Rolls in rolling mills are never completely round but have eccentricity which can be caused by:

- grinding inaccuracy
- non-uniform thermal expansion
- asymmetrical adjustment of bearing rolls shell via drive keys

Each eccentricity consists of a base frequency which is the rotary frequency of the roll and several harmonic frequencies. Every roll of each roll stack can show such eccentricities which lead to thickness and tension errors which also lead to disturbances in neighboring stands. The result is a mixture of many cyclic disturbances in the exit thickness that in most plants add up to a significant percentage of the total thickness error.

The best signal for determination of eccentricities is the stand exit thickness. This however is not available for most stands. Therefore a compensation has to use other, less convenient, signals.

Finally filtering a single eccentricity frequency is difficult as a pair of rolls has very similar diameters and therefore very similar frequencies.

**OUR SOLUTION**

Primetals Technologies delivers hard- and software for eccentricity compensation. The REC is a fully digital model based control, which uses the fact that the eccentricity of each roll remains relatively constant during rolling to model its shape over several revolutions. Using an inverted plant model this modelled eccentricity is transformed into a compensation setpoint for the gap control (pre-control) moving the gap in a way that eliminates the influence of the eccentricity on strip thickness or tension.

As input the REC uses, depending on availability, a combination of the exit thickness, entry strip tension and roll force to extract the eccentricities.
PRODUCT FEATURES
Can be installed in:
• Every stand
• For every roll
• All types of Cold and Hot Rolling Mills

Can work with all kinds of measurement setups. The following possible input signals can be combined for better disturbance differentiation:
• Exit thickness
• Entry strip tension
• Roll force

MAIN BENEFITS
• Better strip quality - improved thickness tolerances also at high rolling speeds
• Maintenance friendly - using existing thickness, roll load or strip tension measurements as feedback for control, hence no additional sensors or instrumentation are needed
• Less roll changes - applicable to compensate backup-, intermediate- and work roll eccentricities
• Fast ROI - easy to implement in existing basic automation environments

Stability and high compensation rate:
• For up to 4 harmonic frequencies per roll
• For high speed levels (up to 22Hz)
• For all strip types
• During acceleration
• For changing eccentricities during rolling
• When other disturbances exist

No need for additional sensors, e.g. for synchronizing

Exit gauge versus time depending on the eccentricity compensation status

Structure of the controller