
Inline Monitoring of Coil Quality in Controlled Punching and Forming Processes

Ondřej Vitoslavský

Advantages of Inline Monitoring



Cost reduction

Dramatically reduces scrap and rework expenses through immediate defect detection.



Enhanced Productivity

Boosts efficiency through continuous process optimisation.



Instant Correction

Identifies deviations in real-time, enabling immediate adjustments.



Improved Traceability

Creates comprehensive quality history for every coil/product produced.

Inline monitoring

Thickness measurement

Width measurement

Shape measurement

Die cushion forces measurement

Real length measurement

Pinhole detection*

Coil cleaning

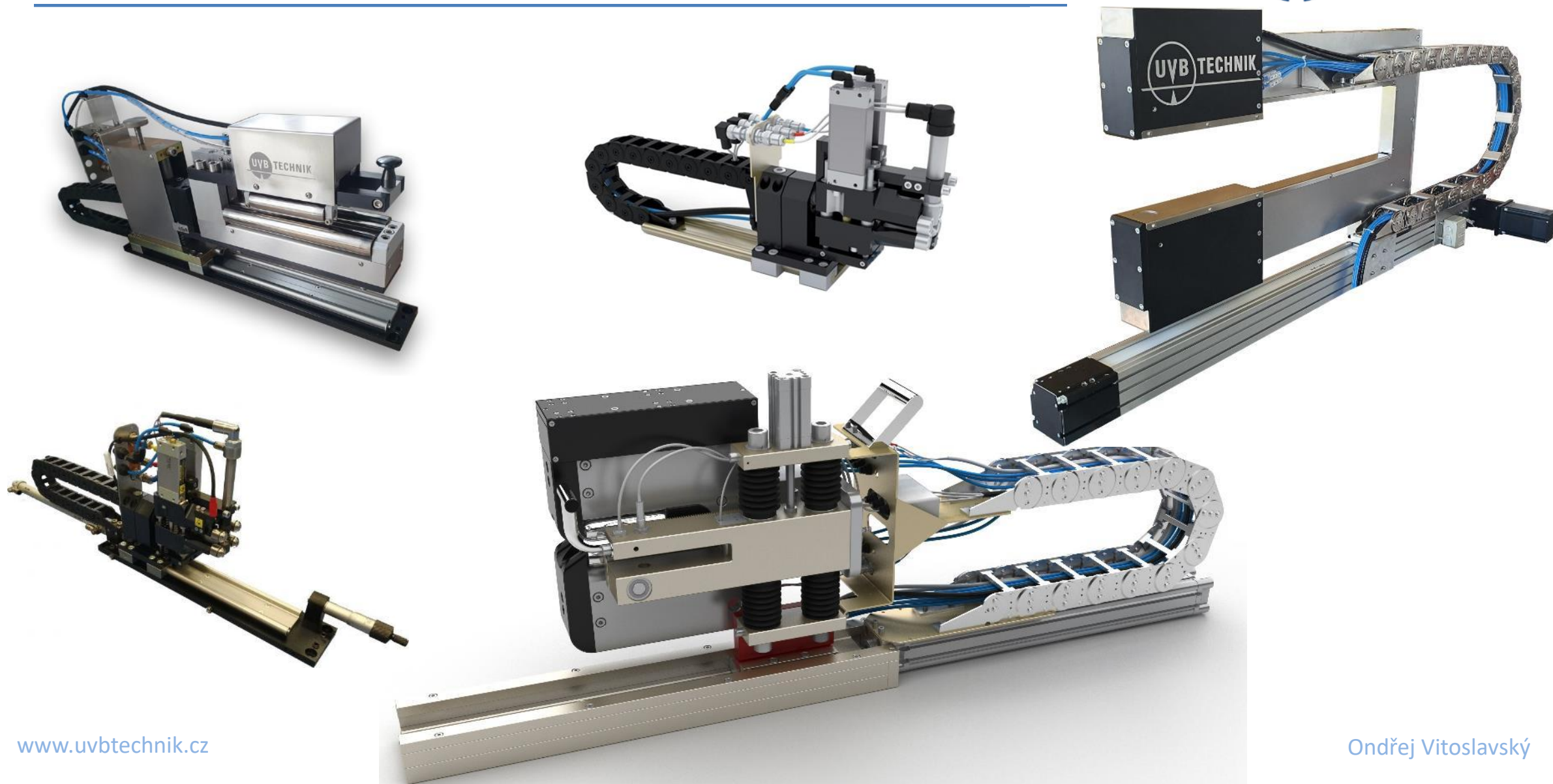
Wiping equipment

Degreasing equip.

Offline monitoring

Profile thickness measurement

Continuous strip thickness gauges



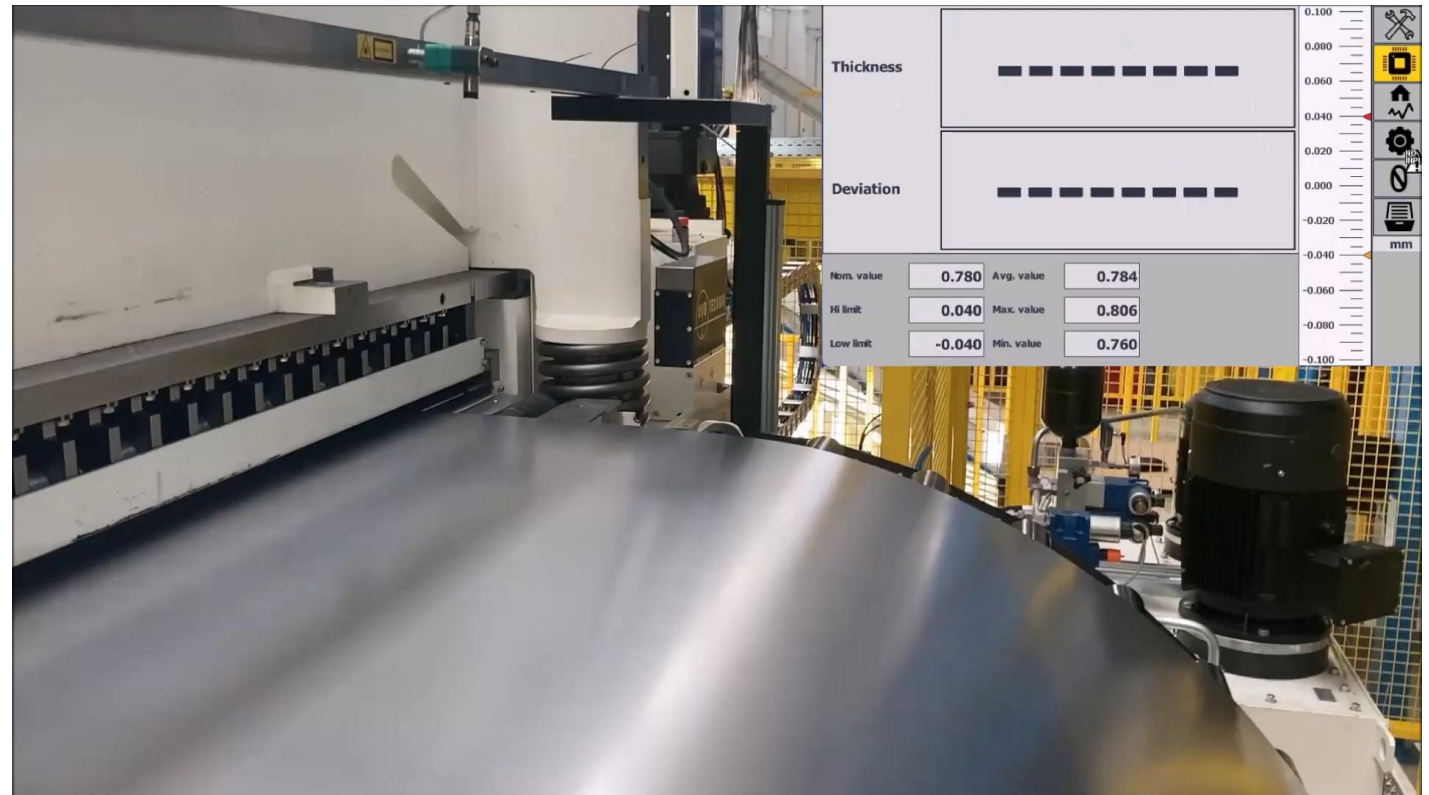
Laser strip thickness gauge

- Non-contact measuring by means of two opposite four-point laser sensor technology located in C-frame.
- Accuracy 1 μm – 9 μm , based on nominal thickness and waviness of the strip.
- Measuring maximum 1000 mm from the edge



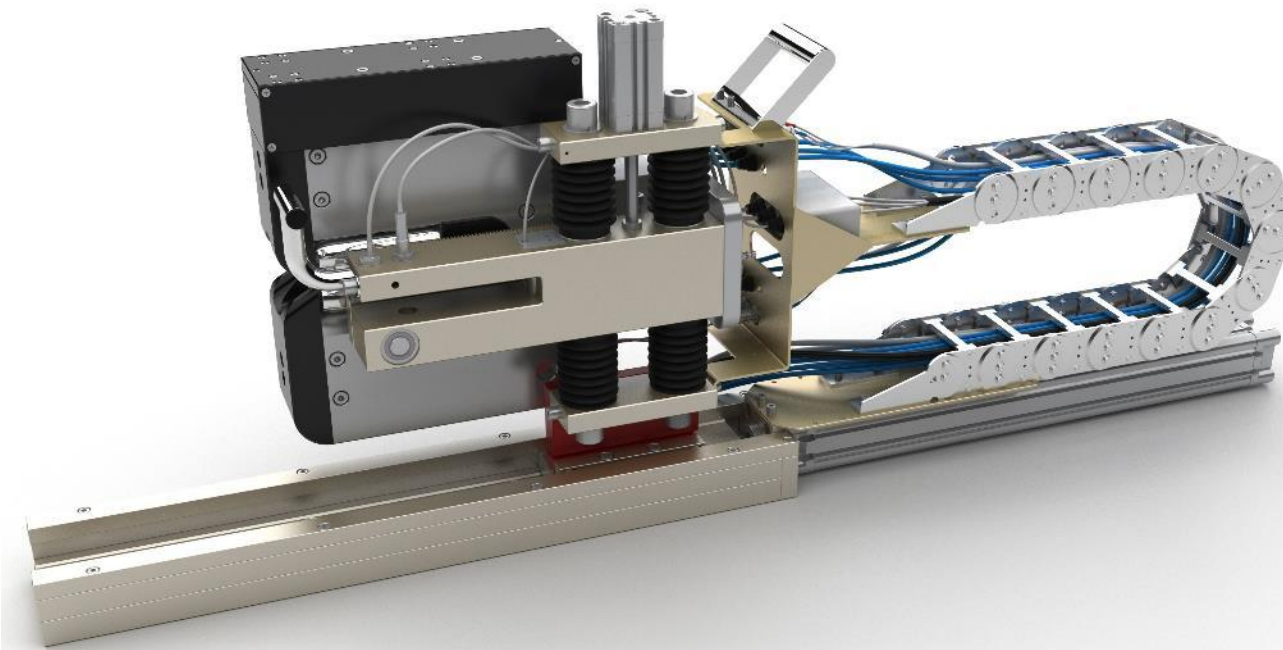
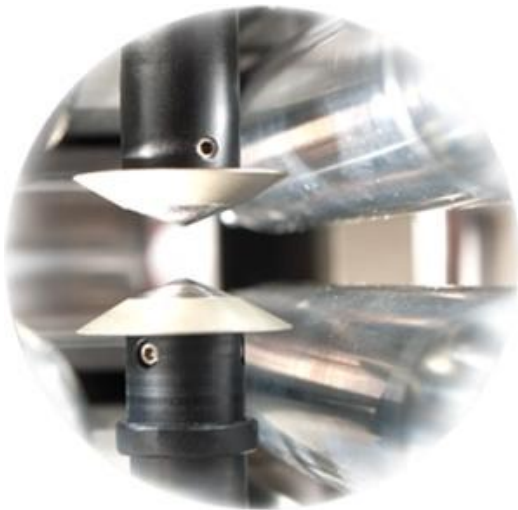
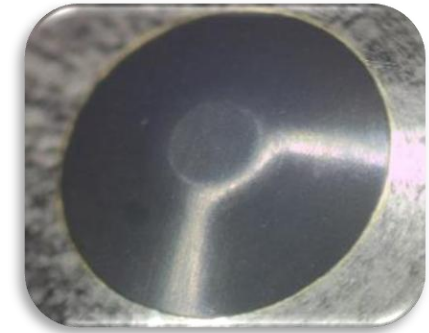
Laser strip thickness gauge

- Automatic calibration
- Automatic cover
- Overpressure protection of the laser sensors
- Scanning mode

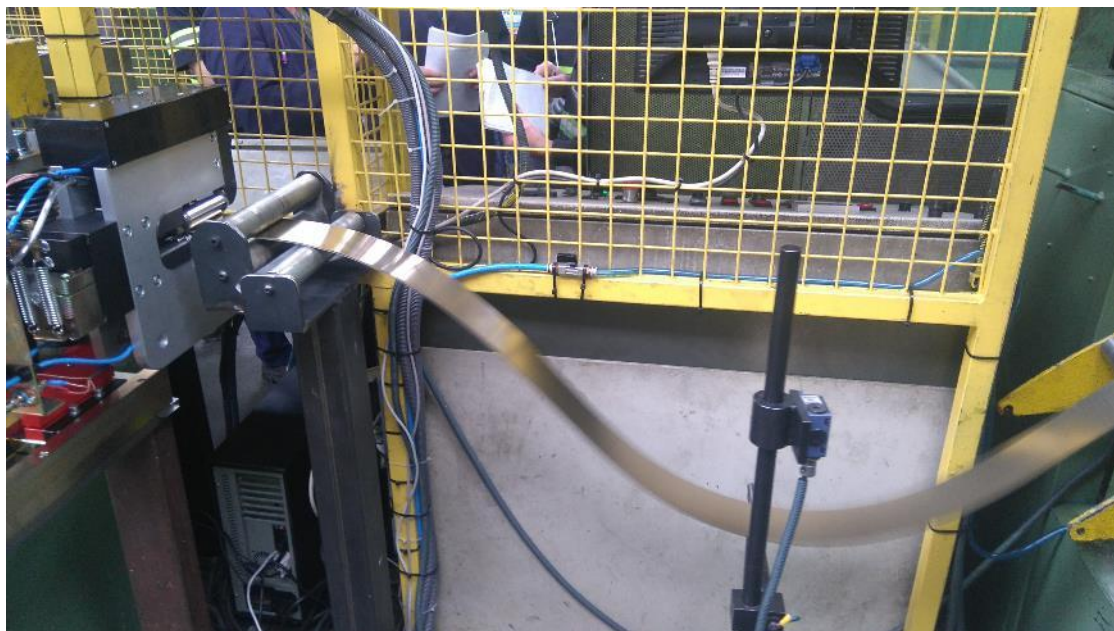


Contact strip thickness gauge

- A pair of durable sensors mounted in C-frame in a floating head
- Own sensor technology, accuracy $< 0,5 \mu\text{m}$
- Sintered diamond contacts in touch with the strip



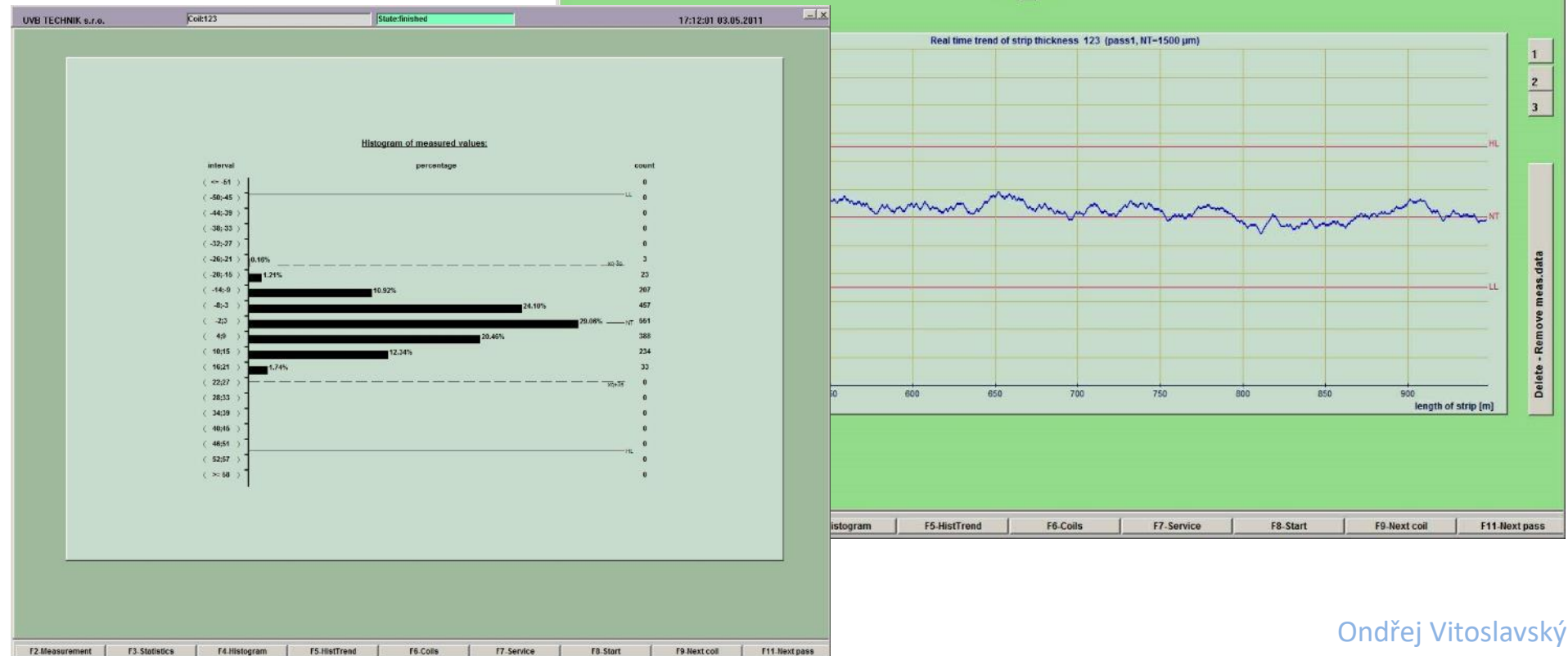
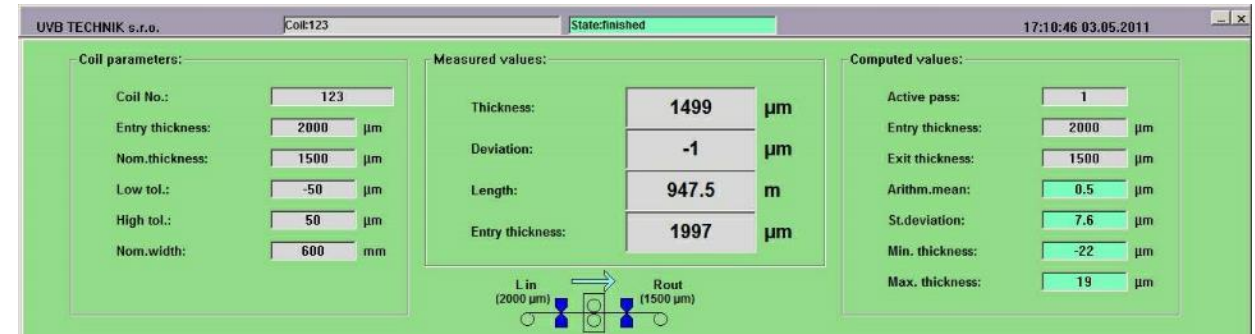
Contact strip thickness gauge in the world



Thickness gauge – data collection

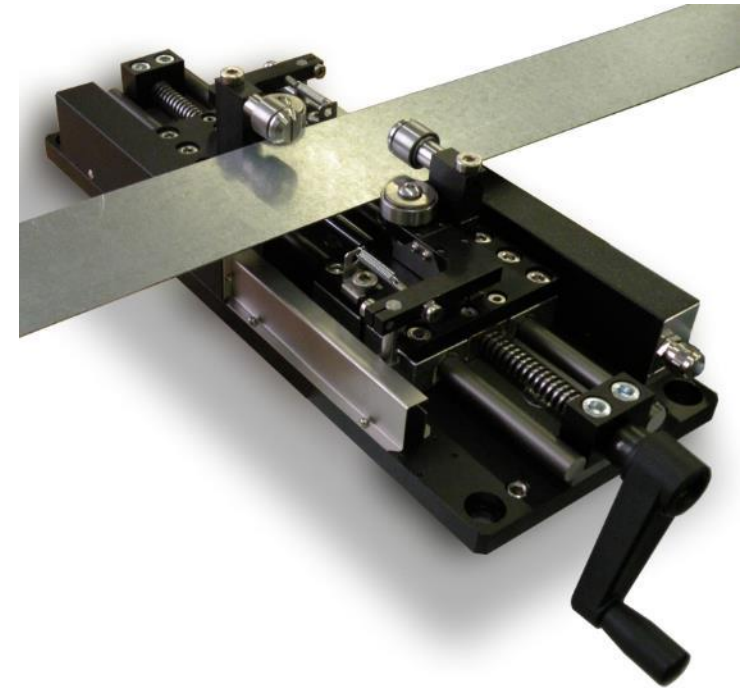


- Graphic display in real time
- Traceability by length
- Statistical reports



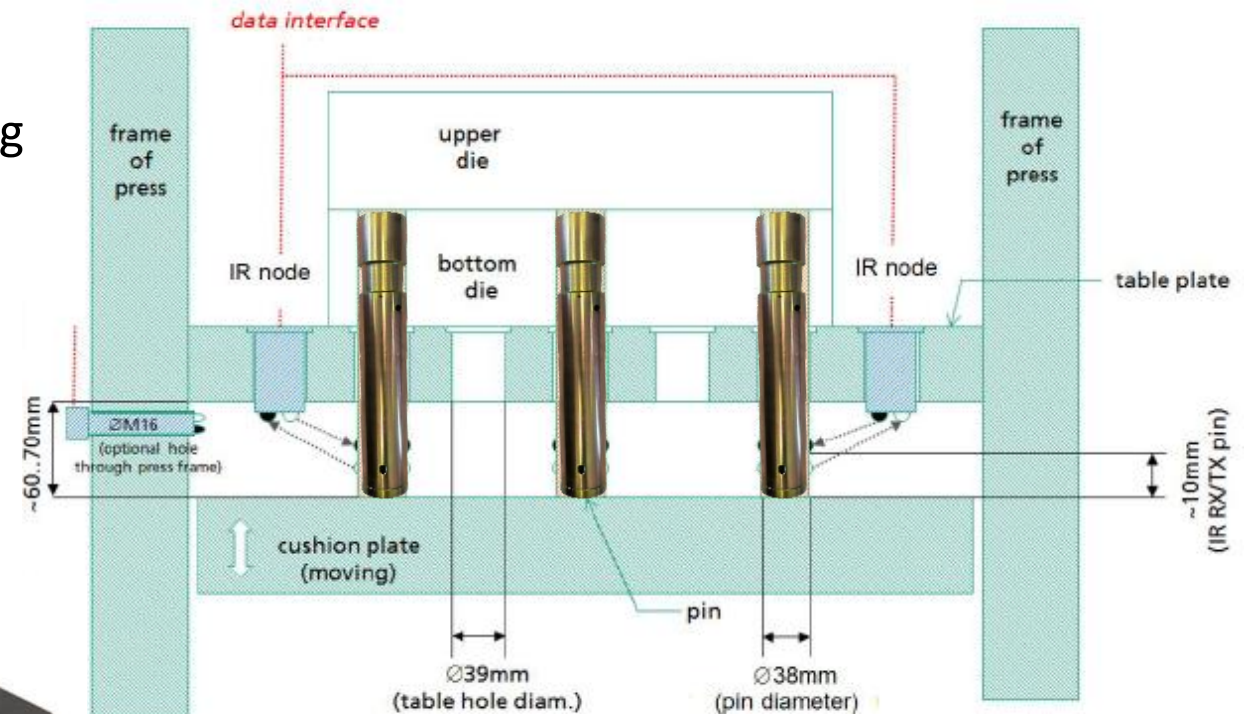
Strip width gauge

- Continuous online contact measuring of strip width
- Accuracy $< 10 \mu\text{m}$
- Strip width up to 300 mm



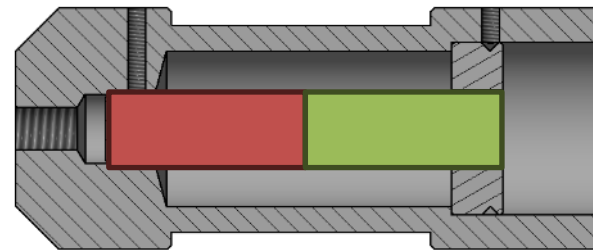
Smart Cushion Pin

- Replacing standard cushion pin
- Measuring of forces during metal sheet forming
- Remove wrinkles/cracking



Mechanical design

- Outer diameter from 30 mm to 100 mm.
- Capacitance principle – two electrodes



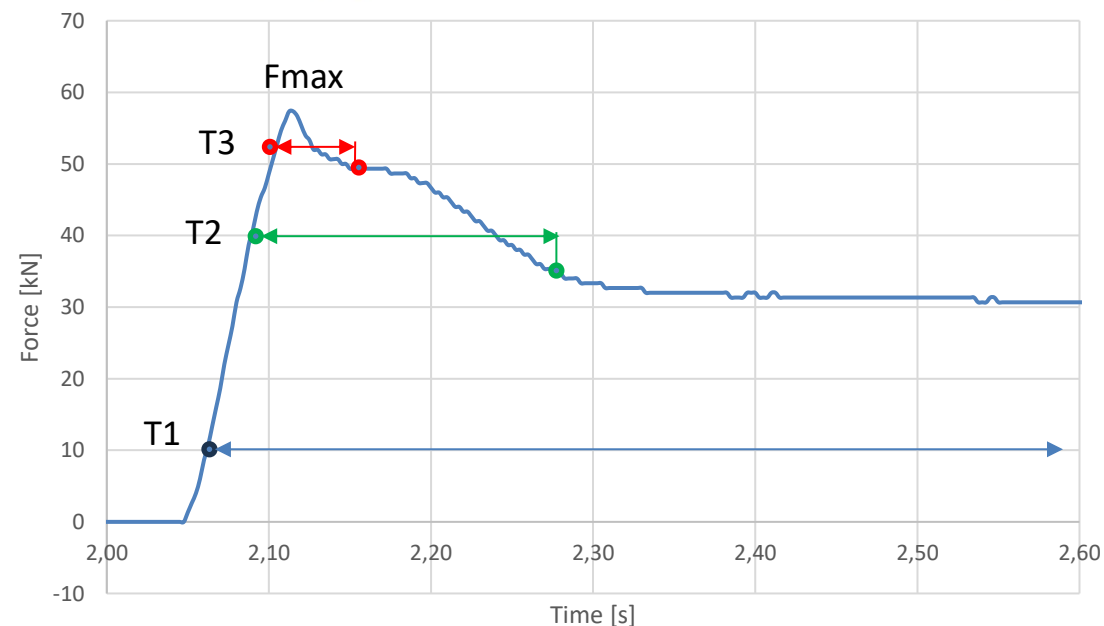
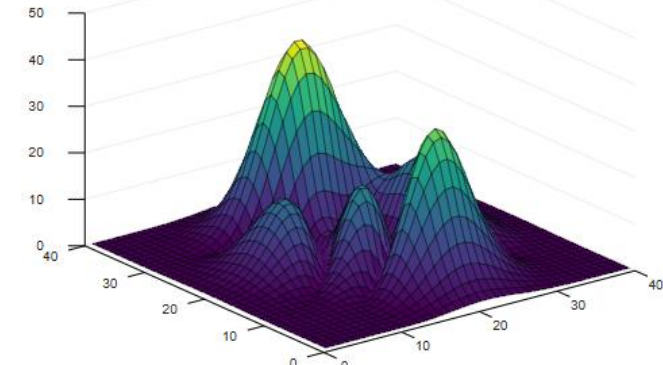
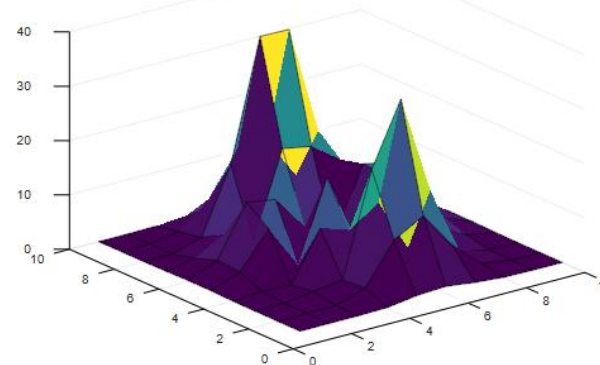
IR node

Smart Cushion Pin

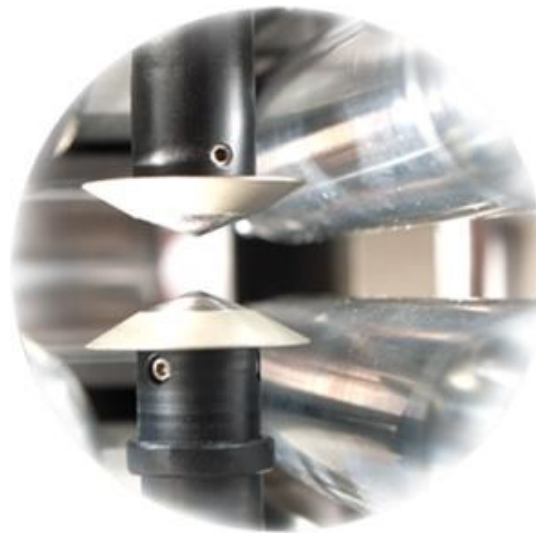


Data collection/visualisation

- Up to 120 Smart cushion pins
- Up to 32 IR Nodes
- 400 Samples per second
- Up to 60 measurings per minute



Thank you for your attention!



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