



STATE OF THE ART OF THE 3S TECHNOLOGY

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A brief history

Tricable ropeways combine the benefits of aerial tramways and detachable gondola ropeways.

The first installation of its kind, the Alpinexpress in Saas Fee, was realized in 1991.



Alpinexpress in Saas Fee

Source: <https://www.bergbahnen.org/lexikon/kapitel8.php#5>

Introduction to the main benefits of the tricable system

Multiple cable solutions guarantee increased wind resistance and are able to cross spans of approx. 3.500 m. This makes for a perfect application over steep and exposed terrain.

Grips are detachable, meaning that the system has a very high transport capacity.

- **Capacity** up to 6,000 p/h
- **Speed** up to 8,5 m/s
- **Cabin capacity** up to 35 people

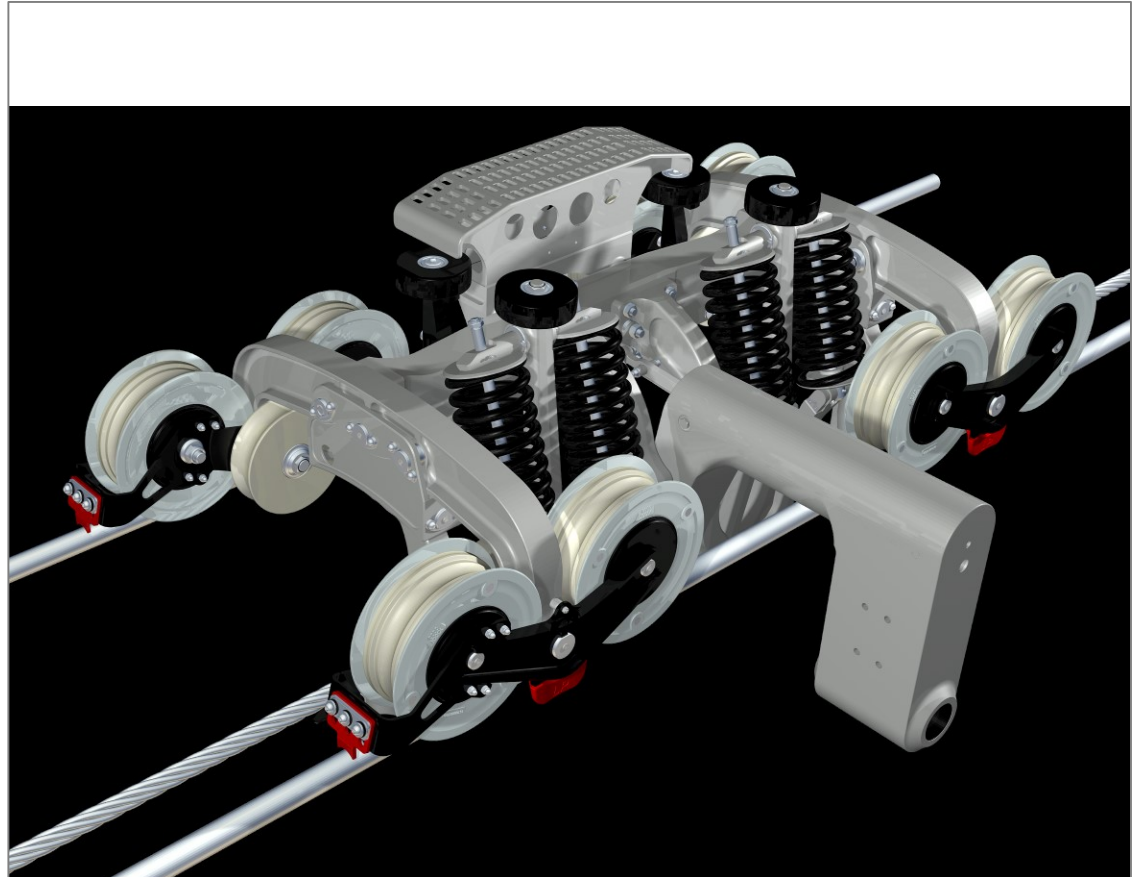


Technical highlights – 3S carriage

Production techniques similar to those found in aircraft construction are used for critical safety components.

Milling parts from one piece reduces the need for safety welds.

- + Increased construction stability
- + Reduced need for maintenance and inspection
- + Optimum safety



Technical highlights – 3S carriage

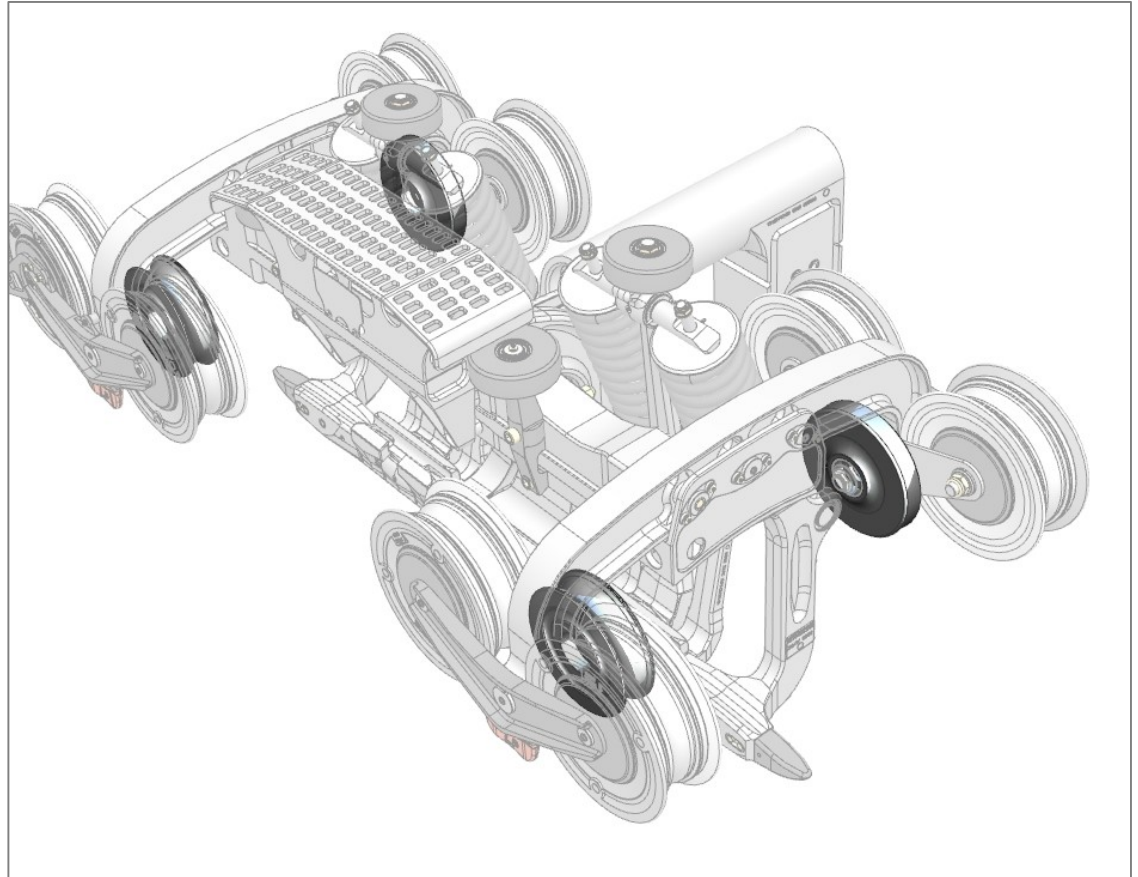
Additional rollers

In stations and garages, the carriage runs on additional rollers.

This allows it to travel around even the tightest bends.

+ Flexibility

+ Compact station design



Technical highlights – 3S cabin Symphony

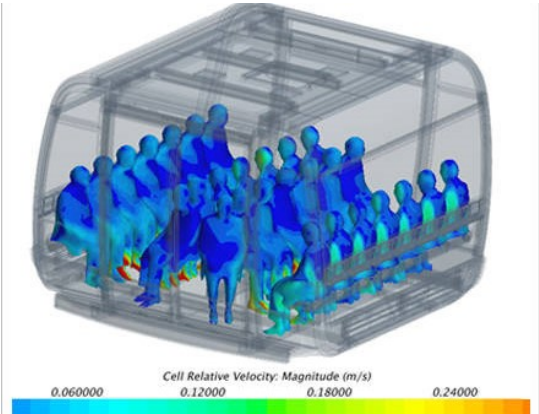
The new 3S cabins by LEITNER ropeways bear the mark of Pininfarina, the famous designer of Ferrari and Maserati sports cars.

The cabin design and comfort span the ideal bridge to the automotive world: advanced technology, aesthetics and functionality in equal measure.



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Technical highlights – 3S cabin Symphony



Ventilation

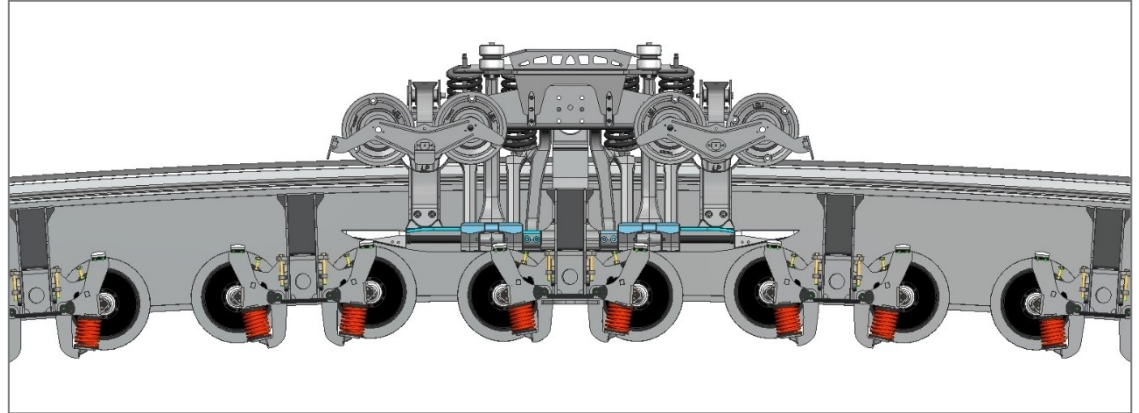


Lights



Seats

Technical highlights – Patented hauling cable rollers with spring system



The **lift-off load** on the hauling cable is **minimized** by the spring roller system on the support towers.

The lower lift-off height results in **fewer vibrations** on the hauling cable and considerably **lower loading** of the support cables by the carriage rollers.



Technical highlights – Simple cable deflection

LEITNER 3S systems only require four sheaves.

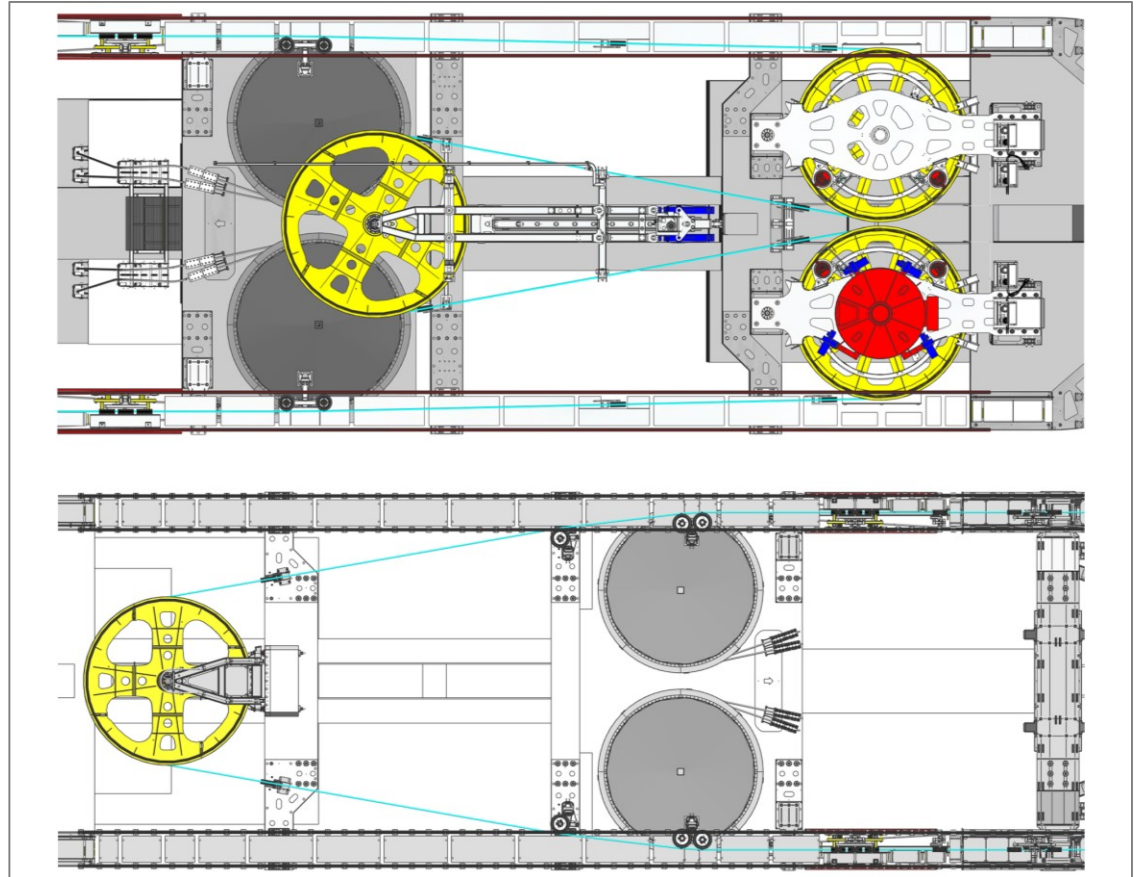
Drive station:

Two drive sheaves and one return sheave

Return station:

One return sheave

Increased service life of the hauling cable thanks to the low number of bend cycles.

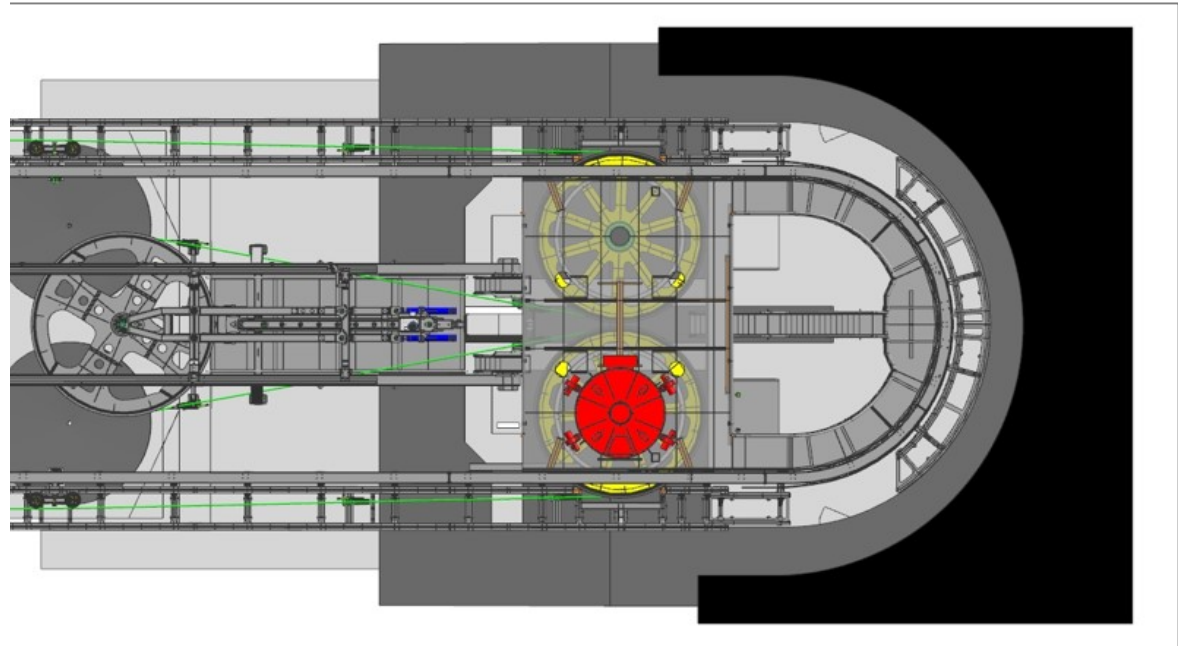


Optimum redundancy for maximum safety

If required, an independent drive can be installed for both drive sheaves.

This is also the case for the emergency drive/evacuation drive.

+ Redundant design for maximum safety and availability.

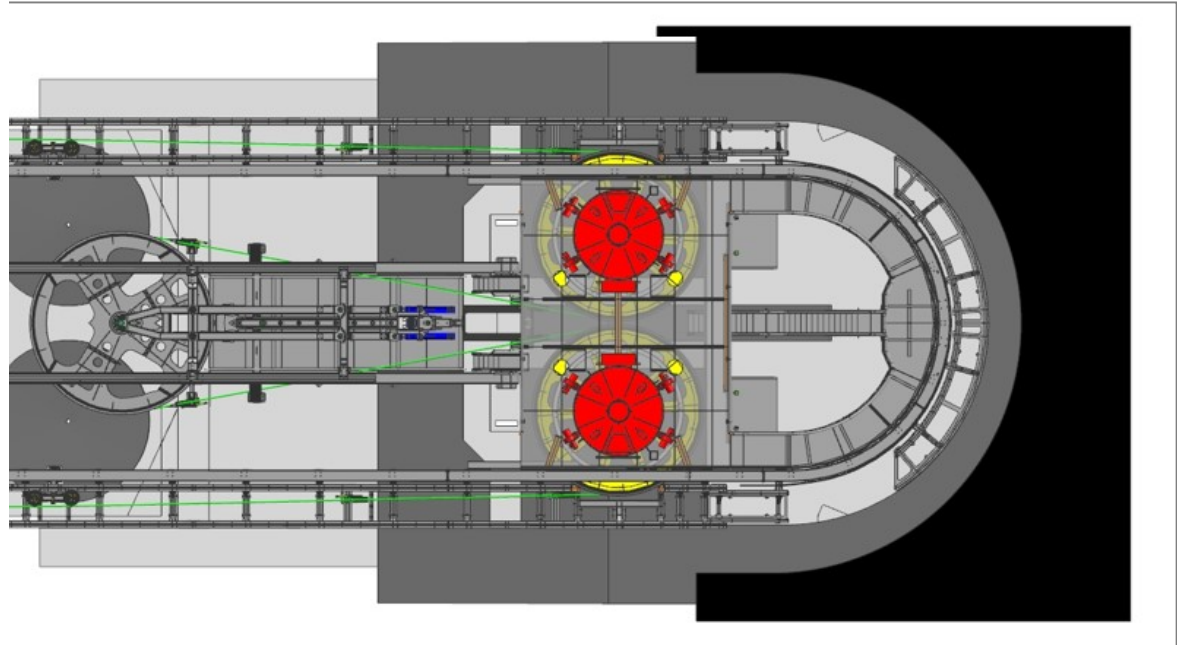


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Technical highlights – Optimized accessibility

Stations are very **easily accessible**.

All mechanisms are directly accessible and thus **easy to check** and **adjust**.

The outer station turnaround is accessible while walking upright. This enables **ergonomic** and **safe working**.



Technical highlights – Flexible switch points system

The switch points are designed for **optimum flexibility**.

The rapid switching cycles allow the vehicles to be pushed in and out during operation.

The garaging procedure can be executed at running speed.

The compartment-style system enables manual control of the switch points.



Technical highlights – Compact station design

LEITNER 3S stations are **highly compact**.

The **low installation height** reduces cubage and costs.







The new 3S carriage permits **minimal curve radii** in the station and the very **narrowest curves** in both directions in the garaging area which enables additional space saving.



REALIZED AND CURRENT TRICABLE PROJECTS

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Realized project – TD35 Ritten / Renon / IT

	4,544 m
	949 m
	550 p/h
	900 kW
	8
	7



First tricable gondola realized by LEITNER ropeways in 2009.

Realized project – TD32 Eisgratbahn / AT

Longest 3S gondola in the Alps
with a total length of about **4,7 km**

Height difference **1,200 m**

48 cabins of the Italian designer
Pininfarina

Transport capacity **3,000 p/h**

7 Towers

Travel time **12 min**



Realized project – TD32 Eisgratbahn / AT

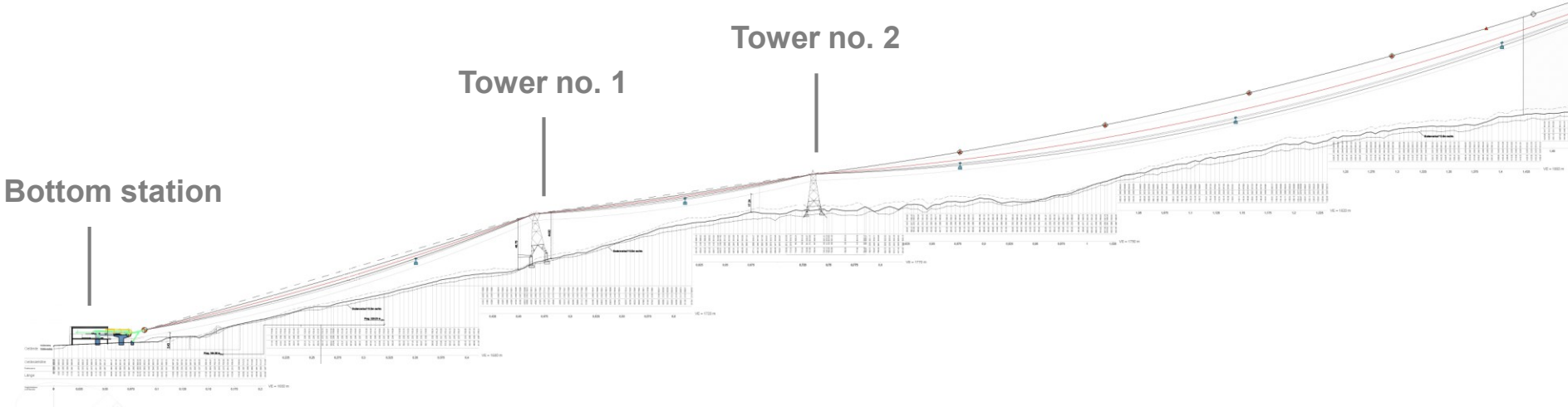
Highlights

First tricable gondola which consists of 2 sections. The vehicles can pass from one section directly to the other one trough the middle station.

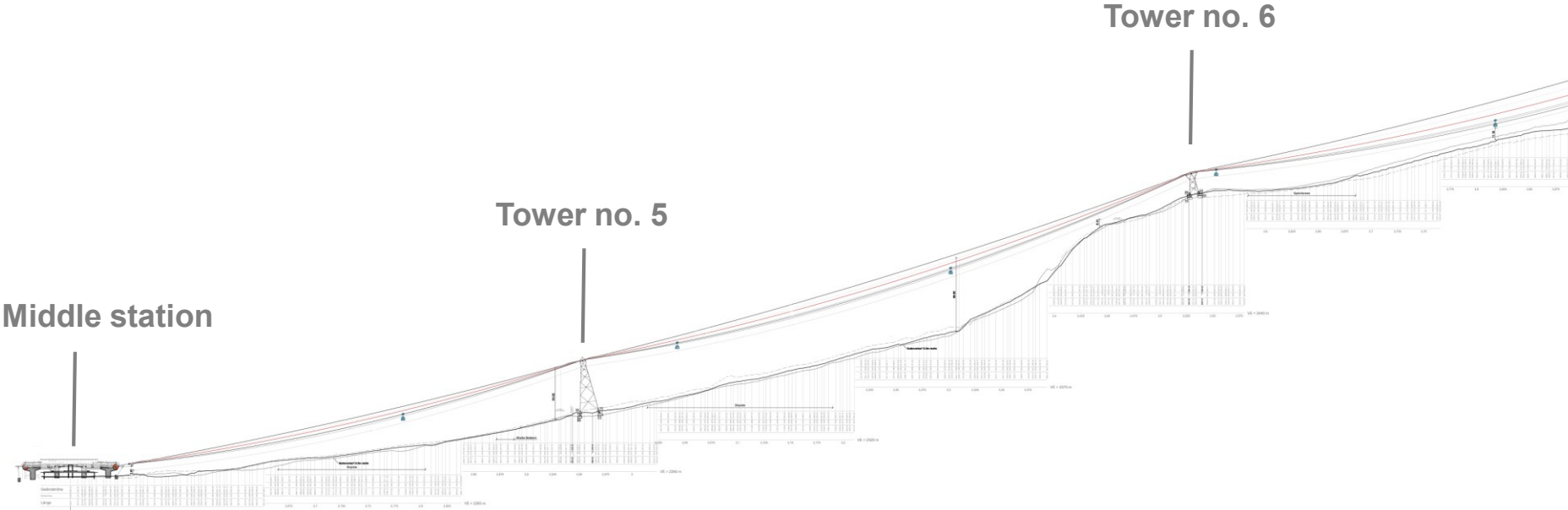
The middle station was attached to the already existing station of the „Gamsgartenbahn“.



Realized project – TD32 Eisgratbahn / AT
Line – Section 1



Realized project – TD32 Eisgratbahn / AT
Line – Section 2



Realized project – TD32 Eisgratbahn / AT



VIDEO
TD32 EISGRATBAHN



Current project – TD28 Trockener Steg – Matterhorn Glacier Paradise

Highest top station in the Alps at around **4,000 m**

Inclined length **3,760 m**

Height difference **900 m**

Transport capacity **2.000 p/h**

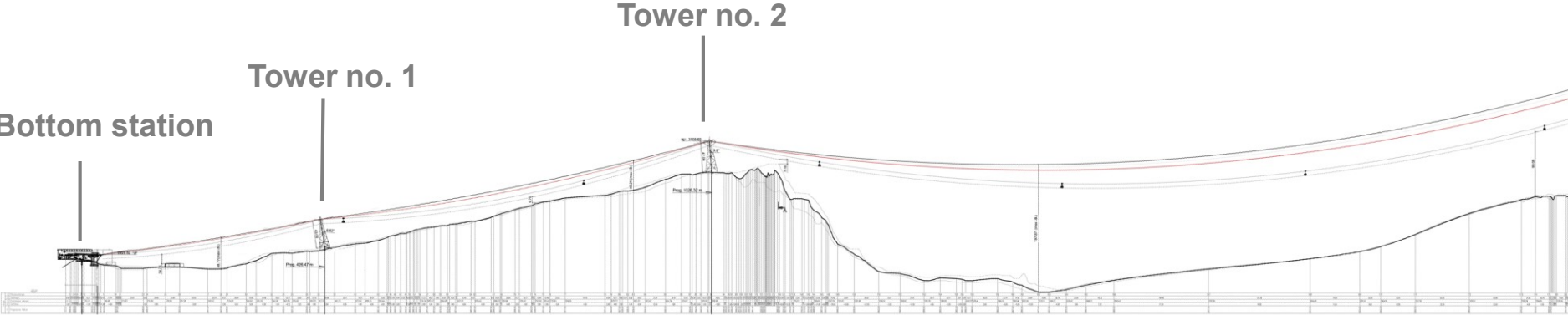
Construction time **3 years**

3 Towers

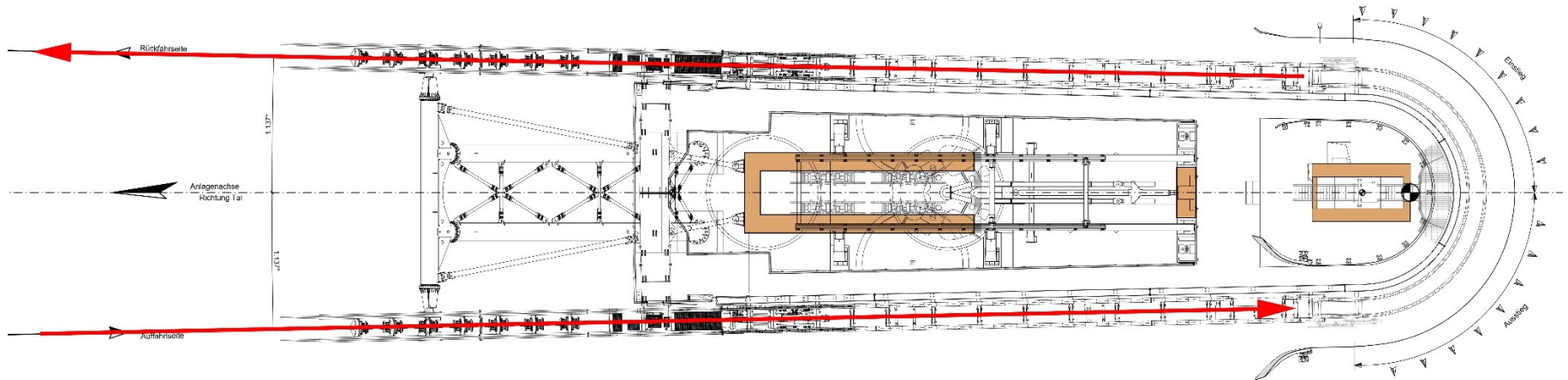
Completion **2018**



Current project – TD28 Trockener Steg – Matterhorn Glacier Paradise



Current project – TD28 Trockener Steg – Matterhorn Glacier Paradise



Due to long spans and other local conditions it can be necessary to install a wider gauge. In the case of Zermatt, the top station will be fitted directly to the rock which means that limited space is available. In order to meet all the requirements, the gauge has to be reduced; the line continues conically towards the station.

Current project – TD28 Trockener Steg – Matterhorn Glacier Paradise

Highlights

To reduce the rock excavation and to meet the special requirements (available space is limited) it was necessary to slightly deflect the rope on tower no° 3.



Current project – TD28 Trockener Steg – Matterhorn Glacier Paradise



Current project – TD28 Trockener Steg – Matterhorn Glacier Paradise



VIDEO

TD28 Trockener Steg – Matterhorn Glacier Paradise

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