## STEP OUT WITH US INTO THE NEXT DIMENSION!

Surface defects arising during continuous casting are often perpetuated through the complete process chain for the production of strip and heavy plate. Non-stop surface inspection from continuous casting to finished coil or heavy plate is therefore critical for the quality of the final product.

## You Know These Difficulties?

✘ **A 100% manual inspection of hot slabs or plates is not possible.**

✘ **Defects in the continuous casting can cause defects in the slabs and the strips or plates produced from them.**

✘ **Feedback from the cold inspection comes days too late.**

✘ **Feedback from later processing steps can be delayed by weeks.**

✘ **Grinding or scarfing is performed with high safety margins.**

surcon )))

100% powered by IMS
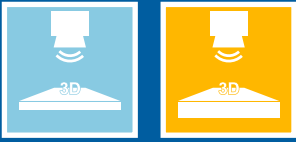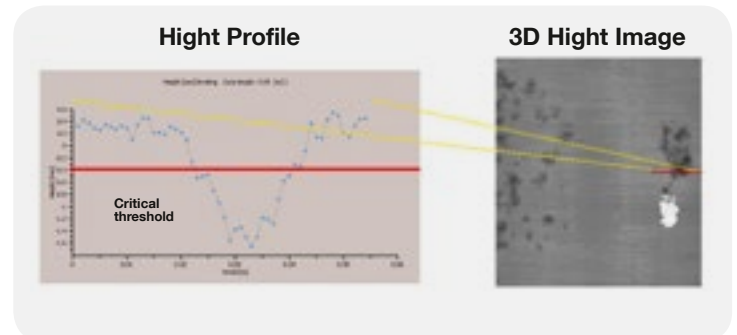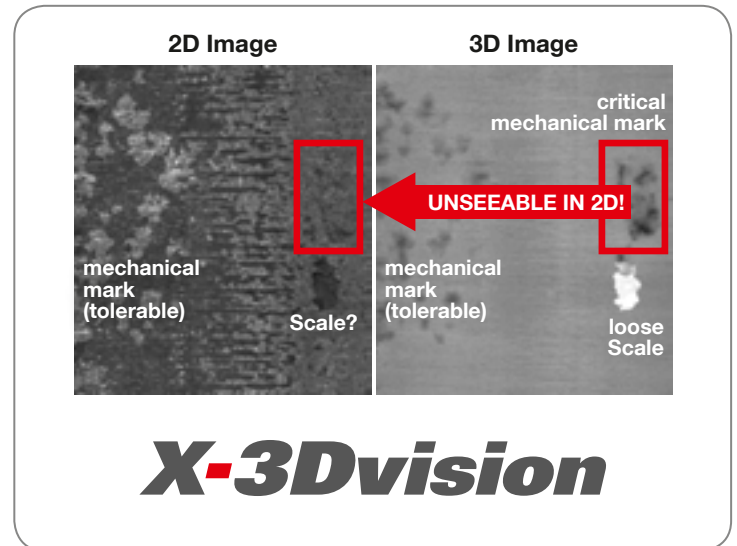
## The Process so Far

It has not been possible to date to inspect the surfaces of *slabs* with conventional systems because it is not possible to distinguish many defects from the textures of the surface safely on the basis of grey value diagrams alone.
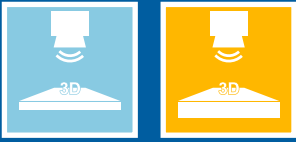
## X-3Dvision –
## The Superior Solution from IMS

In addition to a grey value diagram, we also provide you with the 3D topography of the surface.

## 3D Inspection is Vital!

3D inspection is necessary because the information from a 2D image does not suffice to evaluate the defects as textures and scale offer a multitude of misleading image information.



**2D Image**     **3D Image**

critical mechanical mark

UNSEEABLE IN 2D!

mechanical mark (tolerable)     Scale?

mechanical mark (tolerable)     loose Scale

**X-3Dvision**



**Hight Profile**     **3D Hight Image**

Critical threshold

## These Benefits Will Take You Forward!

✓ **2D/3D classification**

✓ **Estimation of the severity of the defects**

✓ **Correlation between slab and strip or plate**

✓ **Complete dimensional measurement (width, length, thickness, contour)**

✓ **Calculation of volume and weight**

✓ **Documentation of the slabs**

✓ **Archiving of the data for process optimisation**

✓ **Correlation with production parameters**

✓ **Width optimisation**

✓ **Automatic detection and classification of relevant defects including their position and geometric data including the depth**

✓ **Minimisation of subsequent processes such as scarfing or grinding**

✓ **Detection of defects immediately during production before further processing such as hot rolling, warning in the case of serious defects**

✓ **Substitution of manual inspection**
 - **Use of casting powder**
 - **Casting speed**
 - **Temperature balance**

## How Does it Work?

*X-3Dvision* recognises the 3D contour of the surface in high resolution from the run of the laser lines projected on to the surface of the material. In this way the system distinguishes clearly between grey value differences and three-dimensional defects; it reliably detects, amongst other defects, cracks, inclusions, impressions and casting marks and also delivers 3D information – depth and volume – on the defect.

This *triangulation method* has also proven its worth in similar form in flatness and levelness measurement in many hot strip mills.

## 15 Years' Experience Invested in the Leap into the Next Dimension

If both the top and bottom surface are scanned, this technique can also be used to measure the complete thickness profile. Together with detection of the contour of the long side of the slab, which can optionally also be integrated in the system, the volume (and therefore also the weight) of the slab can be calculated.

Automatic detection/classification of relevant defects including their position/geometric data including the depth, minimisation of subsequent processes (e. g. scarfing/grinding).

## Advantages of the Slab Overview

✓ **Complete dimensional measurement**

✓ **Calculation of volume and weight**

✓ **Documentation, process optimisation through archiving of the data**

✓ **Correlation with production parameters**

✓ **Width optimisation**

✓ **Storage of the surfaces and measured data in the database**

✓ **Possibility to zoom into high-resolution defect image**

✓ **Use similar to Google Maps, quick change between slabs**
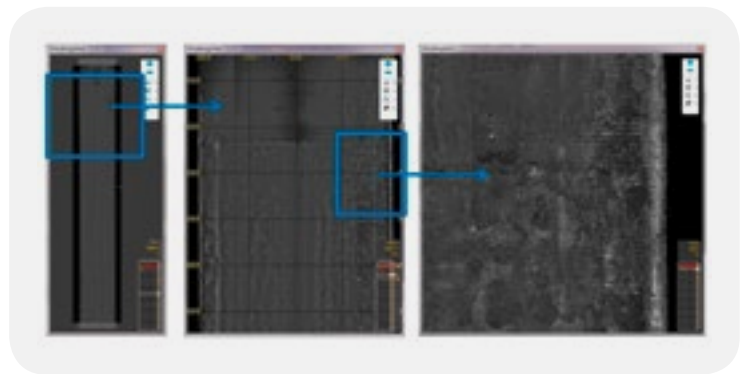
## The Final Touch with the Quality Management System

If the surface data from the casting strand and hot and cold rolling lines are correlated with each other, it is possible to identify the causes of defects arising in upstream stages of the process and whose effects only become visible later on. For this we offer the **MEVInet-Q** quality management system, an easy-to-use tool that enables comprehensive analysis of the complete process.

## The Decision is Up to You!

**MEVInet-QDS** is a rules-based decision-support tool for quality management. It can be used to define rules that are applied automatically to every product manufactured. These rules can check quality on the basis of all data available. The result of this rules computation process can be used by the operator as a decision-making aid.
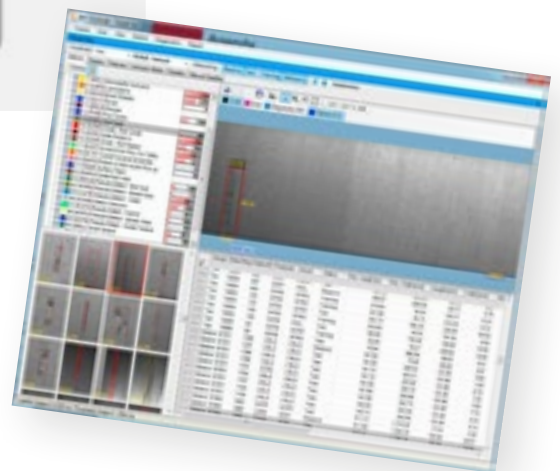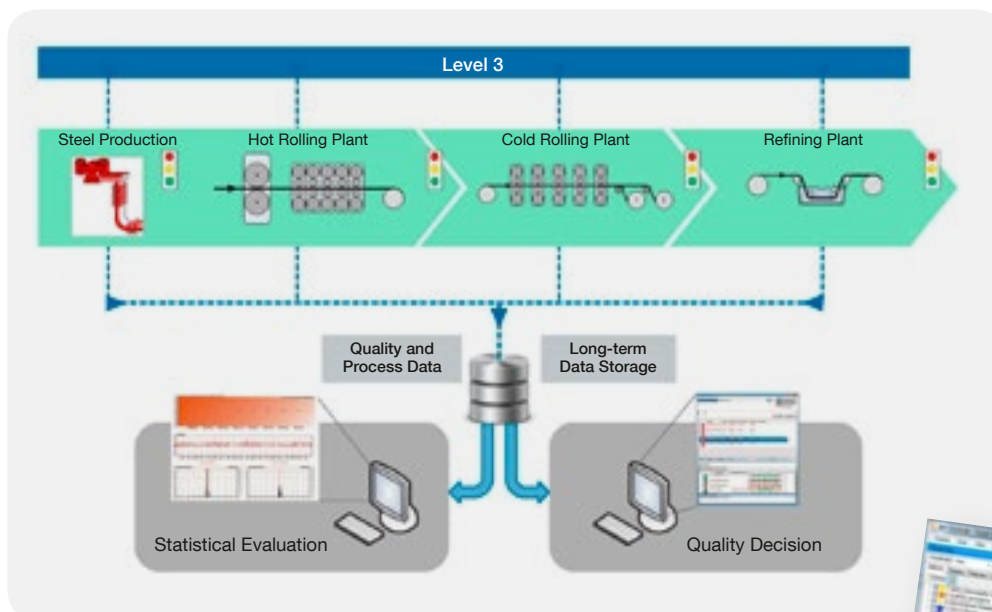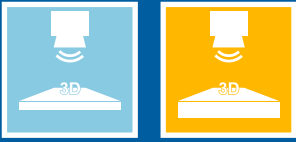
## DRAW UP YOUR OWN CATALOGUE OF DEFECTS!

The software of all inspection systems offers a maximum in ease of use and intuitive intelligibility thanks to graphic user interfaces and simplest program navigation. This leads to faster start-up and enables long-term maintainability of the systems.

## Classification

The key technology of every single surface inspection system is the fully automatic detection and classification of defects. To enable optimal use of this technology, we offer:
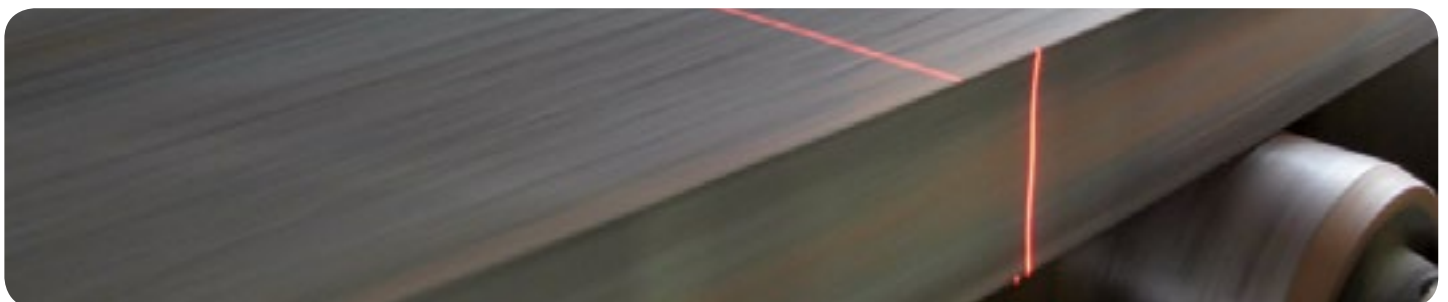
- **easy-to-use tools to adapt detection and classification**

- **easy configuration and quick training of the classifier**

- **rules editors for the creation of optional rules for classification, and additional test classifier**

- **an offline simulation system that enables comprehensive testing of new classifiers with existing data before release for use in production**

## The Helping Hands: The "Inspector" and the "Trainer" of the X-Vision Software

A manageable number of tools enables easy use of the system:

✓ **Viewing, searching and evaluation of all stored data centrally with the "Inspector"**

✓ **Creation, management and testing of the classifier with the "Trainer"**

✓ **Display of the manufactured material at any point with "OnlineView"**

Diagnosis and maintenance of the system is supported fully by graphic user interfaces.

## Your Challenges:

- A 100 % manual inspection of hot slabs or plates is not possible
- Defects in the continuous casting can cause defects in the slabs and the strips or plates produced from them

- Feedback from the cold inspection comes days too late
- Feedback from later processing steps can be delayed by weeks

- Grinding or scarfing is performed with high safety margins

- High-maintenance scales

## Our Solution for You:

- Automatic detection and classification of defects including their position and geometric data including the depth

- Detection of defects before further processing such as hot rolling

- The inspection result provides the basis for grinding and scarfing parameters

- Complete dimensional measurement (width, length, thickness, contour)
- Calculation of volume and weight

Optical Measuring Systems

# X-3DVISION SURFACE INSPECTION
## of Slabs

| Performance Data of a Slab Inspection System (Example) | |
| --- | --- |
| Configuration per side | 4–5 cameras and lasers |
| Typical resolution | 0.25 mm in width and length direction, 0.10 mm in thickness direction |
| Memory management | 1.5 GB raw data per slab, with a database size of 12 TB, about 7500 slabs can be recorded completely, significantly higher storage time if only defect images are saved. Automatic compression available. |