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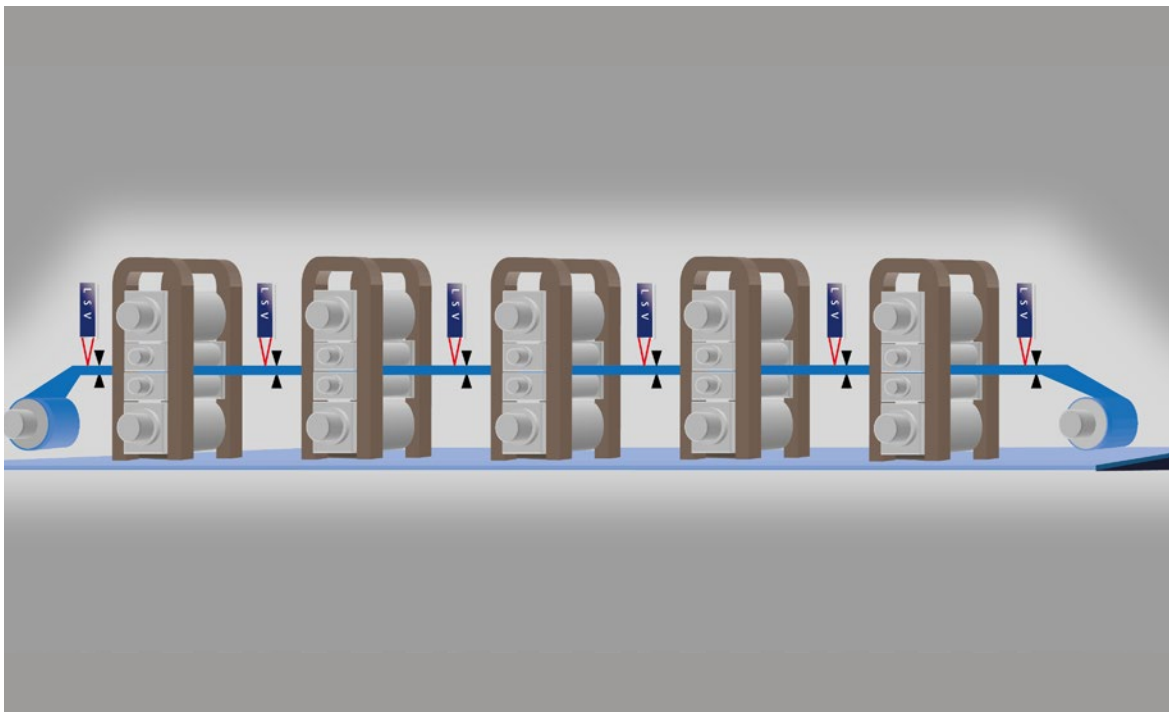


Enhanced Speed Measurement for AGC-Mass Flow

Tandem Cold Mills

Application Note

Improve coil quality and yield in tandem mills with enhanced strip speed measurements for mass flow – Automatic Gauge Control (AGC).

Solution

LSV Laser Velocimeters directly measure strip speed, accurately and reliably, even during mill speed transitions, where contact techniques are most susceptible to slippage. The improved measurements enable a more accurate and reliable calculation of Mass Flow and thus tighter control of gauge thickness over a greater percentage of the coil. The result is improved Quality and increased Operational Yield.

Background

Mass Flow, Automatic Gauge Control (AGC) is a technique used for many years to control strip thickness in Tandem Cold Rolling Mills. It enables tighter control of thickness by providing faster and more accurate control of the roll gap. Utilizing Mass Flow AGC control techniques permit operations to achieve specified thickness requirements over a greater percentage of the coil length, thus greatly improving the final yield.

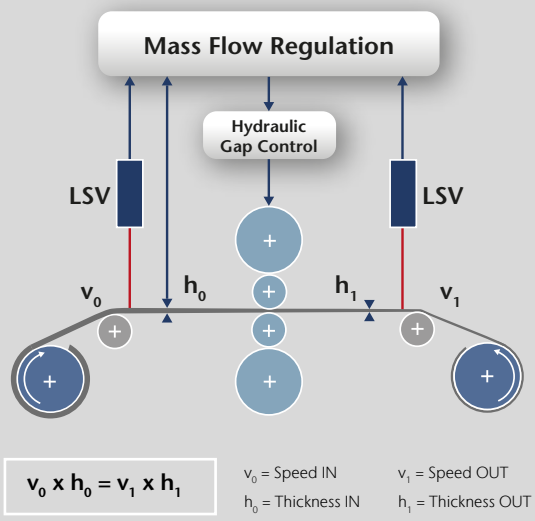
The mass flow technique states that the strip thickness and speed entering the stand must equal the strip thickness and speed exiting the stand, while the width remains constant. Since the response time of a speed measurement is significantly faster than that of the thickness gauge measurement, the exit thickness can be predicted and controlled by measuring the thickness and speed entering the stand and the speed exiting the stand.

Process: Tandem Rolling Mill
- Strip Speed for Mass Flow - AGC

Goal: Optimize Yield and Improve Quality
- Improve speed measurements for more accurate calculation of Mass Flow
- Tighter control of thickness over greater percentage of coil

Problem: Current Measurement Technique
- Tach for drive speed or idler roll
- Slippage during speed transitions

Solution: LSV Laser Velocimeter
- Rugged, mill duty construction
- Advanced optical configuration
- Exceptional performance and reliability



Current Measurement Techniques

The speed measurement for Mass Flow Calculations is often obtained by drive speed or speed from an idler roll. Both are contact methods that measure the speed of the spinning roll or motor rather than the true strip speed. Moreover, both methods are susceptible to slippage, especially at the leading and trailing ends of the coil and during periods of acceleration or deceleration. The errors in speed measurement, during these periods of transition, result in inaccurate Mass Flow calculations and thus incorrect control of the roll gap, causing variability in strip thickness. In short, less of the strip meets the specified thickness requirements.

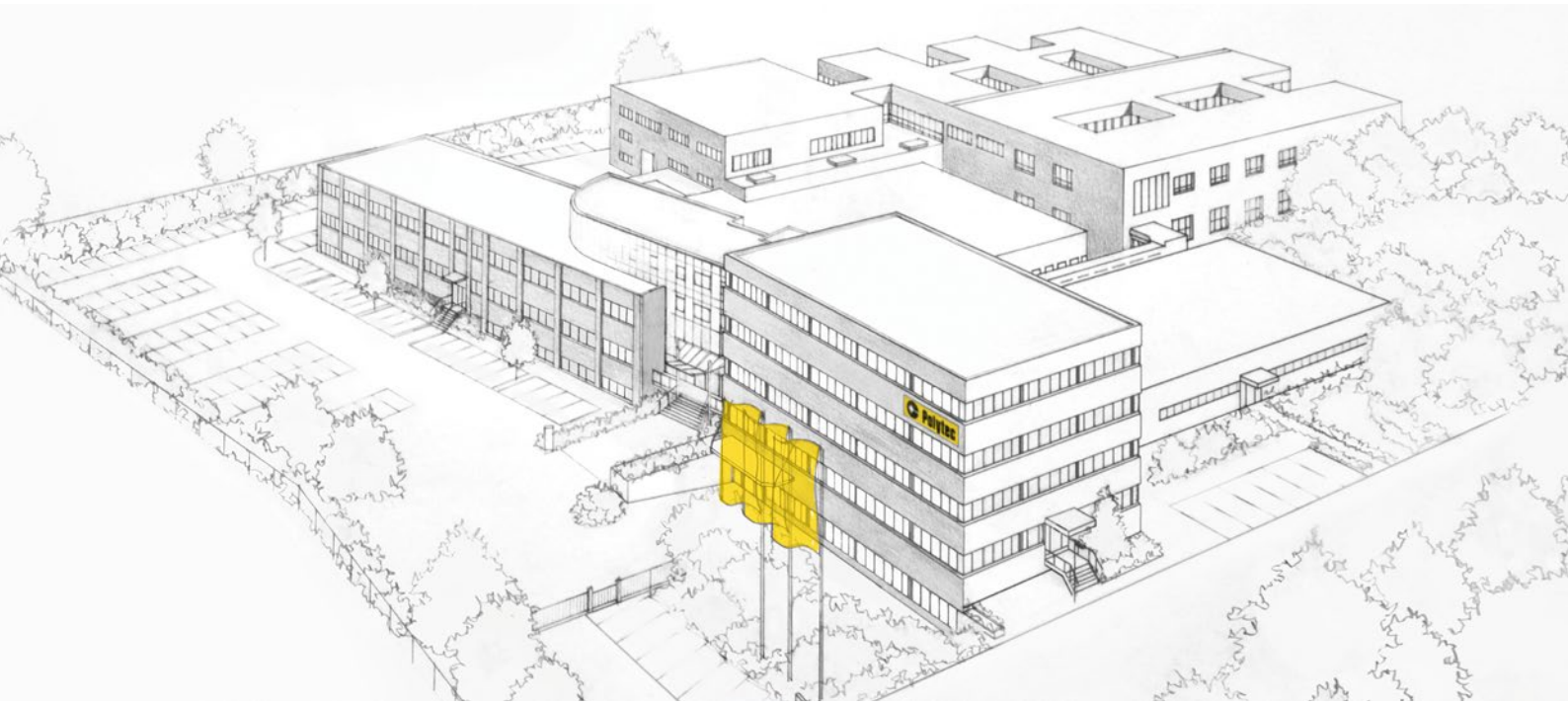
The Polytec Solution

LSV Laser Velocimeters installed at the entrance and exit of the mill stands for Mass Flow calculations have proven to track strip speed more accurately than contact methods because the LSV is not susceptible to slippage during mill speed transitions. The improved speed measurement is most noticeable at the beginning and end of the strip and during those periods of mill acceleration and deceleration, where significant slippage can occur with traditional contact methods.

This improved strip speed measurement provides a more accurate Mass Flow Calculation and thus tighter control of gauge thickness through the Automatic Gauge Control. Moreover, the Mass Flow – AGC, coupled with LSV laser Velocimeters enables the ability to achieve thickness specifications over a greater percentage of the strip. The result is improved quality and increased operational yield.

A typical solution consists of a LSV sensor with 1000 mm standoff distance, protective cooling housing with air purge and various outputs, including Profibus, Ethernet and quadrature encoder output for easy integration to mill control systems. It's rugged, mill duty construction, sophisticated optical configuration and advanced signal conditioning offer exceptional performance and reliability, separating the LSV Laser Velocimeter from other, so called, laser speed sensors.

For more information about Polytec Laser Surface Velocimeters please contact us or visit our web page **www.polytec.com/lsv**



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2016/11 - Technical specifications are subject to change without notice.