

Hot Strip Mill Automatic Gauge Control

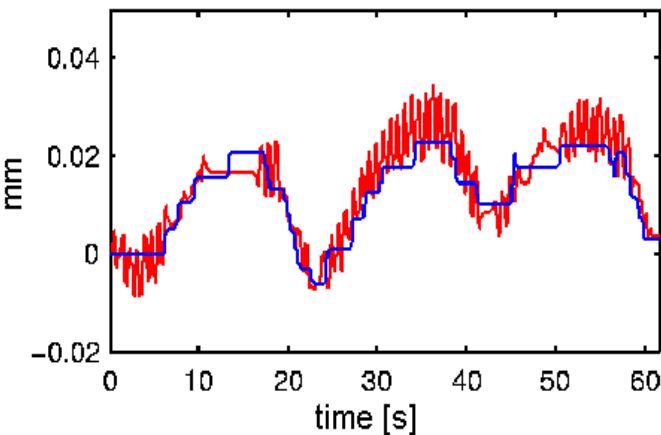
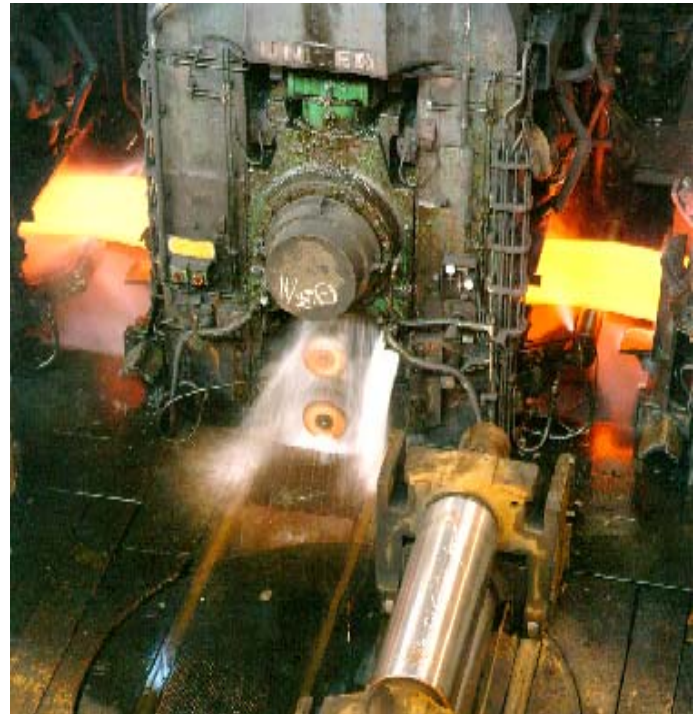


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In 1999 we improved the Automatic Gauge Control (AGC) systems on the finishing train of Corus Strip Products Ijmuiden Plant's Hot Strip Mill 2. Therefore we first extensively studied alternatives for dealing with the roll force ripple. Eventually we removed the non linear eccentricity filters in the roll force and installed simple self adjusting dead bands in the screw drives.

As a result of this the AGC controller settings can fully compensate for the hardness of the steel strip, allowing more accurate and faster gauge control. Provision for this improvement however is the use of backup rolls giving small roll force ripples.

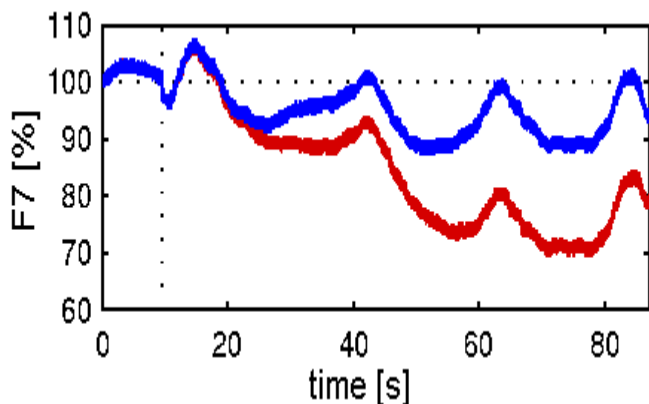
The figure below shows a simulation of the screw moves on finishing stand #6. Here the old filter would cause unacceptable oscillations in the screw position (red); the new filter does not cause oscillations. The result is optimal gauge control and minimal screw movements.



HSM Load Balance Control (LBC)

The roll force distribution gradually changes from head end to tail and of the strip: in the last stands the roll forces decrease while in the first stands they increase. This is caused by a combination of heat losses and acceleration. Load balance control has been developed in order to preserve the target load distribution. We hope to implement load balance control in the present control equipment in 2002.

The figure below shows simulated results. The red line shows a 30% roll force decrease in stand 7. Load balance redistributes the roll force decrease resulting in less roll force change in the last stands. This will preserve strip shape and keep process control within safe margins.



HSM Break Through study

In order to realise a breakthrough in gauge performance alternative process control is presently being studied.