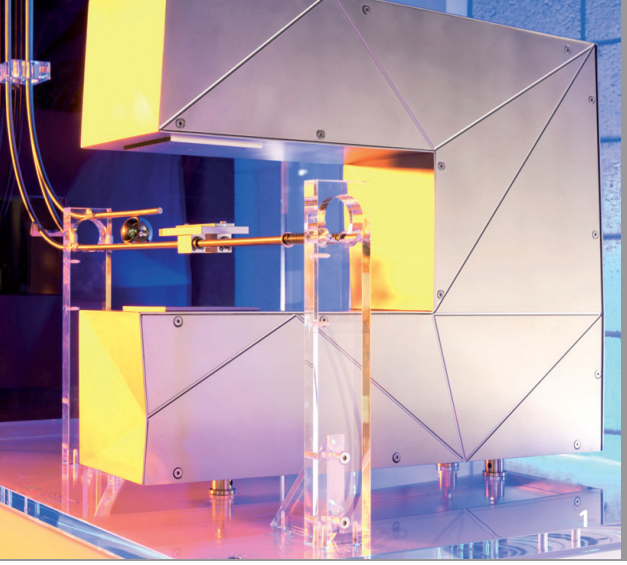

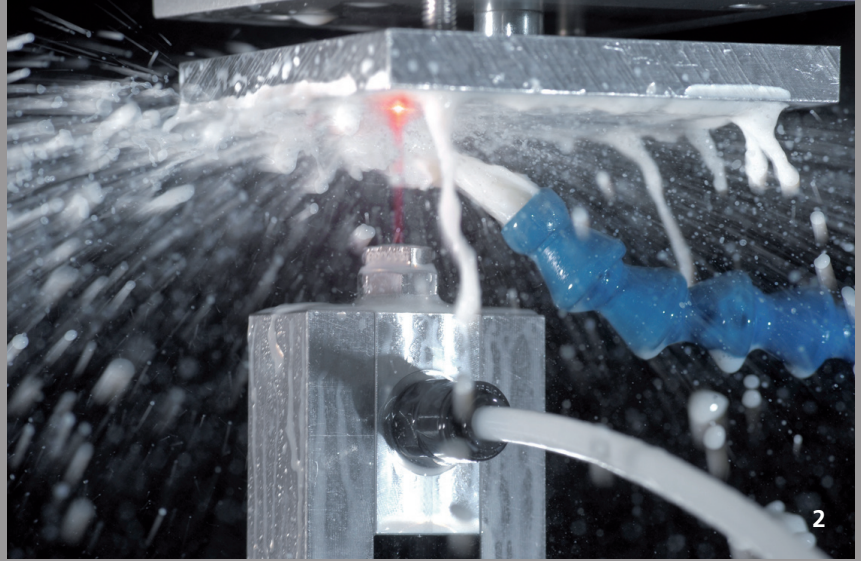

MEASURING THICKNESS ON SHEETS AND METAL FOILS

Task

The aviation and automobile industries are placing more stringent requirements upon material and quality control. When thickness is measured, for example, sensors up into the micrometer range have to be precise, as quick as possible and securely measure directly in the production line.

Method

For these requirements, Fraunhofer ILT has developed an innovative optical thickness and distance sensor. This technology is based on the interference ability of the radiation from semi-conductor light sources. A measurement beam is sent to the surface of the material and from the reflected signal, the distance is measured at a precision of less than 200 nm.

Result

The thickness measuring system »bd-2« was developed especially for metal processing and is used to measure the thickness of rolled strips, sheets and metal foils in the range of 10 µm to 10 mm. Matt surfaces are measured as reliably as glossy ones. In comparison to other optical methods – such as laser triangulation – this new process offers a decisive advantage: Only a small measuring head is needed to emit and measure the distance signal. The space requirements are significantly smaller than, for example, for triangulation. The single measuring head sends and receives through a single, small window with a diameter of only two millimeters and can be reliably protected from impurities in the harshest of environments by a stream of air. In direct comparison with conventional triangulation sensors, the new sensor leaves the competition far behind, for example, with reference to linearity errors.

Applications

With the thickness measuring systems »bd-2« the distance to the surface is measured during running manufacture absolutely and continuously. Two measuring heads in a C-frame measure the product thickness. Measuring frequencies of several 10 kHz allow inline measurement even at high product speeds. Thus the sensor can be used for the active process control.

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1 Robust stainless steel housing of the thickness measuring system »bd-2«. Live measurements at CONTROL 2013 in Stuttgart, Germany.

2 Measuring under harsh environmental conditions.