

Schaeffler Global Technology Solutions

Steel and non-ferrous metals

Modal Analysis helps to increase Speed of Stretch Reducing Mill

The Spanish customer is a world leading manufacturer of seamless pipes. He offers a wide range of products for different industrial areas, e.g. the oil, automotive and mechanical construction industry as well as the energy sector and the overall construction industry.

Challenge for Schaeffler

The customer had invested about 80 million euro in its production process with the objective to install a new pipe reduction gear on its main reduction stand. However, for unknown reasons he was unable to increase the machine speed beyond 80 percent capacity for the most important products. Vibration levels rose exponentially and the product quality got worse. The whole system was very complex with the motors in tandem constituting the most critical part.

Schaeffler Solution

A first examination by Schaeffler revealed that a simple vibration analysis study would not be sufficient. To identify the cause of the high level of vibrations, it was necessary to carry out trouble shooting by means of advanced vibration analysis and modal analysis. The Schaeffler experts ensured that the necessary measurement system arrived promptly on site. After an eight-hour measurement and one week of analysis, they detected the cause of the vibrations: a fault in the motor foundations. In order to resolve the problem, the foundations had to be reinforced, which required rebuilding the base plate. Additionally, the Schaeffler experts recommended adjusting the speed range of two tandem motor frames to avoid resonance frequencies.



Technical Information about the Plant

Stretch reducing mill:

30 stands with 3 rolls each to 120°; with independent movements

Motors:

8 motors with a total power of approx. 5 200 kW

Motor speeds:

Variable, from 700 to 2 000 RPM

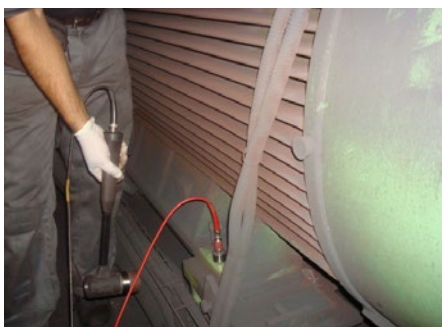
Gearbox:

Three gearboxes with 30 output shafts

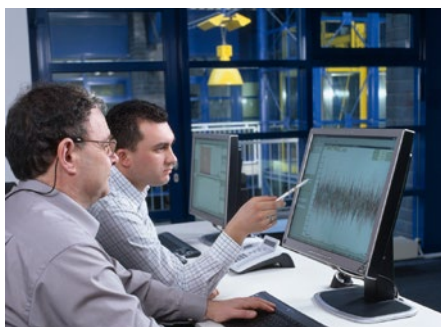
Mill parameter:

- Input speed: 0.8-1.5m/sec
- Max. output speed: 11 m/sec
- Max. input diameter: 180 mm
- Min. output diameter: 25 mm
- Max. input thickness: 18 mm
- Min. output thickness: 2.3 mm





Sensor positions at support of the motor for bump test



Analysis of measured data done by Schaeffler



Schaeffler experts perform troubleshooting

Customer Benefit

Thanks to the precise failure diagnosis, the customer knows the cause of the defect and can take appropriate measures to fix it.

Since then he has been able to run its machines at full capacity.

The rise in production by 25 percent has generated a possible increase in profits of more than 750 000 euros, depending on the market demand.

Concrete cost savings after troubleshooting by modal analysis are:

approx. € 155 000

Reduced unplanned downtime costs::

€ 100 000

Avoided damages and repair costs on gearboxes and motors:

€ 55 000

Technical Information about the Solution

- Vibration measurement
- Transitory measurement
- Impact test
- Spectrum analysis
- Troubleshooting (waterfall, sonogram)
- Frequency response analysis (coherence, phase, vibratory)

What's special

The customer's requirements, with regard to the problem identification, were fully achieved by the work of Schaeffler. The excellent performance contributed directly to keep and consolidate the current bearing supply contract and to generate new improvement opportunities in future maintenance services in the plant.