



Surface Imaging System for the metal industry
SIS HDI800 System for locating, identifying and classifying defects in metal processes

Increasing profitability through surface imaging



Metal strip manufacturers the world over are increasingly turning to surface imaging as a powerful means to improve the efficiency of their rolling mill and processing lines. When selecting a supplier for their surface imaging projects, you do well to choose ABB.

Advanced IT tool for the metal industry

The Surface Imaging System HDI800 is an advanced quality management tool for metal strip production lines. It provides 100% surface inspection of products at full production line speed. Utilizing the right combination of camera technology, lighting options and software application you get a reliable tool for the quality control of your products.

The Surface Imaging System HDI800 is specially developed for the needs of the metal industry. ABB has been delivering inspection systems since 1970. It is now in its 8th generation.

The Surface Imaging System integrates fully with other systems. This means it operates perfectly with other process control systems in your mill. Integration is realized via TCP/IP, OPC or serial link.

ABB's global resources mean you can rely on us to support you throughout the lifetime of your system.

Smart and easy

Demands for surface quality of metal strips have increased enormously over the years.

The Surface Imaging System

- detects defects
- identifies critical defects by name, type, size, and location
- performs special surface quality analyses
- supplies data to quality management and process control systems

Global support

The Surface Imaging System HDI800 comes with a full lifecycle management plan.

Our comprehensive services include

- installation and commissioning
- training
- technical support
- spare parts and repairs
- preventive maintenance services
- migration & retrofits

Unique benefits

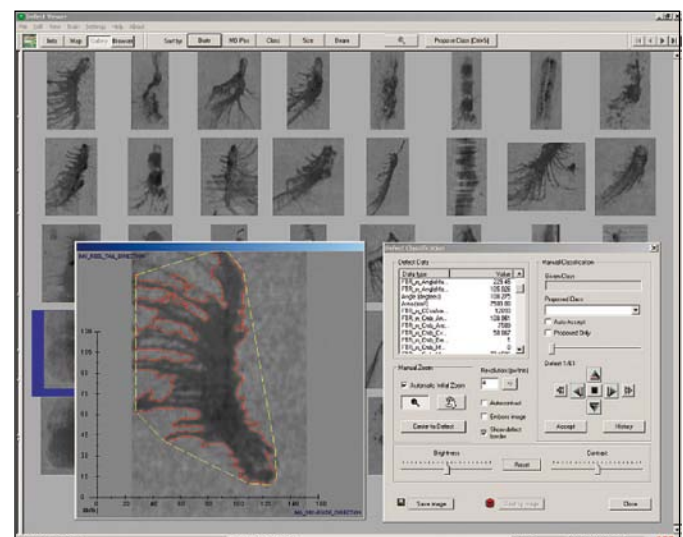
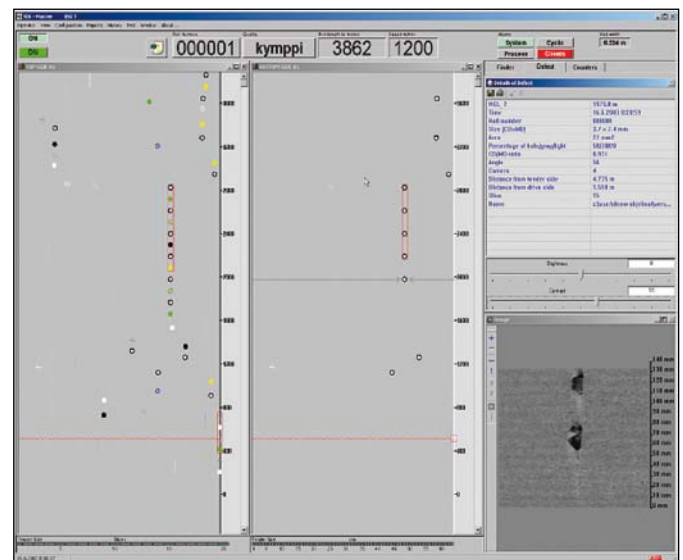
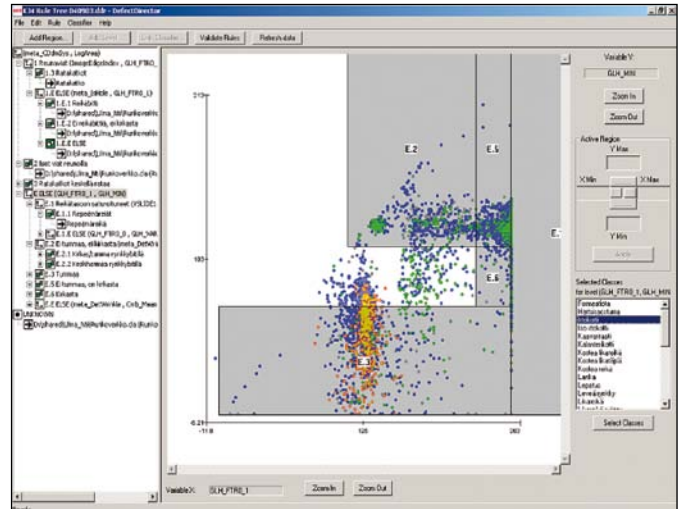
As the manufacturer of the metal strips and user of the system, you get

- reliable measurement results 24 hours a day
- accurate results with unique classification methods
- a user-friendly system with intelligent start up routines and effortless maintenance
- smart tracing back to the origin of defects
- local presence and global service network.

100% edge-to-edge inspection

The Surface Imaging System HDI800 provides true 100% edge-to-edge inspection of the entire coil to detect all defects such as

- slivers
- blisters
- inclusion lines
- roll marks
- scratches
- shells
- scales
- indentations
- etc.



Engineering for maximum performance

Scalable system architecture

The Surface Imaging System HDI800 features the industry's most advanced and sensitive digital defect detection and classification to date. The main components of a Surface Imaging System HDI800 are a camera beam, a light source beam, and the operator main server.

Cameras

The 60MHz linear scan digital camera with 12 bit 1024, 2048 or 4096 pixel CCD-sensors.

Outstanding image quality is achieved with the linear CCD cameras used in the ABB Surface Imaging System.

The cameras are ABB designed and built for these special measurement purposes. Each camera has vast processing capacity already built in. As there are multiple parallel running algorithms for detection, no additional camera PCs are needed.

The camera is built to perform in harsh industrial environments, and withstand stresses such as temperature change.

Automatically controlled illumination

Supreme quality images cannot be obtained without supreme quality illumination. With high mill speed it is essential to use very short exposure times to achieve high image resolution. Therefore high intensity illumination is needed. Specific lamp types need to be chosen for each application according to the defect types and material to be inspected. Optimum visibility of defects for the camera determines the illumination type selected.

ABB offers three different light sources: halogen, fluorescence, or LED. The light needs to be adjusted automatically to account for continuous changes resulting from factors such as lamp aging, dirt, oil, and dust build up as well as with surface reflectivity variations.

Controlled light level maximizes scan times, allows meaningful comparison of different zones, and effective separation of weak defect details.

User interface

The Surface Imaging System HDI800 is easy to learn and use. All the necessary information is available at the right place at the right time. There are user interface packages for each user group in the mill. The display package includes process graphics such as

- zooming maps
- finder map (multiple coils)
- advanced cyclic defect analysis
- direct printing of images
- trending and profiles
- and much more.

Compact architecture

The HDI800's system design is very compact. Your benefits include lower installation and maintenance costs, reduced space requirements and greater system reliability.

Power Supply cabinet

The power supply cabinet provides power for the system. The process I/Os are connected to the logic system in the power supply cabinet. Automatic light level control is also managed by the power supply cabinet. The defect data from the camera is transferred by a single fiber optic cable, irrespective of the number of cameras, to the system server.

Server cabinet

System's main server and database server are located in the server cabinet. It is also possible to have dedicated servers for advanced surface quality analysis or for the use of thin clients.



Operational excellence and total lifecycle support

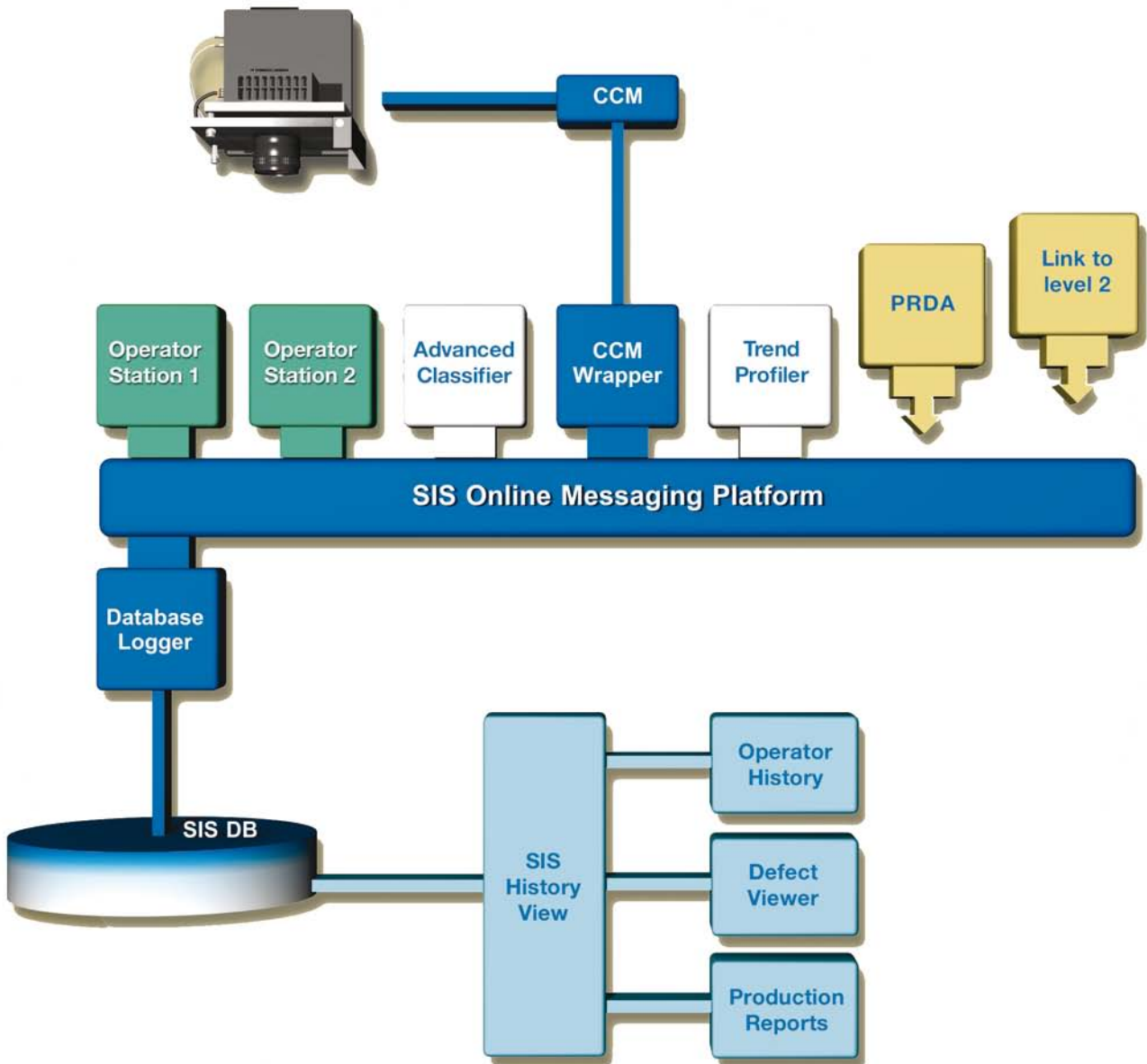
Classification

The present classification method produces more accurate quality reports of your coils than before. The defect classes are precisely defined according to customer needs in terms of problems which different defects may cause in further processing or in end products. Thus the risks of shipping out-of-specification quality can be avoided or minimized.

Automatic classification is based on measured and calculated properties, or "features", of the defect. The characteristics

inside the defect boundary line and the information about the grey scale value distribution inside the boundary area are viewed as features.

Features can be determined by estimating visual properties of objects and by trying to find out which features are characteristic of different defect types. Classification is effected using a neural network Classifier. The classifier is taught by special, easy-to-use tools. Building your own classifier is the way to achieve the best possible results.



Modular software architecture

HDI800's software architecture is modular in design in order to guarantee its usability and cost-effectiveness. Modularity also assures redundancy where needed.

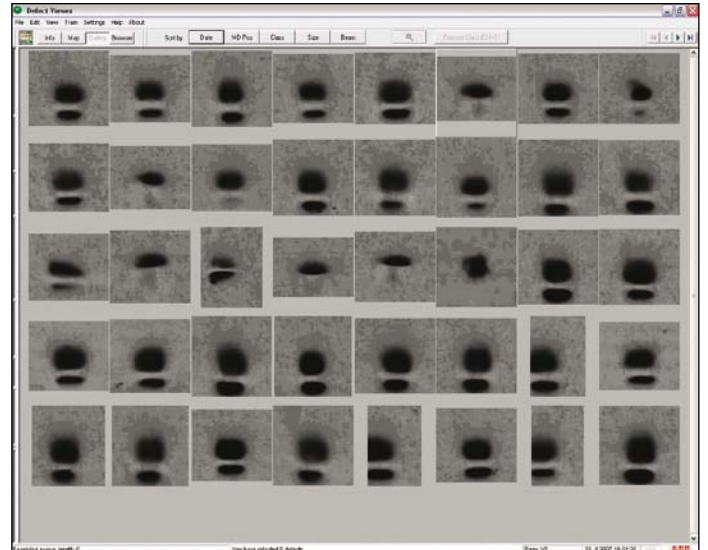
From a simple single camera beam setup for basic detection of defects to a full-blown, multi-beam system with advanced classification, databases and reporting features, the HDI800 software is conceived to provide the right modules to fulfill user requirements.

True scalability is one of the main features of the system.

The desired application modules are easily added to the software platform. It can consist of multiple operator station clients, multiple image analysis modules, coil history clients, links to the level 2, and multiple data loggers, for example.

HDI800's software architecture benefits are

- modularity
- scalability
- user friendliness
- easy updates
- low lifecycle costs



Smart clustering

- automatically organizes defects into meaningful groups
- becomes more accurate as your history database grows
- software options enable enhanced classification and analysis of special grades / alloys.



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