

3D inspection and surface assessment of roof tiles

The production of roof tiles places high demands on measurement and testing methods for ensuring constant high product quality. In the DASTOKON semi-automatic measurement and test system and in the BSPK pilot plant a laser triangulation sensor of the Series ILD 1800 is used for the 3D inspection and for surface assessment.

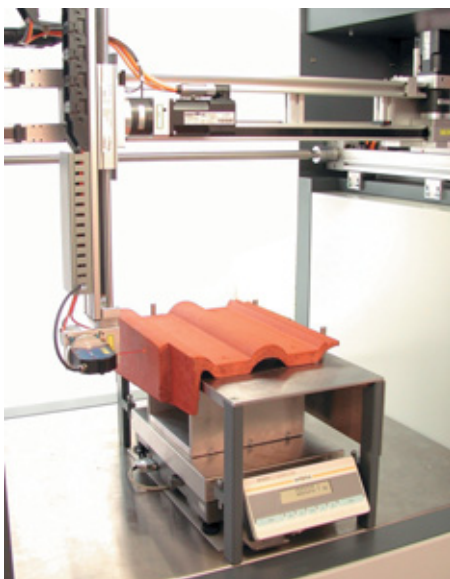
The laser-based optical sensor ILD 1800-50 is mounted on a rotating, movable fixture. The profile of the roof tile in the longitudinal and transverse directions is acquired by moving along defined measurement lines over the x and y axes in order to check the complex dimensional-conformance specification.

For the roughness measurement the sensor is brought via the z-axis into an optimum distance position to the surface of the roof tile, giving the smallest diameter of light spot. From the large number of measurements, certain measuring points are extracted by appropriate algorithms (40 measuring points per mm) and the roughness determined.

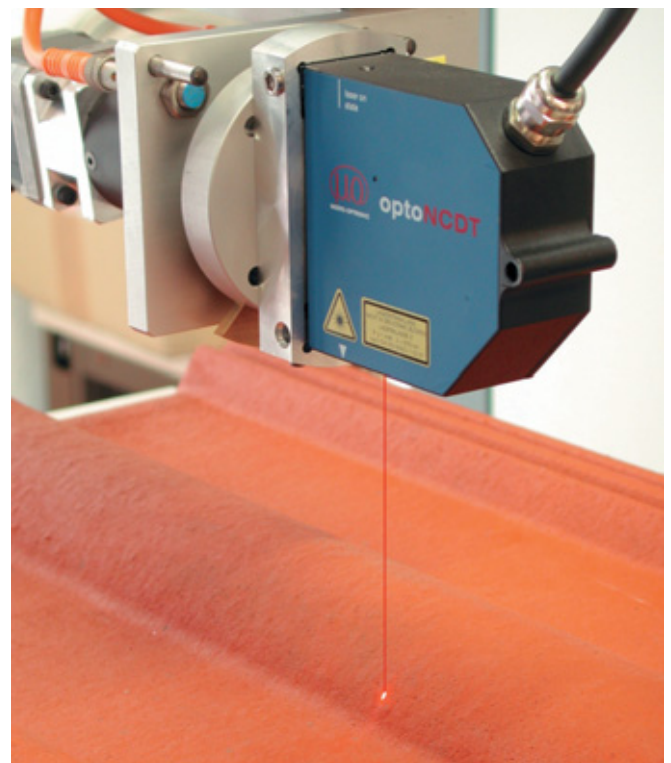
Since optoNCDT operate with a semiconductor laser of Class 2, no special protective precautions are needed against laser radiation.

Advantages of the laser measurement

- New, previously untestable parameters such as surface roughness can be acquired objectively and directly included in the production process.
- The inspection of individual roof tiles in the central laboratory with long waiting periods until the test results are available can be completely omitted.
- The inspection rate is increased substantially.
- Systematically occurring faults are detected within the shortest time.



Roof tile in the measuring cell



Sensor on travel device

Applikation

Measurement system requirements

- Large measurement range (> 40 mm) in order to be able to acquire the roof-tile profile in one working step without sensor tracking.
- High measuring rate (5000 measurements / s) for a short inspection period.
- High accuracy (linearity better than $60 \mu\text{m}$) for the profile measurement
- with simultaneous high resolution ($< 3 \mu\text{m}$) for the surface roughness.
- Color independence for constant measurement accuracy for different roof-tile materials.

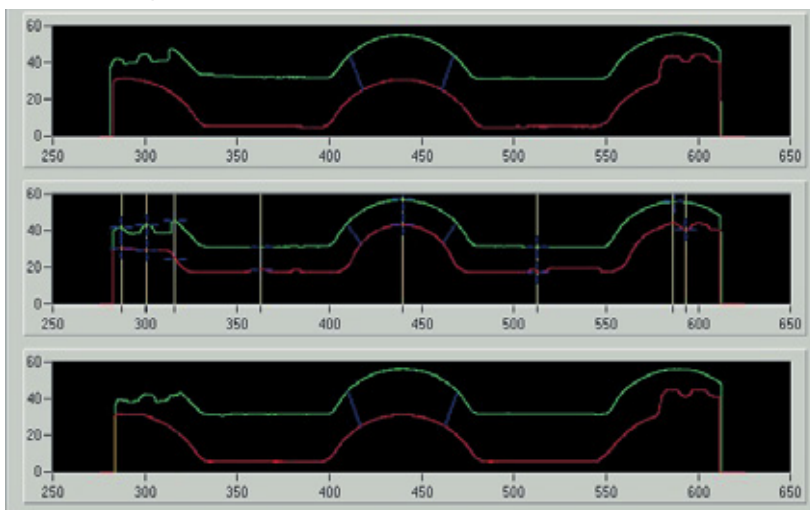
Sensor for the measurement and surface assessment

- Laser-based displacement sensor ILD1800-50
- Measurement range 70 ± 25 mm.
- Integrated sensor cable suitable for trailing chains.
- Controller with RS232 interface.



Total view measurement system

Screenshot of profile measurement



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