CAESS

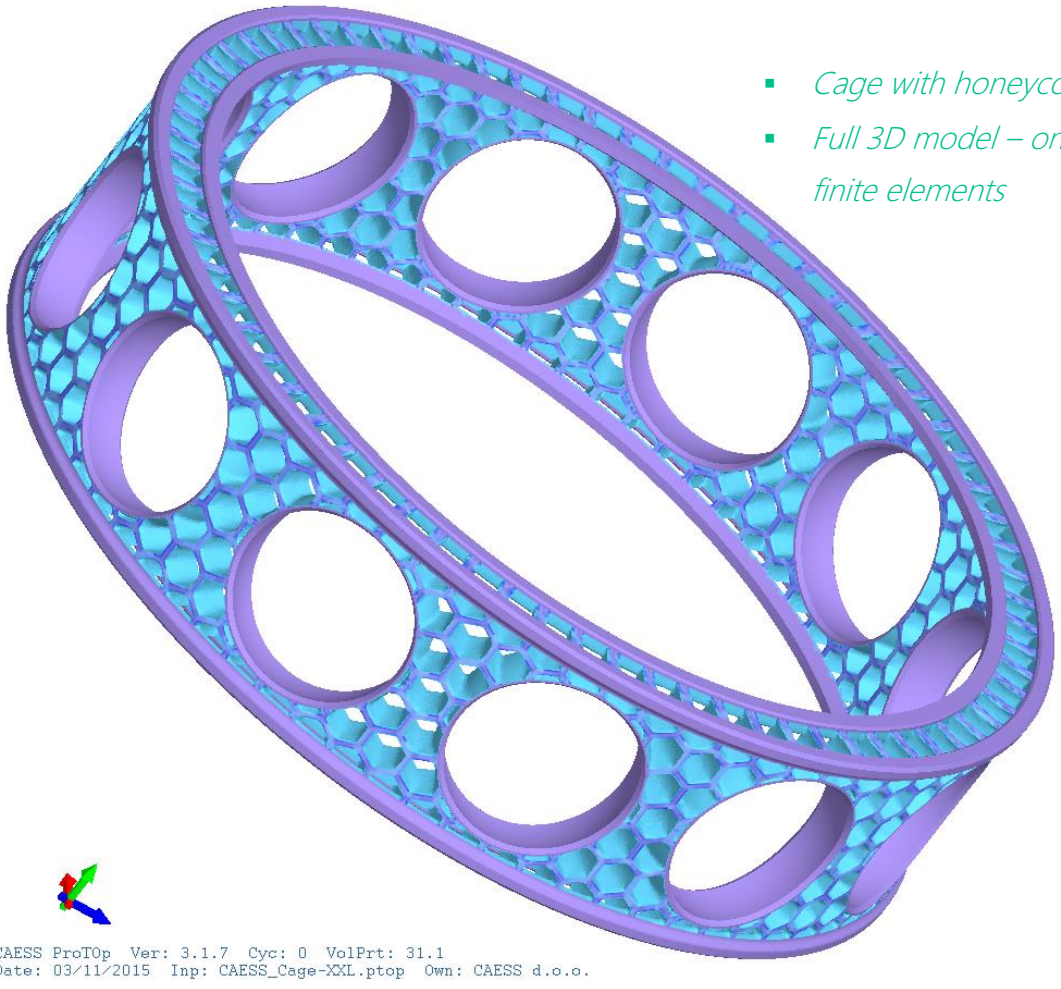
Center for Advanced Engineering Software and Simulations

PTC® PartnerAdvantage SILVER

CAESS ProTOp

Lattice and Shell Tools

Smart tools for creation and optimization of advanced structures …



- *Cage with honeycomb lattice*
- *Full 3D model – only solid finite elements*

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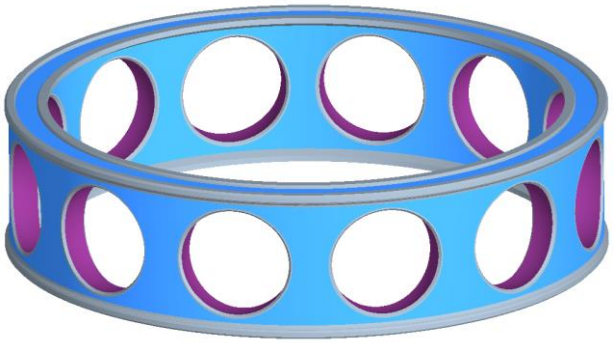
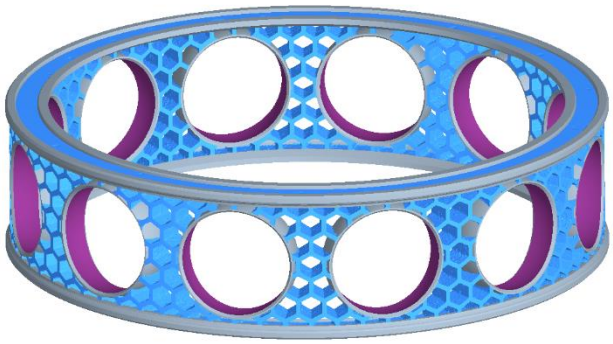
Lattice and shell tools in ProTOp. Overview …

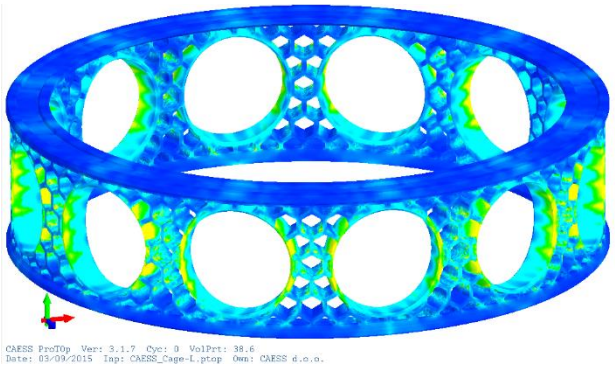
- Prepare the CAD model of your solid part in your favorite modeler
- Apply BCs as usually to define and complete your FEA model
- No need to bother with CAD modeling of a shell or lattice structure



- Import your FEA model into ProTOp and select the desired lattice pattern
- Adjust your lattice configuration as desired
- Create any number of additional (different) lattice configurations if needed

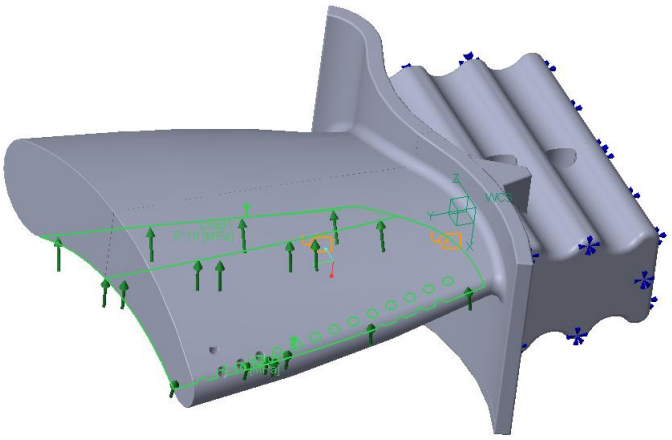


- Check quickly your design by running ProTOp initialization FEA
- Simply proceed with optimization cycles to improve the design and remove stress concentrations
- Engage ProTOp export tools to smooth and export your design

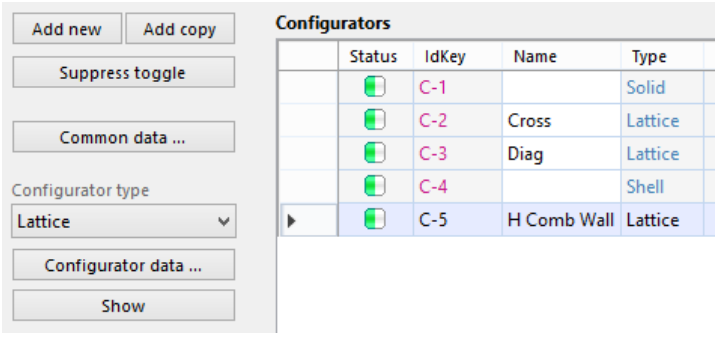


Lattice and shell creation from solid models …

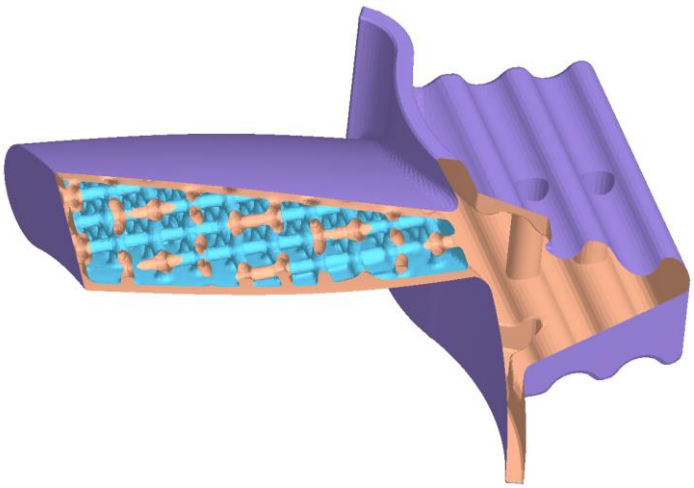
- Use your favorite modeler to create the CAD model of your solid part
- Add and apply various supports and loads to create various analyses – these will define optimization load cases
- Create the FEM model (meshing, export to a FEM model file)



- In ProTOp import the FEM model
- Create numerically various configurations: solid, lattice, shell/lattice
- Any number of configurations can be defined without any CAD modeling
- Individual lattice patterns can be arbitrarily combined by superposition to form more sophisticated patterns

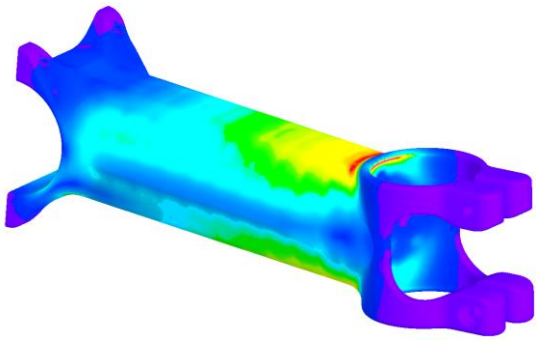


- Check visually your design (cross-sections) to finalize your configuration data
- Adjust and fine tune the parameters (min/max thicknesses, …)
- The full 3D (solid finite elements) structure is immediately ready for optimization

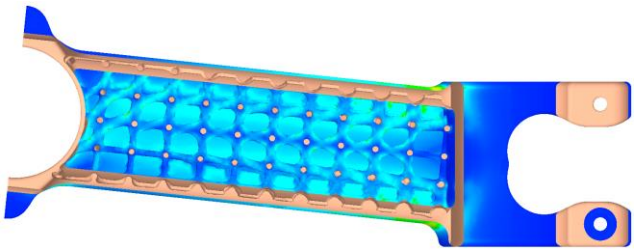


Optimize a full 3D model to make your part durable and failure resistant …

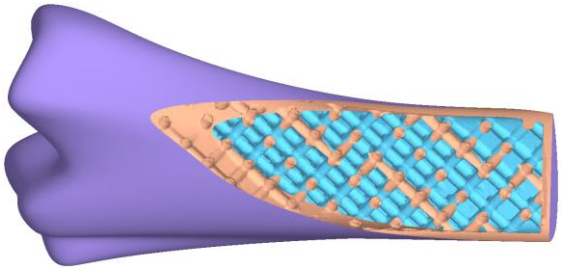
- Stress concentrations initiate fatigue cracks which lead to structural failure
- Thus, stress concentrations have to be removed by all means
- This can only be done by optimizing a full 3D model containing solid finite elements



- ProTOp tools create full 3D lattice and shell models
- Optimization reshapes lattices and shells (continuously varying thickness) to lower the stresses and remove stress concentrations
- This makes the optimized part resistant to fatigue cracks and failure



- Ideally for development of lightweight and durable load-carrying structures
- Applicable in a wide range from machinery parts to medical implants
- Perfectly suited for new additive manufacturing technologies



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We will be glad to discuss your needs and we will do our best to fulfill your expectations.

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