Operation and Maintenance of a Multibrand Cable Car

Diego Scofano

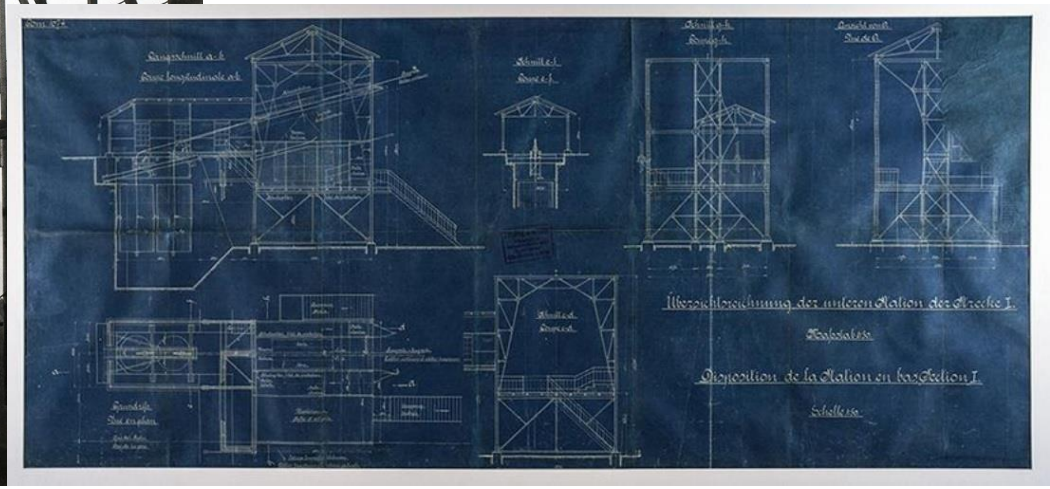
Technical Director – Grupo Iter

History

Parque Bondinho Pão de Açúcar – Sugar Loaf Cable Car History

The first period of operation

- Idea of the cable car
  - Exposition 1908
- First project
  - Pohlig-Haeckel
- Opening 1912
  - 577 persons transported



Parque Bondinho Pão de Açúcar – Sugar Loaf Cable Car History

Renewing the cable car 1972

- Agudio project
  - First cable car without counter weight for track cable
- Award for cabin design
  - Torino exposition 1972
- Maintenance concept
  - Development of an independence concept of maintenance due to the distance to the center of technology

Parque Bondinho Pão de Açúcar – Sugar Loaf Cable Car History

The third generation – 2008 to 2021

- New Cabins
  - CWA
  - Design based on the original design
- New controls
  - Frey AG Switzerland
- Gearboxes
  - Flender/Siemens
- Carriages
  - Leitner
- Bullwheel
  - Leitner
- Brakes
  - Leitner

Multibrand

Parque Bondinho Pão de Açúcar – Sugar Loaf Cable Car Background to become Multibrand

- Protection of the mountain profile
- Legal aspects in Brazil
- Costs for a new cable car
- Culture of independence

Parque Bondinho Pão de Açúcar – Sugar Loaf Cable Car Multibrand Cablecar

The third generation – 2008 to 2021

- Cabins 2008
  - CWA
  - Conection with Agudio/Leitner system
  - Special guiding in the station
  - No support in the station
- Controls 2009
  - Frey AG controls
  - Upgrade in 2018
  - Rexroth brake hydraulic
  - ABB equipments

Parque Bondinho Pão de Açúcar – Sugar Loaf Cable Car Multibrand Cablecar

The third generation – 2008 to 2021

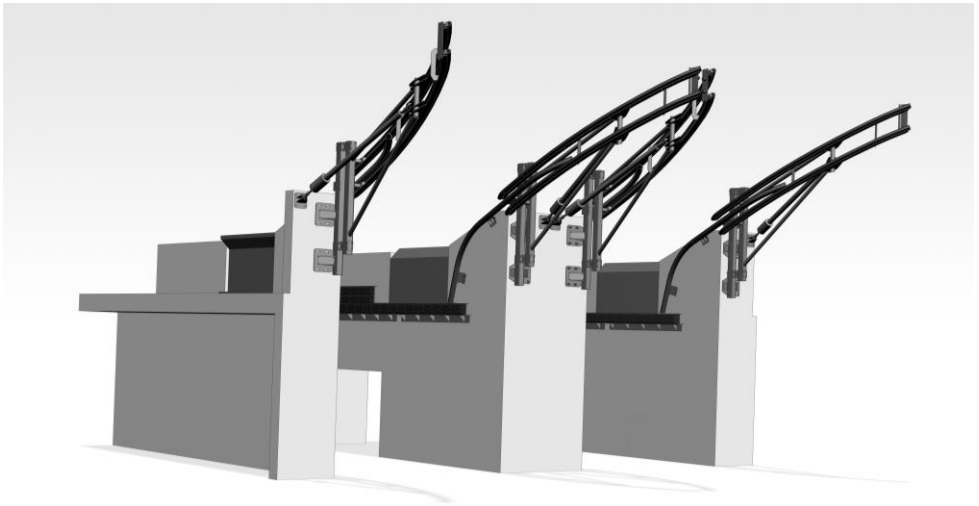
- Study to increase the speed
  - Increasing weight by passengers
- Upgrade of the controls 2018
  - Power subsystem
- Gearboxes 2017
  - Flender/Siemens
- Carriages 2017/2018
  - Leitner
  - Original project available
- Bullwheel + Brakes 2021
  - Leitner
  - New concept

Cases

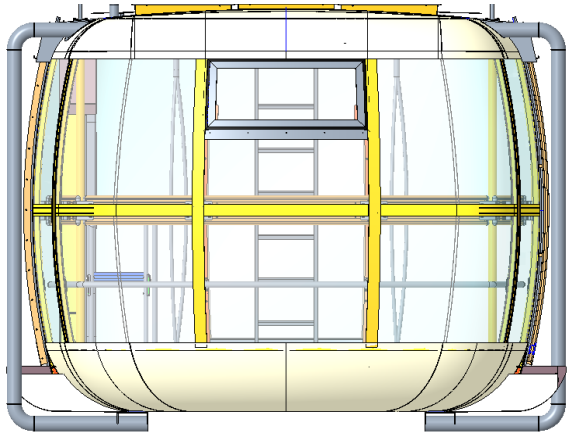
Parque Bondinho Pão de Açúcar – Sugar Loaf Cable Car Case – Cabins and Guides

CURRENT GUIDES

LEITNER GUIDES

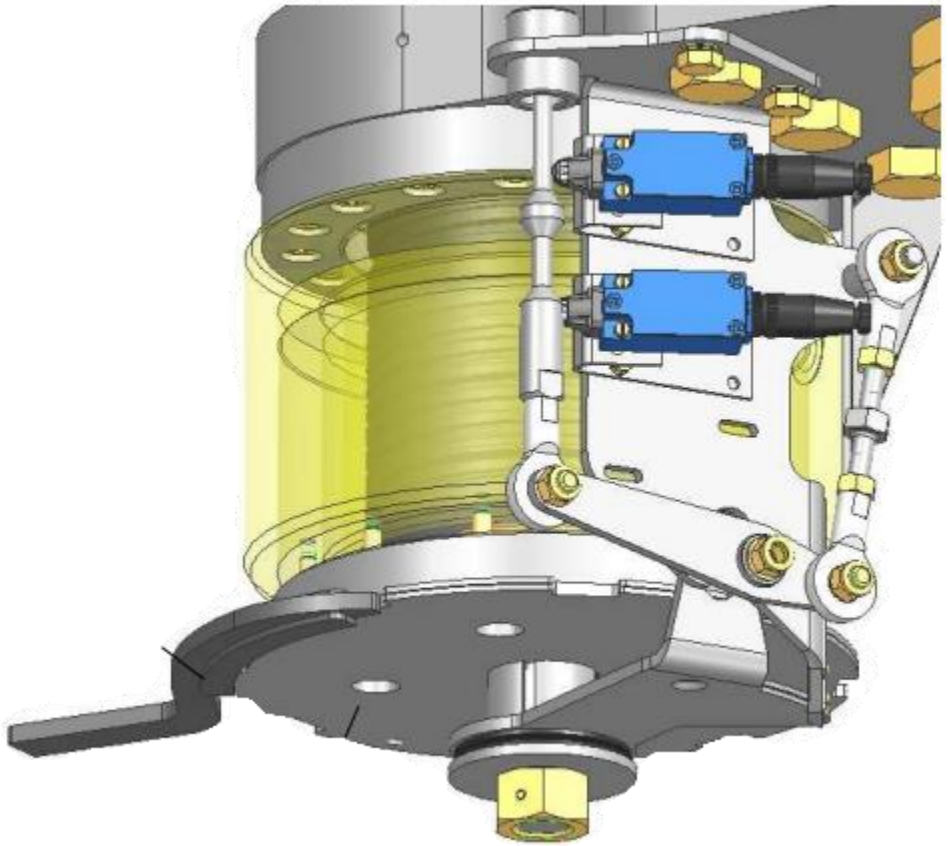


CWA CABIN

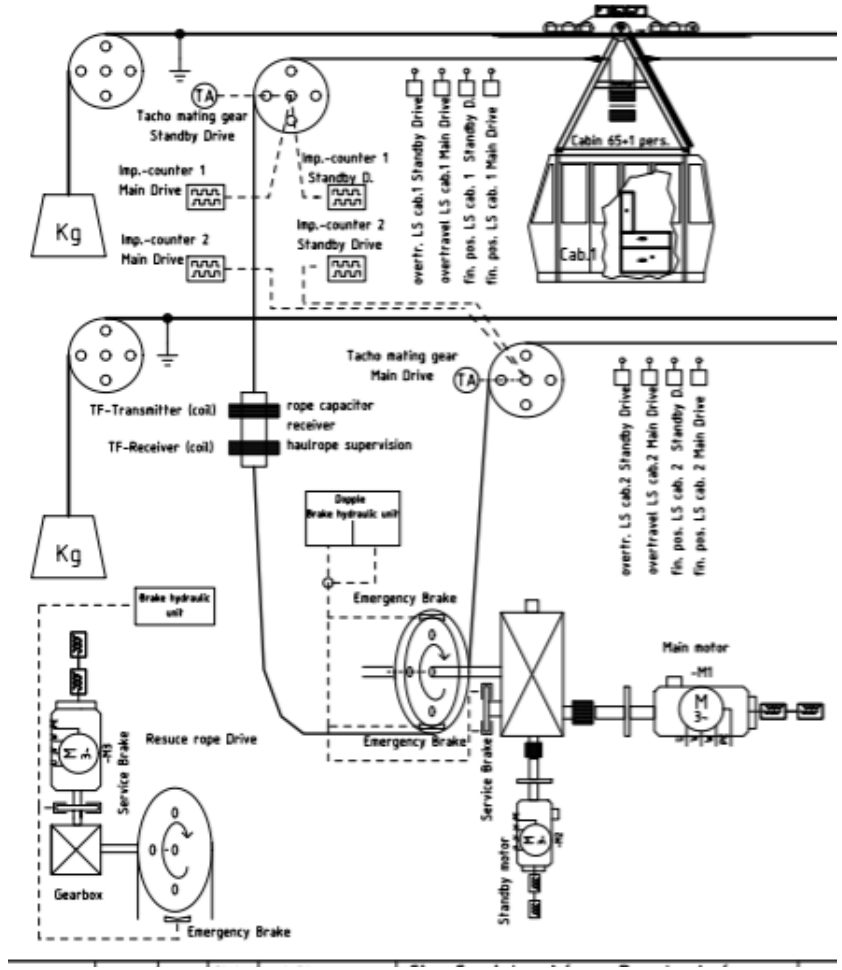


Parque Bondinho Pão de Açúcar – Sugar Loaf Cable Car Case – Brakes and Controls

SERVICE AND EMERGENCY BRAKE: LEITNER



FREY AG CONTROL



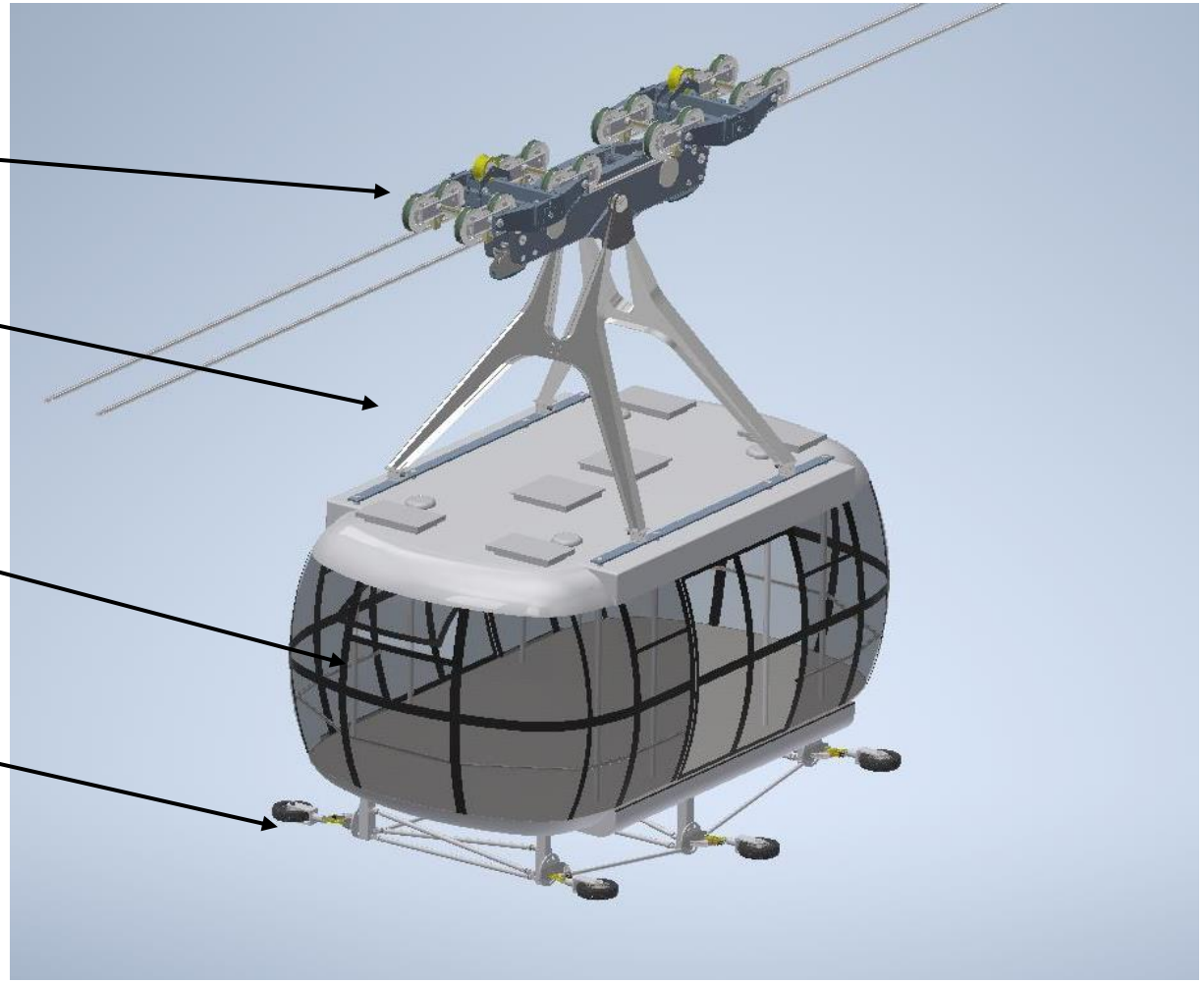
Parque Bondinho Pão de Açúcar – Sugar Loaf Cable Car Case – Cabin, hanger, truck

CARRIAGE: LEITNER 2017

HANGER ARM: AGUDIO; 1972

CABIN: CWA; 2008

GUIDES: AGUDIO; 1972



Parque Bondinho Pão de Açúcar – Sugar Loaf Cable Car Case – Bullwheel and Controls

UpGrade:

Bullwheel drive estation 3, LEITNER

Control breaks, speed, FREYAG

Maintenance Strategy

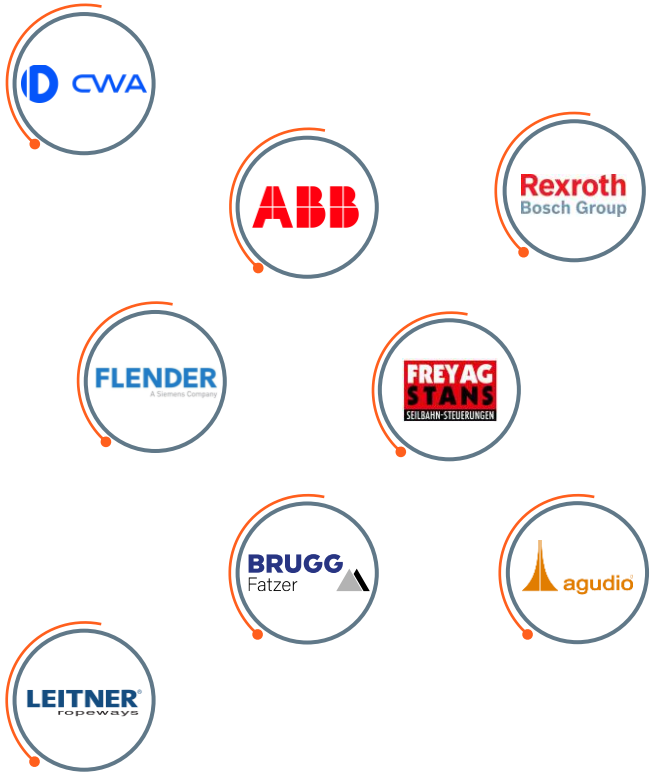
Parque Bondinho Pão de Açúcar – Sugar Loaf Cable Car
Upgrade of the Maintenance Strategy

Previous Conditions

- 365 days/year operation;
- Night agenda on site – events and civil works for new attractions;
- 99,7% availability of the cable car;
- Controls with PLC`s;
- Different maintenance plans;
- Concentrated knowledge;
- New organisation structure.

Parque Bondinho Pão de Açúcar – Sugar Loaf Cable Car Measurements – New Maintenance Concept

- Stabilishment of an Asset Management approach
- Systems Interface
- Management of documents



INTERACTION

PARQUE BONDINHO PÃO DE AÇÚCAR

ESTRATÉGIA DE MANUTENÇÃO

Asset Management approach

New Governance for the Maintenance

- New chart
- Spreading knowledge
- Relationship with holding

Stronger connection with the Manufacturer

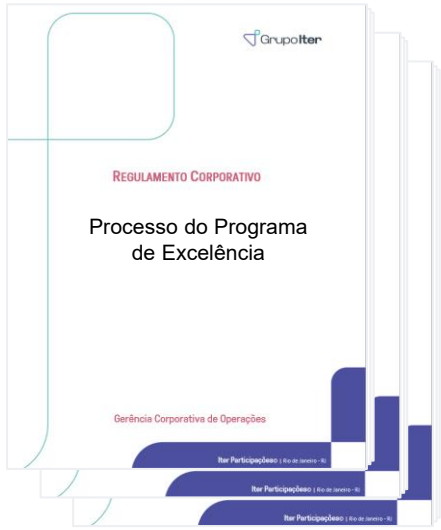
New asset management software

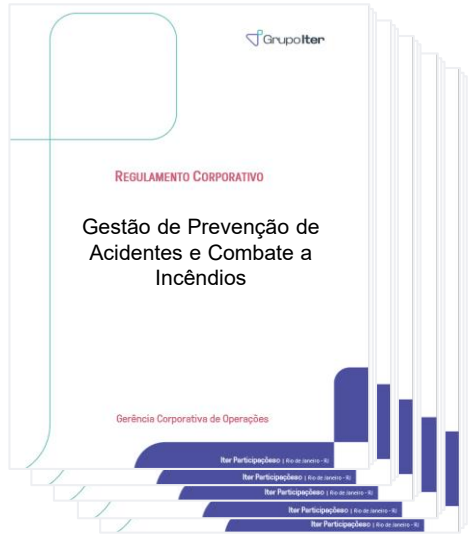
Asset Management: Looking forward

Processes Standard
Norms Based Approach

The norms based approach has as goal:

- Guide the activities and processes in a controlled and standard way
- Ensure a safety and efficient operation of the assets
- Ensure the quality of the services, the safety of people and protect the environment



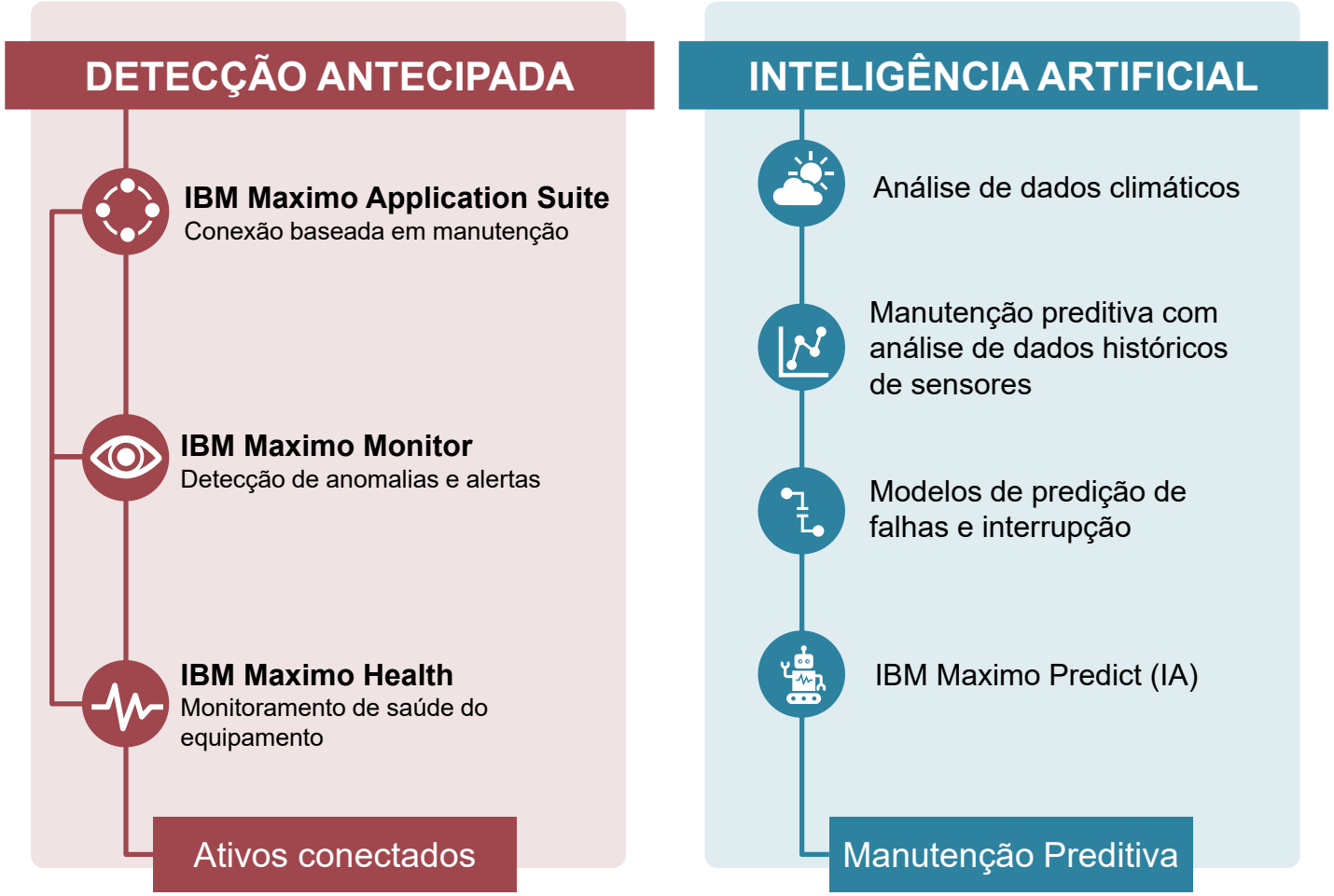


Technology in Asset Management
Transforming Maintenance

Transforming maintenance through technology

Benefits:

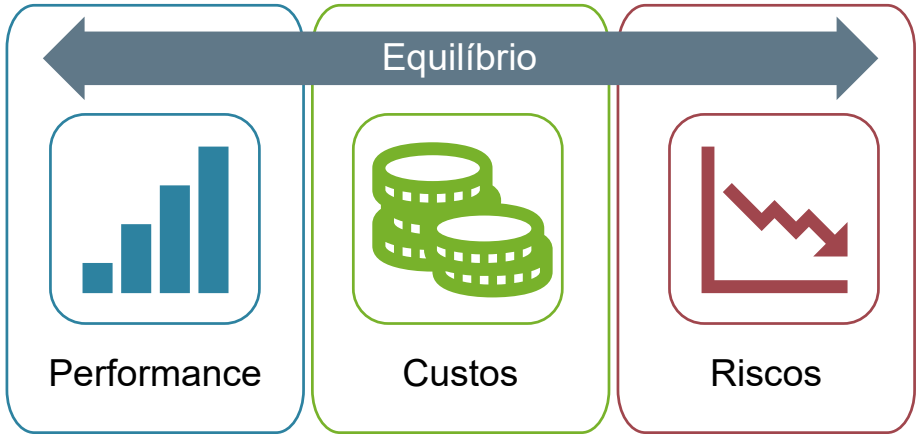
- Optmized Resources
- Higher Reliability of the Assets
- Smart root cause analisys
- Quick and efficient answers
- Real time KPI's management
- Data based decision making



Optmizing Asset Management
Performance, Costs and Risks

Balance between Three Elements

- Strategic Harmonization
  - Find balance between high performance, costs control and minimizing risks
- Organization Alignment
  - Ensure the strategy alignment of the asset management strategy with the organization main strategy
- Flexibility and Adaptation
  - Adjust strategies as necessary to respond to business or operational changes



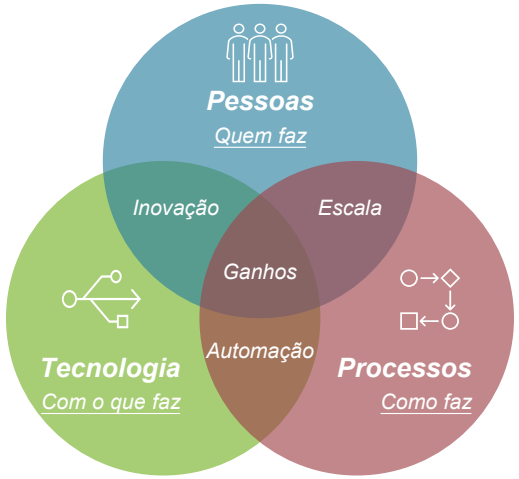
People, Processes and Technology
Balance between 3 key elements

Digital technologies forge the future of maintenance and asset management, bringing not only great opportunities, but also challenges to face on each key element:

People
Cultural adaptation
Continuous training

Procces
Integration of processes
Governance and Compliance

Technology
Ciber Security
Investment in Tachnology

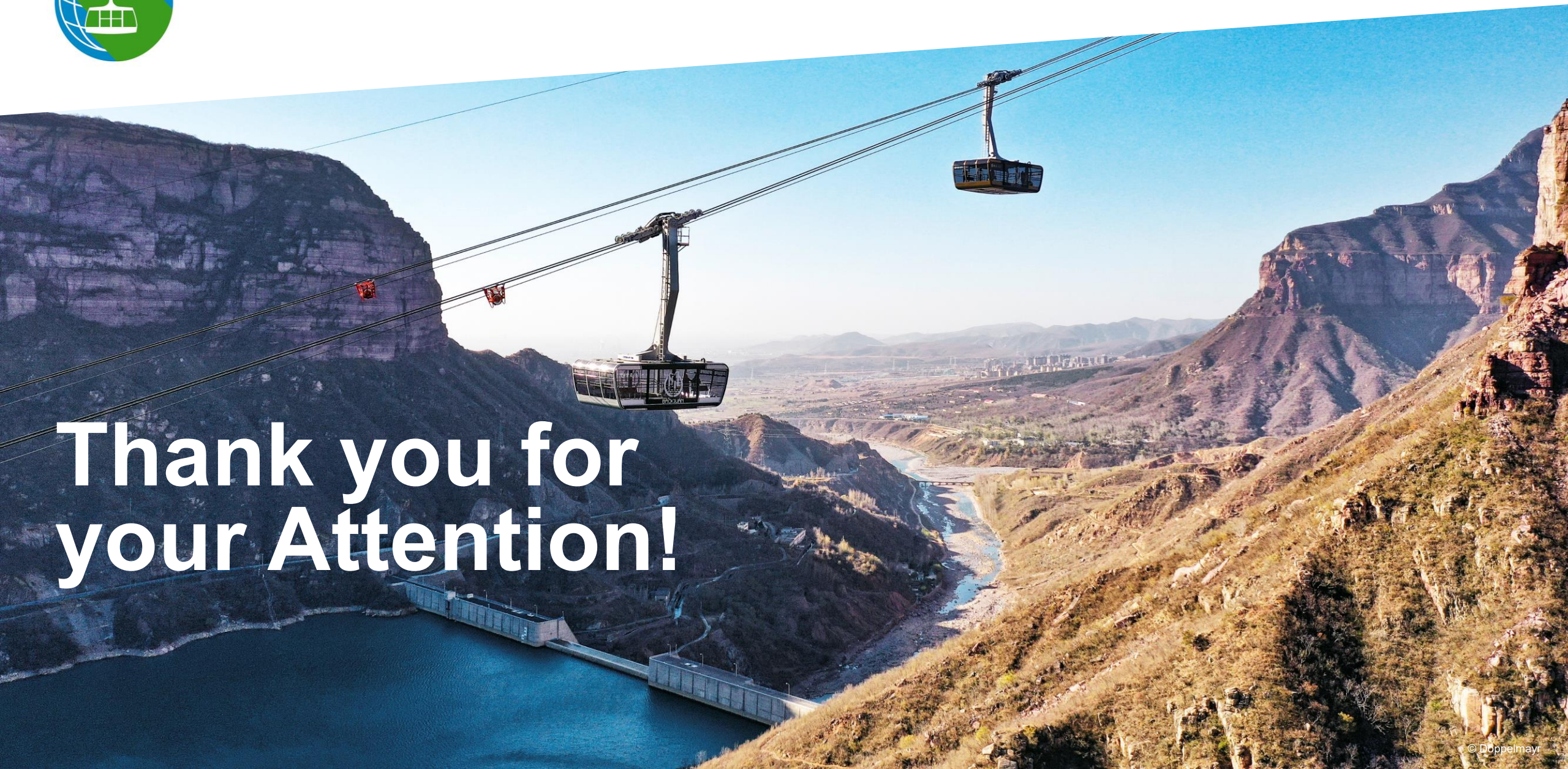


We are building a path to transform **data in decision, people in innovative and systems in synergy** for an asset management that defines the future of organizations.

Our goals

OUR GOALS are

- Implement a world class asset management
- that allow us doing more with less
- managing risks in a sustainable way during the whole life cicle of the assets
- to bring the organization for a new level of operational eficience


Thank you for
your Attention!
© Doppelmayr