

Schaeffler Global Technology Solutions

Cable cars

Doppelmayr/Garaventa, Switzerland

Mobility for Tomorrow – Cable Car Monitoring with FAG SmartCheck

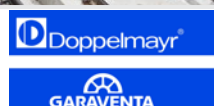
Doppelmayr/Garaventa, headquartered in Wolfurt, Austria und Rotkreuz, Switzerland, is world leader in cable railway construction. Further sales and service offices exist in more than 35 countries worldwide.

Challenge for Schaeffler

Maximum security and availability are central demands in cable railway construction. In order to meet these requirements it was very important for Doppelmayr/Garaventa to receive information about the onset of damage to the rolling bearings and gear teeth at an early stage. Previous monitoring solutions (online and offline) were often not able to reliably cover the entire monitoring spectrum – from the drive motor and the gearbox through to the cable sheaves. Thus the Swiss subsidiary commissioned Schaeffler with realising a pilot project on a two lane funiculars.

Schaeffler Solution

The Schaeffler Sales Engineer in Switzerland contacted for this task the Schaeffler Condition Monitoring Experts in Germany. Together they developed following solution: Eighteen FAG SmartCheck devices were used to monitor a total of approximately 36 components (bearings and gear teeth) in the machine rooms of both cable car stations. The integration of four additional signals from the customer's control station contributes towards ensuring maximum monitoring safety. By using PoE technology (Power over Ethernet), it was possible to reduce the wiring effort. A FAG SmartController serves as bidirectional gateway between customer control system and sensing. In addition, a customer-specific visualization was implemented on the customer's control station PC using the "traffic light principle".



Technical Information about the Funicular

Number of tracks:

2

Number of cable cars:

2 trains, same design

Capacity:

Approx. 20 persons

Speed:

7 km/h

Track length:

Approx. 300 m





Drive train in one of the two mountain stations



Monitoring of drive elements using the FAG SmartCheck



Monitoring of motor vibrations using the FAG SmartCheck

Customer Benefit

The implemented monitoring solution is customized for the individual requirements of a funicular. The FAG SmartCheck enables Doppelmayr/Garaventa for the first time to efficiently monitor all process-critical units including the drive motor, gearbox, and cable sheaves. Previously there were no, or very few, possibilities for the operator to receive reliable information about the onset of bearing damage. However, today operators can detect defects at an early stage, and thus avoid any unplanned downtimes and interruption of transport. Moreover, Doppelmayr/Garaventa can – thanks to the close cooperation with their local Schaeffler Sales Engineer – always rely on a quick and highly qualified support.

What's special?

Cable railways, including funiculars, are among the safest means of transport of all due to the sophisticated safety systems used. As a result, urban cable railways in the public transport network are making advances throughout the world. With its versatile rolling bearing and condition monitoring products, Schaeffler is a leading player in the development and production of solutions for the demanding challenges in mobility for the future. Following successful implementation of the first pilot project, plans are being drawn up for further collaborative cable railway monitoring projects.

Technical Information about the Solution

Number of FAG SmartCheck systems:

18

Power supply:

PoE (Power over Ethernet)

FAG SmartController control system:

A PLC optimized for condition monitoring tasks from the Schaeffler e-F@ctory partner Mitsubishi Electric

Additional signals recorded:

- Speed
- Load
- Direction of travel
- Drive 1/2

Monitored assemblies:

- Motors
- Gearbox
- Drive and cable sheaves

Monitored components:

- Rolling bearings
- Gear teeth

Diagnostic methods:

- Vibration monitoring
- Temperature

Status display:

Individual status visualization by integrating an FAG SmartVisual system into the customer's control station