

Steelinspect 3D

Surface Inspection during Continuous Casting

STEELINSPECT 3D

Process optimization by immediate defect detection

The ability to inspect hot steel in an automated process reliably is crucial for the quality and operating efficiency of the continuous casting method. In our automated inspection, we register the correlations between surface attributes and the selected equipment parameters to balance the production settings.

Steelinspect 3D uses a laser-based 3D surface reconstruction technique. By comparison with the traditional contrast images, this technique has the advantage of providing genuine depth measurement data. The flexible laser-based technique works on red-hot surfaces just as well as on cold surfaces.

The technique does not only detect defects but also measures the exact defect dimensions and analyzes the data. Especially on hot steel surfaces, the method reliably distinguishes between true defects and pseudo-defects. The speedy detection of defects and their statistical analysis afford users a sustainable quality increase and a significant reduction in deficient products.



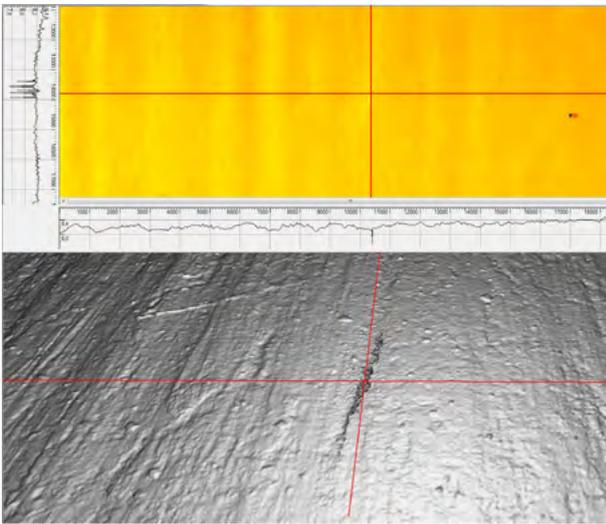
Inspection of a billet while it is about to leave the continuous caster

RELIABLE DETECTION

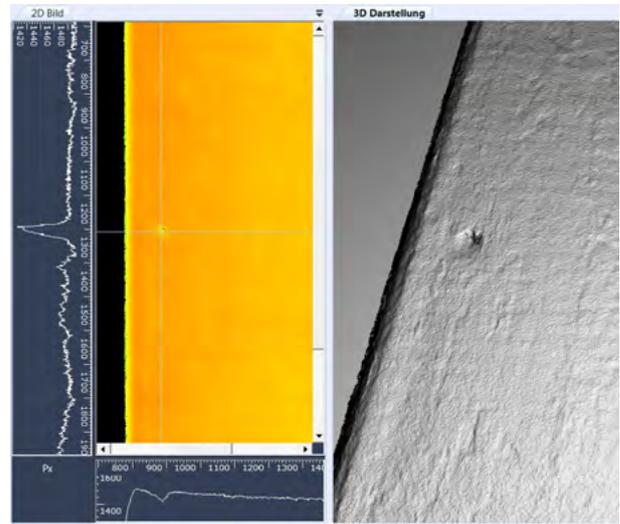
Process Control Boosts Productivity and Quality

Steelinspect 3D detects defects without fail or doubt while the continuing casting process is still underway. After detection, Steelinspect 3D identifies surface irregularities and measures them precisely before reporting the defect analysis to a digital database. This ensures an objective defect classification and the appropriate response across many manufacturing levels. Based on the obtained data, manu-

facturers are now able to compare, evaluate and optimize the parameters used for the continuous casting process. It is possible to analyze all defects in detail. Steelinspect 3D automatically and quickly generates clear and comprehensible diagrams, statistics and shift reports. This results in a significantly reduced reject percentage, which in turn will noticeably reduce the costs while boosting profits.



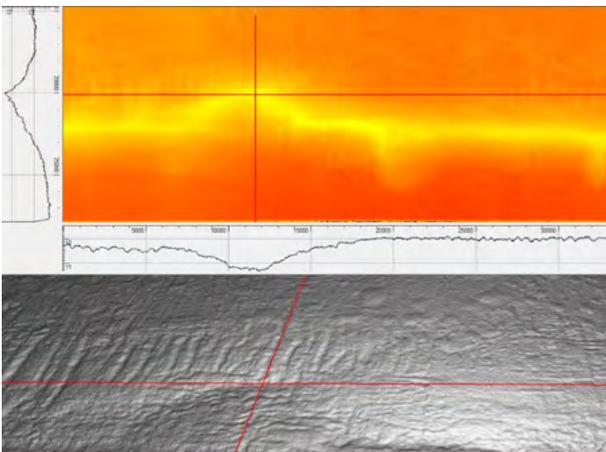
Three-dimensional transverse and longitudinal profiles assist in the detailed analysis. These profiles show a transverse crack in a bloom.



Left: Two-dimensional view with color-coded vertical dimensions and profiles. Right: Three-dimensional view

EASE OF CUSTOMIZATION

Defects Clearly Defined



The images show the precise depth profile of a defect. In this case, the defect is a depression on a bloom.

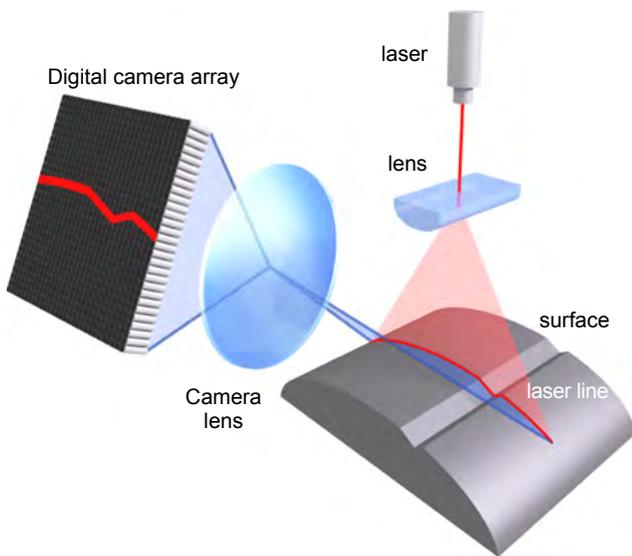
Steelinspect 3D scans the entire surface of billets and slabs and renders the objects as complete 3D models. The inspection technique detects and measures the dimensions of all surface irregularities such as cracks, indentations, scratches, grooves and edge defects. Then the inspection system immediately displays the defect data and stores them in a database. The user is able to tilt and rotate the depicted 3D surface on the monitor to gain insight into the exact topography of the defect. This gives the user an excellent visual impression of the impact the defect may have.

A MATURE CONCEPT

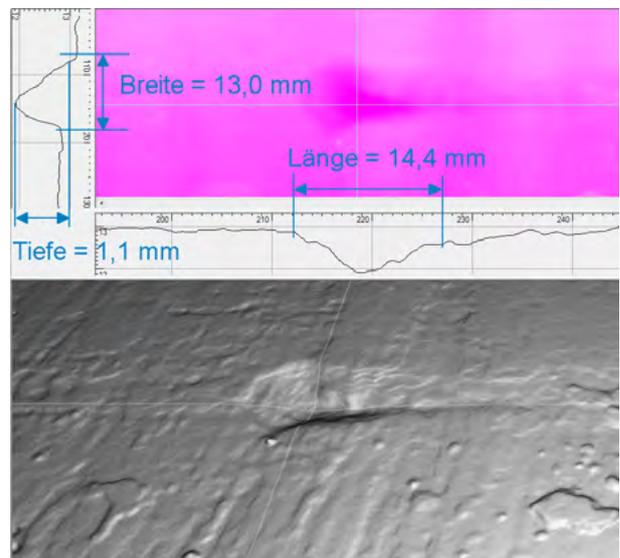
3D Surface Reconstruction

The laser triangulation used by Steelinspect 3D yields data, which describe the surface relief with its tops and valleys. Therefore, neither temperature and scale differences nor reflections play any role. The gathered triangulation data allow the complete digital reconstruction of the entire surface. This reconstruction does

not only provide a visual image of surface irregularities but also measures their surface relief by length, width and height. Operators can immediately access the relevant defect data and base their decisions on them.



The Principles of Laser Triangulation



Defect Measurements Using the Three-Dimensional Profile

FLEXIBILITY AND RELIABILITY

Developed for Rough Environments



Steelinspect 3D Measuring Head, Lateral Installation in a Rolling Mill.

All in all, our company group brings more than 50 years of experience with systems for the heavy industry. Especially steelworks and rolling mills are known for harsh working environments with extreme temperatures, heaps of dust, water and mechanical stress. We developed Steelinspect 3D for just such an environment. The device is just as reliable as its defect detection. The device installation is so flexible that in most cases no changes to your equipment will be necessary.



EVERYTHING FROM A SINGLE SOURCE

The Autision Group is a group of several independent companies dealing with surface inspection, measuring technology and robotics. The name Autision comes from the combination of **AUT**omation and **VISION**. We provide you with application-oriented turnkey solutions from a single source:

Surface inspection – We provide proven solutions to meet practically all performance requirements in the field of automated surface inspection, crack detection, bondability and paintability testing.

Measuring technology – We have many years of expertise in the area of complex 3D measuring technology and capture – both in industrial environments and for individual, demanding tasks or in research and development.

Robotics and automation – The combination of sensor technology, measuring technology and robot-assisted automation provides new capabilities for your handling and rework requirements.

Surface inspection of steel cables – Winspect® wire rope inspection is the perfect solution for semi-automatic inspection of steel cables such as those on ropeways and hoisting plants.

INNOVATIVE SOLUTIONS FOR YOUR INDUSTRY

Foundry

In rough environments, we perform automated testing and processing of cast steel components:

- Flexible post-processing
- 3D shape measuring and testing
- Sand core handling
- Palletizing and depalletizing
- Crack detection
- Surface inspection

Automotive

We offer 100 % quality and safety e.g. for:

- Automated welding seam and soldering seam monitoring
- Wetting tests for bonding and varnishing applications
- Checking surfaces of stamped and precision-blanked parts for geometry and flatness
- Bin-picking
- Inline measurements
- Offline measurements

Technologies of the Future

Our R&D sets the trend. Innovations are crucial in the competitive global markets:

- Collaborative robotics
- Testing the surfaces of fibers and carbon fiber-reinforced plastics
- 3D Shape measurements and rapid prototyping
- Quality analyses and standard reports, e.g. with CT
- Contamination monitoring
- Inline measurement engineering

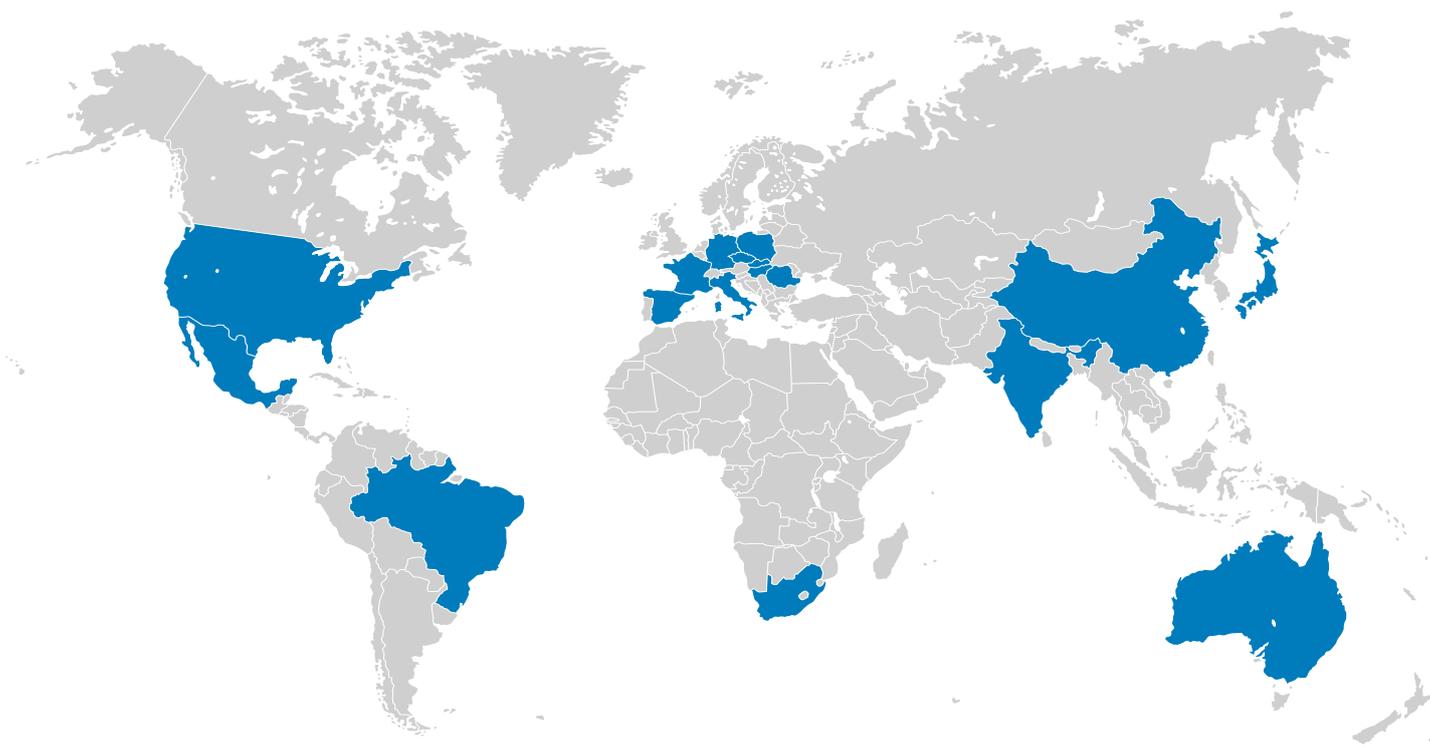
SOLUTIONS FOR THE STEEL INDUSTRY

Our surface tests for continuously cast workpieces and for rolling mills represent only a fraction of our services for the heavy industry. We are also established as automation and quality control experts for the pipe manufacturing industry and for blacksmith operations. We show a few examples below. Please contact us if you like to know more.

- 3D Shape recognition
- Profile measurements
- Ingot mold testing
- Automated crack and surface inspection
- Mandrel bar inspection
- Automated deburring
- Handling, palletizing and bin-picking



OUR SYSTEMS ARE WORKING WORLDWIDE



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