

# VirfacTop Use Cases

Manufacturing Software by GeonX

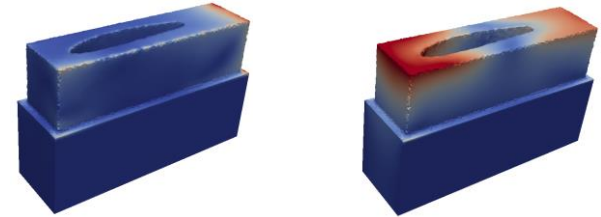
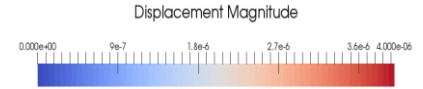
# Machining Sequence Optimization on an Aerospace Blade Shape

## Challenge

- Determine the effect of the machining sequence on distortion

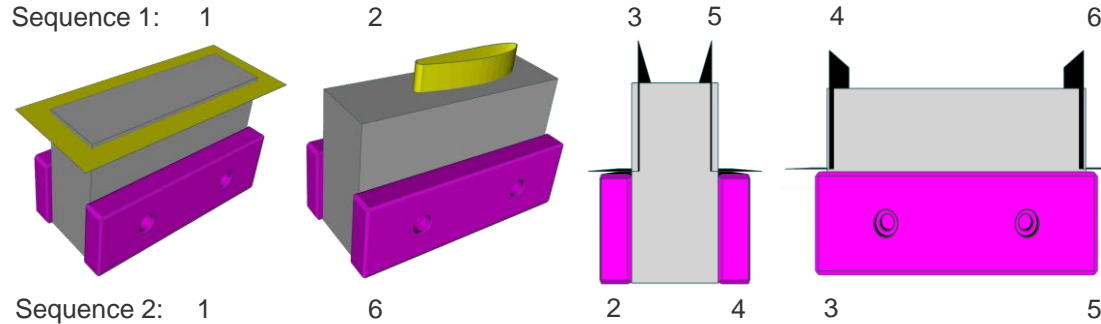
## Solution

- The chaining of a multi-step machining operation of a complex aeronautical blade shape is easily modeled with Virfac Machining Direct module. The linear-elastic computation of each step is based on the results of the previous one as initial conditions.



## Benefits

- Rapid optimization of:
  - The sequence of machining passes
  - The clamping and fixture system



# Surface Heat Treatment of a Forged Crankshaft

## Challenge

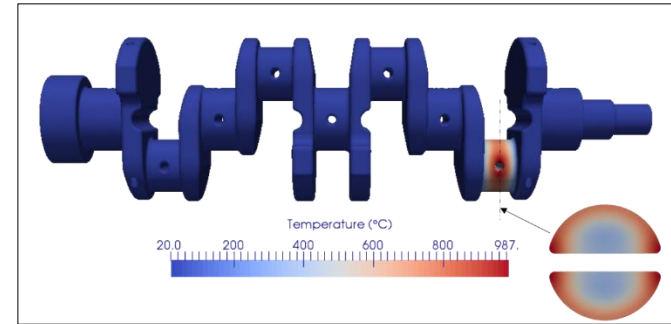
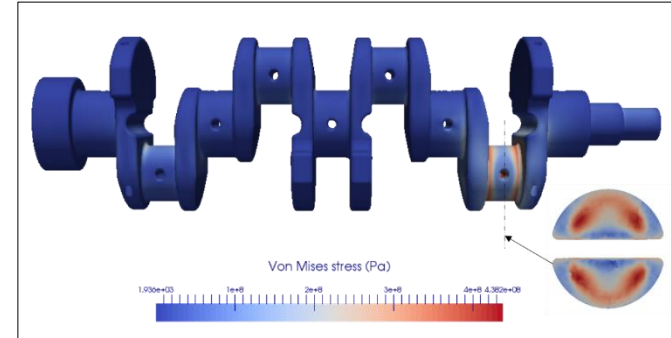
- Simulation of a chained process including surface heating by induction followed by a hold phase then a water quenching

## Solution

- The model is based on a staggered coupling between thermal-metallurgical-mechanical calculations.
- This takes less than 24 hours thanks to the friendly user interface of Virfac® and its massively parallel computation capabilities.

## Benefits

- The simulation leads to the prediction of:
  - Phase transformations in the workpiece
  - Residual stress mapping
  - Thermal cycle



# Caterpillar-Type Boom Welding Simulation

## Challenge

- High precision welding simulation on a complex industrial geometry.

## Solution

- Welding models are easy to set up with Virfac® Welding Designer module and represent the real process conditions such as:
  - Clamping system
  - Heat source
  - Welding speed and beam direction
  - Welding sequences management
- Computation is non-linear transient with parallel capabilities and is based on a staggered thermo-metallurgical-mechanical coupling.

## Benefits

- Ability to predict accurate values of:
  - Residual stresses in the workpiece
  - Distortions due to welding

