

Combined speed and thickness measurement in rolling mills



Combined speed and thickness measurement in rolling mills

C-frame with integrated speed measurement
Application note



The processing industry, especially in the automotive sector, places high demands on the dimensional accuracy and quality of steel and aluminum products.

Aiming to improve thickness tolerances of rolled strips, modern rolling mills are controlled according to the mass flow principle. LSV Laser Surface Velocimeters from Polytec are optical sensors for the non-contact measurement of the velocity component required to optimize the mass flow control in production lines.

Non-contact strip thickness and speed measurement

The mass flow relationship enables fast and precise control of the strip thickness in the roll gap from a speed and thickness measurement before and after the roll stand. The thickness measurement instruments for rolled products are usually installed in so-called C-frames. The strip thickness is determined by absorption of x-rays. The thickness gauge and the detector are housed in the upper and lower arms of a C-frame.

For non-contact speed measurement LSV Laser Surface Velocimeters are becoming increasingly popular in the metals industry.

Compared to traditional velocity measurement wheels, or drive shaft encoders, the LSV operates free of slippage and wear, thus avoiding considerable measurement errors. Measuring with LSV optical sensors offers a more repeatable and reliable speed measurement, resulting in better control of thickness.

Mass flow control always requires a combination of thickness and velocity measurement. Both measuring systems can be installed independently of each other. However, on new or rebuild projects, it is much more convenient for both components to be combined electrically and mechanically into one measuring system.

1
*C-frame by IMS
 with integrated
 LSV laser sensor
 from Polytec*



For the installation of the sensor heads in a C-frame, Polytec designed a cooling plate with deflection mirror. The sensor head is mounted horizontally in the C-frame, while the laser beams are directed onto the strip surface by the integrated beam deflector (Fig. 1).

By moving the LSV measuring head relative to the mirror and setting the correct deflection angle of 90° or 87°, the system can be easily adapted to the application requirements. Due to the large measuring depth of field, the LSV maintains a reliable measuring signal even in case of large pass line variations.

Integration of LSV sensors into C-frames

Since December 2000 the companies IMS as manufacturer of C-frame thickness gauges and Polytec as developer and manufacturer of laser-based length and speed sensor systems cooperate closely. The compact design of the LSV sensors and the great flexibility of the working distance (300 - 3000 mm) have convinced IMS to integrate Polytec LSV systems into their C-frames.

Advantages of C-frames with integrated LSV

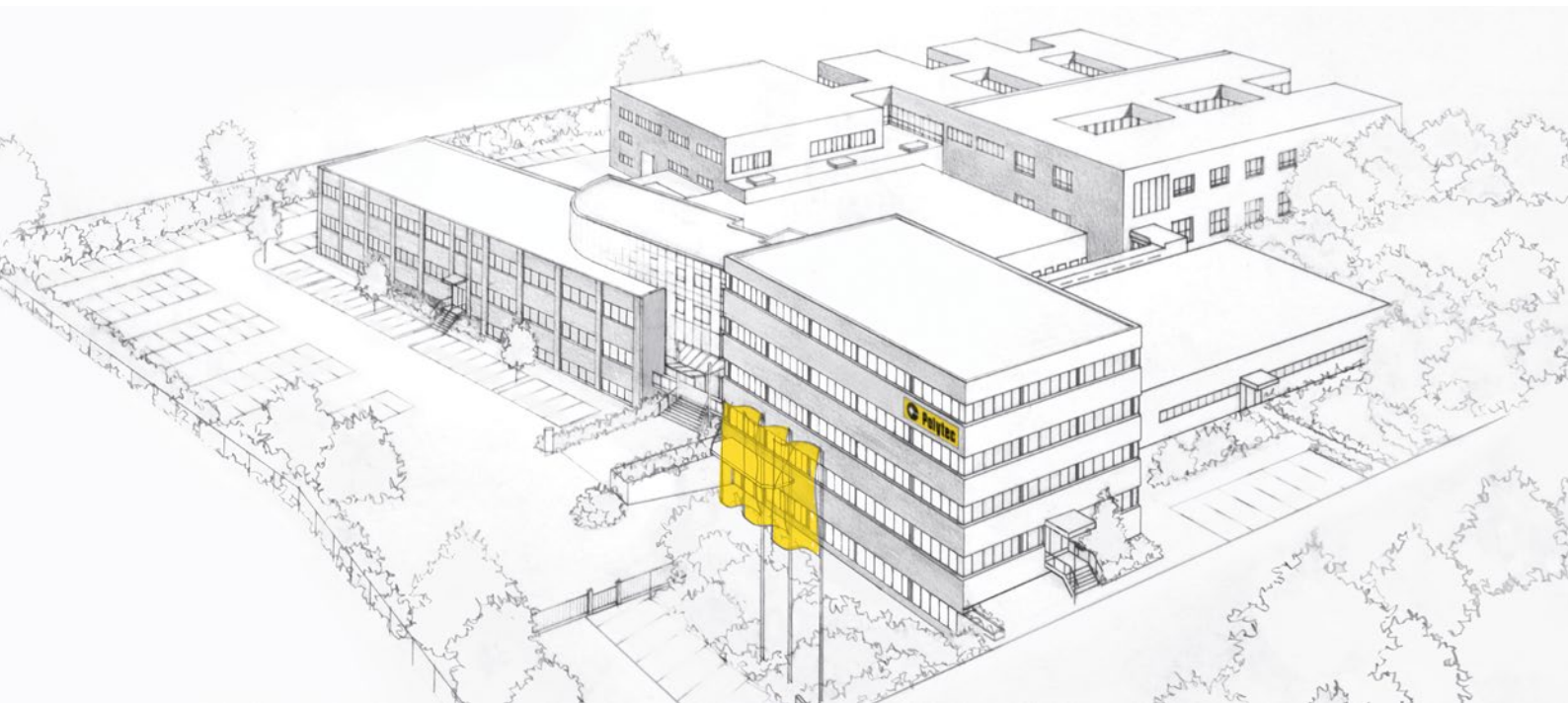
Integrating the Polytec Laser Surface Velocimeter into the C-frame offers significant advantages for mill operators. Additional costs and effort to separately install the speed sensor with separate utilities are no longer required.

The C-frame can be moved into a parking position for service work or during mill start-up. Because of its large maintenance opening, the LSV sensor head is very easily accessible and can be replaced within a few minutes. The interior of the C-frame is under a slight overpressure, that prevents contamination of the sensor optics by dirt or fluids.

The combination of thickness and speed gauge is offered as a complete system by an experienced team. With successful installations around the world, many roll mill complexes benefit from the integration of Polytec Laser Surface Velocimeters into the C-frame thickness gauge.



2
*Strip speed of four
 Polytec LSV in IMS
 C-frames*



Shaping the future since 1967

High tech for research and industry.
Pioneers. Innovators. Perfectionists.

Find your Polytec representative:
www.polytec.com/contact

Polytec GmbH · Germany
Polytec-Platz 1-7 · 76337 Waldbronn