

## Schaeffler Global Technology Solutions

Raw material extraction  
and processing

### Vibration Monitoring of Rolling Bearings on High-Pressure Grinding Roller

The customer is an international manufacturer of cement, ready-mix concrete, and gravel and is one of the world's leading manufacturers of construction materials.

#### Challenge for Schaeffler

High-pressure grinding roller mills are used to grind raw materials. Damage to the bearings of grinding rollers results in disruptions to the production process. In order to minimize this risk, Schaeffler was commissioned to conduct vibration measurements as part of a pilot project supported by the machine manufacturer (OEM). The difficulty was in reliably detecting typical damage frequencies of rolling bearing components despite the high vibrations and slow speeds of the grinding rollers.

#### Schaeffler Solution

In order to ensure permanent monitoring, Schaeffler installed an FAG SmartCheck device on each of the four main bearing housings and evaluated the measurement data. The pilot project was terminated after four months since no alarm levels of rolling bearing frequencies had been exceeded. Three months later, the customer reported damage to the outer ring of one of the two spherical roller bearings of the floating roller. This resulted in a system downtime lasting several days. Schaeffler re-examined the measurement data for possible signs of damage, this time, however, even more thoroughly than usual. Further examination did in fact reveal initial signs of outer ring damage in the vibration spectrum, just before the measurement data recording was stopped. Had the measurements continued, these initial signs would have caused the FAG SmartCheck to trigger an alarm a short time later.



#### Technical Information about the Plant

High-pressure grinding roller

Grinding rollers:

2 parts, separately driven

Installed bearings:

2 spherical roller bearings per grinding roller

Bearing type:

241/710

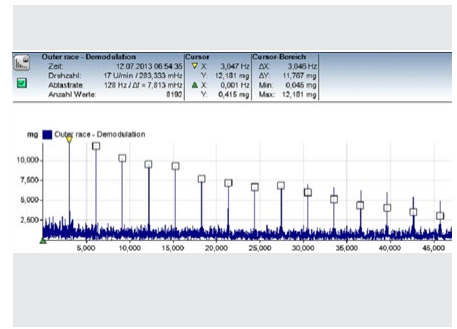




Monitoring of grinding roller bearings using the FAG SmartCheck



Dismounted spherical roller bearing with outer ring damage



Presentation of outer ring damage on a rolling bearing

## Customer Benefit

Continuous use of the FAG SmartCheck means that the initial signs of rolling bearing damage on a grinding roller can be reliably detected at an early stage. The operator can thus adjust his maintenance planning accordingly and avoid any unplanned downtime of the plant.

The avoided costs for subsequent damage caused by a defective rolling bearing, the repair costs, and the costs for a potential production stoppage are much higher than the investment and operating costs for a Schaeffler monitoring solution.

## What's special

Until now, continuous vibration measurement on the bearings of grinding rollers has been offered by neither machine manufacturers nor by maintenance service providers. With the FAG SmartCheck, Schaeffler offers a system, which thanks to its high signal resolution and the monitoring of machine-specific parameters, is capable of precisely monitoring rolling bearing damage frequencies – despite the high level of interference related to the process. The Schaeffler monitoring solution described can be realized with the FAG SmartCheck or with other online vibration measurement systems from Schaeffler.

The solution can be used irrespective of manufacturer and it can be implemented on other grinding rollers, roller presses, and in further areas of application, such as ore mining.

## Technical Information about the Solution

### Monitoring systems:

4 FAG SmartCheck

### Vibration sensor used:

High-resolution piezoelectric sensor

### Monitored components:

Bearings of grinding rollers

### Monitored operating parameters:

- Mill charge
- Rolling bearing frequencies

### Diagnostic methods:

- Time signal
- Envelope spectrum
- Trend data

### Further options:

- Integration of alarms in machine control systems
- Remote monitoring