

PRESS RELEASE

Proven surcon 2D surface inspection
now also available for aluminium rolling
mills

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Reliably detect surface defects even under the harshest environmental conditions



The non-contact detection systems of IMS Messsysteme GmbH have formed an integral part of process lines in rolling mills since the 1980s, contributing significantly to quality control and assurance in the manufacture of flawless and documented end products.

The wide-ranging IMS product portfolio therefore also includes high-precision systems for virtually every measuring task in hot and cold aluminium rolling mills, such as measurement of

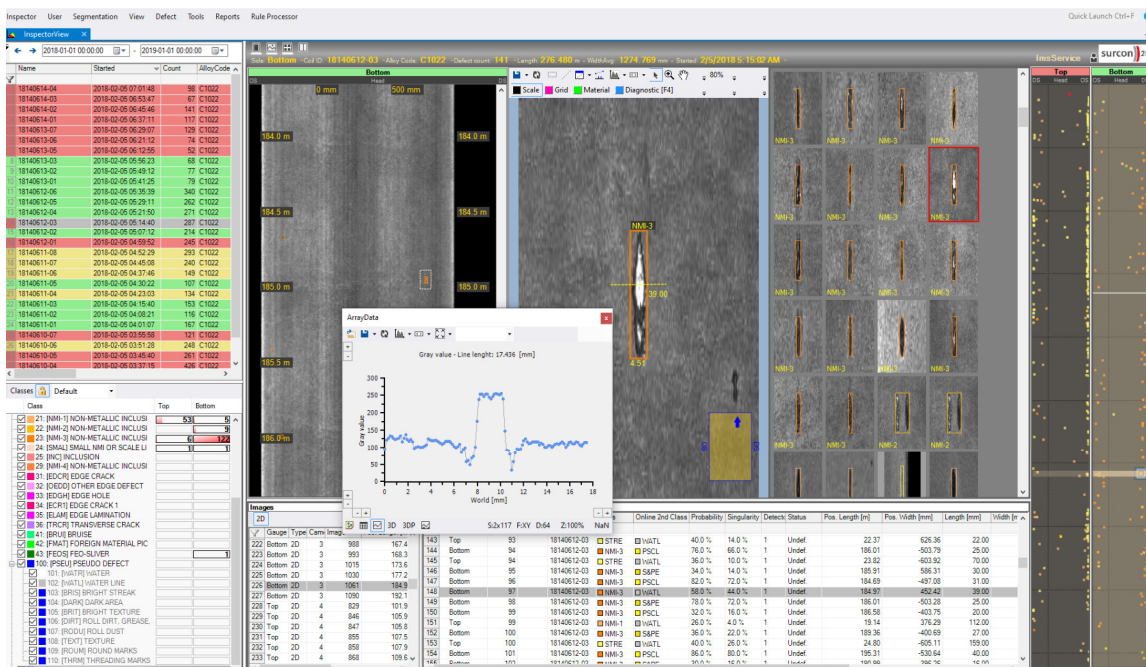
thickness, thickness profile, width, wedge, coating and flatness. Placed at strategic points in the production process, all IMS measuring systems work while the process is running and deliver essential data for precise plant control through the integrated quality management and evaluation system.

One exception to this was – until today – the surcon 2D surface inspection system, which is already firmly ensconced in the production and processing of steel.

Since development began in 2008, well-known manufacturers of slabs, heavy plates, complex profiles such as double-T beams or sheet piling as well as seamless tubes have benefited from the high-performance surcon 2D and 3D surface inspection systems.

The logical consequence of the experience gained from these very successful reference projects for IMS could therefore only be to develop the already well-established surface inspection systems further for detection of highly reflective materials.

The more advanced a production process is, the finer both the surfaces and the defects become. For this reason, it does not suffice for reliable detection of surface defects occurring there to detect only with the help of a bright field area, as is the case with matt surfaces.



Surface defects that produce light reflections are not visible in the bright field. The solution to this problem is an additional camera beam placed in the dark field area, which reliably detects, visualises and documents even the smallest defects.

A real milestone in this direction was the successful adaptation of the existing system configuration for inspection of shiny steel and hot-dip galvanised surfaces. For IMS, this simultaneously sounded the kick-off for taking the final step towards engineering a surface inspection system for aluminium.

In 2017, initial laboratory tests and evaluations of aluminium samples already yielded extremely promising results, quickly leading to active field tests in 2019. However, various challenges specific to the aluminium industry still had to be overcome before the surcon 2D surface inspection system for aluminium was finally ready for series production.

The harsh environmental conditions and confined spaces in aluminium rolling mills also place increased demands on the mechanics of the measuring frames.

The aggressive kerosene-based rolling oils used in the production of aluminium strip are particularly problematical here. Special modifications therefore had to be developed to protect the sensitive equipment of the surface inspection systems safely over their complete life cycle.

Further, to ensure a flawless inspection result, it is essential to keep the camera and illumination windows free of oil deposits at all times, and the seals of the housing must also be able to withstand the corrosive environment.

In addition, the confined space conditions in rolling mills require a very individually adaptable design of the inspection system. Working in close cooperation with engineering teams on site, surcon's system designers succeeded in constructing a flexibly adaptable system that also grants easy access for maintenance work.

In the end, the verification of previous test results as well as additional on-site evaluations led to today's optimally designed set-up of the surcon 2D surface inspection system for continuous detection over the complete range of aluminium strip.

The advantages for customers in the aluminium industry for continuous process optimisation are clear:

- 100% automated surface inspection
- Automated detection and classification of surface defects
- Detection of periodic defects
- Integrated quality assessment and display of inspection results
- Provision of inspection results via interfaces as well as archiving for subsequent review

Technical Data

Material data	
Max. speed (m/min):	up to 1,900 m/min for 0.4 mm length resolution
Width (mm):	not limited
Length (m):	no restriction / continuous inspection possible

Measurement system data	
Configuration:	2D bright field and dark field (2 camera rows per side)
Installation type:	fixed installation or movable
Camera type:	CMOS line scan camera / Gigabit Ethernet / Camera Link
Illumination source:	High Power LED 450 nm / 630 nm / white more than 500 W/m ² at 500 mm working distance
Typical working distance:	400 -1,500 mm

Performance data	
Chip size / framerates:	up to 8,192 pixels up to 140 kHz
Typical resolution:	0.2 mm x 0.2 mm / 0.2 mm x 0.4 mm
Image processing capacity:	Xeon 8 Core or better, GPU processing enabled More than 600 megapixels / second per camera computer
Image storage:	defective areas in full resolution full background in reduced resolution short intervals can be stored in full resolution
Image storage capacity:	20 up to 60 TB
Image type:	lossless compressed tiff format
Database:	Microsoft SQL Server

Evaluation	
Classification:	feature based, pre-trained AI parallel classification using multiple classifiers
Features for classification:	> 400 feature values per defect
Quality management:	rule based quality grading