

Využití produktů Hexagon v COMTES FHT

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Software User
Conference CZ&SK
Zaječí | 18. - 19. června 2024

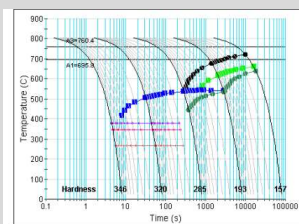
Who we are and what we do

- We are a **private research institute** dealing with R&D in metals, development of their processing technologies and materials analyses and testing
- We provide **R&D services** – our results are **always utilized in technical applications**
- We do consultancy in **administration of public funded R&D projects**
- We are **partners of leading companies** in many industrial segments; our customers are Apple, Škoda, Boeing, Swatch, Megatech, CPF and many others

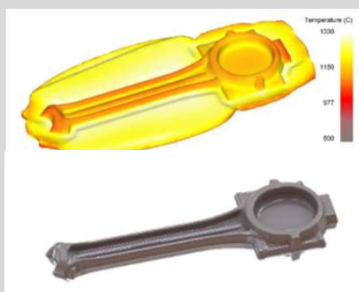
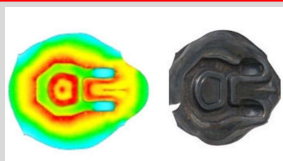


Our activities

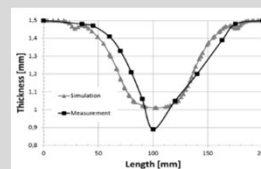
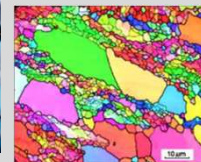
Materials research



Technology development



Testing



Prototyping



Consulting, education etc.

Hexagon produkty používané v COMTES FHT



Simufact Additive

- aditivní výroba technologií PB



Simufact Welding

- aditivní výroba technologií DED



Marc Mentat

- statické analýzy, Contour Cut Method

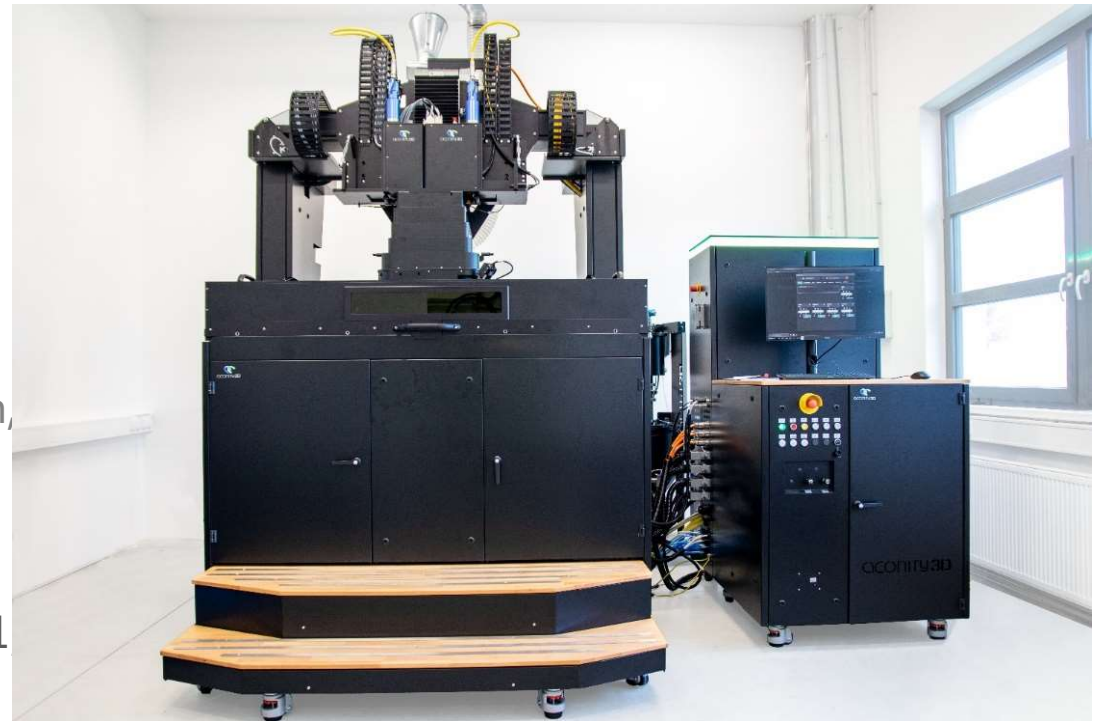


MSC Apex 2020

- nástroj pro meshování

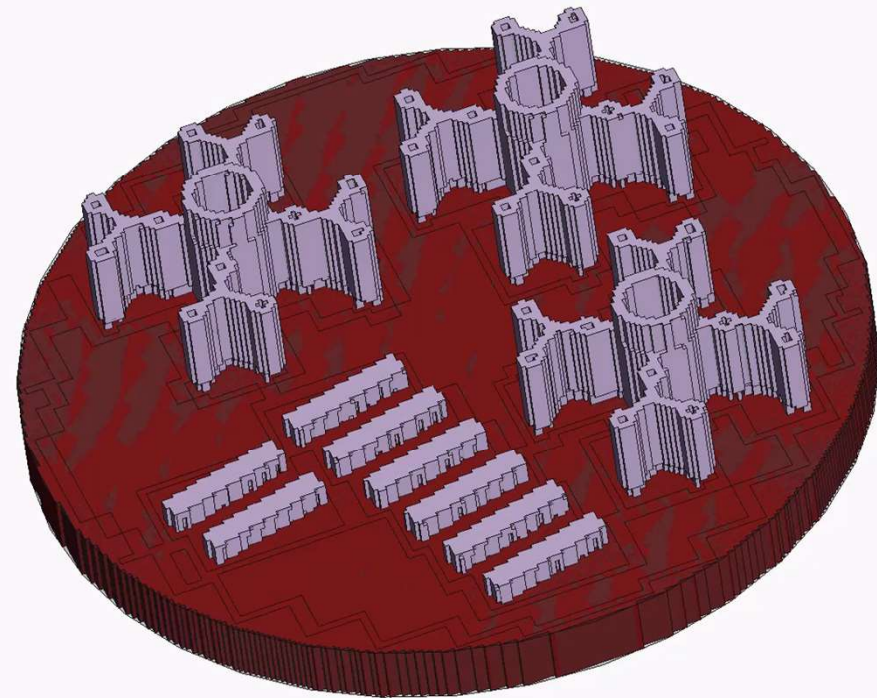
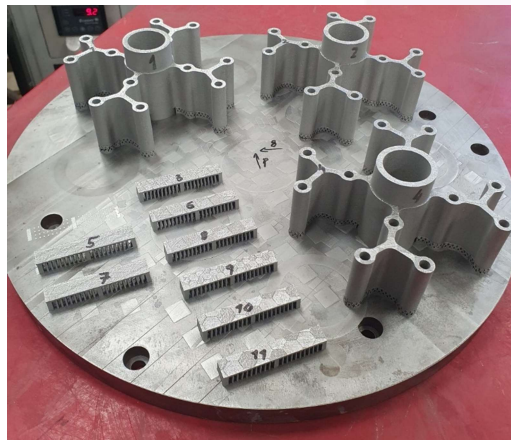
Aconity3D TWO

- Laser Power bed Fusion technology
- IR laser 2 x 1000 W
- Laser diameter 80 – 500 μm
- Workspace:
 - Standard chamber $\varnothing 400$ - 400 mm
 - Heated reduced chamber $\varnothing 350$ - 400 mm, maximum temperature 500 $^{\circ}\text{C}$
 - reduced chambre $\varnothing 140$ - 200 mm
- Materials: 316L, 1.2709, CoCrMo, CuCrZr1, Ti6Al4V, IN718, AlSi10Mg

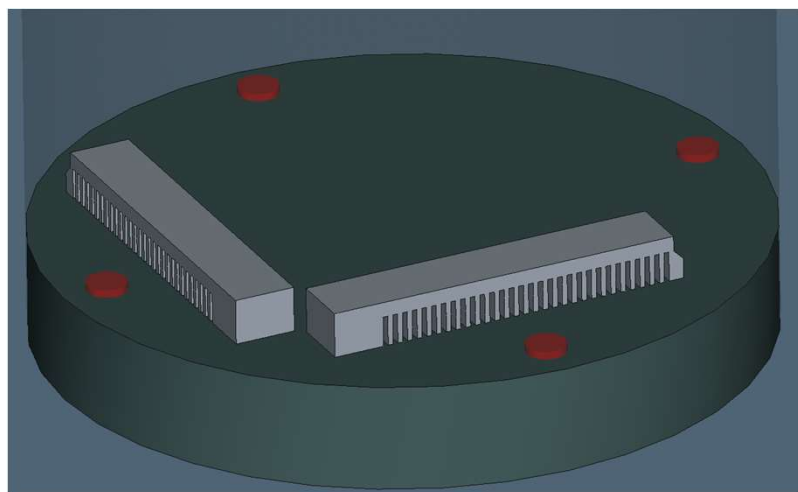


Numerical simulation of Powder Bed Fusion

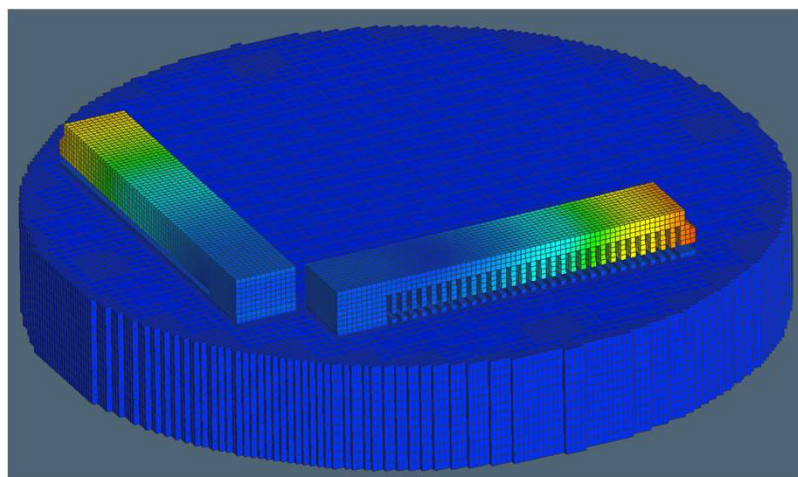
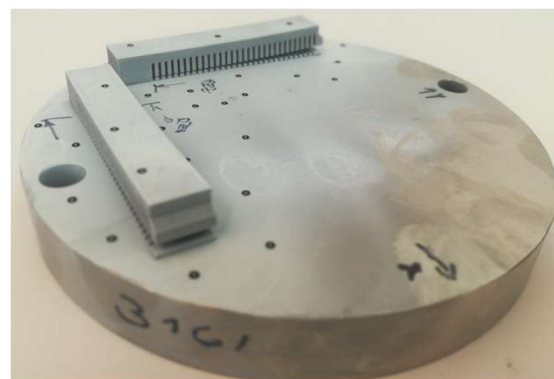
- material: 316L – feasibility study + porosity evaluation



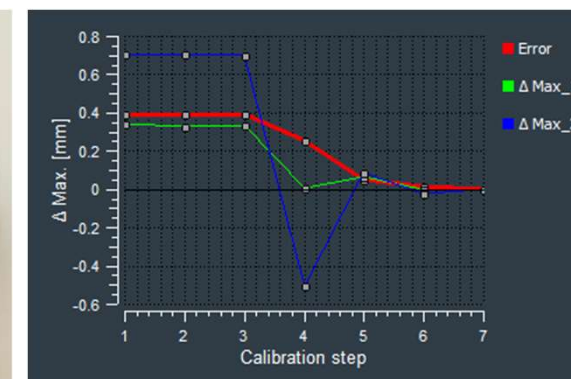
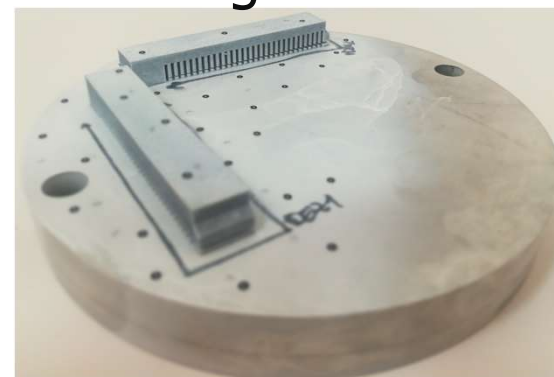
Kalibrace modelů Simufact Additive



316L



AlSi10Mg



InssTek MX-600 DED machine

- Industrial machine
- AM by Directed Energy Deposition method
- 2kW Ytterbium fiber laser
- Working area: 450 x 600 x 350 mm
- Motion: 5 axis
- Multi-material deposition / 4 powder feeding systems

- Three deposition regimes:
 - SDM 800 (beam diameter 800 μm , layer thickness 250 μm),
 - SDM 1600 (beam diameter 1600 μm , layer thickness 600 μm)
 - SDM 2400 (beam diameter 2400 μm , layer thickness 900 μm)

- DMT mode – the printer changes the laser power to maintain a continuous layer
- Particle size distribution 50 - 150 μm

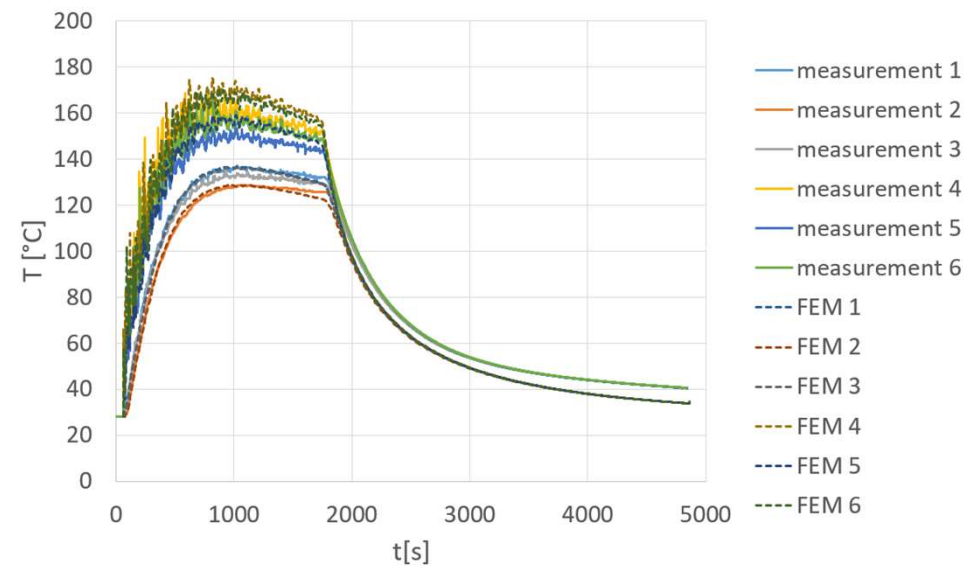
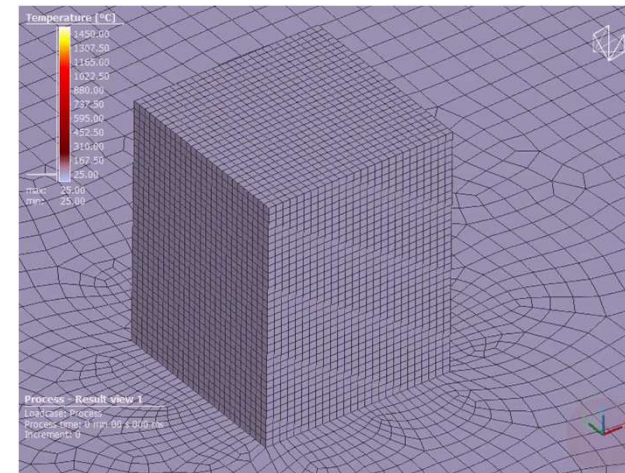
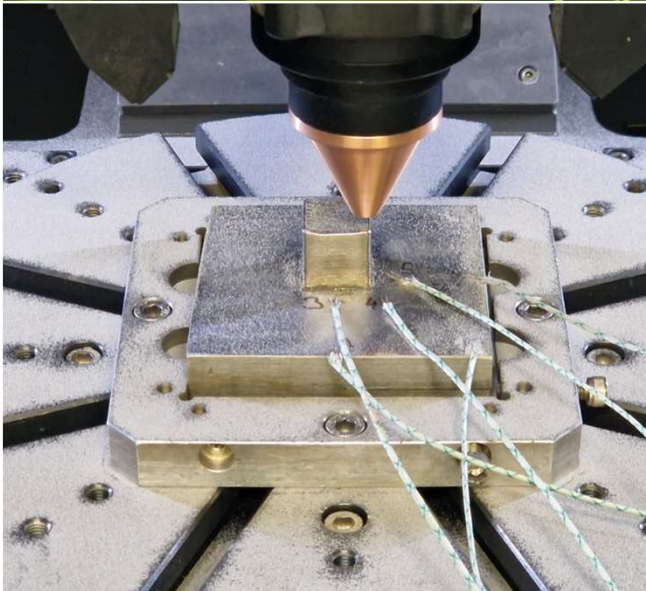
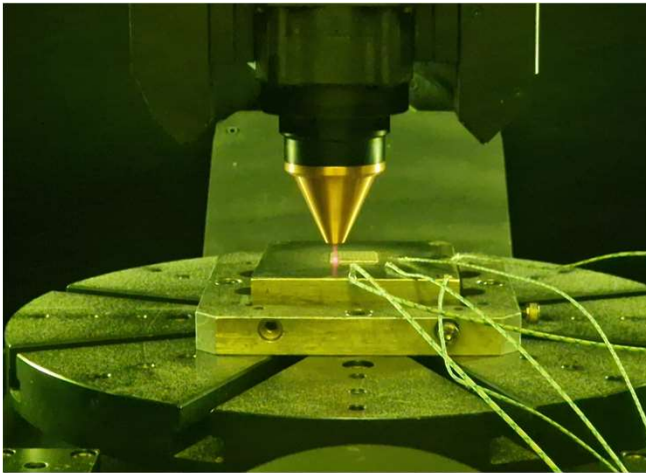


Numerical simulation of AM DED structure behavior

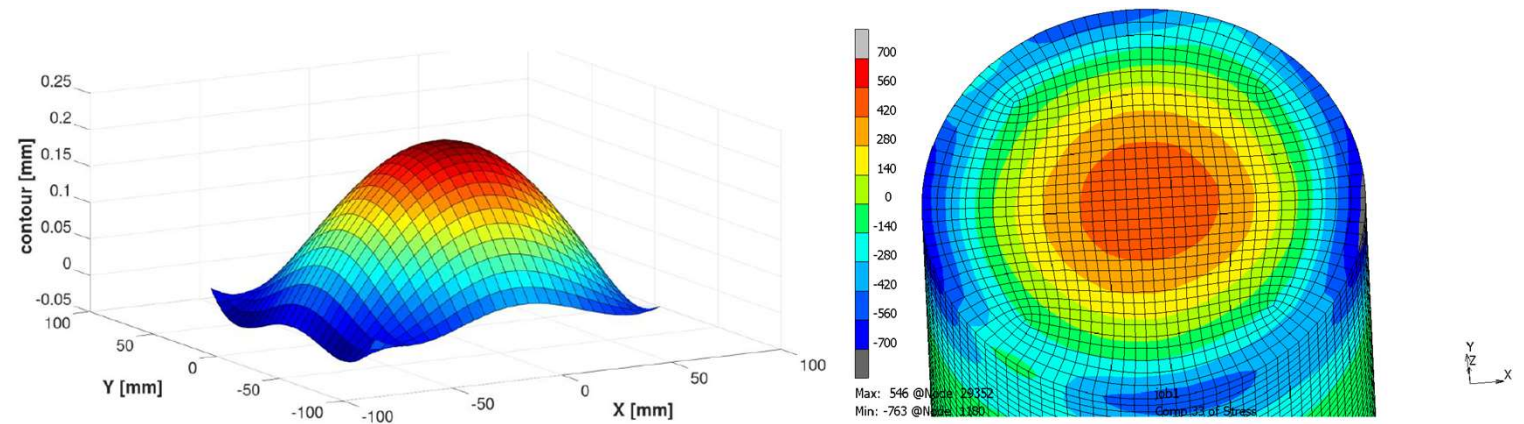
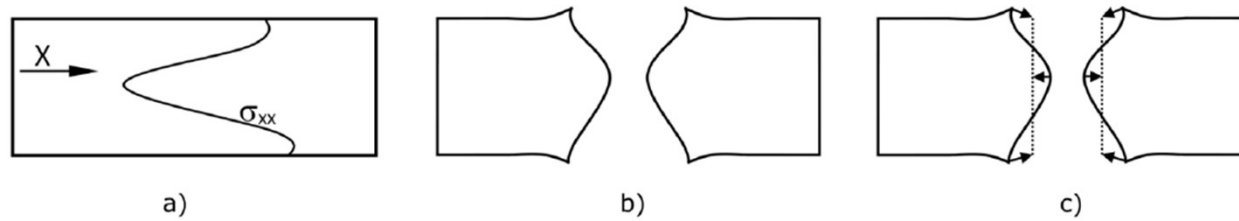
- Temperature distribution during process
- Residual stresses after process
- Material description with transformation phases



Experimentální zjištění HTC během depozice

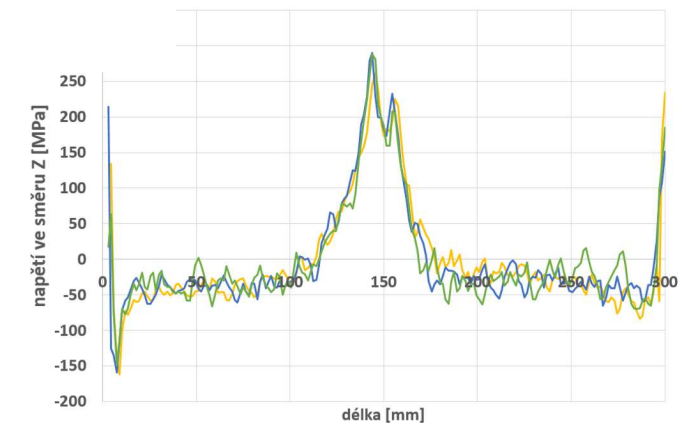
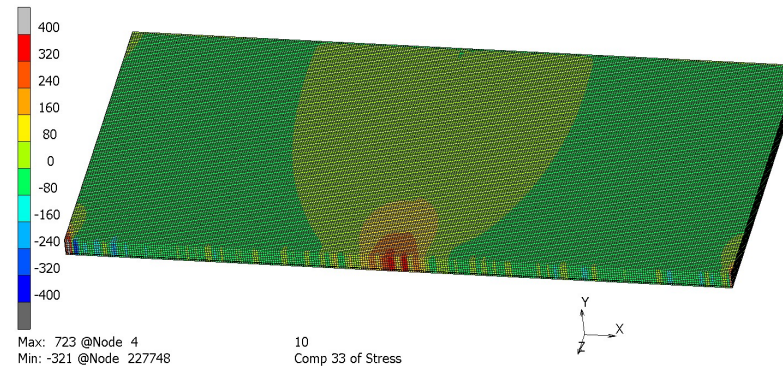
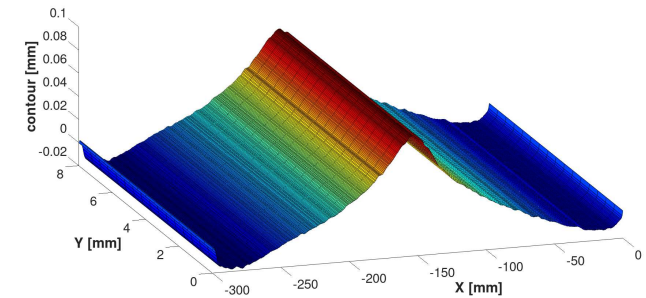
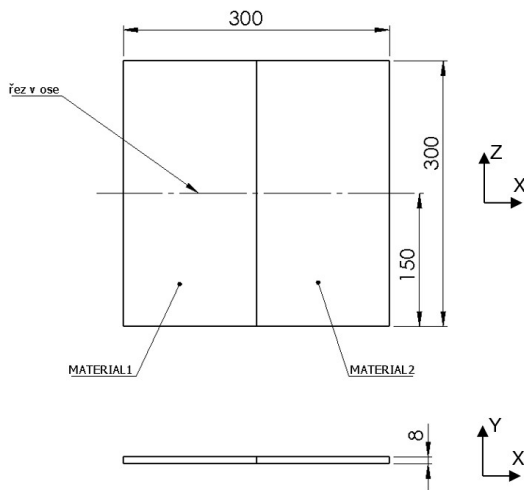


Contour Cut Method



Příklady použití Contour Cut Method

■ Analýza napětí svaru



Příklady použití Contour Cut Method

- Aditivně vyrobený vzorek z 316L

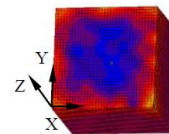
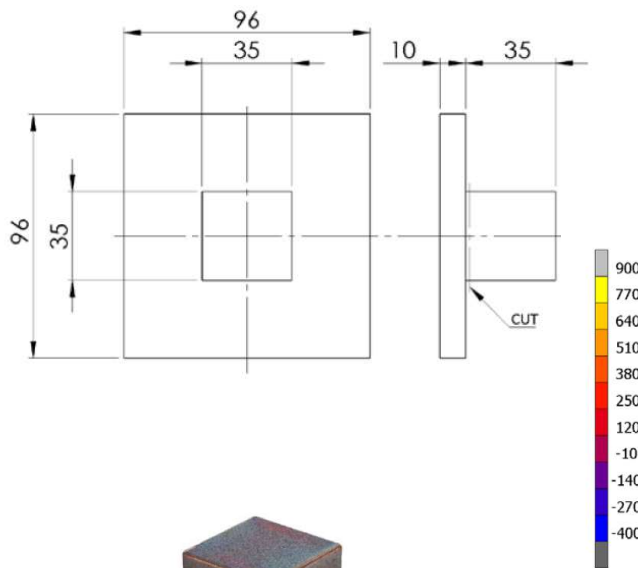


Fig. 6 Stress in the build along Z-axis

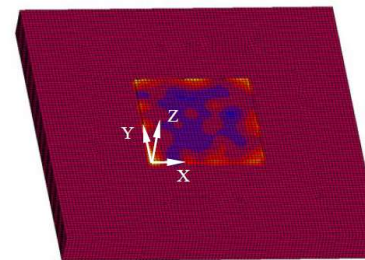


Fig. 7 Stress in the base plate along Z-axis

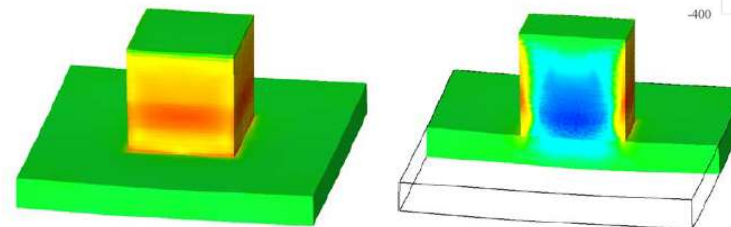
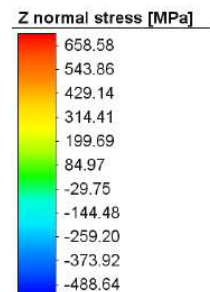
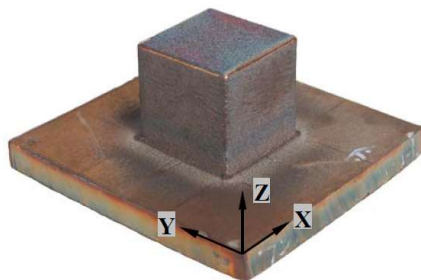
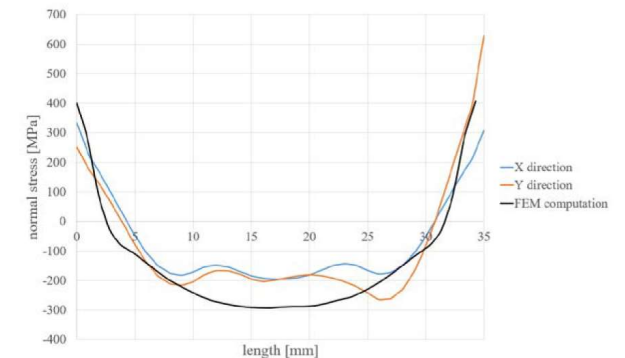
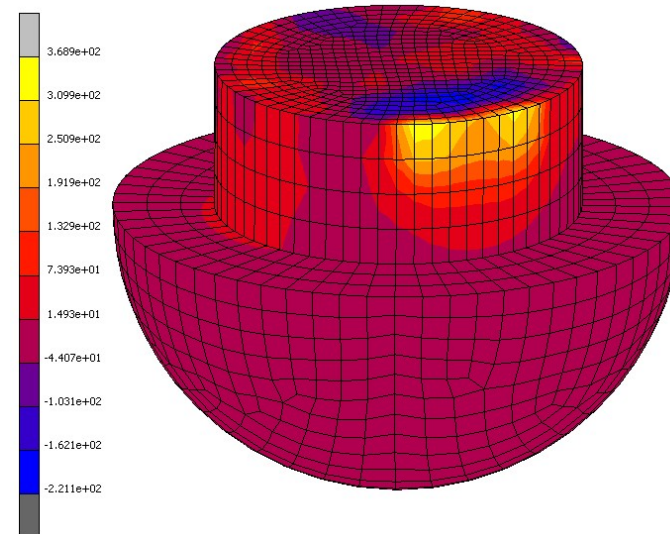
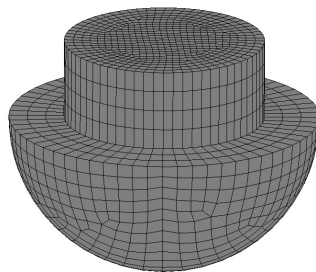


Fig. 10 Stresses along Z-axis on the surface of and cross section through the model

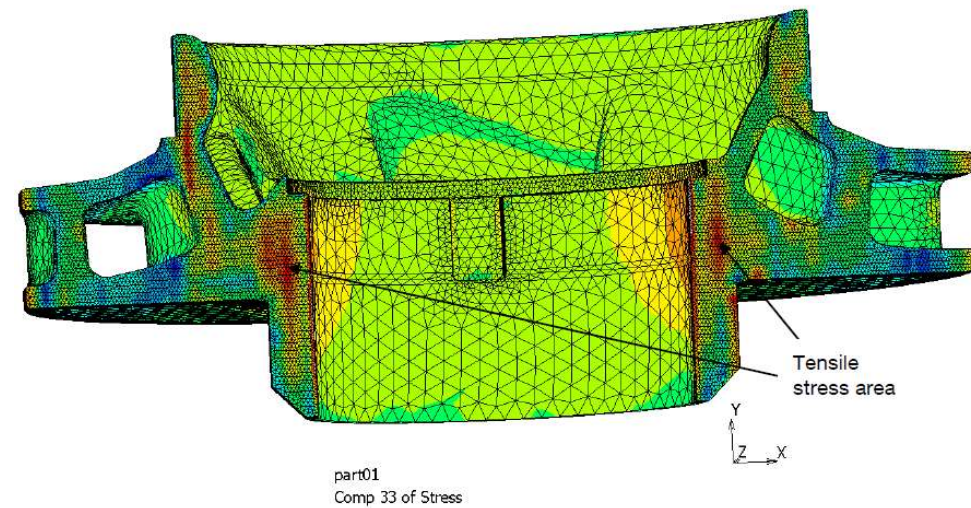
Příklady použití Contour Cut Method

- Analýza napětí na nýtu historického mostu



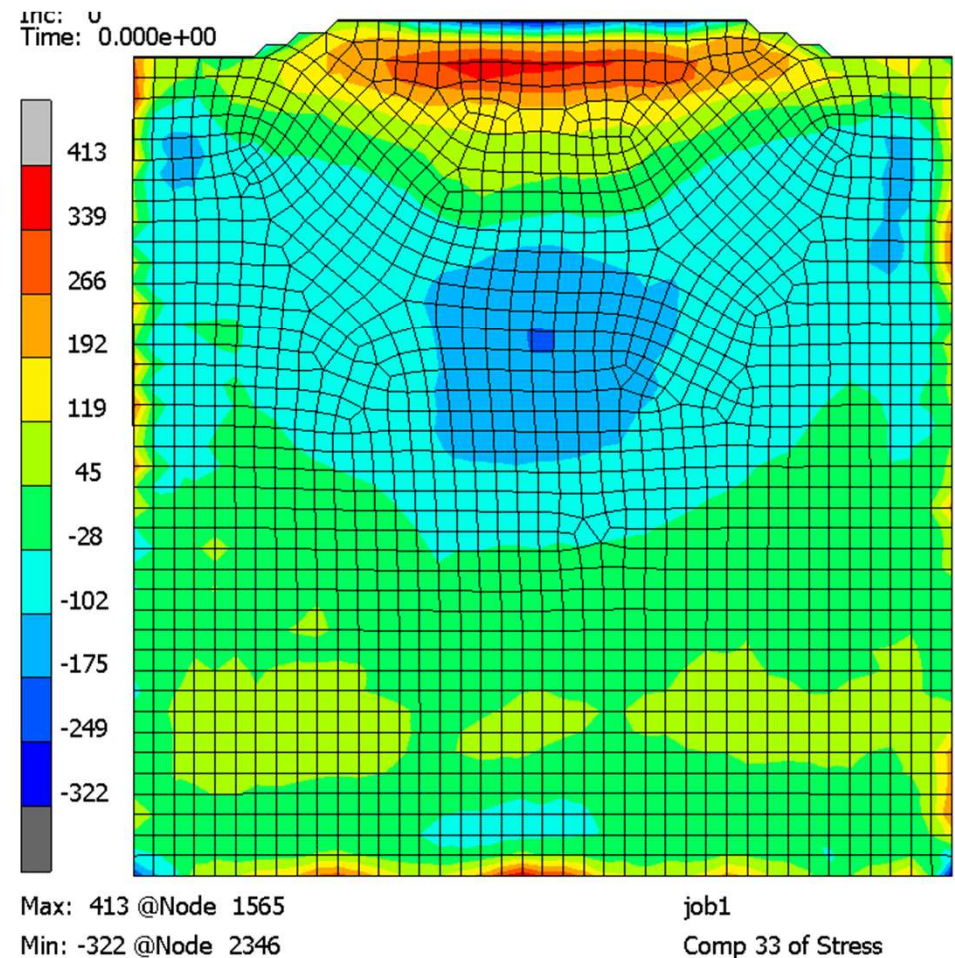
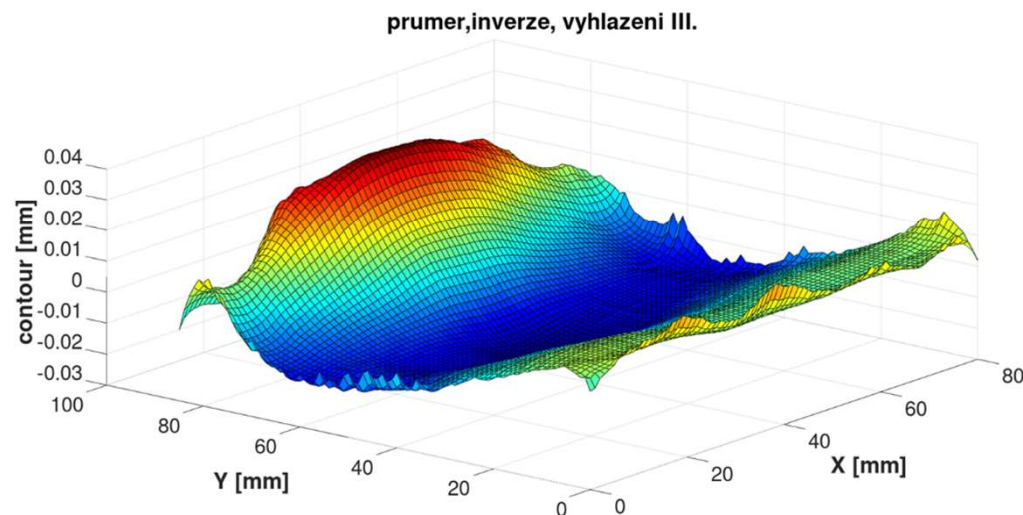
Příklady použití Contour Cut Method

- Rozvodné kolo D500mm



Příklady použití Contour Cut Method

Model opravy reaktorové nádoby pomocí DED
Materiál Ochnot - 08Ch18N10T





Děkuji Vám za pozornost!

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