

Industry: Metals

Application: Elongation Ratio

Accurate, Stable Measurements for Elongation Ratio and Differential Speed

Profile:

Temper and skin pass mill

Solution:

LaserSpeed® Pro 8500/9500

Results:

- ▶ Non-contact measurement eliminates measurement errors associated with contact measurement techniques
- ▶ Integrated system saves time and money previously spent on tweaking the mill control system to keep the product within specs
- ▶ High repeatability ($\pm 0.02\%$)
- ▶ No measurement error due to slippage
- ▶ High reliability (no moving parts to wear out)
- ▶ Direct speed measurement of the steel strip



Elongation ratio and differential speed measurements are necessary for a variety of manufacturing processes like temper mills and skin pass mills. If you use contact rollers and tachometers, this is no easy task. This application note describes how you can complete this task with ease using the LaserSpeed Pro gauge.

The Challenges:

Measuring Elongation Ratios

To measure elongation ratios and differential speeds, you typically need the entry speed and the exit speed of the mill stand to calculate the elongation ratio. The elongation ratio can be calculated as follows:

$$\text{Elongation Ratio} = (\text{Exit Speed} - \text{Entry Speed}) / \text{Entry Speed} \times 100$$

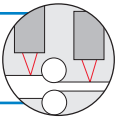
Historically, mills have used contact rollers and tachometers to obtain the speed measurements they need to calculate the elongation ratio.

The following are two major problems with obtaining speed from contact rollers and tachometers:

- ▶ Errors due to slippage between the roller and the strip
- ▶ Errors due to the change in roller diameter due to wear

The Solution:

LaserSpeed® Pro Gauges

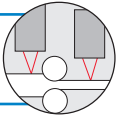


The LaserSpeed Pro gauge is ideal for this type of application because of the following features:

- ▶ Non-contact measurement
- ▶ High repeatability ($\pm 0.02\%$)
- ▶ No measurement error due to slippage
- ▶ High reliability (no moving parts to wear out)
- ▶ Direct speed measurement of the product



The Solution:

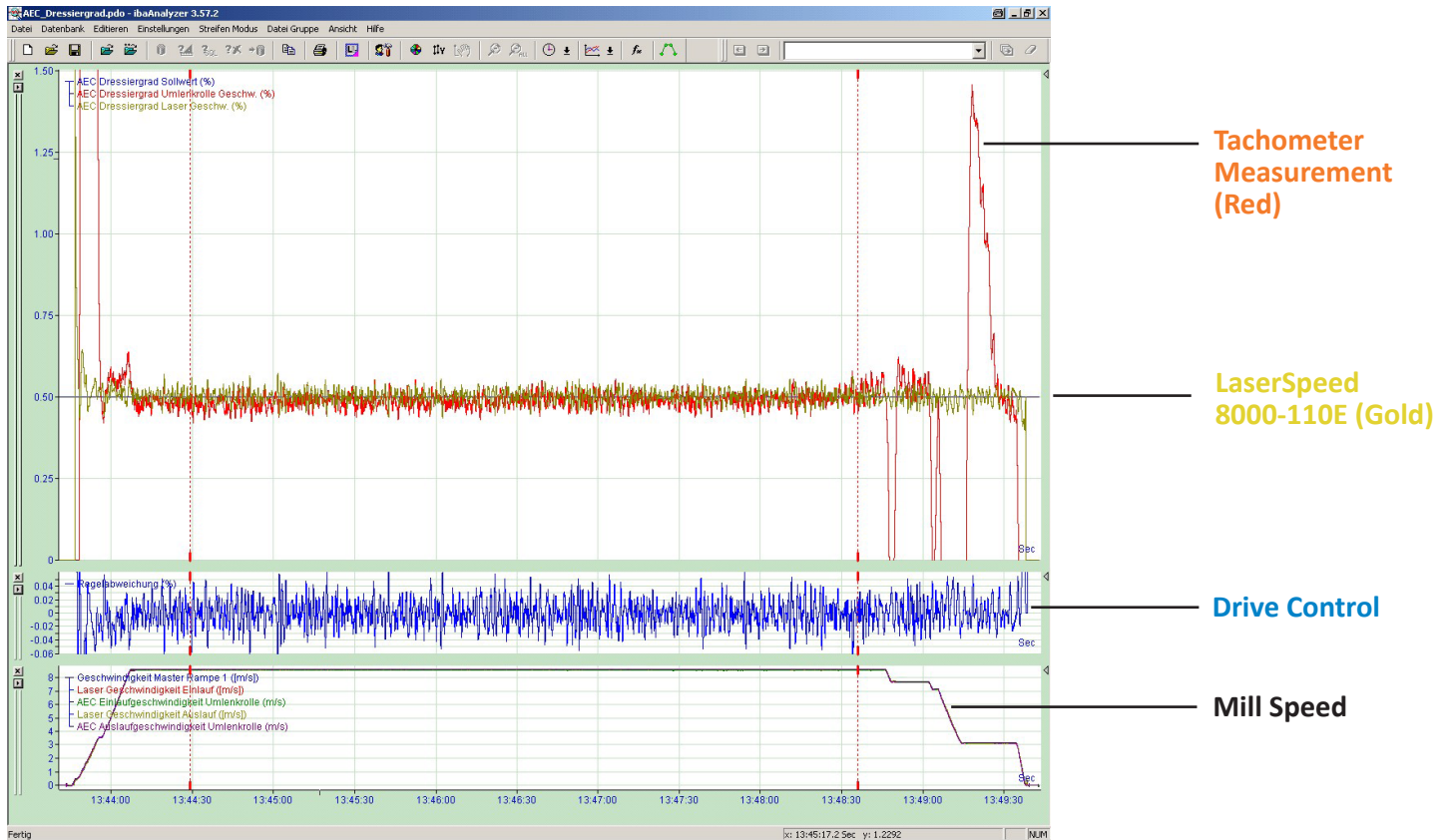


The following graph shows slippage error due to contact rollers on a wet temper mill. The upper graph (Red trace) shows the elongation ratio measured using contact rollers and tachometers. As you can see, the elongation ratio has huge errors when the mill accelerates or decelerates.

The upper graph (Gold trace) shows the elongation ratio measured using the LaserSpeed gauge. You can see that the LaserSpeed Pro gauge produced an accurate elongation

ratio even when the mill accelerates and decelerates. The lower graph (Black trace) shows the mill speed. The large errors in the elongation ratio correspond to when the mill changes speed.

Recommended Gauges: LS Pro 8500-410E, LS Pro 9500-410E



The Results:

The LaserSpeed Pro gauge delivers the following benefits:

- ▶ Non-contact measurement eliminates measurement errors associated with contact measurement techniques
- ▶ Integrated system saves time and money previously spent on tweaking the mill control system to keep the product within specs
- ▶ High repeatability ($\pm 0.02\%$)
- ▶ No measurement error due to slippage
- ▶ High reliability (no moving parts to wear out)
- ▶ Direct speed measurement of the product

The LaserSpeed Pro non-contact gauge is the most accurate, reliable, and cost-effective measurement solution for elongation ratio and differential speed measurement and ensuring product quality.

For questions or support go to: <https://ndc.custhelp.com/>

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