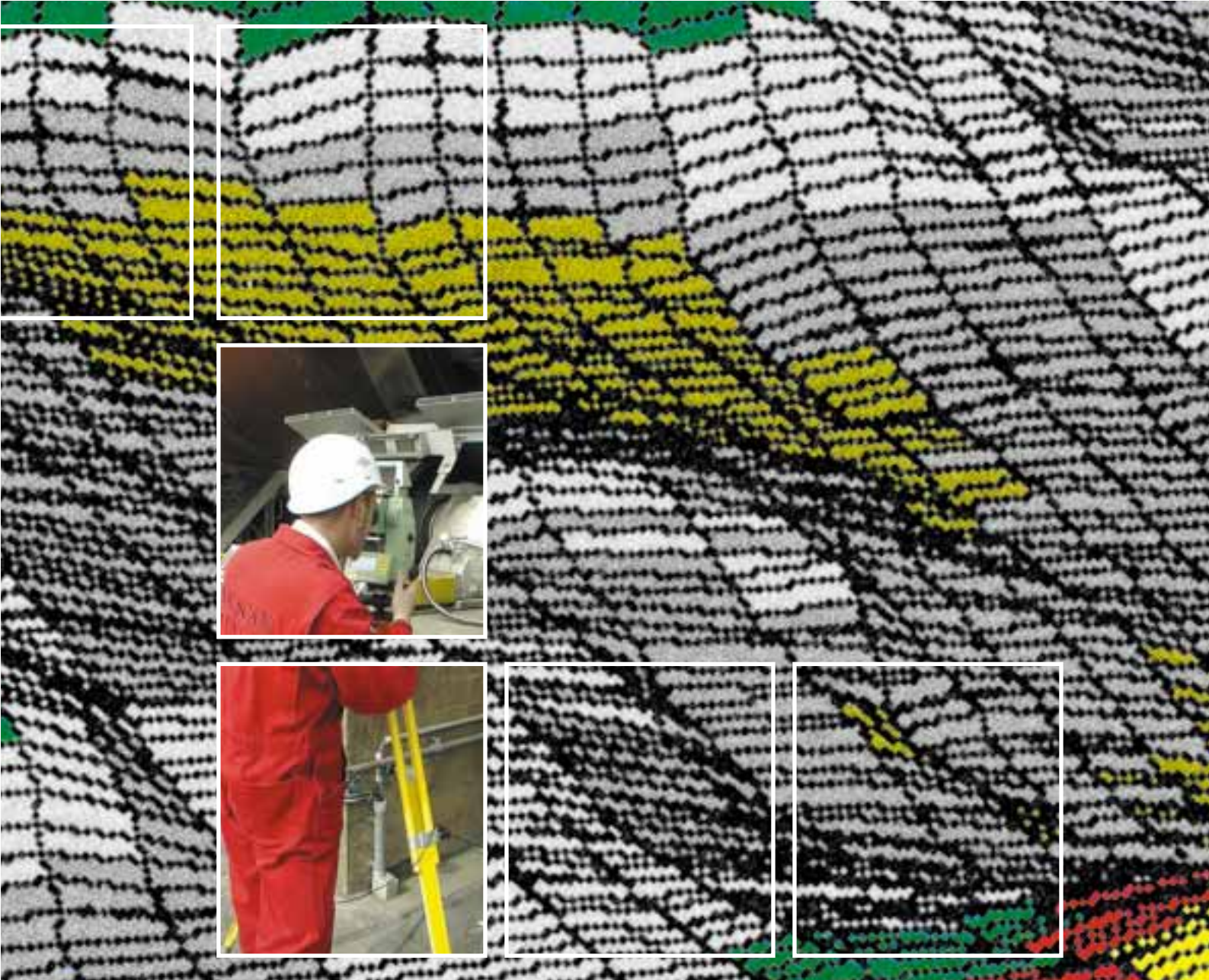


POLSCAN® Service

for checking the rotary kiln geometry.



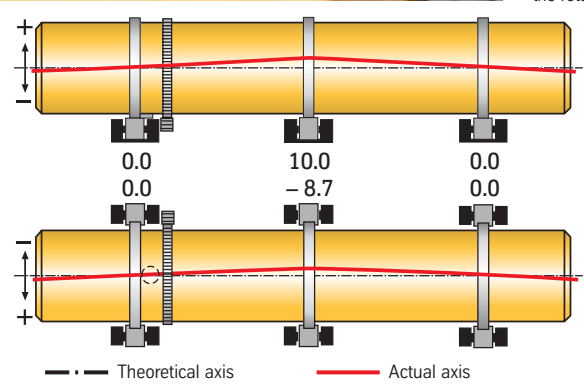
A company of
ThyssenKrupp
Technologies

Polysius



ThyssenKrupp

There are many ways to save money – POLSCAN® is a very effective one ...



Determination of the rotary kiln axis reveals the vertical and horizontal deviations.

High rotary kiln availability crucially depends on correct kiln geometry. Changes caused by foundation settlements, uneven wear or incorrect repair lead to overloading of individual components. This can result in serious damage and loss of production.

The Polysius POLSCAN® service eliminates this risk. Its high-precision optoelectronic measuring system measures rotary kilns quickly, precisely and without interrupting operation, reliably diagnosing any discrepancies. Since the POLSCAN® system was introduced in 1985, Polysius has measured and successfully readjusted over 800 (!) rotary kilns in 45 countries. These kilns, which had from 2 to 8 kiln tyre stations, consisted not only of Polysius units but also of machines from other suppliers.

In order to comprehensively record the geometry of the rotary kiln, Polysius uses three optimally harmonised measuring processes.

Determining the rotary kiln axis

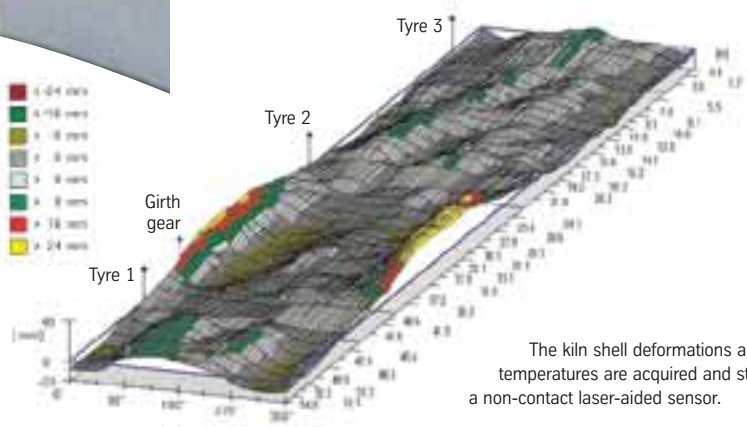
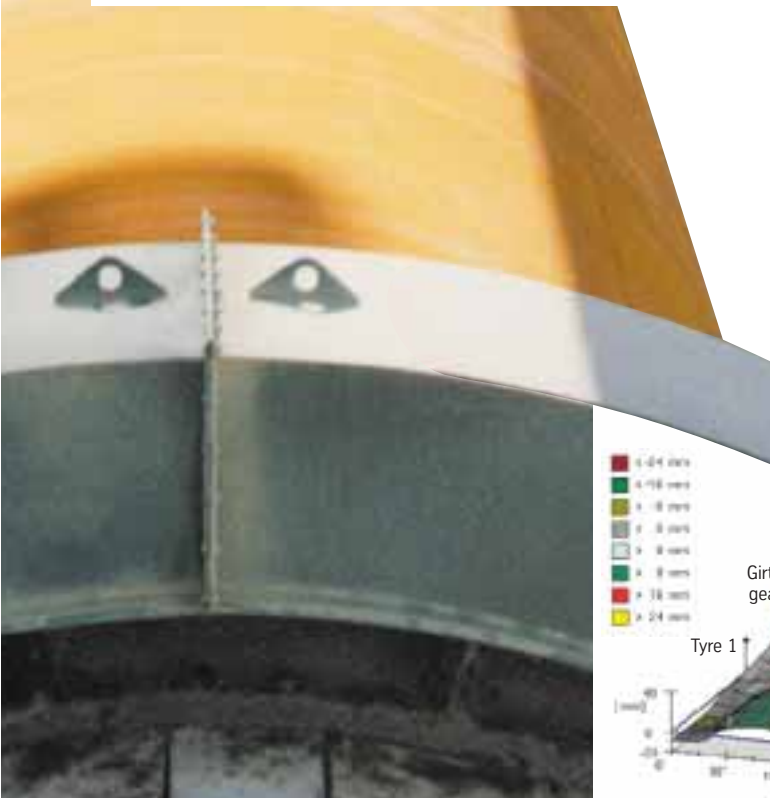
Ascertainment of the rotary kiln axis shows up any mechanical changes in the supporting roller stations and allows eval-

- uation of their effects on the
- kiln shell,
- tyres, supporting roller axes and supporting-roller bearings, as well as
- the mechanical stressing of the refractory lining.

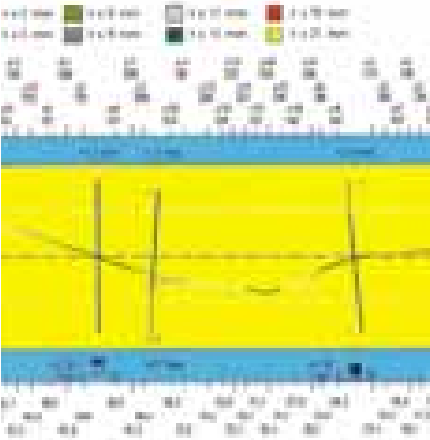
The spatial coordinates of the supporting roller axes and of the rotary kiln axis are determined with high-precision motorised tachymeters in combination with software developed specially for measuring the kiln geometry. On the basis of the measured centres of rotation of the rotary kiln axis at each kiln tyre station, the software calculates the vertical and horizontal deviations. The tooth bottom clearance and backlash of the kiln drive system can also be taken into account in the calculation.

The documentation created and printed out on the spot provides the correction values needed for readjusting the rotary kiln axis. If desired, this correction is performed immediately, without interrupting kiln operation, and can optionally be followed up by a second measurement to record the new kiln situation.

All measurements are performed at machined surfaces with high-precision devices,



The kiln shell deformations and temperatures are acquired and stored by a non-contact laser-aided sensor.



Record of the eccentricity measurement.

some of which were developed specially for the kiln geometry measurement. An optimum result is thus assured.

Determining the kiln shell deformation

The kiln shell deformation measurement registers the plastic (permanent) deformations in the entire rotary kiln shell or in individual kiln sections, caused for instance by temporary overheating (red spots). The system then defines the possible effects on

- mechanical stressing of the refractory lining,
- excessive kiln shell stressing,
- functioning of the kiln inlet and outlet seals,
- tyres, supporting roller axles and bearings,
- radial and axial runout of the girth gear and
- axial runout if the tyre.

Any elastic (temporary) deformations which are also present in the kiln shell due to differences in the temperature distribution over the circumference, caused for instance by uneven coating formation, are registered via the measured kiln shell temperatures and filtered out by a special calculation program. Based on the determined kiln shell deformations, a special analysis filters out the eccentricity (radial runout). An animation program displays the

eccentricities of the rotating kiln shell and the resultant effects on the additionally measured flexions of the supporting roller axles and wobbling of tyres and girth gear. This enables optimum determination of the points in the kiln shell where sections have to be replaced or even corrective cuts and rewelding of the shell are required in order to straighten the kiln.

Determining the kiln shell ovality

Determination of the kiln shell ovality at the tyres optimally rounds off the POLSCAN® service package. Its data are used in evaluating the effect of the tyre clearance on the refractory lining. The measurement is performed by an absolutely unique measuring device made by Polysius, which electronically acquires the high-resolution data, stores them, then sends them by radio data transmission to a datalogger. The calculated curves appear directly on the datalogger's display, together with the kiln shell ovality at the measuring point.

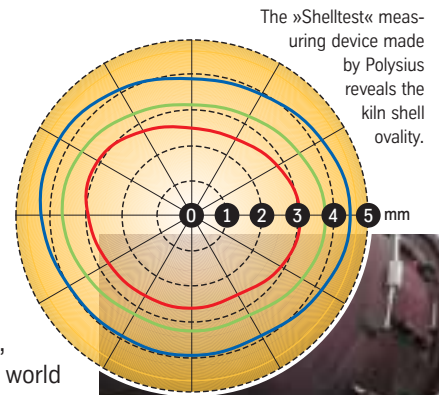
Evaluation of the measurement results

Immediately after the POLSCAN® measurements have been completed, the documentation, consisting of record sheets containing all the required information is printed out and the results are discussed with the customer. The documentation is rounded off with a CD ROM containing the measurement report and all the results from the performed measurements. This permits the measurement results to be called up at any time onto a PC and

printed out or copied into other documents.

In numerous discussions, customers all around the world have stated their conviction that the POLSCAN® process (including comprehensive documentation, animation and logically consistent optimisation proposals) is the right strategy for cost reduction and an optimum preventive maintenance tool.

In addition to kiln axis correction, Polysius offers a comprehensive service program for checking and increasing the operating economy of production plants.



The »Shelltest« measuring device made by Polysius reveals the kiln shell ovality.



Measurement of the axial runout of the tyre.



Measurement of the supporting roller axle flexion.

Criteria showing the need for kiln geometry measurement:

- Overheating bearings
- Cracks in the kiln shell
- Refractory lining problems
- Tyres lifting off the supporting rollers
- Foundation settlements
- Increasing relative movement of floating tyres
- High or fluctuating drive motor ampere requirement
- Temporary or permanent knocking or vibrations in the kiln drive system
- Serious deformation of the kiln shell
- Big radial runout at the kiln inlet or outlet
- Uneven wear of the supporting rollers and/or tyre surfaces
- Before or after repairs (replacement of tyre-bearing shell section, turning-around the girth gear...)
- After grinding of supporting roller and/or tyre surfaces
- As part of the preventive maintenance programme