

Schaeffler Global Technology Solutions

Cable cars

Monitoring Cable Cars using the FAG SmartCheck

Today, cable cars are generally used as a means of transporting passengers. The following example is taken from a customer with a small cable car with two tracks and a capacity of 20 persons each. The cable cars are pulled up the slope by the drive train in the upper station.

Challenge for Schaeffler

For cable cars designed to carry passengers, strict safety requirements must be adhered to. In order to ensure that these safety requirements are met and, at the same time, to ensure smooth operation, it was very important that the cable car operator received 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.

Schaeffler Solution

The FAG SmartCheck solution goes beyond the scope of previous approaches. 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. Additional signals are recorded and transmitted to the FAG SmartCheck systems via a central control unit. In addition, a customer-specific visualization was implemented on the customer's control station PC using the "traffic light principle".



Technical Information about the Plant

Cable cars

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 the upper station



FAG SmartCheck ensures reliable online monitoring of bearings and gear teeth



Customer-specific visualization makes it simple for the operator to carry out monitoring

Customer Benefit

The FAG SmartCheck enables the cable car operator 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. Schaeffler experts provided support during the entire project – from the project planning through to handover. The monitoring solution implemented ensures safe, reliable, and trouble-free transportation every day.

What's special

The FAG SmartCheck acts as an early-warning system that can realize customized solutions to the highest quality standards. In this case, all technical challenges, such as the monitoring of machine elements with only 17 revolutions per minute, the integration of four additional signals via a central control unit, and the use of PoE technology to reduce the wiring effort were optimally solved in accordance with the customer requirements.

In addition to using the measurement technology itself, an individual service of experts is often brought in to ensure a more efficient monitoring of all process-critical units.

Technical Information about the Solution

Number of monitoring systems:

18

Power supply:

PoE (Power over Ethernet)

Additional signals:

4

Monitored assemblies:

- Motors
- Gearbox
- Drive pulleys and cable sheaves

Monitored components:

- Bearings
- Gear teeth

Monitored operating parameters:

- Temperature
- Speed
- Load
- Direction of travel

Diagnostic methods:

- Speed
- Acceleration
- Demodulated signal

Status display:

Customized visualization via integration into the customer's control station using FAG SmartVisual