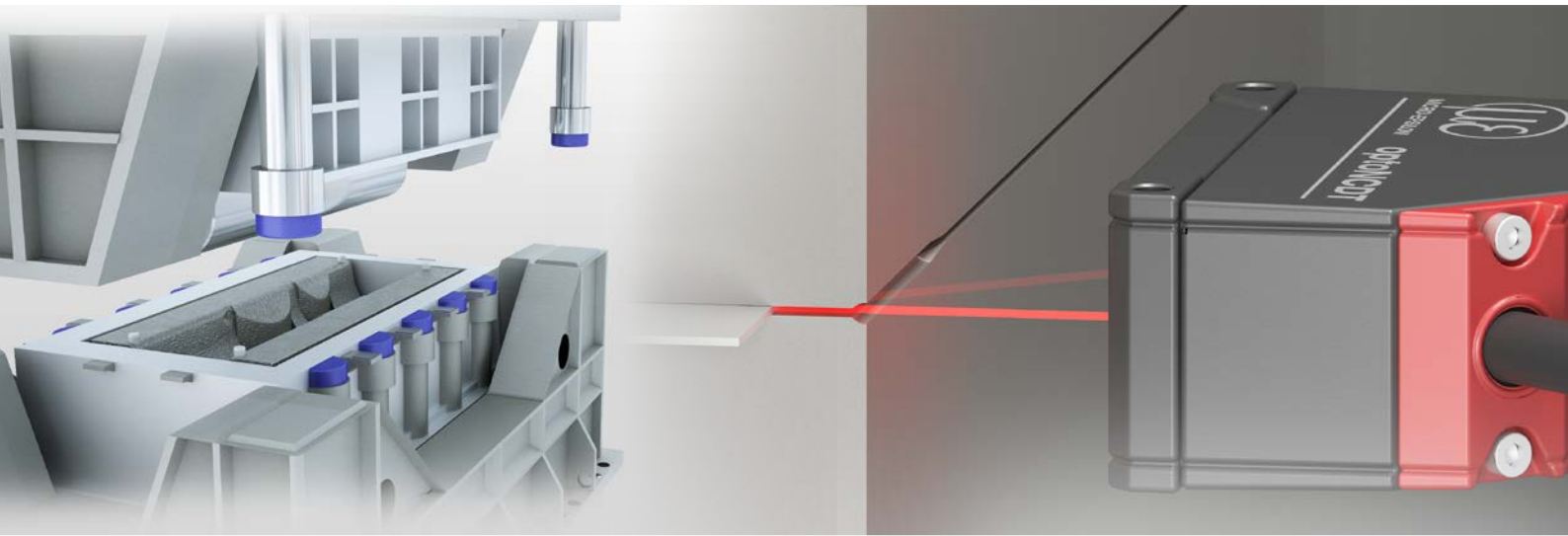




Monitoring metal sheet infeed during the pressing process

In cold forming processes, deep drawing is considered a decisive step in the production process, which has a huge impact on the quality of the component. The tool punch presses the plate to be formed into the mold (die). Blank holders ensure the correct position of the plate. In this application, the flange of the sheet is partially pulled inwards because the thickness of the component decreases slightly as a result of the deep-drawing process while the displaced material flows from the edge of the sheet. This distortion can be detected as a change in distance. This value is crucial for the quality assessment of the pressed part.

The measurement of the distortion is carried out using several optoNCDT 1420 laser triangulation sensors, which are placed around the metal sheet, either in the tool or on the side of the tool. The arrangement is chosen in such a way that the laser beam measures on the edges of the sheet, which is between the top and bottom of the tool. Due to the extremely small measurement spot size, the laser is therefore able to measure extremely small gaps between the two tool parts of less than one millimeter. The measured values are transmitted via analog or digitally to the controller. They allow a conclusion to be drawn on how much material has flowed. This enables, for example, the pressing force to be controlled during the ongoing process, reducing waste, material consumption, downtime and costs.

Micro-Epsilon laser triangulation sensors are rugged and can withstand high mechanical loads such as vibration and shock. The Auto Target Compensation (ATC) feature rapidly compensates for different reflections caused by high-gloss through to dirty-matte sheet metal parts, while enabling a smooth distance signal. The measurement results are therefore consistently accurate even under difficult environmental conditions. Due to their extremely compact design, optoNCDT 1320/1420 sensors can be effortlessly integrated into a small space.

Requirements for the measurement system

- Miniature measurement spot size
- Typ. measuring ranges: 50, 100 and 200 mm
- Resolution < 100 μm
- Linearity 100 - 200 μm
- Typ. measuring rate 1 - 2 kHz, up to 4 kHz possible

Ambient conditions

- Pressing plant
- Continuous vibration and shocks
- Oil mist
- Mechanical loads

System design

- Several optoNCDT 1420 sensors
- 25 cm adapter cable between sensor and customer system

Advantages

- Reduces waste
- Improved quality due to consistent drawing
(improved forming quality and consistent thickness)

