SCHAEFFLER

Schaeffler Global Technology Solutions

Steel and non-ferrous metals

Trouble-shooting Measurements in 4-High Cold Rolling Mill

The customer is one of the worldwide leading manufacturers of flat steel with a comprehensive range of grades, sizes and surface finishes.

Challenge for Schaeffler

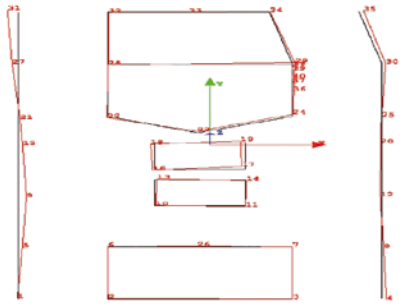
The plant builder had modified the 4-high cold rolling mill to increase its capacity. However, after the modification the steel producer was no longer able to produce high quality strips that matched the customers' requirements. The finished product was always marred by chatter marks. The cause of these flaws was supposed to be an increased level of rolling stand vibration. As the customer had already had very good experiences with the service and condition monitoring solutions provided by Schaeffler in the past, they enlisted the Schaeffler services to solve the problem.

Schaeffler Solution

In no time at all, the Schaeffler service division organized the necessary trouble-shooting activities. Two experts carried out various vibration measurements and a modal analysis. The results showed an irregularity in the region of the work rolls and a heavy frame deflection in the direction of rolling. The upper chock – and consequently the upper work roll – rotated freely in the frame, causing a cyclic reduction of the roll gap. As a result, chatter marks were produced on the steel strip at regular intervals.

Technical Information about the Plant
4-high rolling stand (Quarto)
Strip width:
700 – 1300 mm
Strip thickness:
0,15 – 2,0 mm
Maximum coil weight:
25 t

LuK INA FAG



Lattice model of a 4-high rolling stand

Service experts during analyzing

Vibration measuring device FAG Detector III

Customer Benefit

Thanks to the trouble shooting carried out by the service experts, the cause of the chatter marks on the rolled strip was determined in no time at all. Directly afterwards, the steel producer initiated the necessary design modifications in collaboration with the plant builder. In this way the problems with the rolling stand were solved quickly, and further costly production losses have been avoided.

Cost savings realized thanks to fast trouble-shooting service	
Production capacity:	16 coils/day
Coil weight:	at least 20 t
Price of cold rolled steel strip:	€ 685/t
Production losses per day:	**€ 200 000**

What's special

The modal analysis and vibration analysis carried out by our experts provided the plant operator with very important information about the rolling stand's actual dynamic behaviour. Without this approach, the cause of the chatter marks could have been identified only by trial and error – a method that is not only very time consuming but also very expensive (high labour costs and production loss costs).

Technical Information about the Solution

Measuring methods used:

- Modal analysis
- Operating vibration measurement
- Bumb test
- Run up / coast down measurements

GTS 0010/ 01 / GB-D / 201307