

Measuring strip flatness using electromagnetic deflection: IMS makes new system ready for series production

- High-precision flatness measuring at high strip tension
- Deflection through electromagnets, detection by camera cluster system (CCS)
- Vertical resolution of up to 5 μm , high horizontal resolution (5 mm)
- Contactless measuring, easy to integrate into existing lines
- Reduction of rejects, process automation and quality documentation

Heiligenhaus, 23.06.2025 *With the new magnetic strip flatness measuring system, IMS Messsysteme GmbH presents a revolutionary solution for inline flatness measuring. Especially at high strip tension, conventional optical systems reach their limits: The elastic strain covers up plastic length differences – the material appears optically flat, although it forms waves in a de-energised state.*

"Our new system overcomes this limitation," explains Richard Rak, CEO of IMS Messsysteme GmbH. "We generate a defined bending of the strip by means of an electromagnetic deflection vertical to the direction of the strip flow. This is measured with high precision using triangulation with our CCS system." The deflection is proportional to the local strip tension: If a fibre is longer than the adjacent one, it is deflected further with the same force – off-flatness can thus be clearly identified.

Continuous flatness monitoring

Besides the aforementioned problem that a purely optical flatness measuring produces incorrect results with regard to the actual fibre lengths when the strip is under tension, there is a further disadvantage: In manual quality control, samples are usually cut off at the end of the strip and measured. This method provides localised, often unrepresentative results, especially for welded single strips with different flatness properties. The novel magnetic strip flatness measuring system now allows for significantly improved information on the produced material. Due to the continuous measuring of the stripe during the ongoing process, the flatness of the entire material can be evaluated.

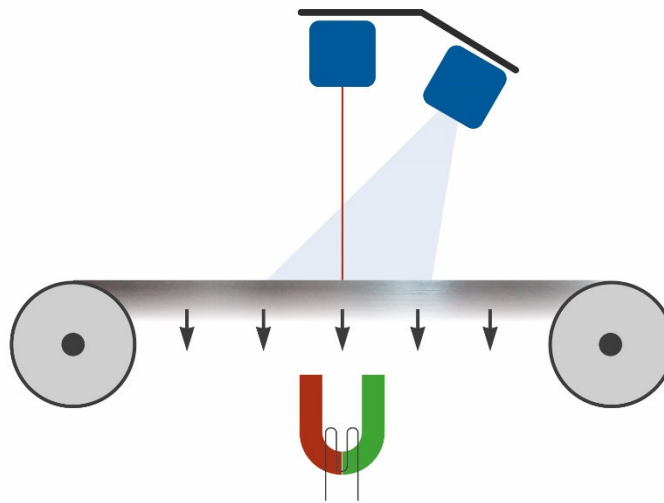


Figure 1: Functional principle of a magnetic strip flatness measuring system

Quality benefits and customer satisfaction

With a vertical resolution of up to 5 μm , the camera cluster system offers a highly accurate basis for measuring ultra-thin and thin metal sheet, which allows a high-precision evaluation of the flatness of the rings, when combined with the electromagnetic deflection unit. In addition, the system guarantees a quantitative reproducibility of the measuring results. "This not only offers advantages for producers. The determined and documented measurement data can be used as proof to customers and thus document the company's own high quality standards," emphasises Rak.

Optimum integration into existing production lines

Thanks to the compact design, the magnetic strip flatness measuring system can be easily integrated into existing processes – both in terms of space requirements and control technology. As the measuring is carried out contactless with line lasers, the steel strip is protected against any mechanical damage. Automating data collection and evaluation minimises the workload for operators and error sources that can occur through manual processes.

Cost savings and competitive advantages

By combining an electromagnetic deflection unit with optical strip flatness measuring, the new system significantly contributes to cost savings in the production of plates and gives users crucial competitive advantages. This allows deviations in quality to be detected immediately and corrective measures to be taken before larger parts of the steel strip are affected. A rule-based implementation based on the determined flatness profile is also possible. "With our magnetic strip flatness measuring system, we offer a solution that is designed to meet the quality and efficiency requirements of modern

production lines,” summarises Rak. “It is flexible, economical and it delivers accurate measuring results that form the basis for optimised and sustainable production in process lines.”



Figure 2: Magnetic strip flatness measuring system in a zinc plating line

For technical details on the new magnetic measuring system for strip flatness, please refer to the attached White Paper.

If you have any questions, our experts will be happy to assist you.

About us

Since 1980, X-ray, isotope and optical measuring systems of the globally leading producer IMS Messsysteme GmbH ensure highest product quality in the production and processing of steel, aluminium and non-ferrous metal. The impressive portfolio of high-precision, perfectly coordinated and customisable measuring systems is worldwide unique in this scope; our solutions substantially contribute to optimised process sequences, increased output, reduced scrap rates and thus an economical, profitable and more environmentally compatible production. Today, more than 4,500 non-contact detecting IMS measuring systems are an integral part of the production equipment of hot mills, cold mills, process lines, plate mills, long-product rolling mills and tube rolling mills as well as metal service centres.

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