORS' NEEDS

With its focus on the operators' needs, MyNeige has also developed great expertise in the modernization, optimization, retrofitting and integration of existing facilities (whether from MyNeige or any other vendor). These operations allow ski areas to increase their snowmaking capacities while controlling operating costs through savings on the related energy bills; energy efficiency has always been a cornerstone of the company's strategic orientation. This strategy translates into the French manufacturer's product offering and especially the latest snowgun to come onto the market, the Rubis Evolution. This snowgun is a further development of the technology employed so successfully in the classic Rubis launched in 2000. It offers enhanced efficiency, with an air consumption of only 28m³/h. That makes the Rubis Evolution one of the most energy-efficient snowguns on the market.

A KEY TO SUCCESS

While the energy performance of the snowguns is a key to the success of the installations designed by Myneige, the control software developed by its IT team also plays a major role. This Liberty software offers users precise control of their snowmaking activities and effective management of available resources. This powerful software constantly monitors the weather conditions and the operating parameters of the installation and makes the adjustments needed for optimum output in line with the user's requirements.

MyNeige has a strong commitment to customers over the full life of their snowmaking installations, with an extensive service offering that covers spare parts, service contracts and a fast response for one-off support requirements. The MyNeige engineers are highly qualified and regularly trained on all the com-

pany's products and software.

Today, MyNeige boasts an installed base of 300 automatic snowmaking systems in eighteen countries of the world, from North America to Europe and Asia-Pacific. That total includes over 900 compressors, 3000 pumps and 41,000 snowmaking pits, all contributing to a healthy bottom line for ski area operators worldwide.

The Borax high-pressure snowgun is a great performer in windy conditions.



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License to snow

SUPERSNOW With advanced technology and innovation, the new Supersnow 700 automatic snowgun raises the art of snowmaking to a previously unseen level.

Supersnow 700 made its debut at the 2013 InterAlpin mountain tourism trade fair in Innsbruck, Austria.

Many months of development work, hundreds of tests and the hard work of the Supersnow engi-

neers resulted in a powerful and reliable snowgun combining low energy consumption with maximum output of snow of consistent quality. At the same time, the Supersnow 700 snowgun is extremely quiet and easy to use.

nozzles, which greatly improve the snowgun's performance. That is because of the innovative ceramic inserts; they are highly resistant to wear caused by the flow of water contaminated with particles of sand and other materials which are not picked up by the filter. The ceramic insert also ensures optimum orientation of the water flow, guaranteeing the right spray angle even after many seasons of use. The extraordinary ease of assembly and disassembly of the nozzles is one reason why maintenance requires a minimum of time and work.

Thanks to various new solutions, like an innovative hydraulic control system instead of the usual electrical controls, the Supersnow 700 uses 30% less energy than previous models and up to 50% less energy than other manufacturers' snowguns. The Supersnow 700 snowgun consumes a maximum of 17.5 kW of energy.

The hydraulic controls for oscillation, barrel tilt and the hydraulic valves guarantee trouble-free snowmaking in all conditions. The Supersnow 700 has a slot filter. It is much more accurate and robust than conventional net filters, and only water is required to clean it. In addition, the design and good accessibility ensure that it cannot be damaged during cleaning.

MINIMUM ENVIRONMENTAL FOOTPRINT

The Supersnow 700 has a fan with 8 sickle-shaped blades for enhanced efficiency and quieter operation. A soft start function ensures gentle starting of the snowgun and protects the fan from damage in the event of icing.

To ensure maximum protection of the environment, the high quality oil used for the hydraulic system

meets the strictest ecological standards. It is biodegradable/degradable when exposed to sunlight and microorganisms in water. Neither the processes of decomposition nor their products have any adverse effects on the environment.

EXTREMELY QUIET AND EASY TO USE

The barrel of the Supersnow 700 is a completely new design. Along with other innovations introduced by Supersnow, it significantly reduces the noise level of the snowgun in operation. Thanks to the modern materials used, the Supersnow 700 weighs only about 500 kg (without chassis). So moving and transporting the snowgun is light work. In their design engineering work, the Supersnow engineers have a focus on functionality, usability and ergonomics. The new snowgun, for example, has a control panel which can be removed at any time, moved to another location like the base of an outrigger and connected to the snowgun with an extension cable. This is an ideal solution for small ski resorts, where the owners do not want to invest in wireless snowgun control. In addition, each snowgun can be operated with a remote cable connected to the machine. For those who want maximum convenience, the entire snowmaking system can be radio controlled.

The Supersnow 700 is a snowgun which introduces the art of snowmaking to new areas. Packed with innovation and engineered in advanced materials, the new Supersnow 700 is an impressive snowgun that no-one will walk past without noticing.

Rafat Topolski



neers resulted in a powerful and reliable snowgun combining low energy consumption with maximum output of snow of consistent quality. At the same time, the Supersnow 700 snowgun is extremely quiet and easy to use.

INNOVATIVE SOLUTIONS

The advantages of the Supersnow 700 snowgun are the product of innovation, including new wear-resistant ceramic TwinC Supersnow



OMEGA from CWA -
THE CABIN WITH A GUARANTEE
OF SUCCESS



THE MISSION:

Complete overhaul of
all 36 OMEGA-s cabins
of the Panoramic-
Cableway in Chamonix
during operation

CWA - smart travelling solutions

Why exchange a tried and tested cabin whose design is still contemporary, just because the paintwork is becoming a little shabby after a long operating history?

CWA offers all customers an inexpensive and rapid alternative. All cabins can be gutted and then with new cladding and freshly painted, shine again like new. At the same time recent improvements are incorporated into the renovation work.

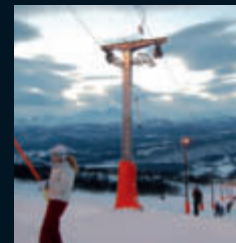
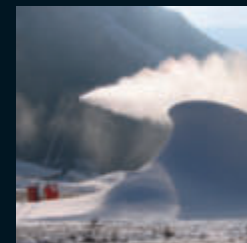
We could already implement such an order for our customers in Chamonix. At the same time the operational service of the cableway could not be completely shut down, so that we had to adhere to a strict schedule. The OMEGA cabins, which were in part very battered from the cable-car operation, were once again brought up to scratch. The final result is very impressive. Already 24 of the 36 cabins are again in operation and are transporting visitors and local inhabitants with customary reliability from Chamonix up towards Mont Blanc.

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