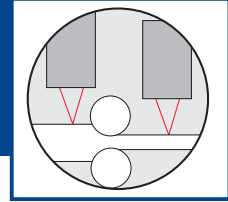


Elongation Ratio & Differential Speed



Elongation Ratio and Differential speed measurements are necessary for a variety of manufacturing processes like temper mills and skin pass mills. Typically you 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:

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

LaserSpeed gauges are ideal for this type of application because of the following features:

- Non Contact measurement
- High repeatability (+/- 0.2%)
- No measurement error due to slippage
- High reliability (no moving parts to wear out)
- Direct speed measurement of the steel strip

Historically, contact rollers and tachometers have been used to obtain the speed measurements needed to calculate the Elongation Ratio. The are two major problems with obtaining speed from contact rollers and tachometers:

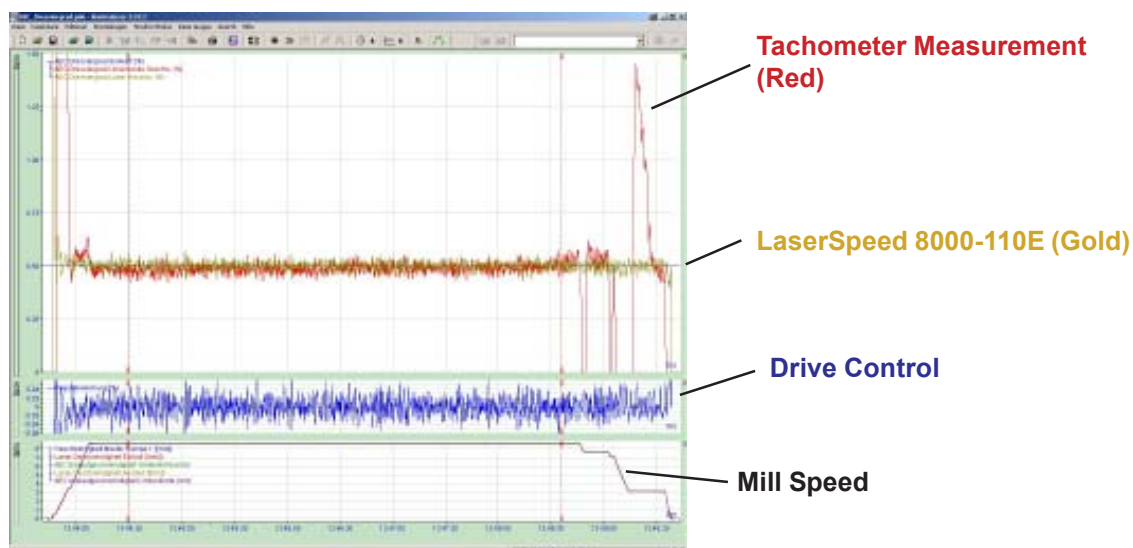
- Errors due to slippage between the roller and the strip
- Errors due to the change in roller diameter due to wear.

The 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 can be seen the elongation ratio has huge errors when the mill accelerates or decelerates.

The upper graph (Gold trace) shows the elongation ratio measured using two LaserSpeed gauges. As can be seen by the graph the LaserSpeed gauge produce a 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: LS8000-310E, LS9000-310E



LaserSpeed®