

Figure 1-1: Process chain for laser surface treatment and combined nitriding - CURARE



Machining system Alzmetall

Machine tool

- Gantry-Concept (5-Axes simultaneous)
- Working space:
 - Traverse path X-,Y-Axis: 800 mm
 - Traverse path Z-Axis: 600 mm
- Fast traverse at TCP 60 m/min
- Position accuracy 0.007 mm

Rotary/ Tilting unit

- Direct drives in turning and rotating axis
- A-Axis tilting range $\pm 140^\circ$
- C-Axis turning range 360° (continuously)
- Turning table diameter 320 mm

NC-Control Siemens SINUMERIK 840 D Solution Line

Figure 1-2: Machining system for the automated laser surface treatment

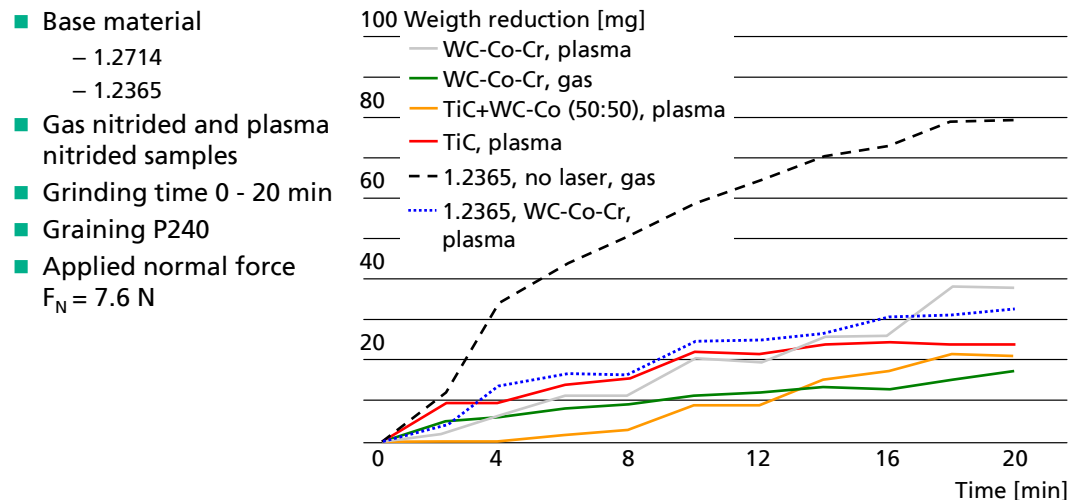


Figure 1-3: Wear resistance of laser alloyed/ dispersed and subsequent nitrided samples (Pin-on-disc-test)

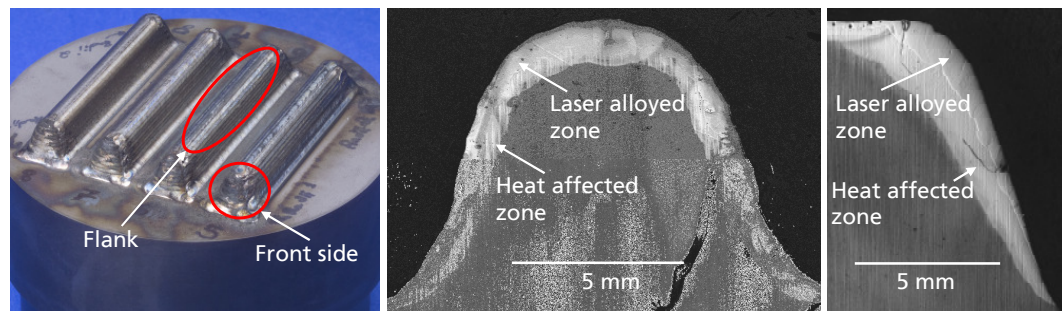


Figure 1-4: Laser alloyed demonstration part (left); metallographic cross-section at the flanks (centre); metallographic longitudinal-section at the front side (right)

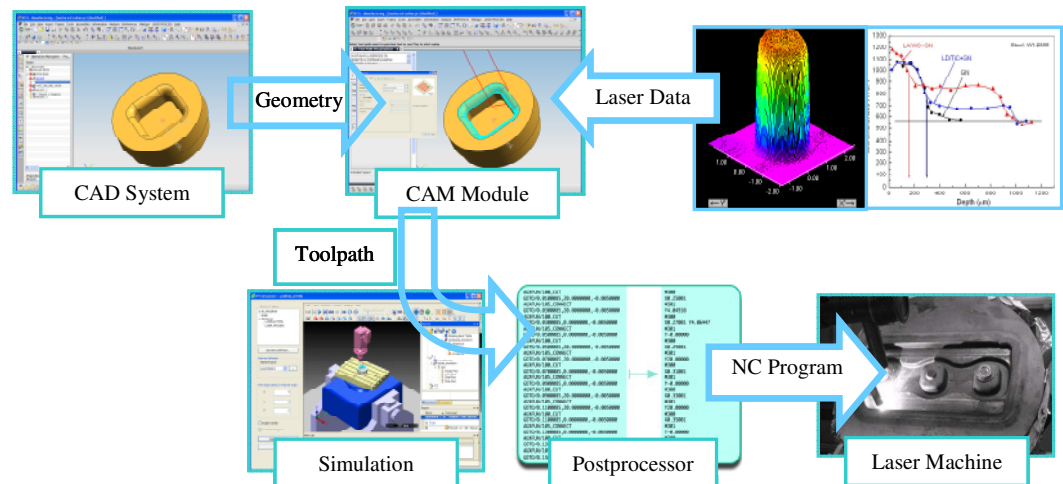


Figure 1-5: Process chain for the CAX-module

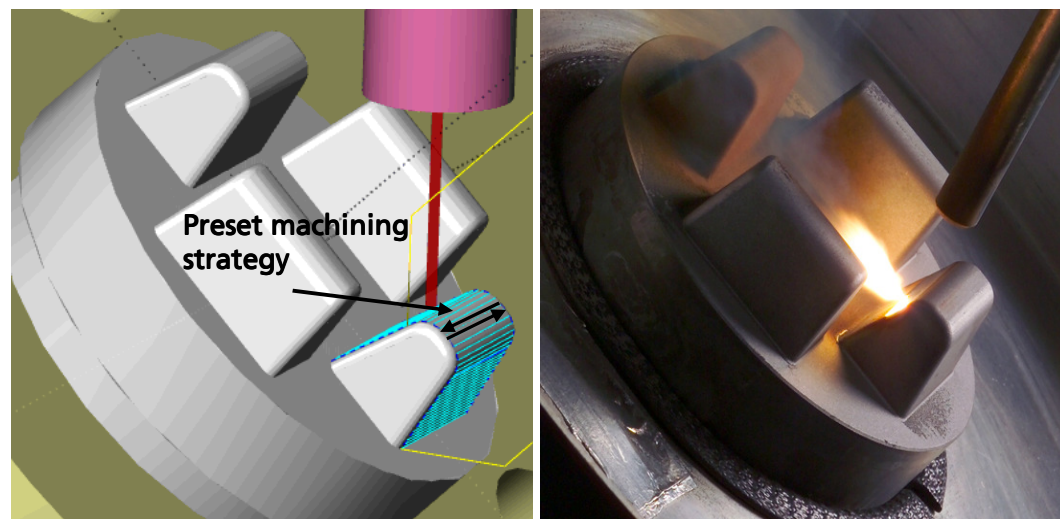


Figure 1-6: Calculated tool path and 5- axes treatment of a selected demonstration part



- Base material
 - Steel 1.2343
- Additive material
 - WC-Co-Cr
- Nitriding process
 - Plasma nitriding
- Depth of the characteristic layers
 - PN 0.2 mm
 - LA 1.0 mm
 - HAZ 1.5 mm

Figure 1-7: Micrograph of a combined treated surface

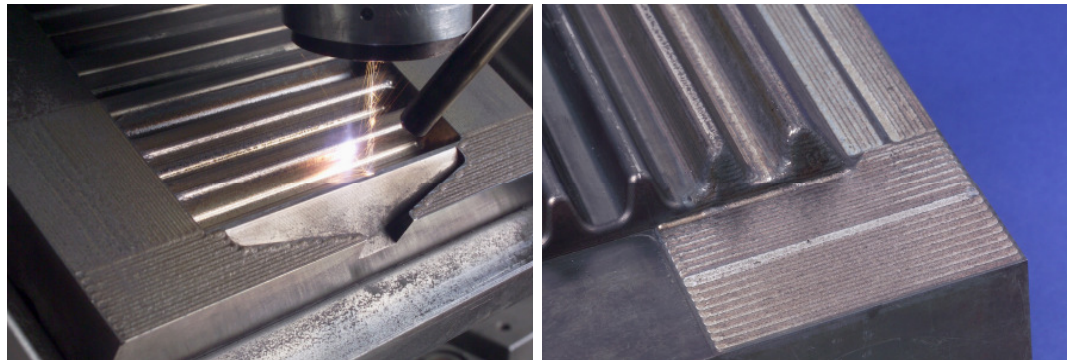


Figure 1-8: 5-axes laser surface treatment (left); Laser treated surface (right)

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