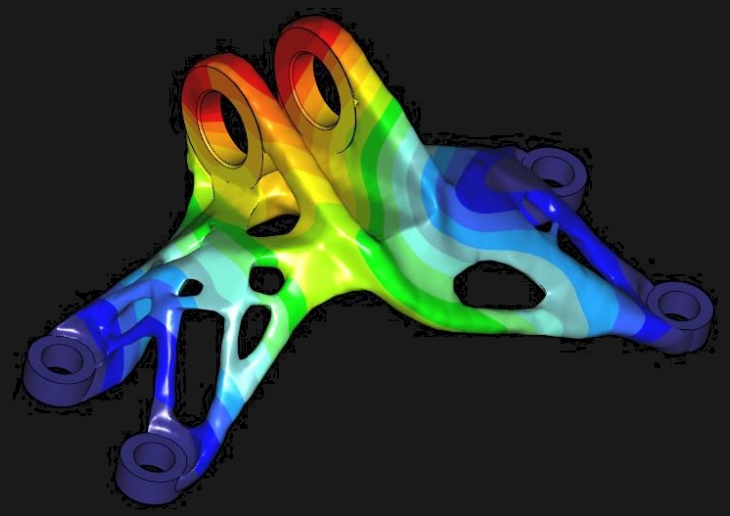
CAESS
Center for Advanced Engineering Software and Simulations

K-TAG

GIA



CAESS ProTOp:

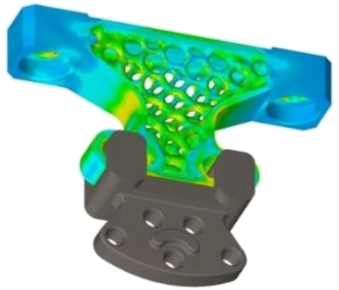
Topologieoptimierungs-Software entwickelt von Ingenieuren für Ingenieure

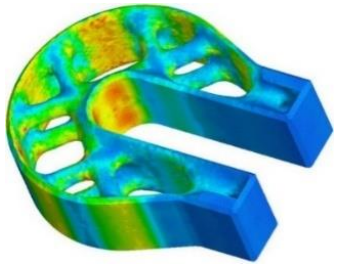
Agenda

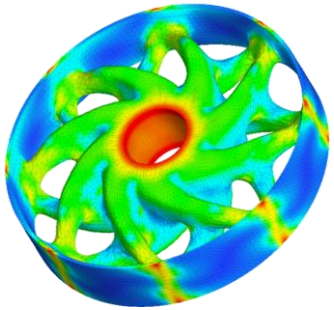
- Präsentator
- GIA Informatik AG
- CAESS, ProTOp für diverse CAD-Lösungen:
  - PTC® Creo® (.fnf)
  - SolidWorks® Simulation (.inp)
  - Siemens NX™ (.dat)
  - CATIA Simulia® Abaqus (.inp)
  - SolidWorks® Simulation (.geo)
  - …..
- Intuitiv, logisch strukturiert, effizient
- Schalen-, Gitternetz-Strukturen (Lattices)
- Fertigungsrandbedingungen (Guss, Stanzen, Schmieden, Pressen, Drehen, Fräsen, …)
- Nichtlinearitäten: Kontakte, Plastizität, Vorspannung
- Netzverfeinerung in ProTOp
- CAD-Flächenrückführung mit .OBJ-Datei (Wavefront)
- Live Demo: Halter
- Kundenbeispiele
- Fragen

https://caess.eu/index.html

Präsentator







Präsentator

- Fokus auf Creo Simulations-Lösungen
- Presales / Training / Consulting:
  - Creo Simulate (Pro Mechanica)
  - Creo Mechanism (MDX, MDO)
  - Creo Animation (DAO)
  - Creo Manikin
  - Creo Behavioral Modelling (BMX)
  - Creo Spark Analysis (CCX)
  - Creo Mold Analysis (CMX)
  - Mathcad
  - ProTOp (Topology Optimization, CAESS, PTC Partner Advantage Silver)
  - FLoEFD (CFD-Simulation, Mentor)
- 28 Jahre Simulations-Erfahrung
- davon 20 Jahre bei PTC als Application Engineer

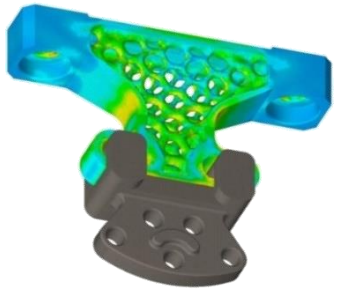
Urs Simmler

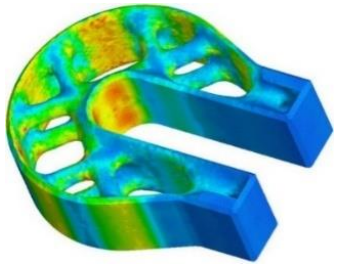
CAD Simulations Experte

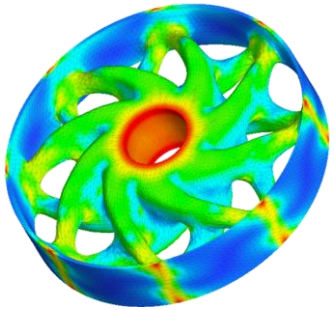
GIA Informatik AG (Schweiz)

mail: urs.simmler@gia.ch
mobile: +41 76 574 90 16

GIA Informatik AG



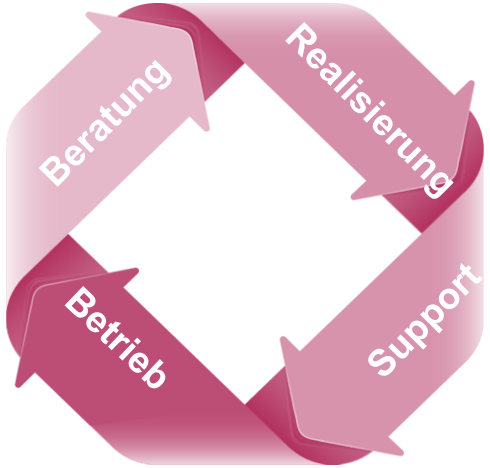




GIA Informatik AG: IT Services für Industrie & Handel

- Seit 1988 mitten in der Schweiz
- 145 erfahrene Mitarbeitende
- Unternehmen der Müller Martini Gruppe

- SAP Lösungen
- IT-Services
- CAD / CAM / CAE / PLM



Partner

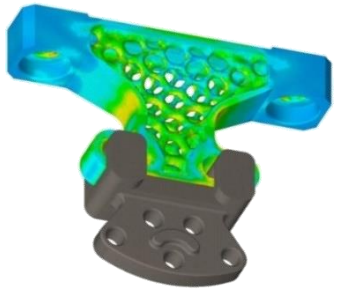
SAP Gold Partner · Hewlett Packard Enterprise Silver Partner · Citrix Partner Silver Solution Advisor · Microsoft Partner Gold Datacenter Silver Devices and Deployment · SAP Certified in Hosting Services · SAP Certified in Cloud Services · Veeam pro partner · ptc · partner network channel · vmware Partner Regional/National Consulting and Integration · Cisco Select Partner · EMC² Business Partner · Mentor Graphics FloEFD™ · Software Factory · Tech Soft · CAESS Center for Advanced Engineering Software and Simulations

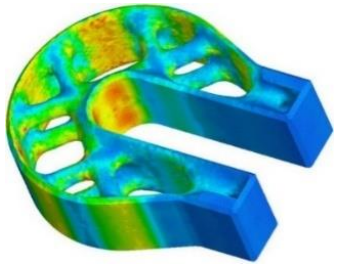
Partner

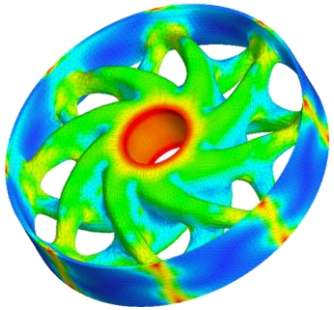
GIA Informatik AG: CAX/PLM-Leistungen

- Vertrieb / Training / Consulting:
  - PTC Creo Parametric
  - PTC Creo Elements Direct
  - PTC Windchill
  - PTC Mathcad
  - PTC ThingWorx / Navigate
  - ProTOpCI (Topology Optimization, CAESS,)
  - FLoEFD (CFD-Simulation, Mentor)
  - Lösungen von Techsoft
  - Lösungen von Software Factory
- Monitoring PDM-Kundensysteme
- PDM-ERP-Schnittstelle
- Eigenes Schulungszentrum in Oftringen
- über 130 Mann-Jahre Erfahrung im CAX/PLM-Umfeld

CAESS, ProTOp für diverse CAD-Lösungen







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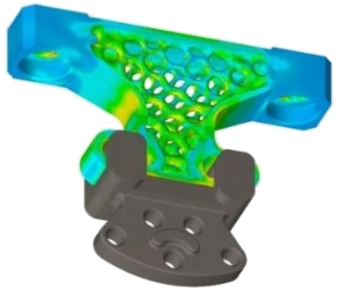
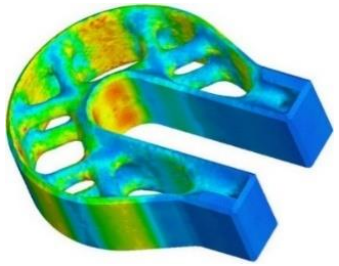
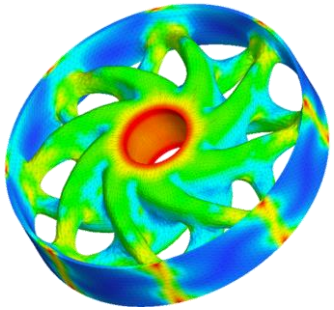


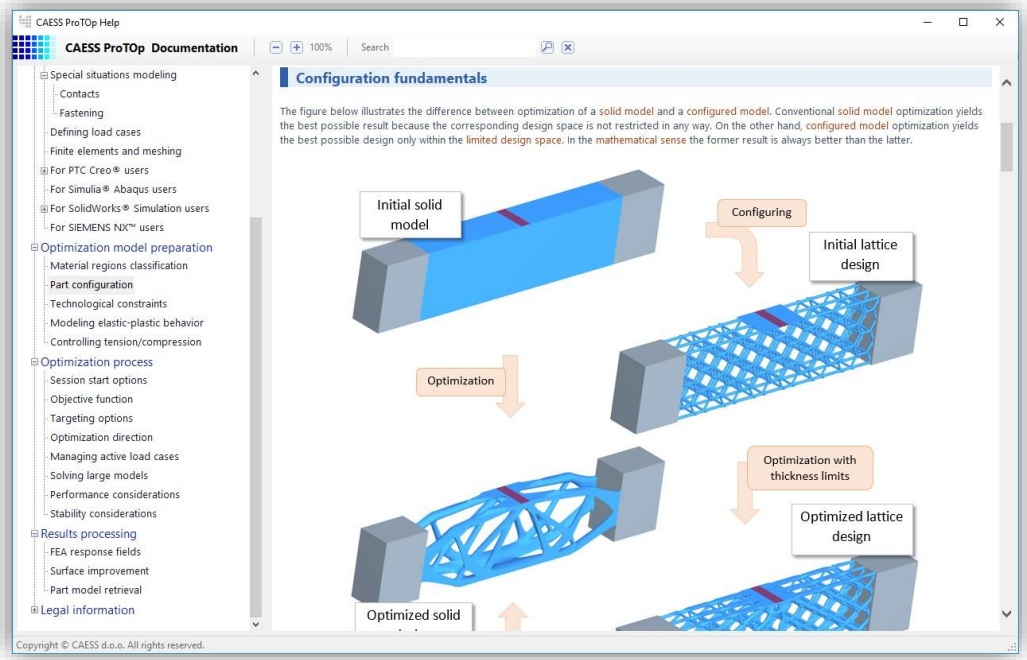
Intuitiv, logisch strukturiert, effizient

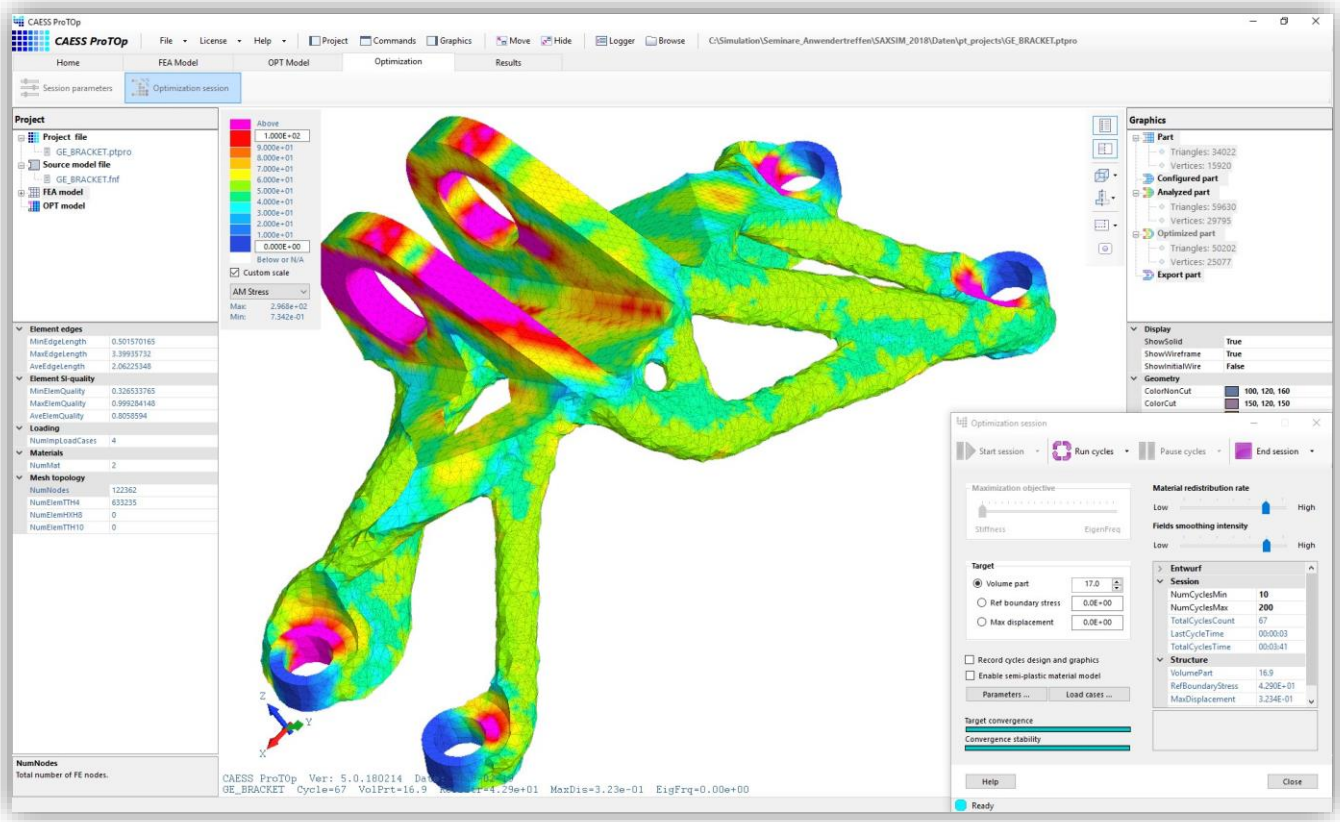




Intuitiv, logisch strukturiert, effizient

- Benutzeroberfläche
  - Intuitiv
  - logisch strukturiert
- effizient
- sehr gute Hilfe

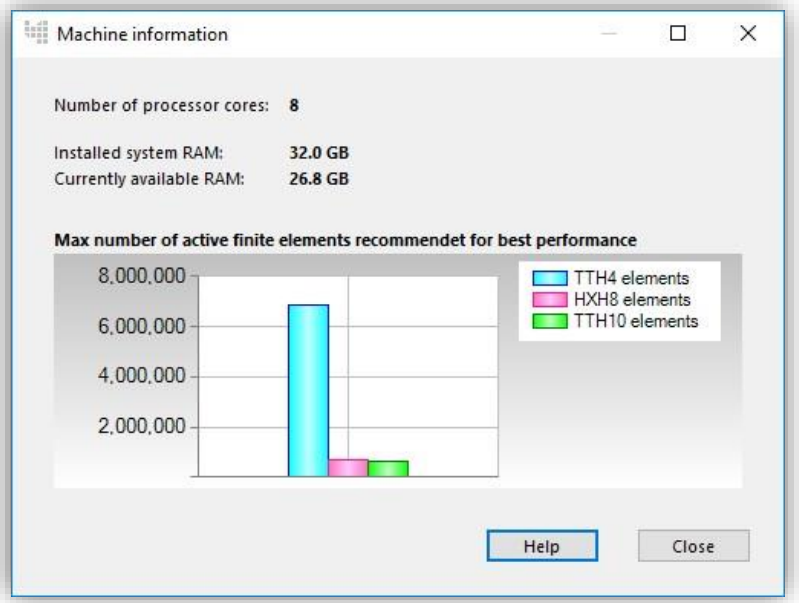




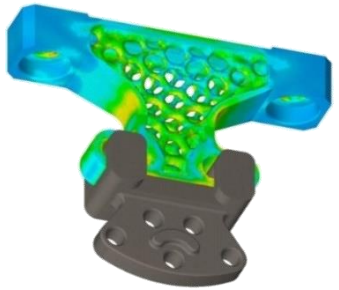
Intuitiv, logisch strukturiert, effizient

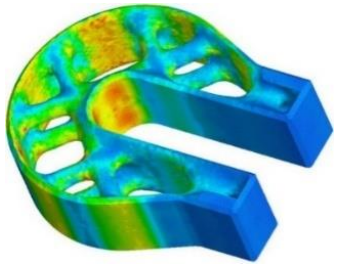
- Extrem leistungsfähig
  - RAM
  - Zeit

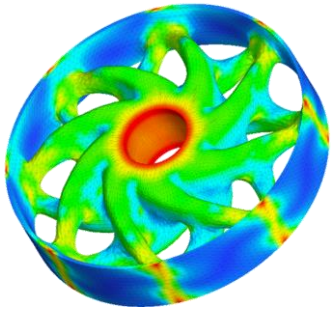
- Rechner-Performance



Schalen-, Gitternetz-Strukturen (Lattices)

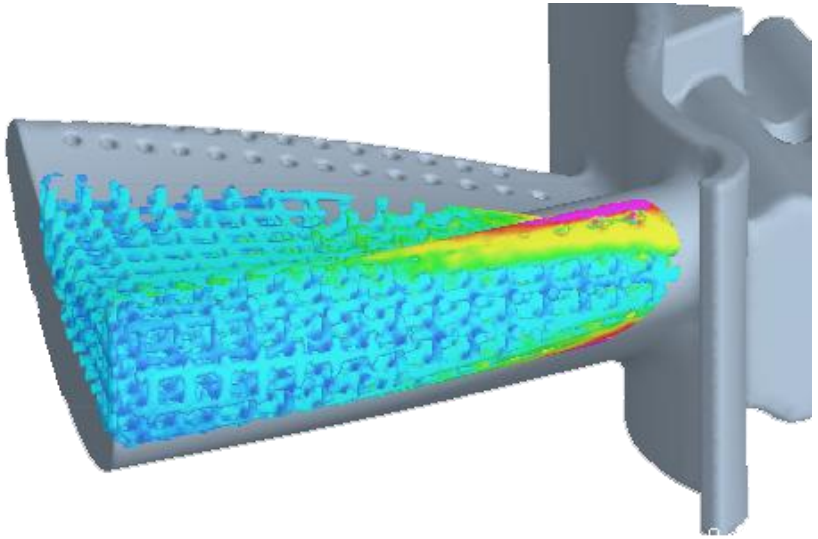


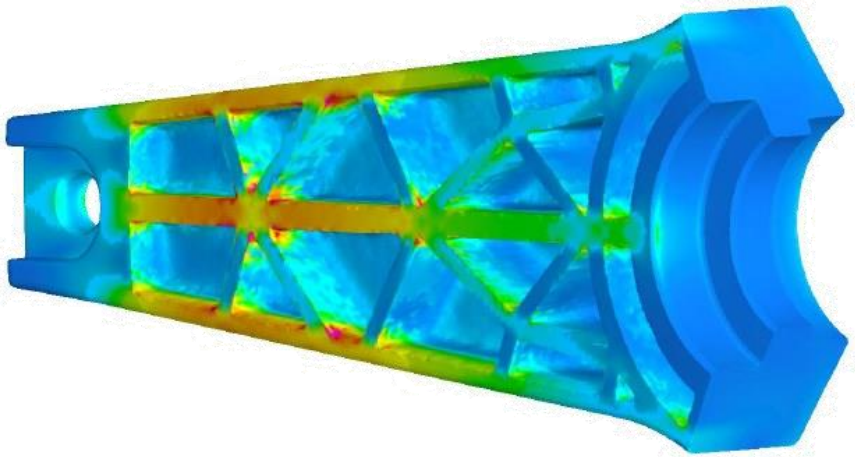


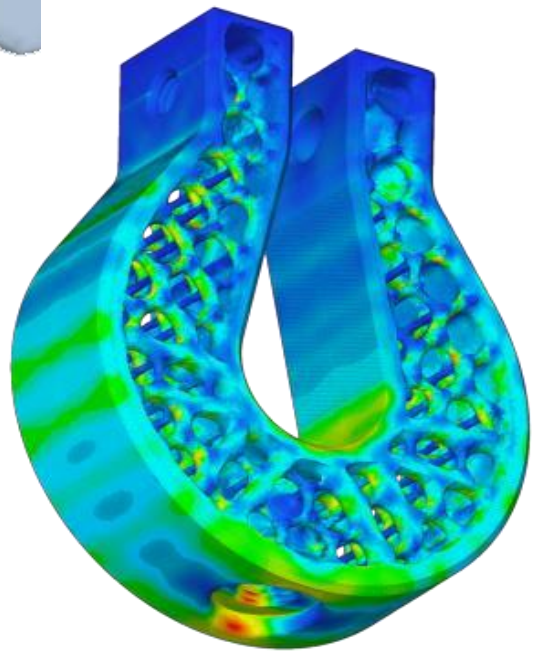


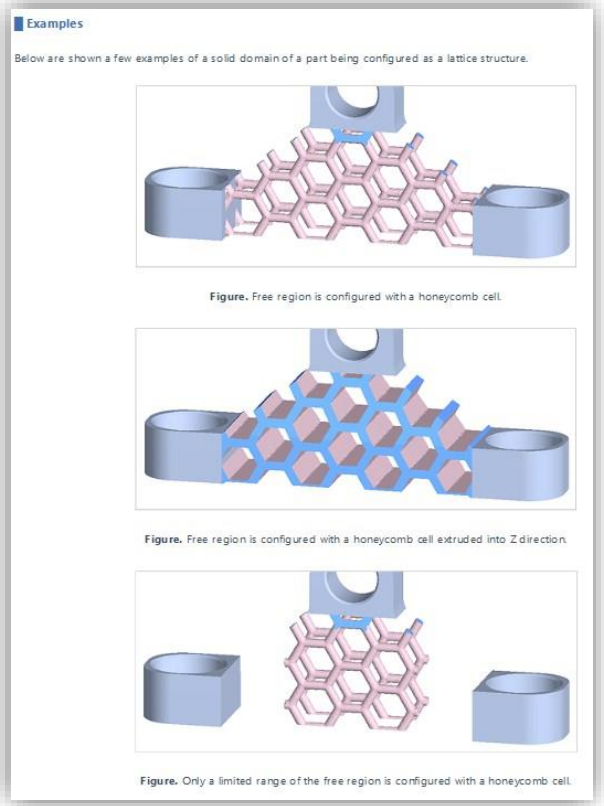
Schalen-, Gitternetz-Strukturen (Lattices)

- Schalen
- Gitternetze
  Lattices









Examples

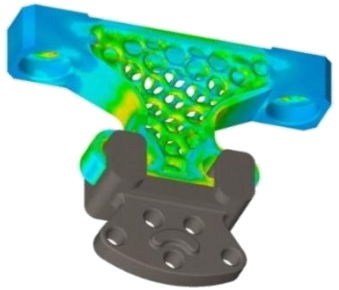
Below are shown a few examples of a solid domain of a part being configured as a lattice structure.

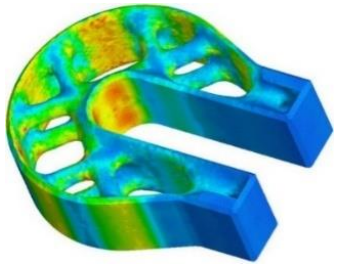
Figure. Free region is configured with a honeycomb cell.

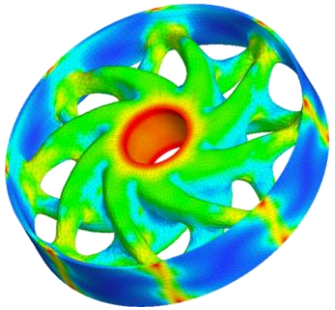
Figure. Free region is configured with a honeycomb cell extruded into Z direction.

Figure. Only a limited range of the free region is configured with a honeycomb cell.

Fertigungsrandbedingungen (Guss, Stanzen, Schmieden, Pressen, Drehen, Fräsen, …)

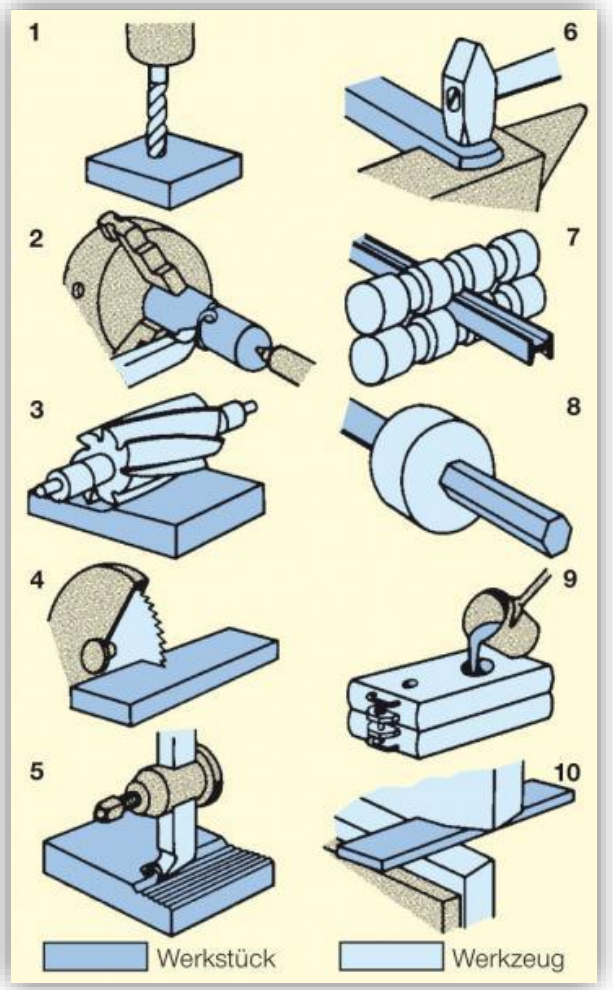


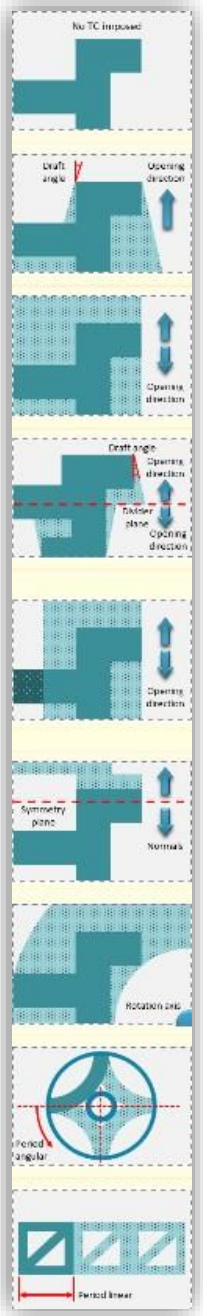


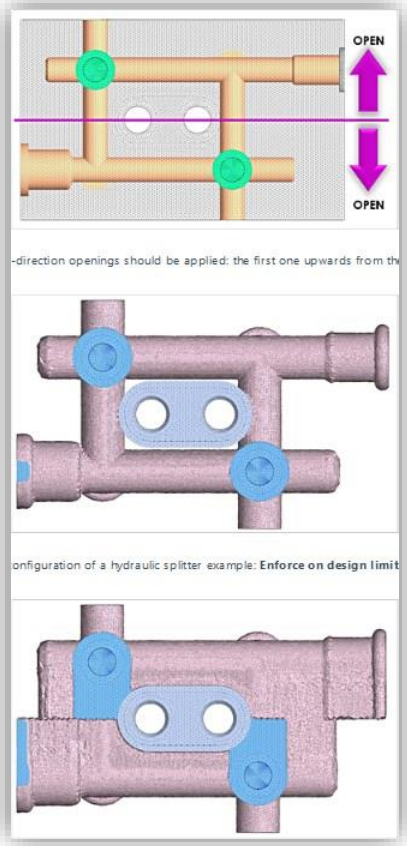


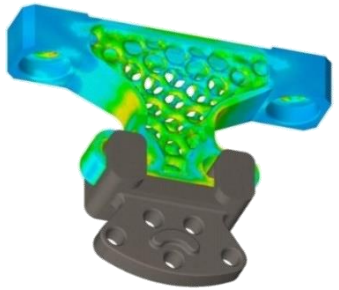
Fertigungsrandbedingungen (Guss, Stanzen, Schmieden, Pressen, Drehen, Fräsen, …)

- Trennebenen
- Formschrägen
- Symmetrien
- Muster

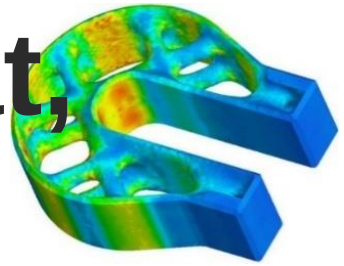


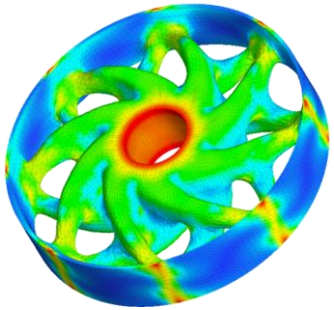






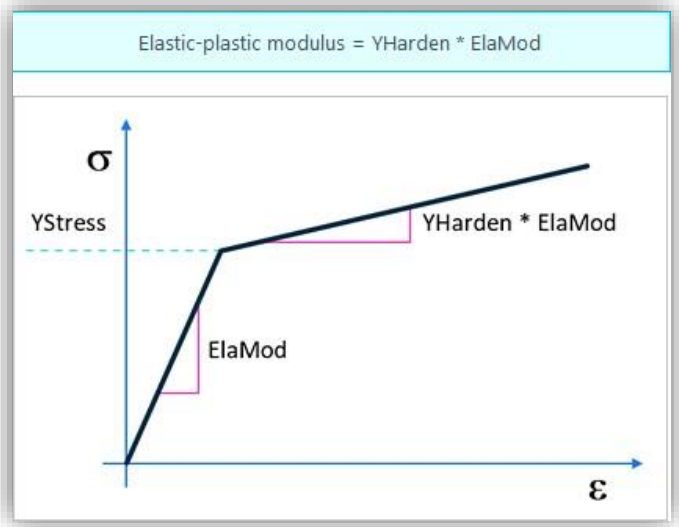
Nichtlinearitäten: Kontakte, Plastizität, Vorspannung

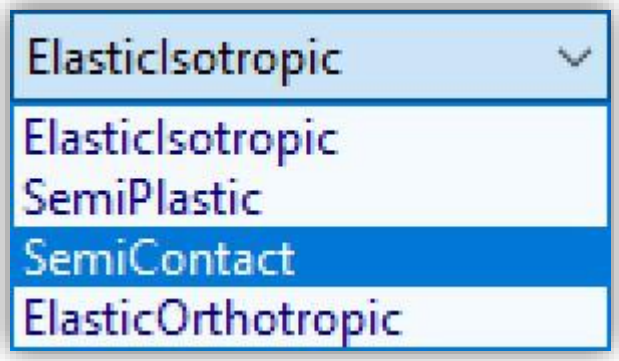


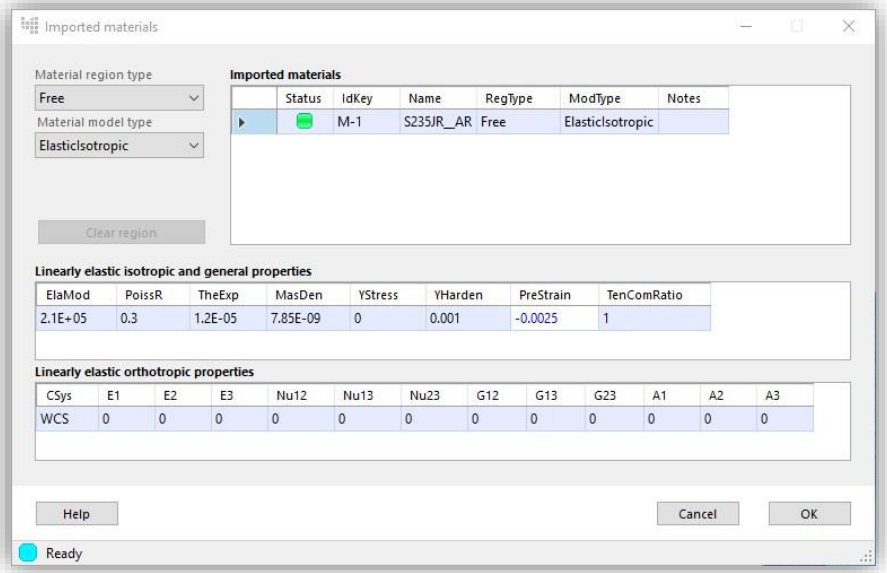


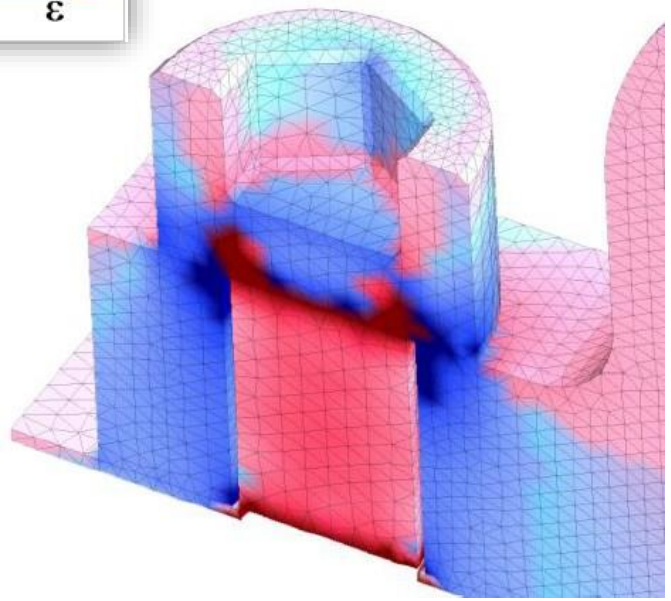
Nichtlinearitäten: Kontakte, Plastizität, Vorspannung

- Vorgespannte Schrauben
- Kontakt
- Plastiziät

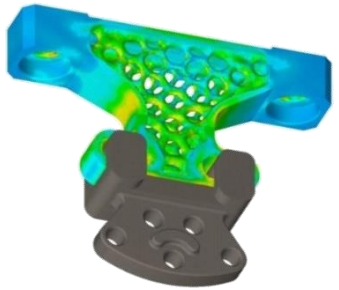


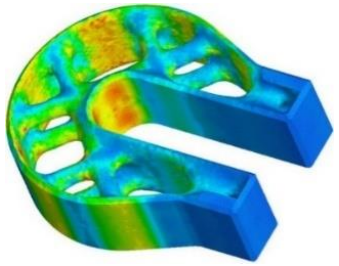


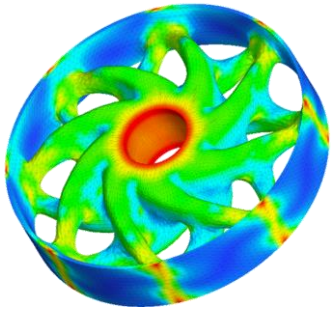




Netzverfeinerung in ProTOp

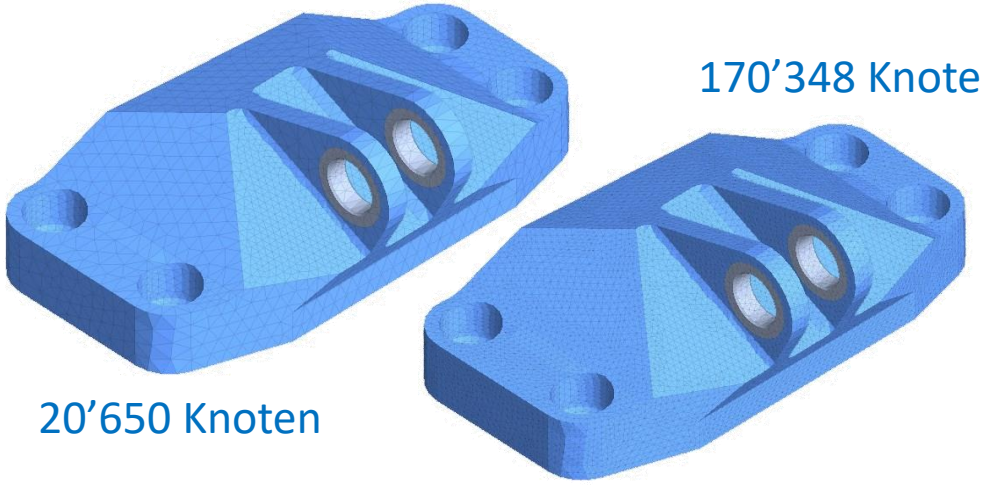


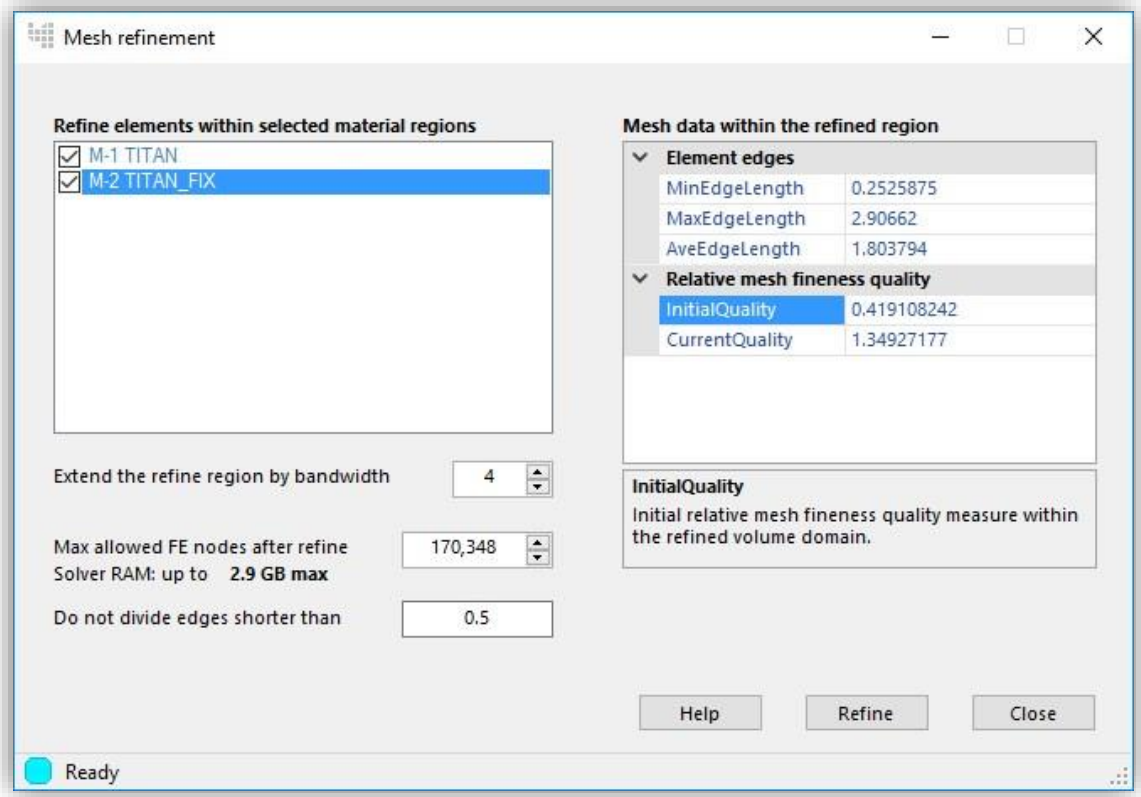




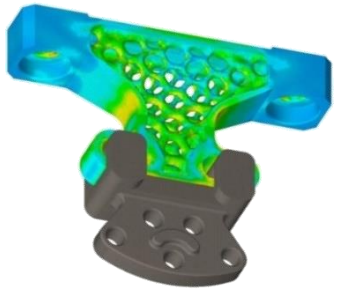
Netzverfeinerung in ProTOp

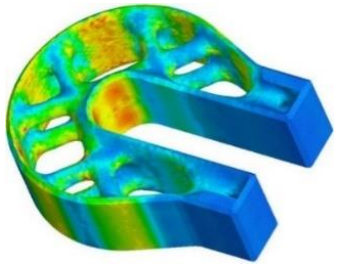
- Verfeinerung der Vernetzung in ProTOp
  - Kurze Kanten
  - Prognose Solver-RAM
- KEINE zusätzliche Netz-verfeinerung in FEM nötig

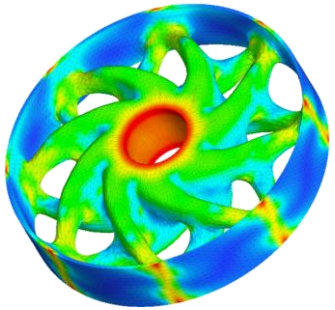




CAD-Flächenrückführung mit .OBJ-Datei (Wavefront)

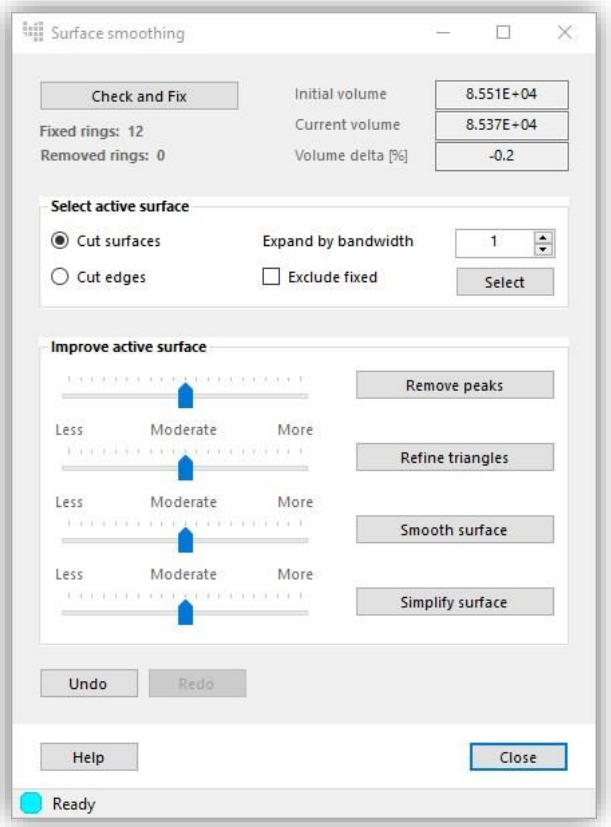






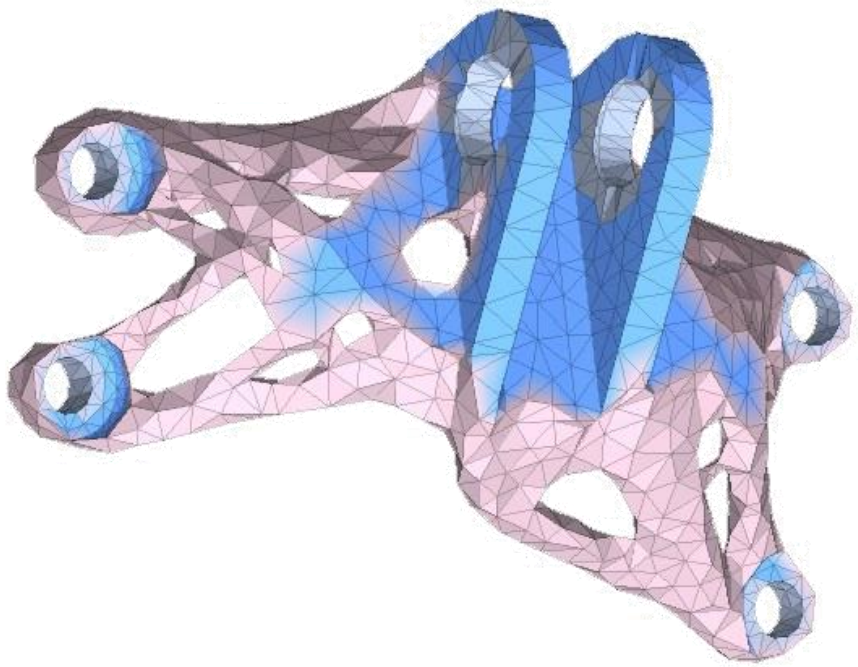
CAD-Flächenrückführung mit .OBJ-Datei (Wavefront)

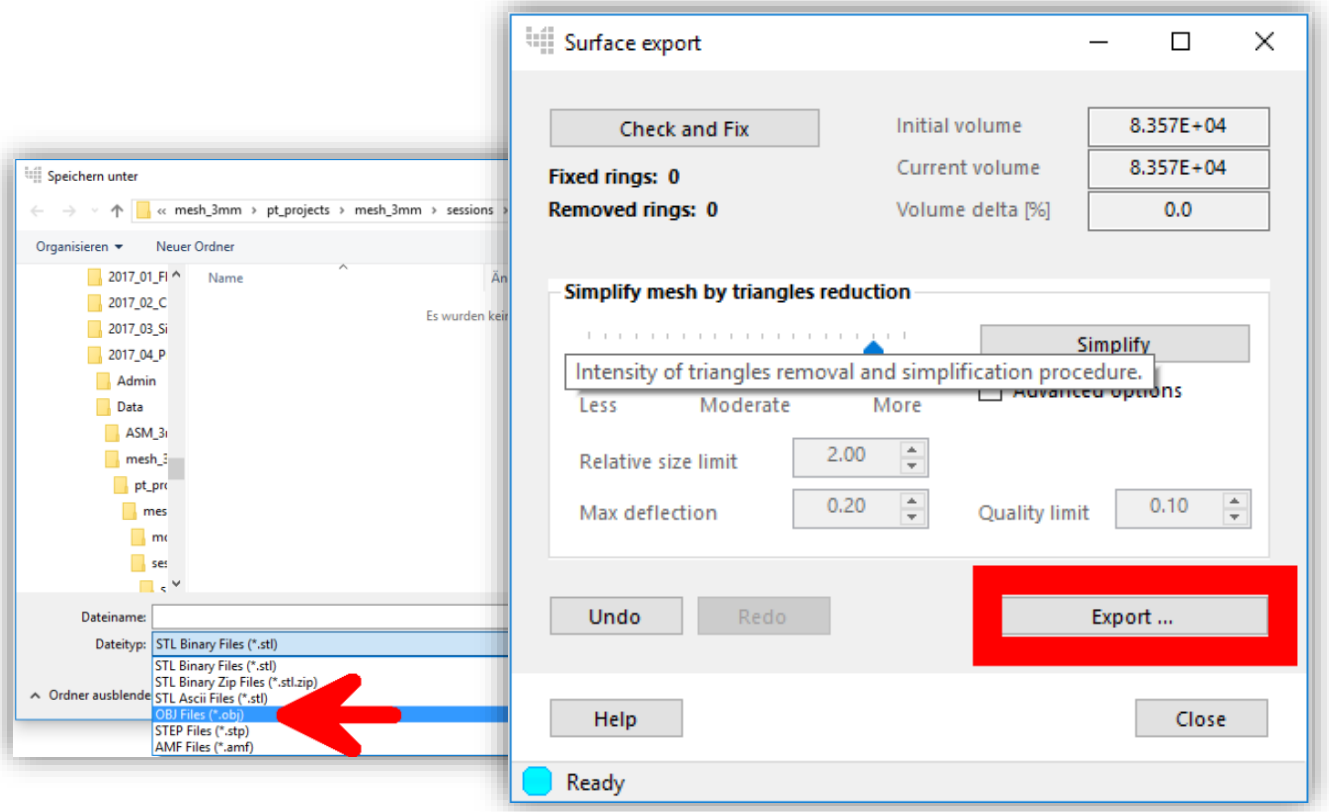
- Verbesserung der Oberflächen-Qualität
  - Wegnehmen Spitzen
  - Verfeinern Dreiecke
  - Glätten Fläche
  - Vereifachen Fläche



CAD-Flächenrückführung mit .OBJ-Datei (Wavefront)

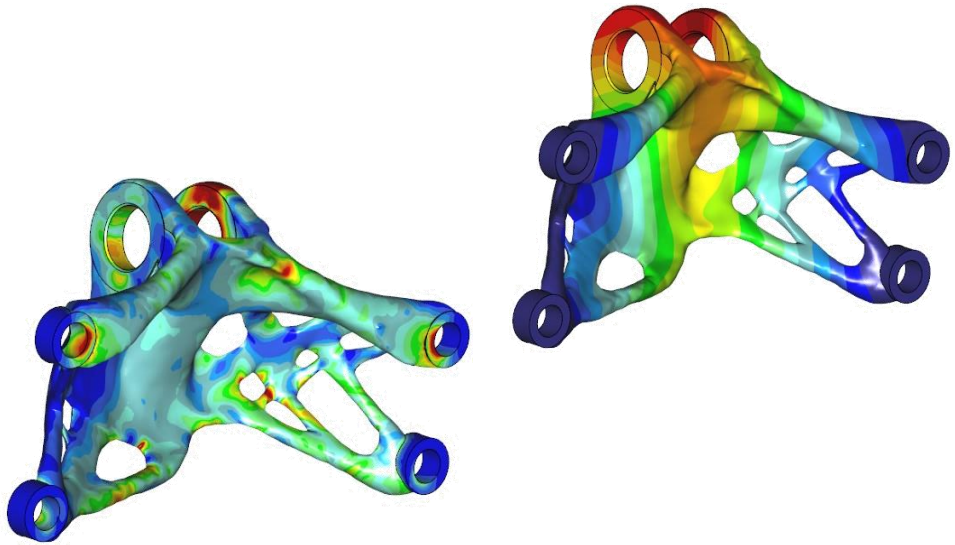
- Vereinfachung der Oberflächen-Triangulierung
- Export
  - OBJ-Datei (Wavefront)

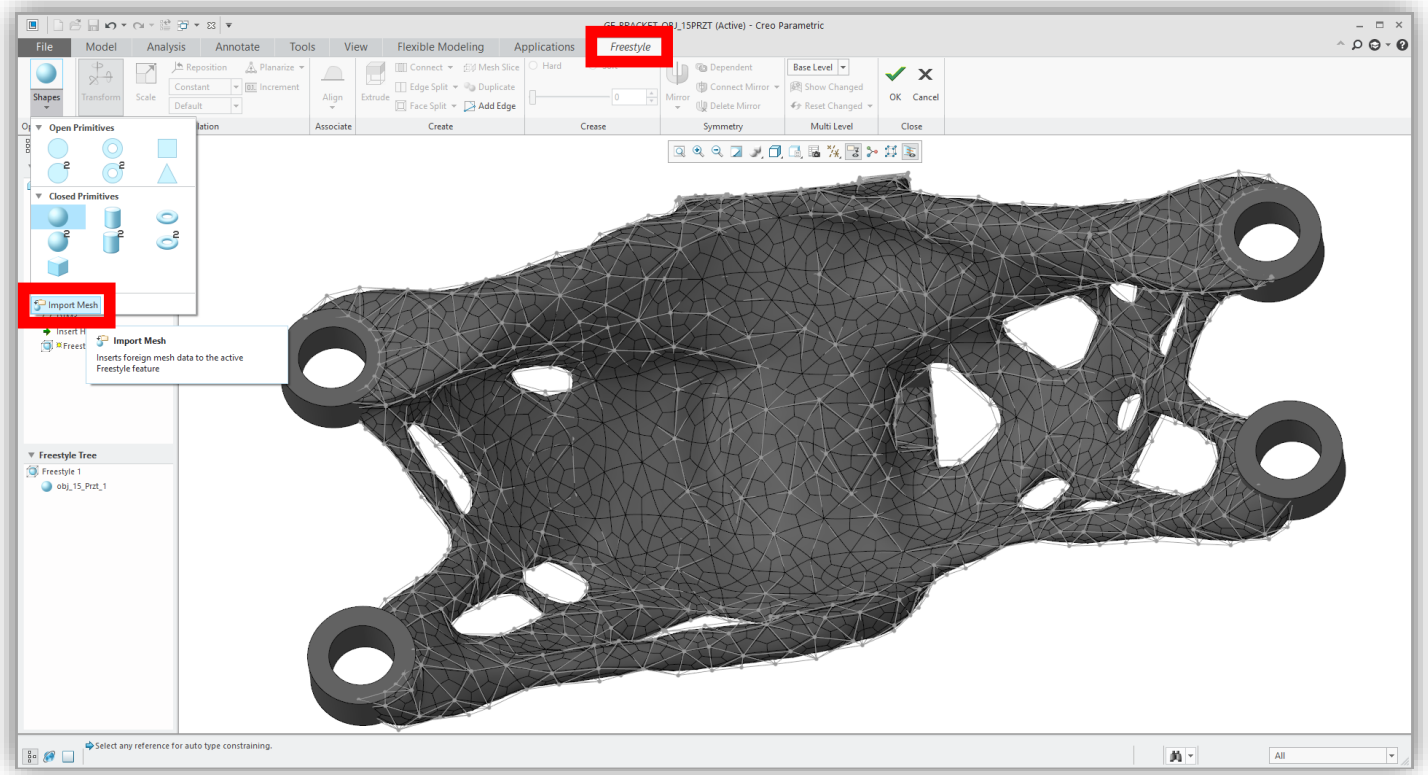




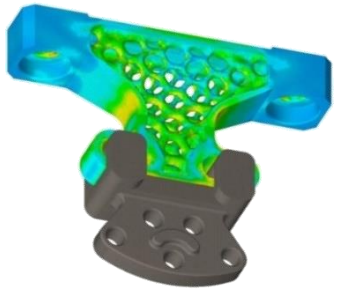
CAD-Flächenrückführung mit .OBJ-Datei (Wavefront)

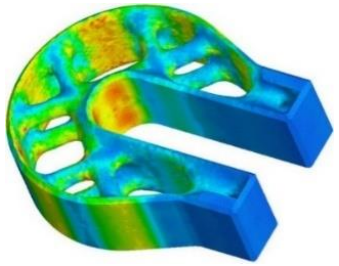
- Import OBJ-Datei (Wavefront)
- Modellieren der Anschluss-geometrien
- Validierungsberechnung

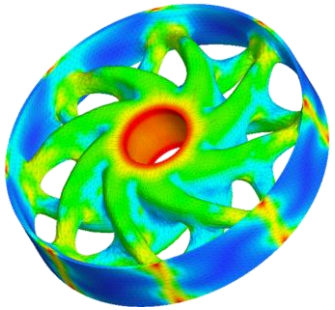




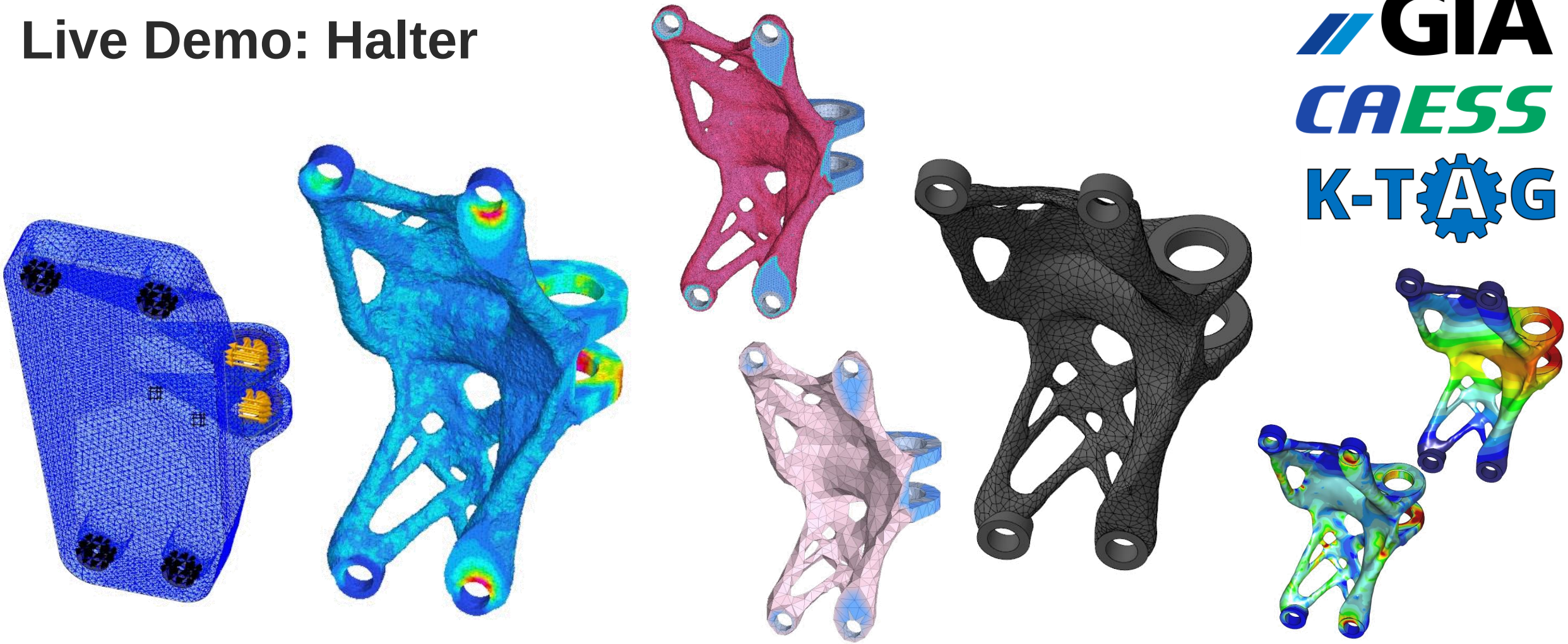
Live Demo: Halter





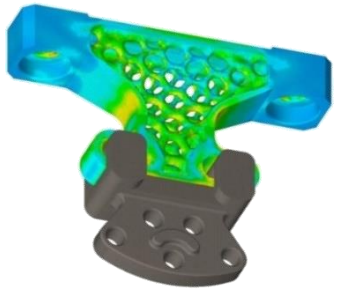


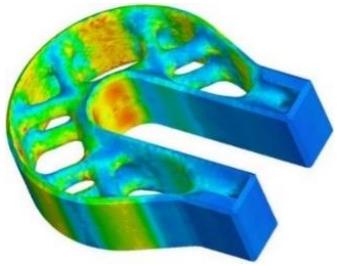
Live Demo: Halter

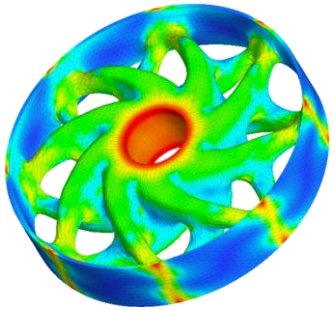


Model-Vorbereitung	Optimierung	Flächen-Glättung/Export	.OBJ-Import	Validierung
Creo Simulate (FEM)	ProTOp	ProTop	Creo Parametric Freestyle	Creo Simulate (Native)

Kundenbeispiele

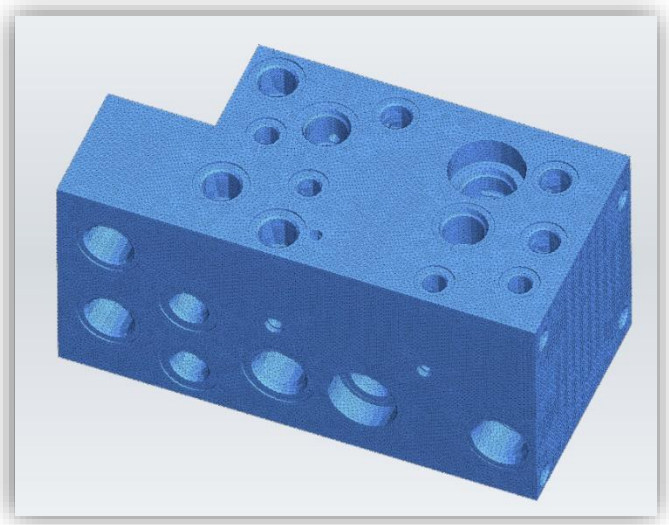


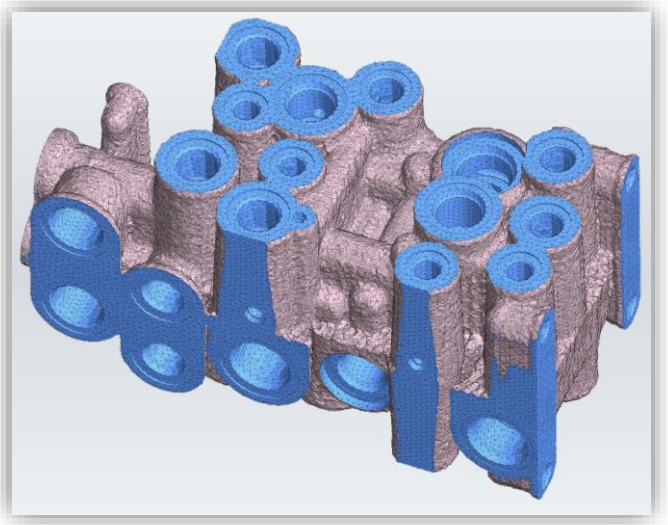


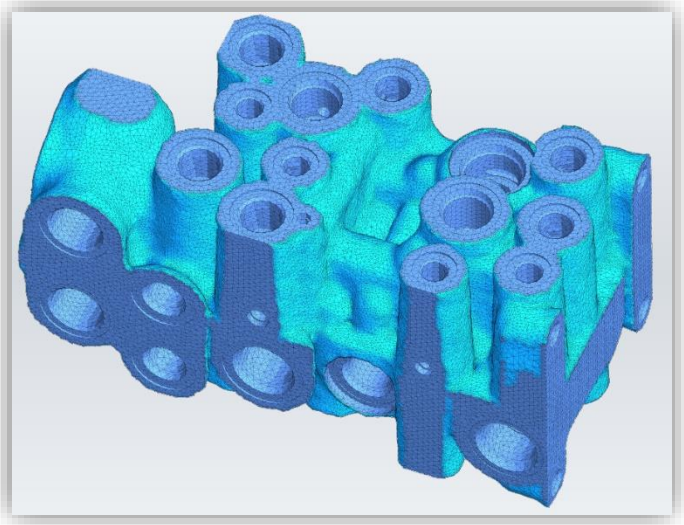


Kundenbeispiele: Hydraulik-Block

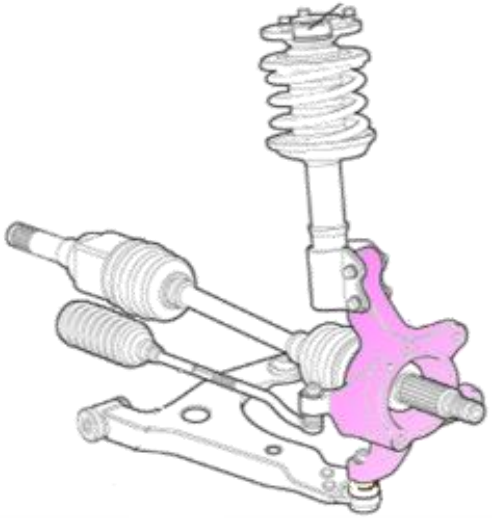
- Lastfälle: 2
- Elemente: 2.0 Millionen
- Konfiguration:
  - 1x Schale 1x Lattice
- Zeit: 1.5 h



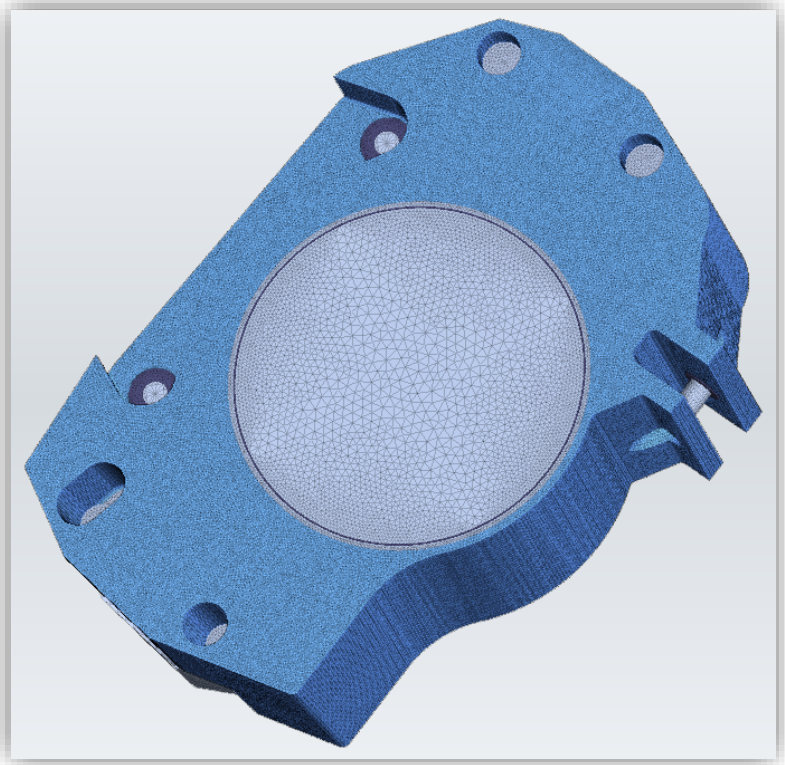


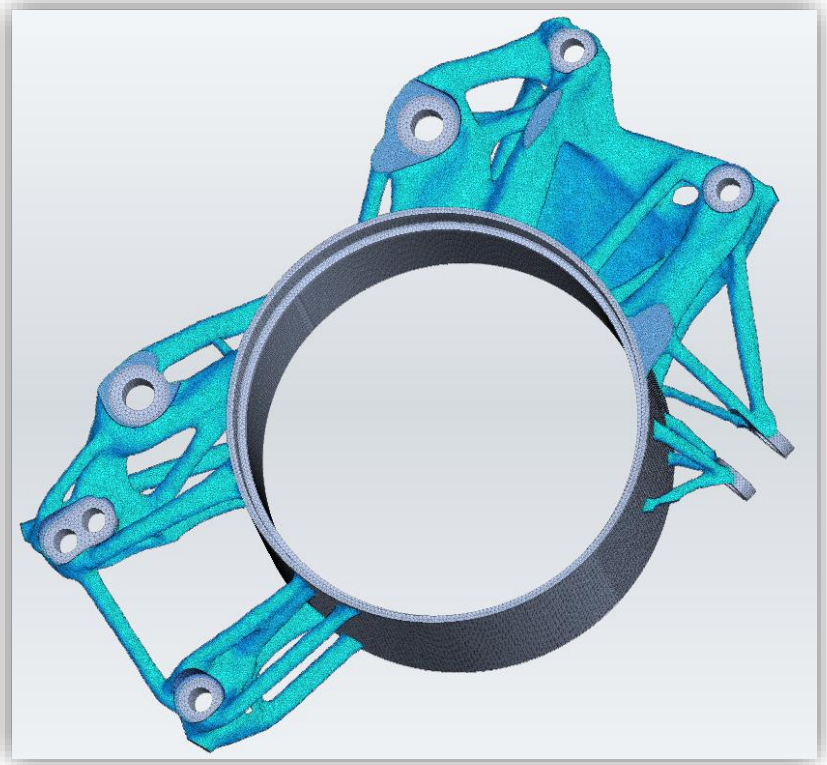


Kundenbeispiele: Achsschenkel



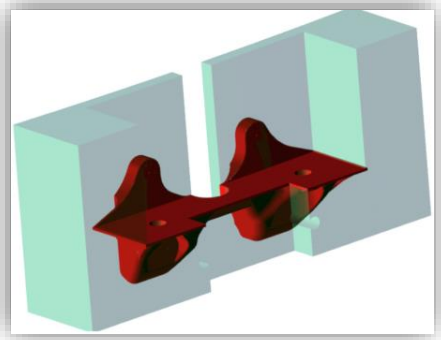
- Lastfälle: 8
- Elemente: 35.3 Millionen
- Zeit: 24h
- 7% Initial-Volumen

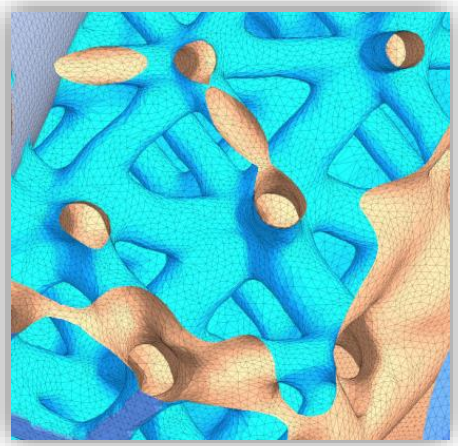


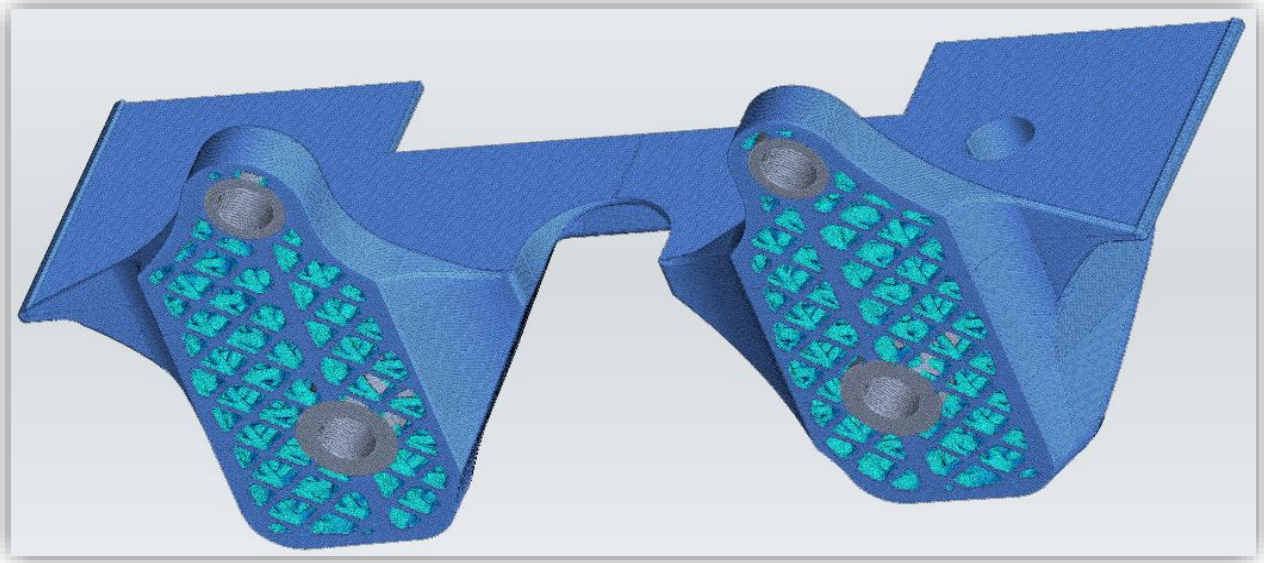


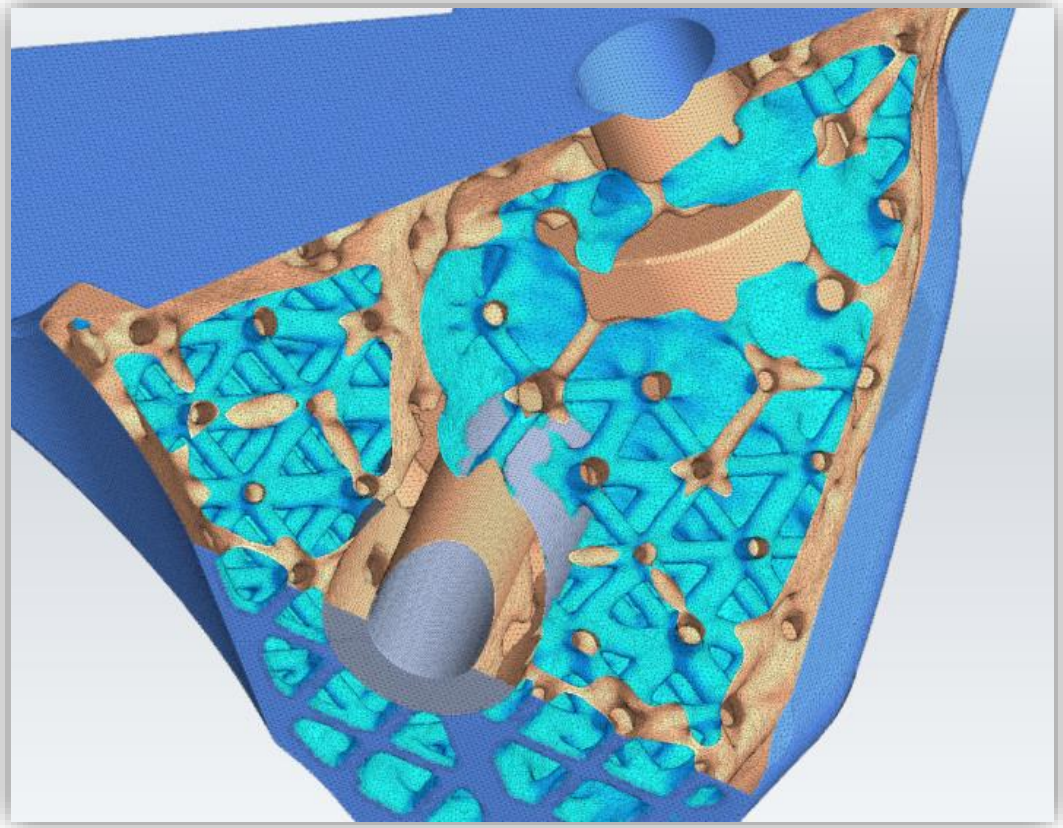
Kundenbeispiele: Halter

- Lastfälle: 1
- Elemente: 24.6 Millionen
- Konfiguration:
  - 1x Schalen 1x Lattice
- Zeit: 34 h



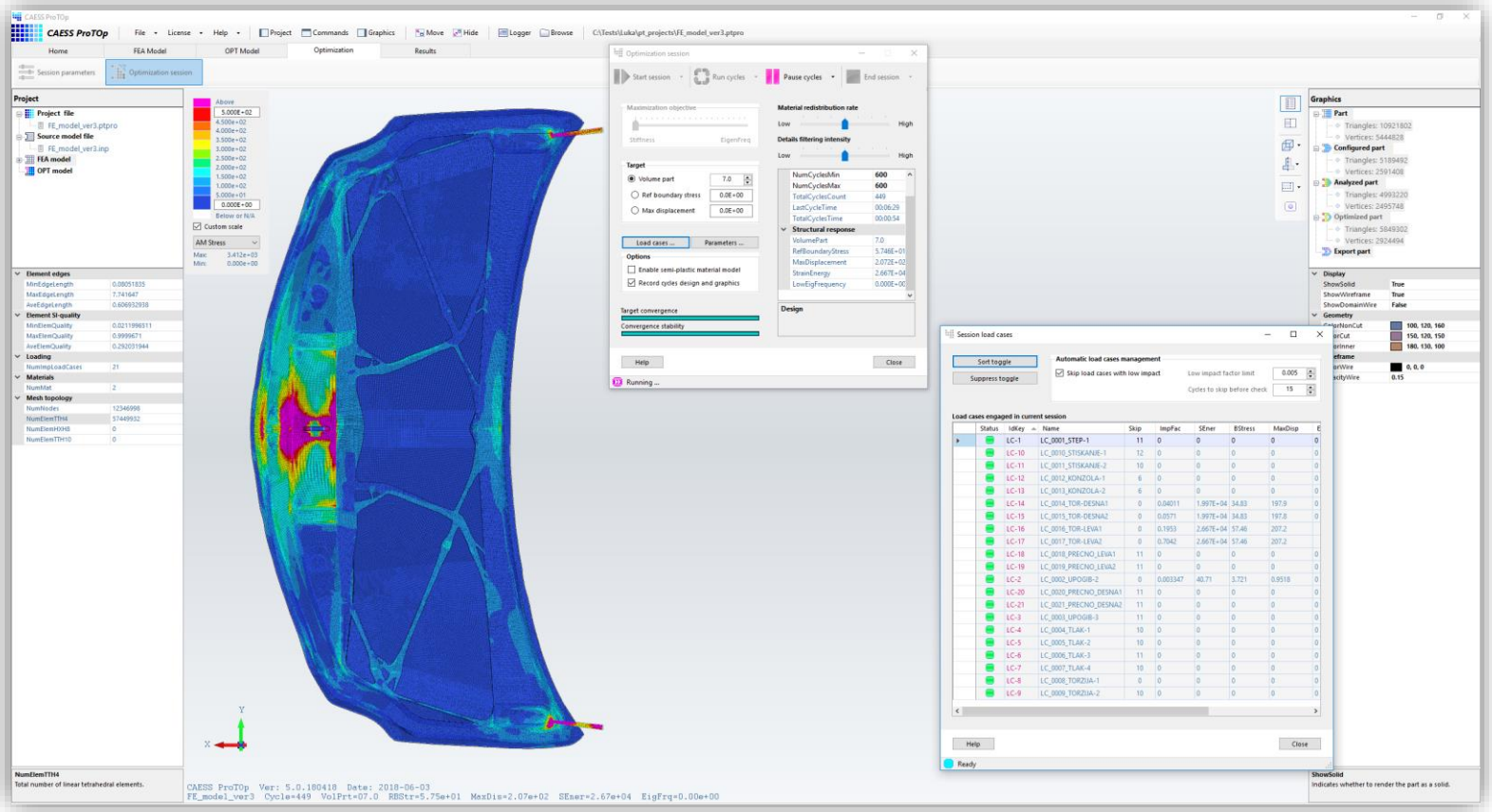




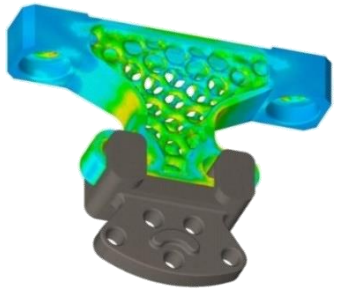


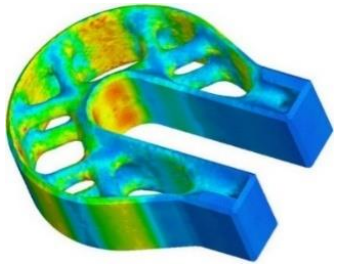
Kundenbeispiele: Motorhaube

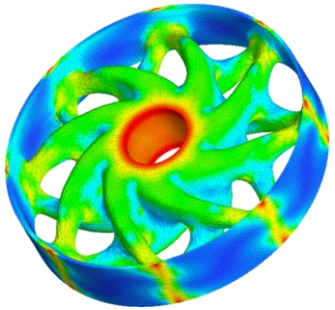
- Lastfälle: 21
- Elemente: 57.4 Millionen



Fragen







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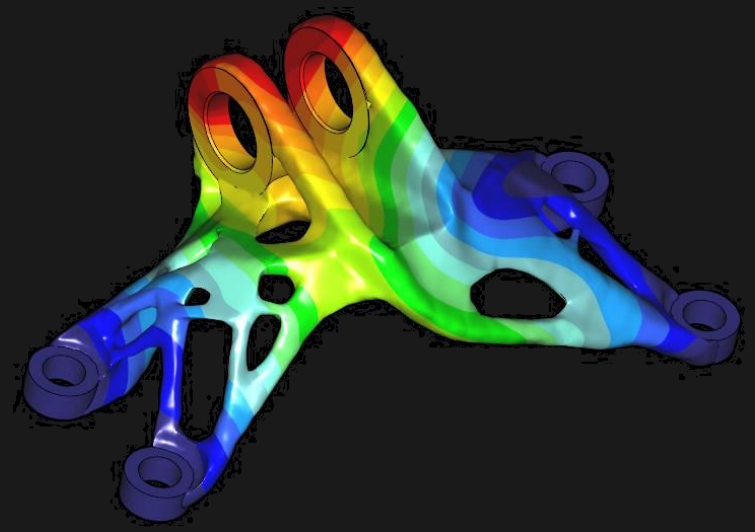

DANKE