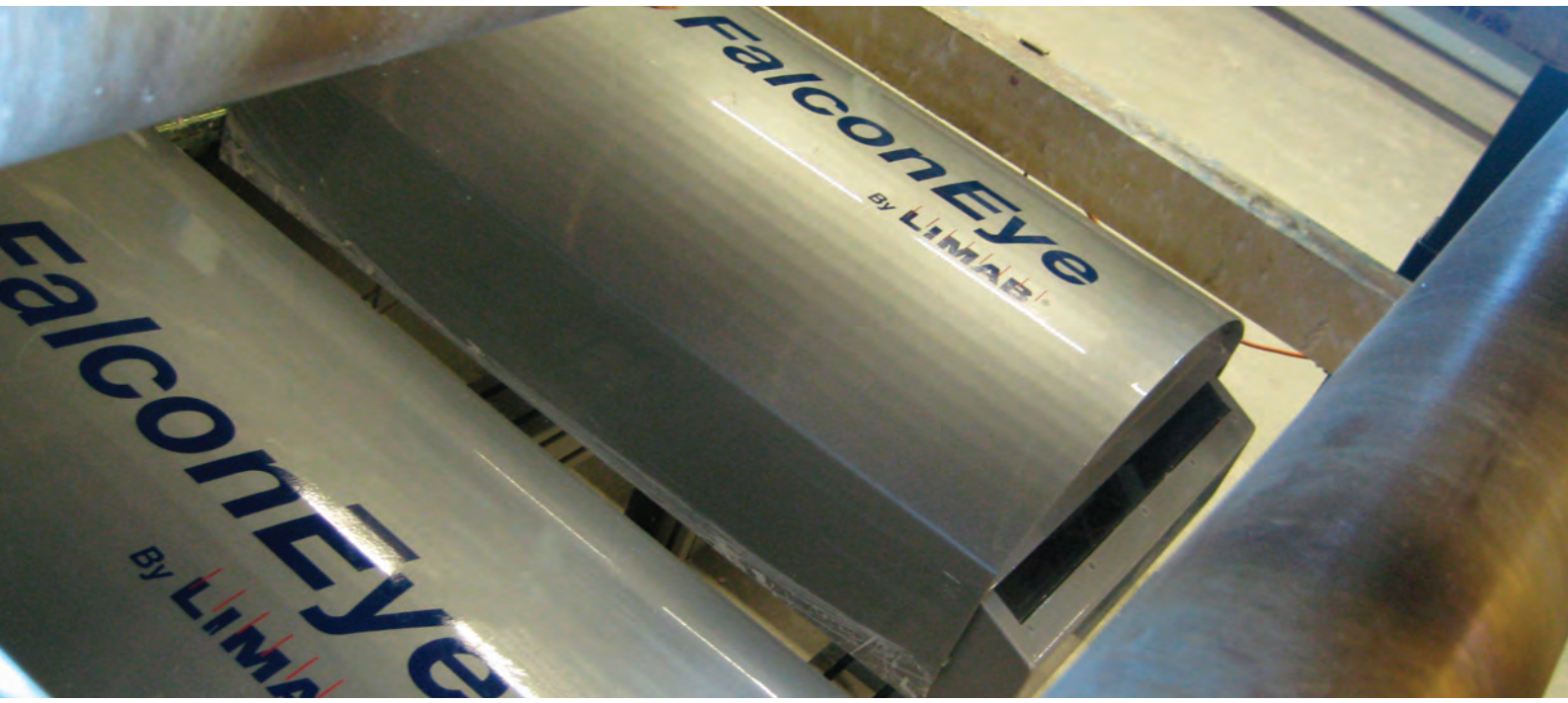
LIMAB®
CONTROL BY MEASUREMENT

FalconEye

Gypsum Board Surface Inspection System



- *The first dedicated on-line Surface Inspection System for gypsum boards*
- *Detects all types of surface defects with mm-resolution even on high speed lines*
- *Automatic alarms when defects are detected*
- *Reduces costly customer rejects and returns*
- *Software with real time image display, database logging and recipe handling*

Functional description

The board surface is illuminated by powerful LED lightning. The illuminated area is viewed by two high speed industrial cameras and any surface defect will be indicated by contrast changes detected by the cameras. The latest image processing techniques are used to evaluate and classify the defects in real time. The size, magnitude, position and frequency of irregularities will be displayed and stored on the system PC.

Protected installation

The system is designed to give trouble free operation in the harsh environment below the wet belt in gypsum board production lines. A powerful side channel blower is constantly supplying the camera enclosures with high pressure filtered air. The air exits at the camera window apertures preventing the cameras from contamination from falling dust. Additional protection is provided by mechanical camera shutters that automatically close to prevent falling debris contaminating the cameras during production startups and stops.

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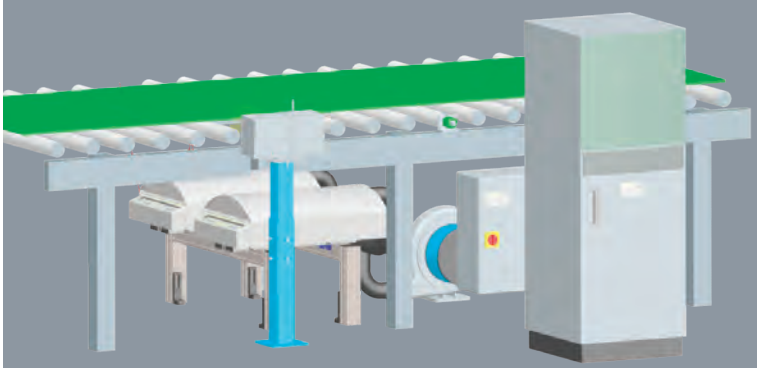
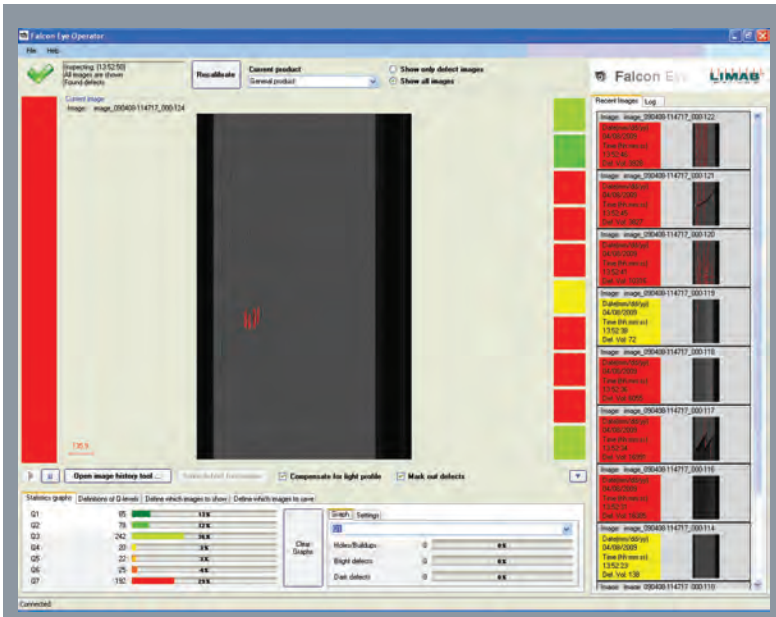


System Overview



Operators Software

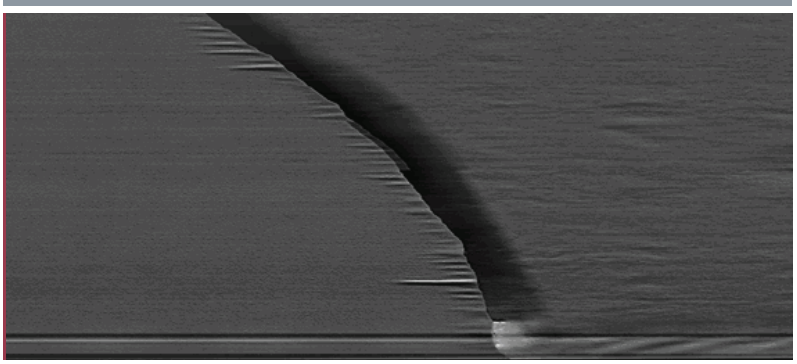
FalconEye is a complete stand alone system for on-line surface inspection of gypsum boards. The system will automatically warn immediately a surface defect appears. Every board will be consistently graded and its image stored for archiving purposes.

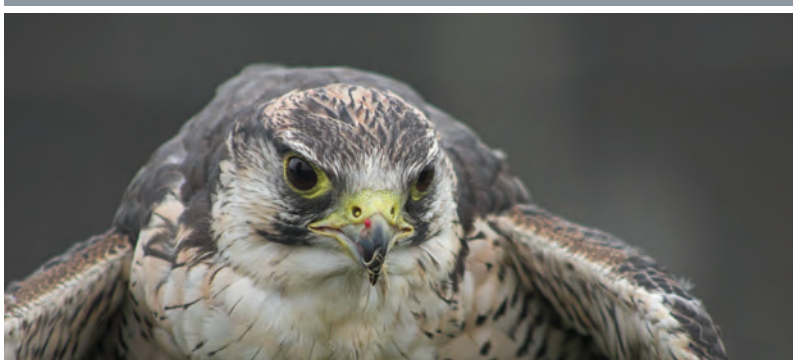
Operator screens can be located at multiple plant locations such as the wet-end transfer area, the mixer area, laboratory or any other monitor connected to the factory network.

The easy-to-use Windows-based system software has an extensive set of functions to define the defect limits and to optimize the quality for each individual product and customer. Production reports with statistical evaluation can be obtained, not only for each batch but also for each used paper roll which helps to improve the process.

In the recipe handling module each separate product can have individual criterias for quality sorting and reject limits. There are digital output signals for both rejects and different quality grades.

The operator screen has a real time display of scanned images, with show options ranging from every new image to images exceeding a selectable defect level. The ten last images exceeding a choosen defect level will also be continously displayed and saved for immediate access later on. All board images can be permanently stored in compressed database format. The system has a built in database search engine to look for images based on date/time/defect level/number of defects/ comments etc. It is possible to track the image of a physical board, “re-run” this board as feedback for fine tuning of quality sorting criterias.





Defects

The FalconEye will detect all types of surface defects that are typically found on gypsum boards down to a size resolution of 1mm2. These defects may originate from the paper, faults with the forming belts, plaster/dirt on conveyor rollers or problems with the gypsum core and will all be detected with the system. Typical defects detected: Scratches, periodic roller dirt defects, finger cockling, orange peel, grooves, paper tension, paper splices, depressions, foreign particles and colour spots.

The Falcon

Falcons have incredible vision and fly at very high speed. The characteristics of the Falcon have been used by man for over 4000 years for hunting other birds. The Peregrine Falcon for example has been registered travelling at 380 kph (210 mph) whilst hunting prey and can see a bird the size of a dove at a distance of 8km (4.5 m). These attributes of incredible vision and high speed are the feature of our surface inspection system so it seemed appropriate to name it after this amazing bird.

Technical specifications

Panel width	≤ 1500mm (60”)
Panel length	unlimited
Production line type	continuous or piecewise
Line speed	≤ 275m/min (800feet/min)
Panel thickness	no limit
Defect size (WxL) sensitivity	1x1mm at 60m/min (0,04”x0,04” at 180 feet/min)
	1x3mm at 180m/min (0,04”x0,12” at 540 feet/min)
Power supply	230VAC/115VAC, 50/60Hz
Ambient temperature	0 - 40°C (32 - 120°F)
PC	High-end with Raid hard drives
(subject to technology upgrades)	Windows XP operative system
	21inch screen
Interfaces	Ethernet TCP/IP (PC-PC/PLC)
	HTL 24V(Digital alarm outputs)
	VPN-connection (remote diagnostics/ software upgrades)
Floor cabinet for PC	
Size	2000x600x600mm (79x24x24”)
Protection class	IP54
High speed Line scan cameras	2pcs. 2000 scans/s
Camera enclosures	Automatic open/close-function of camera “eye-lids” for increased protection during production stops
Protection class	IP65 (NEMA 4X)
LED light, flux	600 lumen
Fan capacity	0,55kW, 690m3/h

Standard delivery contains:	2pcs. Line-scan cameras
	2pcs camera enclosures with motorized open/close-function and mounting support
	Mounting support for camera enclosures
	PC with floor cabinet, power supply and connectors
	LED light assembly with mounting support
	Fan with air filter and spiro tubes
	Encoder with mounting bracket and coupling
	Electrical connection box, cables and power supplies
	Technical manual
	XION module for digital in-/output signals
	Operators, technical and installations manuals

We reserve the right to introduce modifications without prior notice.

SP Certified ISO 9001 ISO 14001

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LIMAB has since its foundation in 1979 been dedicated to the design and manufacture of non-contact in-process measurement and inspection systems. Today LIMAB supply all of the major gypsum companies world-wide with inspection systems and have installations in more than 150 gypsum sites. We have in house design, production, service and sales with regional offices in key markets. LIMAB provide innovative solutions for on-line dimensional measurement, surface inspection, void/lump detection and temperature monitoring.

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