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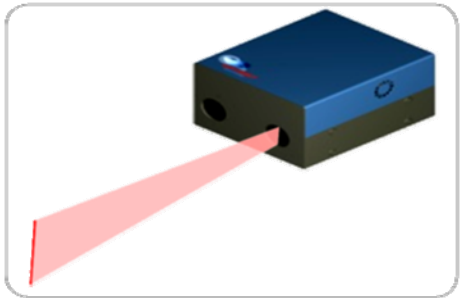
ConoLine L.S - Long Standoff 3D Line Sensor for in-process inspection of hot steel slabs and pipes in harsh environments

Jerusalem, October 2009….Optimet introduces the ConoLine L.S, a non-contact 3D line sensor with up to 1200mm standoff and a 300mm line width for heavy duty profile and in-process 3-D measurements and inspection applications.

The ConoLine LS provides a 2D profile when stationary, and full 3D surface measurement when scanning an object on a moving belt.
The ConoLine LS profiles deep grooves and sharp angles at high precision. It is designed to work in harsh environments and is able to perform surface inspection such as crack detection in objects at over 1,000°C, and in-process hot steel bar inspection.



The ConoLine L.S is used for in-process inspection of hot steel slabs in the Metal & Steel industry and in the Seamless Tubes & Pipes industry

The ConoLine L.S is used in the **Metal & Steel industry for on-line inspection and detection** of longitudinal surface cracks and defects on hot steel slabs of up to 1000°C. The inspection system, which includes the ConoLine L.S sensor and machine vision, inspects the slab both from the top and bottom faces while it is still hot, eliminating the need for inspection after cooling and the necessity for re-heating of the slab for re-work if defects are found. The inspection is also done before solidification, which changes the characteristics of the surface.

An additional application for **in-process inspection of hot laminated seamless tubes and pipes** was developed in cooperation with **DSI.Plus, Spain**. The system includes several ConoLine-L.S sensors, protected by a thermal shield and folding mirror, covering the full hot tube surface from all sides, while moving at high speed. The system software automatically detects the start and end of each tube and generates a map of defects of the object, with resolutions better than 100µm on hot surfaces at 1000°C.

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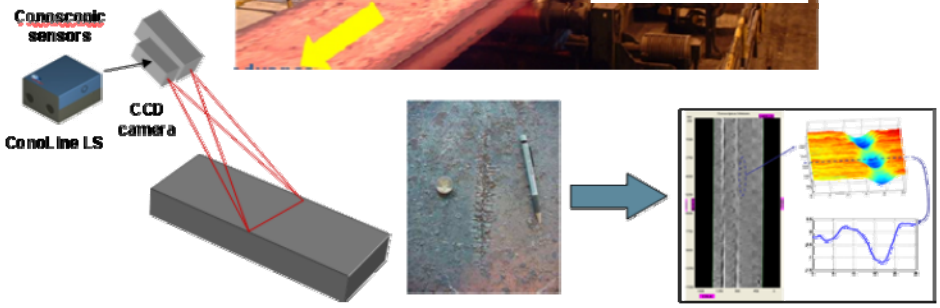
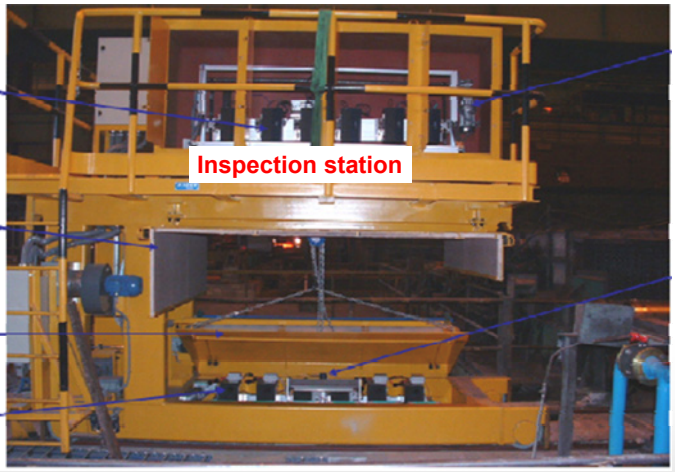
In-Process Inspection of Hot Steel Slabs



Inspected profile

Over 200.000 steel slabs were inspected within one year until January 2008[1])



1) L Alvarez, L.F. Sancho, J Diaz, J.R. Somoano, C. Fraga. Automated industrial slab surface inspection system, based on contactless technologies. Spain 2008.

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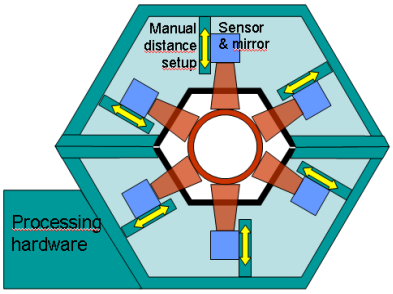
In-process inspection of Seamless Tubes and Pipes

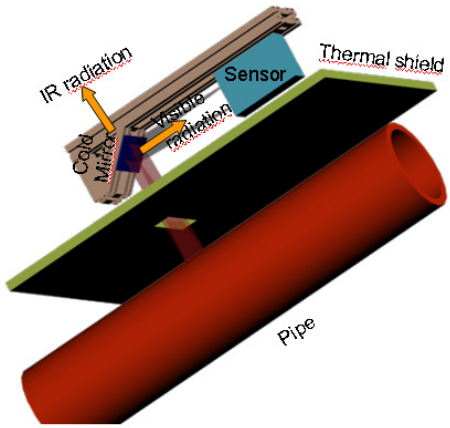
System set-up

- 6 sensor-sets at 60° from each other.
- Manual radial movement of each sensor for optimal stand off.
- Heat protection shield/compressed air/water cooling



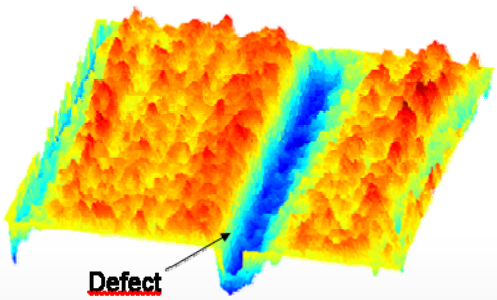
Sensor set-up

- 45° cold folding mirror enables to hide sensor from direct radiation
- Sensor automatically detects start/end, processes data, and generates results in less than 10 sec.



Measurement and analysis

Profile and 3-D Measurement obtained during movement and the results



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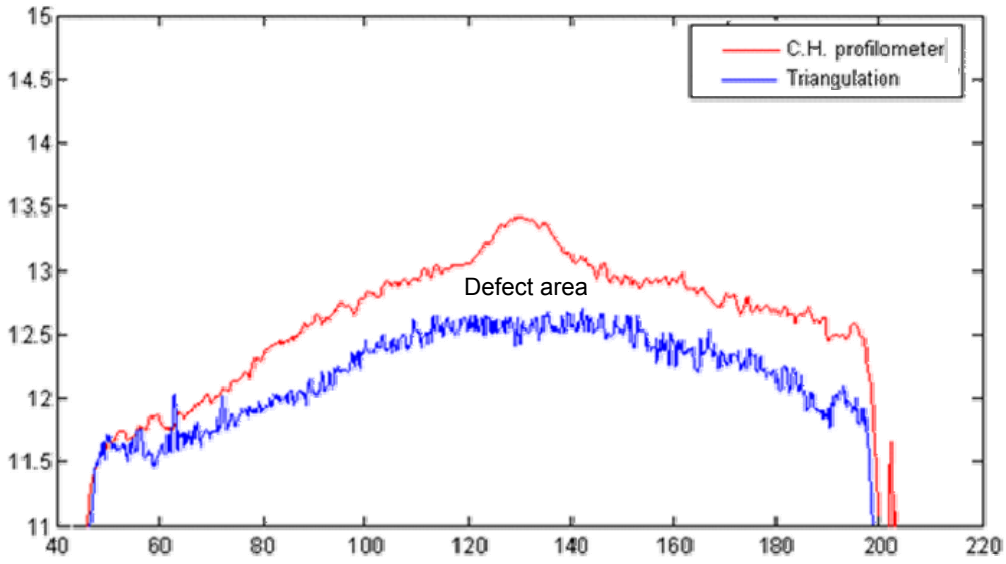
Comparative profile measurement - defect on a pipe segment at 1000°C
ConoLine-L.S (red line) vs. a triangulation sensor



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ConoLine-L.S Technical Specifications

Lens focal length (mm)	770	1200
Minimum working range (mm)	50	100
Standoff (mm)	700	1200
Line length (in middle of range) (mm)	200	320
Line width (µm)	200	300
Resolution (µm)	<100	<150
Linearity over working range	0.2%	0.2%
No. of points per line	600	
Maximum target temperature (°C)	1050	
Data Handling		
Data rate	60 lines/sec	
General		
Weight (g)	5Kg (including PC)	
Dimensions (mm)	151H X 224W X 272L	
Operating Temperature	18 to 35°C	
Supply Voltage	12V DC	
Light Source	Visible red laser Diode – Wavelength 655 nm	
Laser Class	IIIb	

Sharp 3D Measurement

Optimet is a provider of sophisticated non-contact measurement sensors and solutions, with up to sub-micron precision, for distance 2-D & 3-D measurements.

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About Optimet: **Optimet** (Optical Metrology Ltd.) - a member of **Ophir Optronics** group - is a provider of sophisticated non-contact measurement sensors and solutions, with up to sub-micron precision, for distance 2-D & 3-D measurements. **Optimet** implements practical application of its unique and patented conoscopic holography technology. Established in 1995, **Optimet** is a member of the Ophir Optronics group, a world leader in Laser Measurement Instruments, Optical Infra-Red components and lens-assemblies. Sold worldwide, with several thousand installations, **Optimet** products offer measurement solutions for a wide range of markets and applications, among which are the Automotive, Aerospace, Dental CAD/CAM, Steel and LCD / PDP in-process inspection. **Optimet** solutions and sensors are used for in-process inspection, quality control and reverse engineering applications.
Optimet is ISO9001-2000 certified.