

Schaeffler Global Technology Solutions

Cement

Spenner Zement, Germany

Online Vibration Monitoring on Tube Mills in the Cement Industry

Spenner Zement offers its customers a wide range of products and services in the fields of cement, lime and dry mortar. In addition, Spenner Zement develops disposal concepts for many industry sectors whose waste products can be used for secondary raw materials and as fuel.

Challenge for Schaeffler

The customer has several cement mills (tube mills) at its location in Erwitte, Germany, and runs its production at full capacity despite the difficult market conditions in the sector. Despite monitoring with a temperature sensor, in 2002 one of the mills had to be shut down for three weeks because of a gearbox damage. The gearbox showed already heavy deterioration and had to undergo cost-intensive reparings.

Schaeffler Solution

Schaeffler employees of the service department installed the online monitoring system FAG DTECT X1 with five sensors at the main gearbox and reduction gear. Whilst Schaeffler experts supported the customer for three months in analysing the data, Spenner employees were trained in vibration monitoring and they started to operate the system on their own. In 2004, the FAG DTECT X1 detected a tooth damage in the gear mesh which was confirmed after a visual inspection by Spenner Zement. The gearbox was replaced during a planned shutdown. At the same time, abrasion on the toothing of the layshaft gear pinion was identified and removed.



Technical Information about the Plant

Tube mill (tube grinding)

Driving power:

1 MW (triple shaft helical gearbox)

Length:

8 m

Diameter:

3 m

Speed:

15 RPM





Tube mill in cement industry



Online monitoring system FAG DTECT X1



Tube mill in cement industry

Customer Benefit

Thanks to an early detection of the damage with the FAG DTECT X1, an unscheduled shutdown, and thus a major loss of production, could be prevented. Considerable repair costs could be saved through preventing secondary damage on the gearbox. This means in figures:

Costs of preventative maintenance:	
Before installing the Online Condition Monitoring System:	
Repair costs in case of major gearbox damage	€ 50 000 – 100 000
Production loss	approx. € 6 000/h
Total cost	> € 5 000
With Online Monitoring System FAG DTECT X1:	
Project costs for monitoring system incl. service	€ 18 000
Actual repair costs with early detection of damage	€ 5 000
Total cost	€ 23 000
Savings:	> € 27 000

What's special

Particularly challenging from a vibration diagnostic point of view is the monitoring of gear meshing on a slowly rotating assembly. The success of the project convinced Spenner Zement to expand their monitoring system. Moreover, the customer reported the monitoring success to the professional journal "Automation & Drive" (edition April 2006). This solution can be transferred to nearly all tube mills used in raw material extraction and processing as well as coal pulverizers in fossil power plants worldwide.

Technical Information about the Solution

Monitoring system:

8-channel FAG DTECT X1

Sensor system:

ICP acceleration sensor (5 pcs.)

Housing:

IP66

Communication:

Com-Server (TCP/IP)

Additional signals:

Speed and load (motor current)

Monitored machine elements:

- 3 sensors at the gearbox:
Monitoring of the gear bearings and gear mesh
- 2 sensors at the reduction gear:
Monitoring of gear rim and pinion