

SHAPEMON

PRECISE INLINE SHAPE MEASUREMENT FOR HOT STRIP- MILLS

During the rolling process for slabs and transfer bars in hot strip mills, the shape changes with every pass. In the roughing mill section the general shape is the main focus, in the finishing mill section the focus is on the head and tail end camber as well as on central alignment of the strip on the roller table during rolling. After rolling, the geometrical dimensions of the hot band must correspond with the target values. It is therefore essential to have geometrical information about the rolled material during the rolling process.

A tool to measure the shape of hot material on the roller table between passes and between the mill stands is necessary in order to evaluate the exact geometrical parameters of the product.

YOUR CHALLENGE

For process optimization and for quality purposes material parameters must be measured and recorded. Strip straightness must be optimized during the rolling process and the geometry must be documented. Maintenance efforts must be low, remote maintenance should be possible and the tool must be easy to adjust and calibrate in order to meet the requirements of the plant operator.

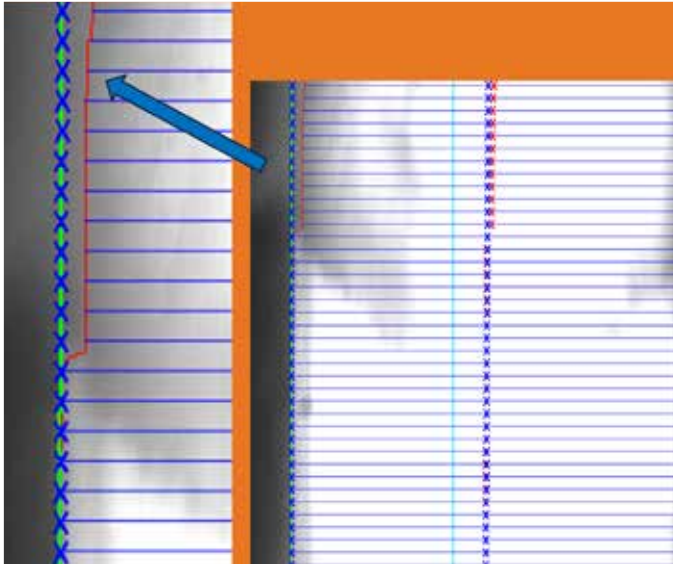
Despite a challenging environment with steam, water and scale, a high availability of shape measurement is also required. In hot rolling mills, even good rolling models are often limited in determination of accurate strip profiles and flatness. The camber (mainly at the roughing stand) and the position of the strip between the finishing stands are two important parameters for obtaining a high repeatability of the strip geometry. High temperatures and high speeds, in addition to the challenging environmental conditions at the rolling mill, make it difficult to take accurate measurements.

OUR SOLUTION

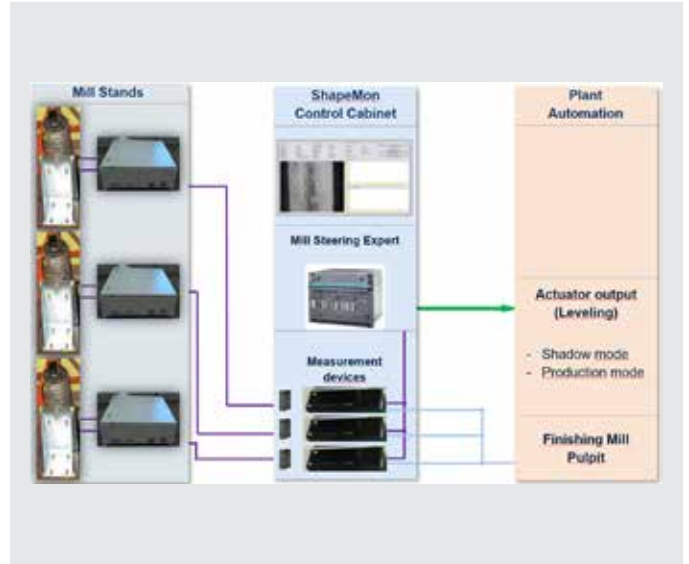
An optical sensor based on the self-radiation principle is installed safely above the roller table at a height where it does not interfere with the rolling process or crane movements. When the material passes through the field of view, the sensor automatically detects the slab or transfer bar and starts the measurement procedure. The results are visualized and transferred to Level 1 and/or Level 2 for use in rolling process optimization. This system is used for camber and center line measurement at roughing mills and finishing mills. Additionally, the head and tail end geometry can be measured to support maximization of yield as well as the speed of the material.



ShapeMon sensor: simple and robust design



Robustness against harsh environment



Optional Mill Steering Expert

ShapeMon constantly collects images of the slab or transfer bar. Special predictive edge filtering algorithm ensures reliable measurement even under the harsh environment with the results calculated and available in real time. The calculated values are:

- Strip centerline deviation
- Head end and tail end camber
- Complete transfer bar shape (RM)
- Head and tail end geometry
- Width measurement
- Speed measurement

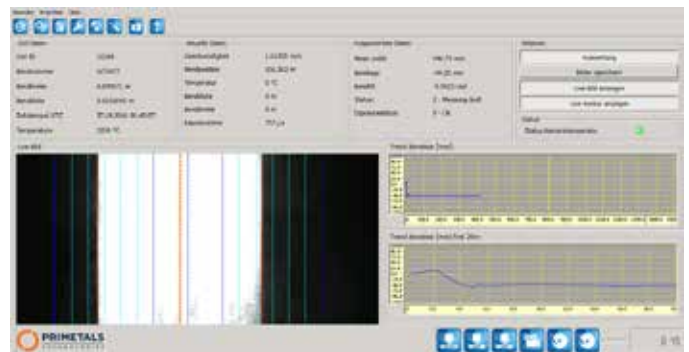
ShapeMon can also be supplied with the Primetals Technology Mill Steering Expert for automatic rolling process improvement with respect to geometric characteristics.

TECHNICAL DATA

- Sensor up to 2,400 x 2,000 pix
- In HSM RM and FM: working distance 5-10m
- In HSM RM and FM: field of view 2,5x2m
- Up to 50 measurements per second
- Temperature range > 700°C edge temperature

ADVANTAGES OF SHAPEMON

- Minimizing camber formation
- Reduced scrap at head and tail end
- Increasing productivity by prevention of coiling problems at HSM
- Increase in throughput thanks to rolling control optimization (avoidance of cobbles in combination with Primetals Technologies rolling model)
- Automated threading process with no manual interaction from operator



ShapeMon operator view

