

Schaeffler Global Technology Solutions

Steel and
non-ferrous metals

ThyssenKrupp Steel Europe AG, Germany

Condition Monitoring on a Hot Strip Mill

With a turnover of nearly 13 billion euros, ThyssenKrupp Steel Europe AG (TKSE) is the leading manufacturer of high-grade flat steel products in Germany. TKSE operates a hot rolling mill at their factory in Bochum. With a power rating of 62 500 kW the 7-stand hot strip mill is especially suitable for the production of high-strength and stainless steels.

Challenge for Schaeffler

The weak spot of the rolling stands in any hot strip mill are the roller bearings on the work rollers. Under extreme operating conditions only relatively short stoppage times are possible. Unplanned stoppages and expensive consequential damage, such as damage to the roller seating or even journal fracture on the work rollers, may be the result. In order to guarantee operations with as few faults as possible TKSE has opted for a vibration monitoring solution.

Schaeffler Solution

Following the installation of seven FAG DTECT X1 online condition monitoring systems the work rollers are permanently monitored. The vibrations sensors were integrated in the customer's software and the customer's staff trained to independently operate the condition monitoring system. Schaeffler has access to the TKSE intranet by means of remote software, allowing the vibration experts to evaluate the data in the Schaeffler Online Monitoring Center. One case of bearing damage was immediately detected during test measurements for sensor installation.



ThyssenKrupp Steel



Technical Information about the Plant

Finishing mill:

7 x four-high mill stands

Model year:

1966

Work roller diameter:

775/675 mm

Backing roller diameter:

1530 mm

Power rating:

62 500 kW

Max. final rolling speed:

15,6 m/s





Damage to rolling element of tapered roller bearing



Condition monitoring with FAG DTECT X1



Hot strip mill in steel production

Customer Benefit

The number of unplanned stoppages caused by bearing damage on the work rollers and subsequent consequential damage can be drastically reduced.

In addition, the project costs have been recovered in less than one year.

In tangible terms:

Annual costs before the introduction of condition monitoring:	
Per year 5 repairs part/roller journal of € 21 000 each:	€ 105 000
Per year 5 unplanned roller replacements of 7 minutes each:	€ 35 000
Total:	€ 140 000
Compared to project costs:	€ 100 000

What's special

The slow speeds on stand 1 are diagnostically complex to master, where third octave chatter occurs, and the damping of structure-borne noise at the transition of the roll chock to the rolling mill housing. The application is transferable to heavy rolling stands in the hot strip field. Thanks to a new approach to attaching the vibration sensors to the stand, thereby dispensing with mounting/removal of the sensors on the roll chock during roller replacement, TKSE opted for the Schaeffler solution.

Technical Information about the Solution

Monitoring system:

7 x 2 channel FAG DTECT X1

Monitored components:

Roller bearings on the work rollers

Sensors:

- 14 ICP acceleration sensors
- 2 sensors per stand at the level of the operating side of the work roller roll chocks

Signal filter:

TP3 module due to large speed monitoring range

Housing:

IP66

Communication:

Com-Server

Additional signals:

Strip speed (conversion to roller and gear speed) „strip in mill“

Alarms:

- Red signal lamp on rolling stand
- Remote monitoring