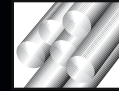
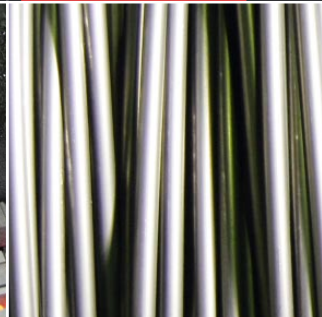
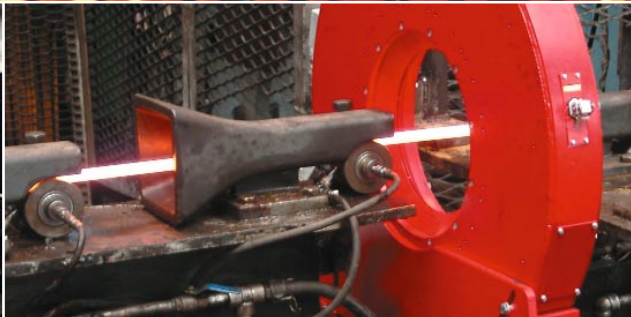
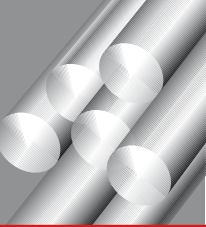


MEASURING SYSTEMS FOR ROD AND BAR



SOLUTIONS





PROFILE MEASUREMENT.

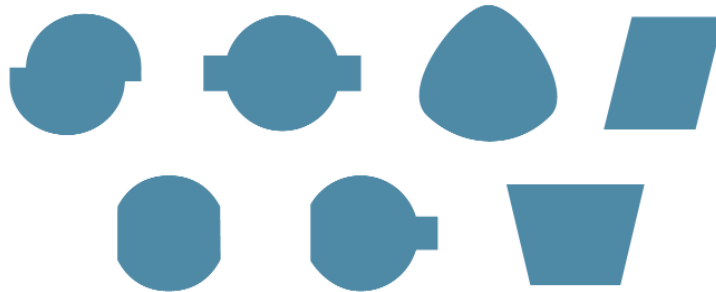
The quality requirements of long products are continually rising. Customers request tight tolerances and short delivery times.

FREQUENT FAULTS

of wire rod and bar are due to

- roll misalignment
- roll eccentricity
- roll wear
- asymmetric fill
- over-/ underfill
- roll break
- "off-the-hole" alignment of entry guides

EXAMPLES OF COMMON SHAPE ERRORS.

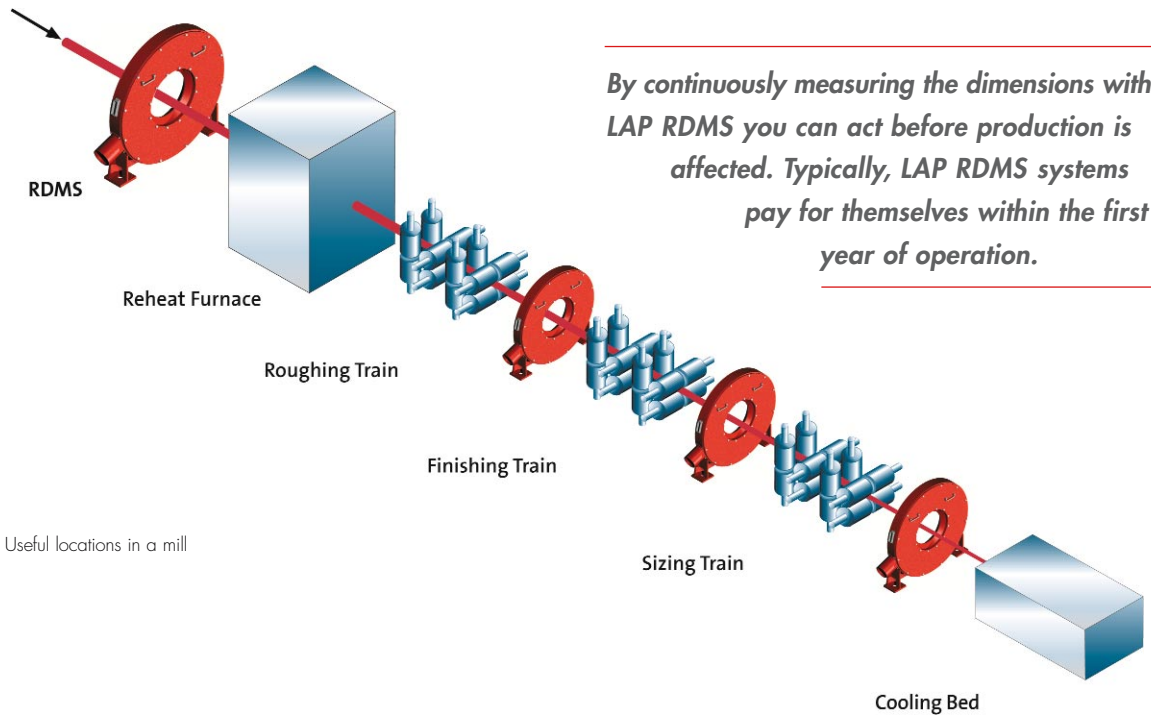


DAY-TO-DAY PRODUCTION WITHOUT ONLINE PROFILE MEASUREMENT

- achieving the optimal mill set-up is most time-consuming,
- samples have to be cut at regular intervals which delays production considerably,
- deviations from the predefined tolerances are noticed only late, production of faulty material continues unnoticed,
- continuous documentation of quality is not possible.

YES, WE

TRUE-SHAPE MEASUREMENT.



WITH LAP RDMS ONLINE PROFILE MEASUREMENT GAUGE

- the true shape of wire rod and most bar shapes such as rounds, squares, flats, and hexagons can be measured. Optional software extensions for rebar or products that are rolled in 3-roll technology are available.
- not only the main dimensions, ovality and profile are measured; cross rolls, roll eccentricity, roll wear, roll break as well as influence of tensile forces can easily be determined.
- through sophisticated data evaluation with comprehensive graphical displays including trend analysis the operator can quickly take corrective action on imminent tolerance deviations – specific and before production is affected.
- run-in times after changes of size or steel grade are cut because there is no more need to sample and mike manually.
- the time for adjusting the rolling parameters can be drastically reduced; often the rolling time of the first billet is already sufficient.
- the entire rolling train from roughing mill to the cooling bed can be monitored by installing multiple networked systems.
- 100% quality control and documentation is ensured by storing of all relevant data.

CAN

POWERFUL AND RELIABLE.

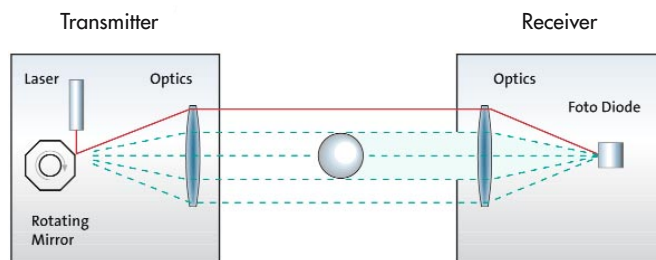
PROFILE MEASUREMENT OF LONG PRODUCTS.

Modern Laser technology and powerful DSP micro processors, in combination with over 10 years of experience in online profile measurement in rolling mills have made LAP RDMS an absolutely reliable and powerful profile measurement system.

LAP RDMS provides complete profiles at 400 measurements per second. A complete cross section of rod with a diameter of 10 mm is measured in just 44 μ s (0.000044s). This is why vibrations of the rolled stock have no influence on the results.

As the measurement is not only based on a "shadow measurement" of height and width, three-lobed shapes, trapezoid, rhomboid and even asymmetric profiles are measured.

THE MEASURING PRINCIPLE.



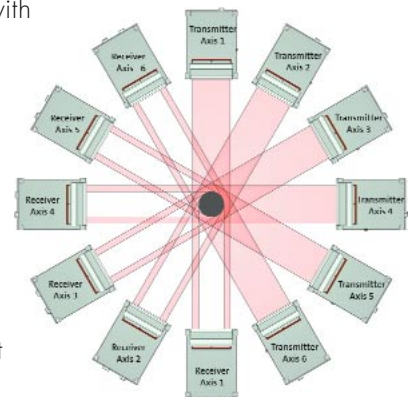
Multiple Laser micrometers scan the surface of the rolled stock precisely. This reproduces the entire envelope polygon of the object correctly even at very high rolling speeds.

The system is equipped with 2, 3, 4, or 6 axes depending on requirements and

rolling technology – from simple measurement of width and height to the measurement of the complete profile. Due to the stationary design of the measurement axes each individual measurement produces an undistorted cross section, while rotation of the axes could falsify the measured shape.

The true ovality of a round object is thus determined as difference of min. and max. size of the same cross-section. Each measurement supplies a complete profile – without any time-consuming rotation or oscillation of the system, like it is the case with conventional systems. Even short tolerance violations as frequently occurring on the side (width) of rods/bars are reliably detected and not by chance of an oscillating/rotating system being at the right angle in these unpredictable moments.

Flat and square profiles are measured twist-independent based on sophisticated computing methods. With a multi-axis (3 or more) system even asymmetric shapes can be measured precisely. Conventional shadow gauges would fail and suffer drastic measurement errors.

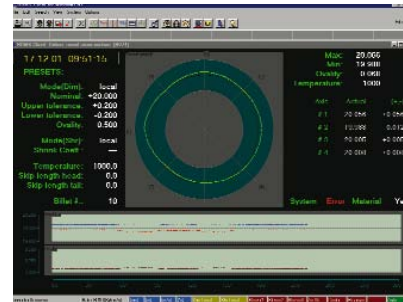


PROFILE GEOMETRY IN REAL TIME.

COMPLETE QUALITY CONTROL.

All results are displayed on the monitors in real time. Results can be displayed in different ways:

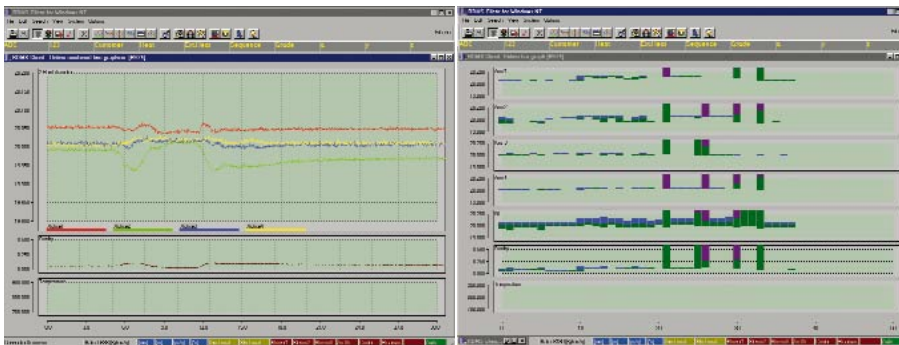
- graphic display of the cross section,
- line charts over the length of the material (single axes or combined),
- bar chart trend display of the last 50 rolled billets (per axis and combined),
- numerical display,
- statistics.



Screenshots of Profile Graphics

Information conveyed by the primary data such as roll misalignment, roll eccentricity, roll break, roll wear or push-pull conditions are easily determined by the operators using the comprehensive graphical displays.

The different screens as well as the substantial statistical functions are available online at up to 10 operator terminals. Every user has the entire functionality at his disposal. This ensures continuous production monitoring and a complete quality control.

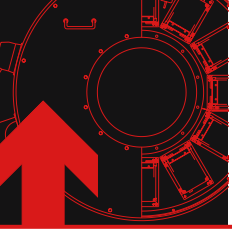


Screenshots of Line Charts of Ovality and Diameter

INTEGRATION INTO PROCESS CONTROL SYSTEMS.

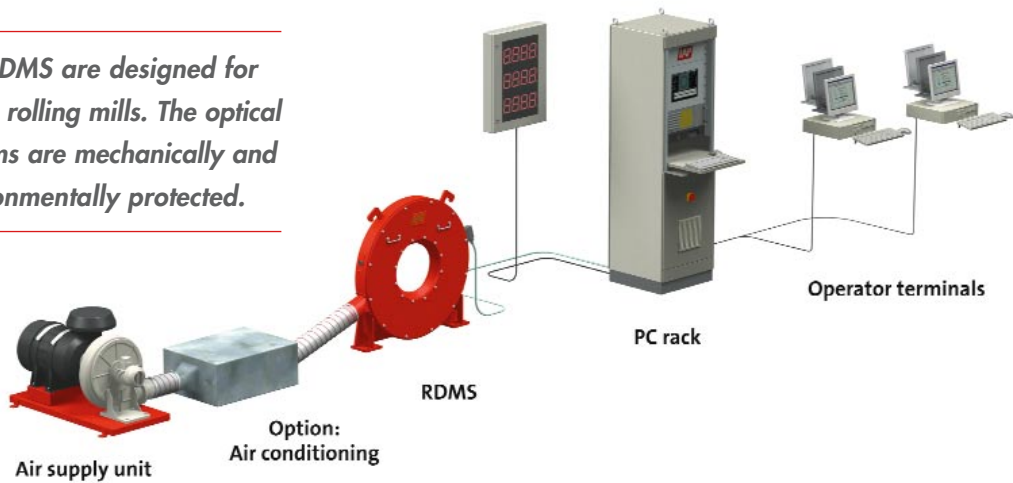
Interfaces to integrate LAP RDMS profile measurement systems with existing process control systems, material tracking systems or the basic automation naturally exist. Data can be transferred via standard serial interfaces and Ethernet.

Up to 4 measurement systems can be interconnected, tracing the billet through the rolling train or monitoring multiple strand rolling mills.



MEASURING UNDER ADVERSE CONDITIONS.

LAP RDMS are designed for use in rolling mills. The optical systems are mechanically and environmentally protected.



THE MEASUREMENT FRAME.

Since the system does not have rotating sensors, the frame could be designed extremely compact. It takes up less than 150 mm (6 inch) in rolling direction, thus facilitating easy mechanical integration into existing lines. There are no moving parts. Even under the challenging environmental conditions in rolling mills the system is virtually maintenance free.



THE COOLING SYSTEM.

The refined air purge with autonomous air supply unit keeps the optical system clean and cools the components, thus ensuring permanent availability of the RDMS. As the measurement frame is purged with filtered ambient air, neither compressed air nor cooling water are needed.



Advantages of the self-contained sustained air supply:

- independence from mill utilities (compressed air, cooling water)
- safe protection against pollution of the optical system
- high reliability
- low maintenance costs
- very low operating costs

YES, WE

ONE STANDARD – MANY OPTIONS.



STANDARD SYSTEM.

In its basic configuration, LAP RDMS comprise 2, 3, 4, or 6 axes.
For special production conditions several add-ons are available:

OPTIONS.

Swing

Tiltable measuring frame: Measurement angle and operating modes are software controlled: stationary operation, twist tracking, cyclic or permanent movement.

Rebar

Software module to determine the diameter across the ribs of rebar using an intelligent filter algorithm. Depending on the rebar size and type, also core diameter and rib height can be measured and the weight per length computed.

Kocks

System expansion for 3-roll-reducing/sizing technology. A system with 3 or 6 axes in combination with specific software ensures the precise measurement of contour and ovality using the patented 3-point-method (US Patent 6,549,293 B2, German Patent 100 23172.1). Asymmetric contours and 3-lobed shapes are detected and measured precisely.

Database

Advanced archiving of dimensions and relevant process data using a powerful SQL data base. Depth and duration of the data storage can be easily selected by adjusting parameters.



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