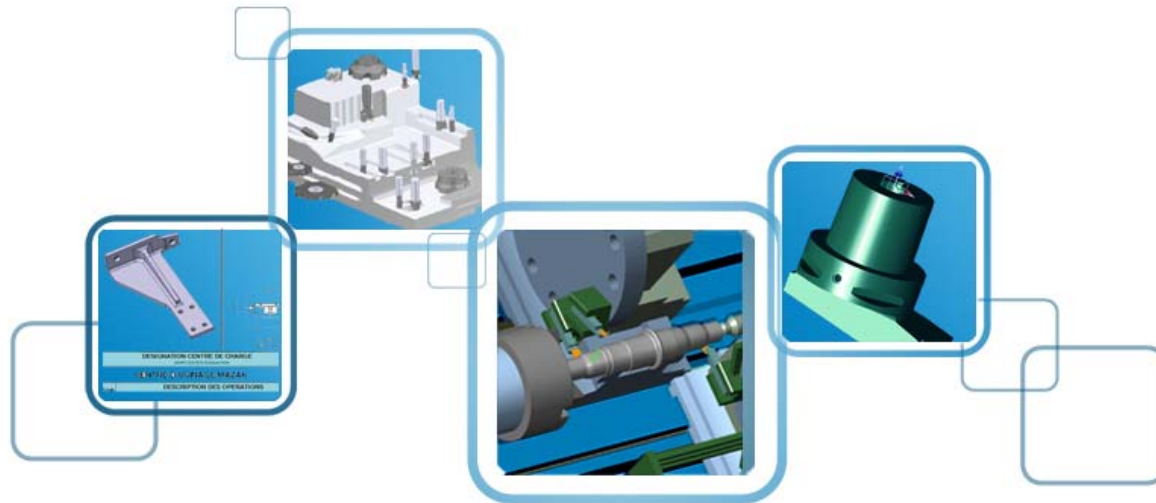




Machining optimization



OPTITOOL



- Why optimize?
 - Reduce machining times
 - Increase tool life
 - Improve machining quality
- Whom is interested by optimization?
 - Proven NC programs: milling from 3 to 5 axis
 - Serial production (small series to mass production)
- How to optimize without OPTITOOL?
 - Testing campaigns to find working condition points
 - ▶ Single results: not generalizable
 - ▶ Investment and resources
 - Collaboration with tool makers
 - ▶ Time consuming
 - ▶ Only for particular cases
 - Machine operators and tool specialists know-how
 - ▶ Problem of people leaving the company (retirements, etc.)
 - ▶ Unshared knowledge



- NCSIMUL: a solution designed to optimize
 - Optimization of production means
 - Use the machine tool only to produce (not for program debugging)
 - No interruption in production flow (no crash, off-line program testing)
 - Standard functions for tool length optimization
 - No more collision with tool attachment
 - Limitation of tool flexion
- OPTITool: the module to optimize NC programs



Cutting condition analysis

Tool path segmentation and cutting parameter calculation

Cutting condition analysis by multicriterion request

Air cutting optimization

Reduction of approach and retract motions

Cutting condition optimization

Feedrate and spindle speed optimization according to the removed material

Tool-material pair (TMP) data customizable in standard



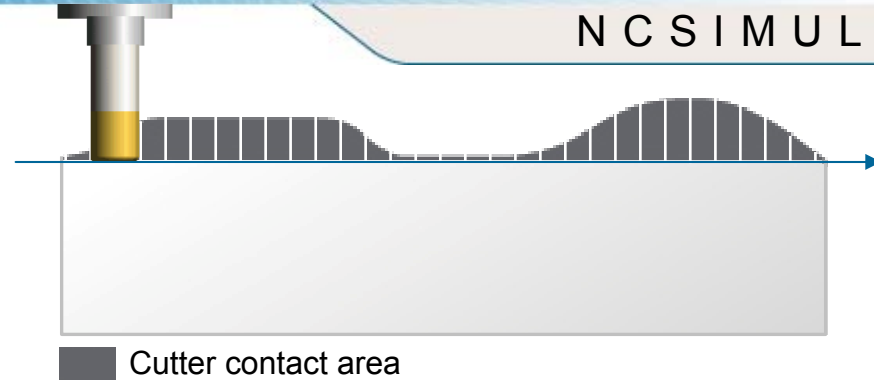
3HTI
LLC

Putting Customers First To Create Products Better, Faster, and Cheaper

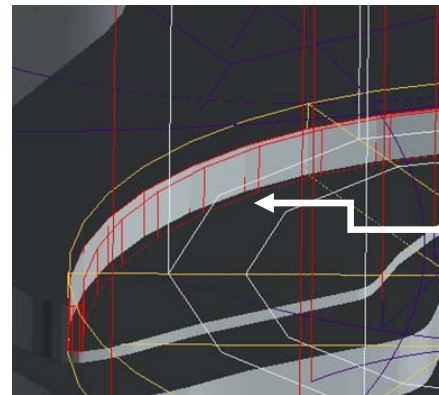
N C S I M U L

How does it work?

- OPTITOOL segments the tool path according to user parameters



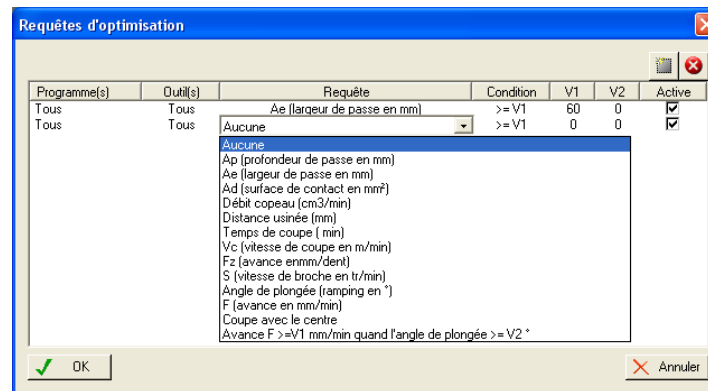
- OPTITOOL computes all cutting parameter for each segmented portion



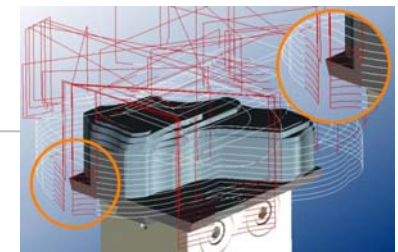
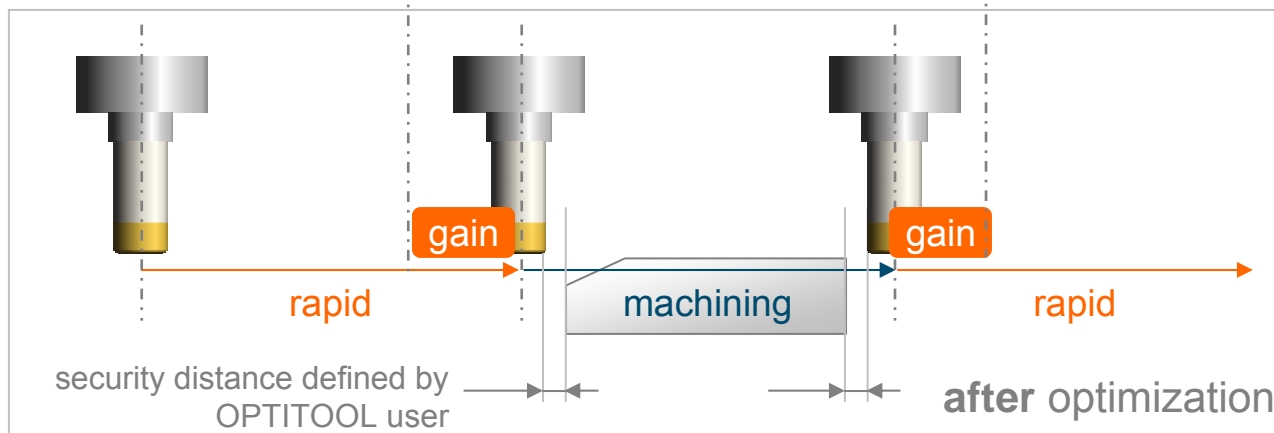
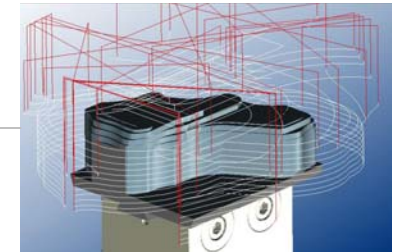
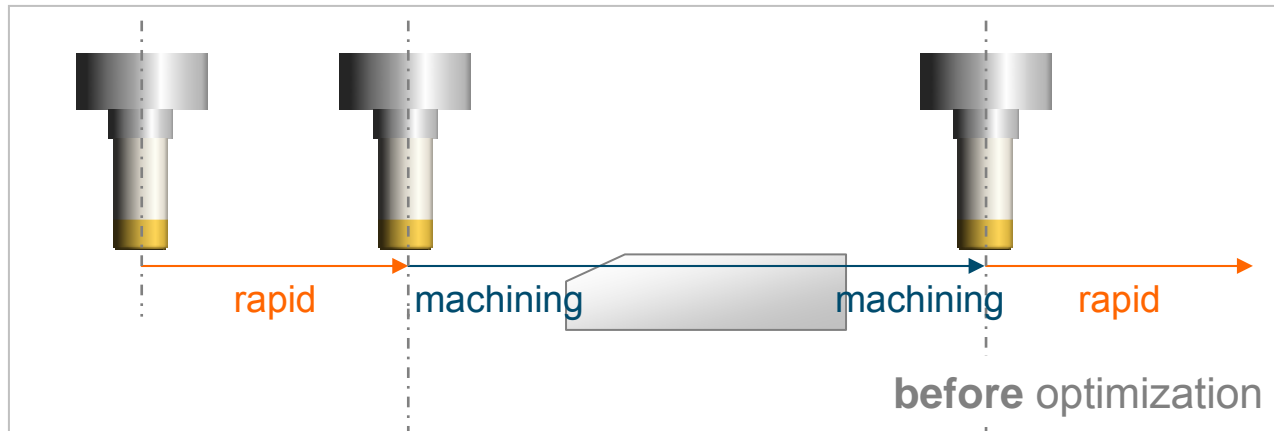
Cutting conditions:

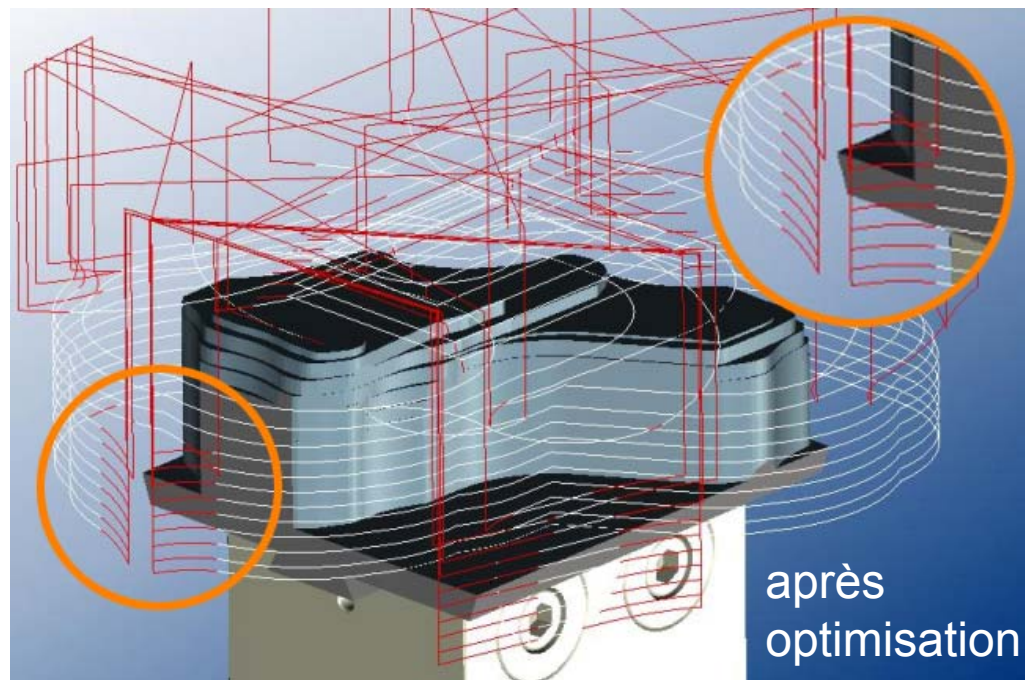
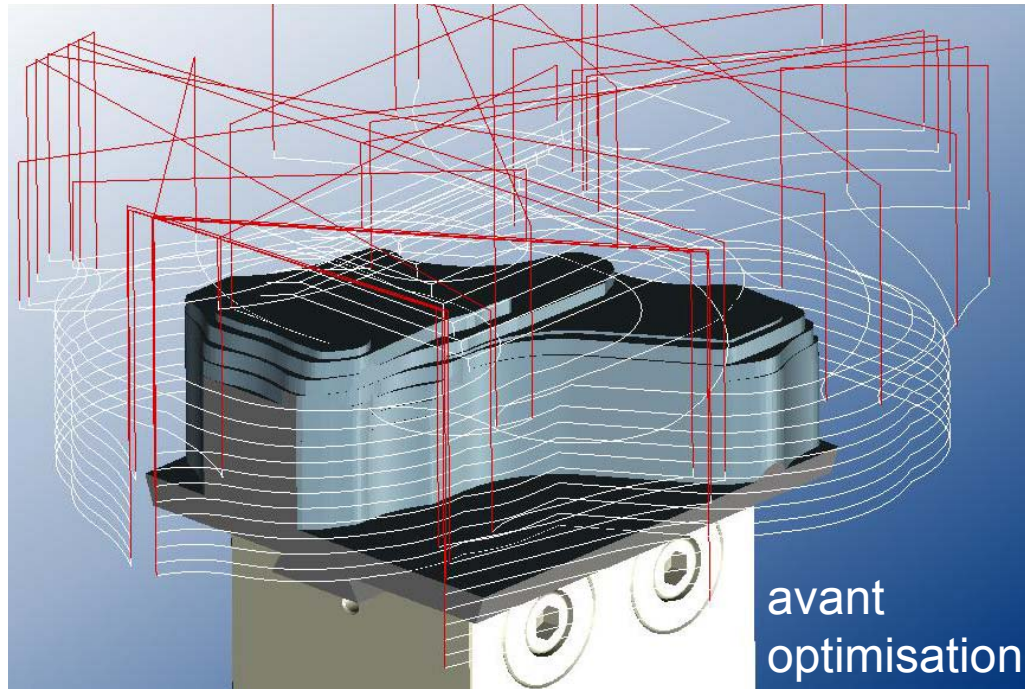
AE : 34.787 mm (max 34.787 mm)
 AP: 3.223 mm (max 3.223 mm)
 AD: 112.118 mm² (max 112.118 mm²)
 Volume: 0.103 mm³ (max 1.54 mm³)
 Angle: 0 °
 Machined length: 0.919 mm (cumulated 34.006 mm)
 Type of motion: Perpendicular motion plane to the tool axis
 Machining of a non cut material
 Center cut: No

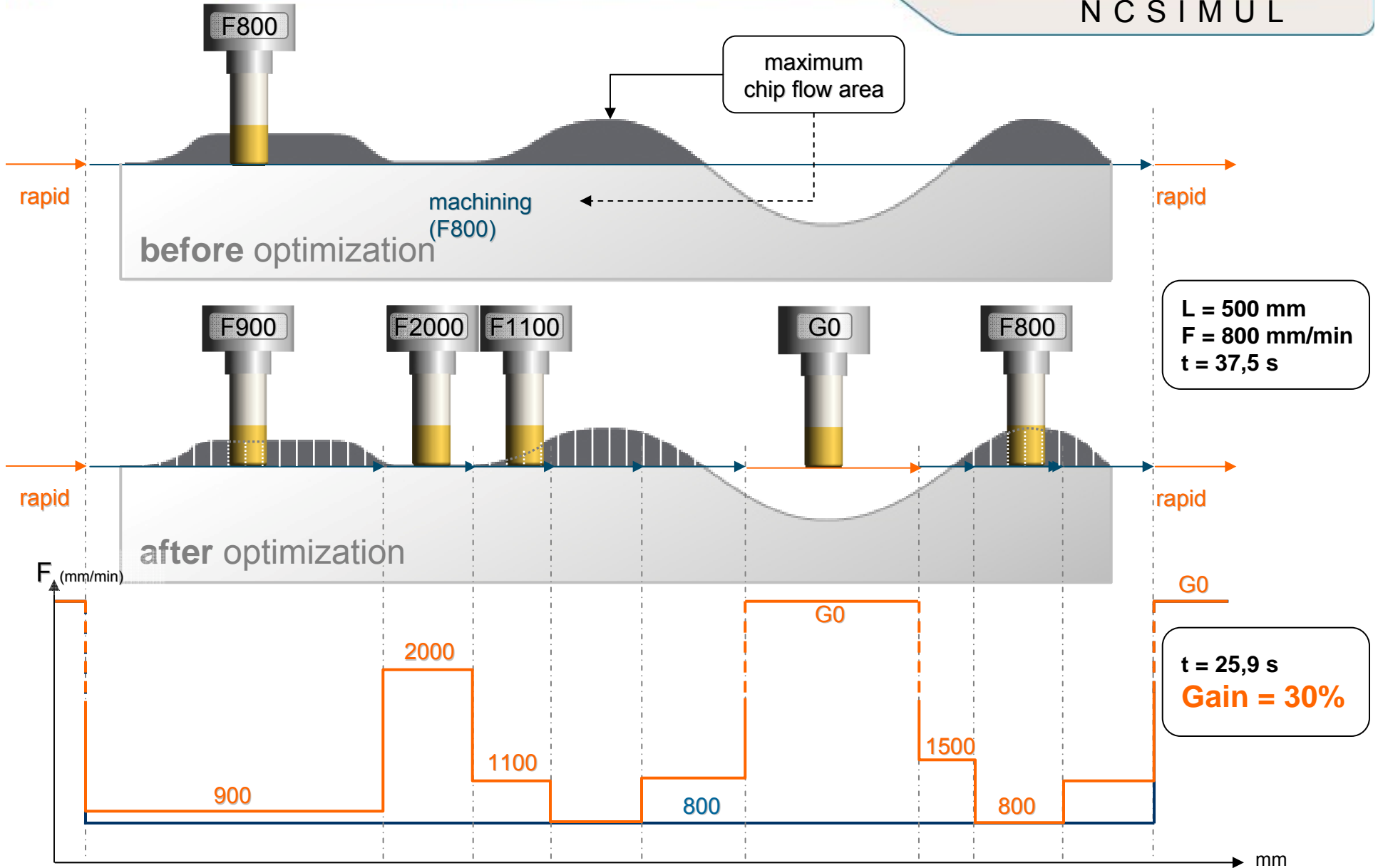
- Users will be then able to make any type of multicriterion request to analyze cutting conditions in the NC program

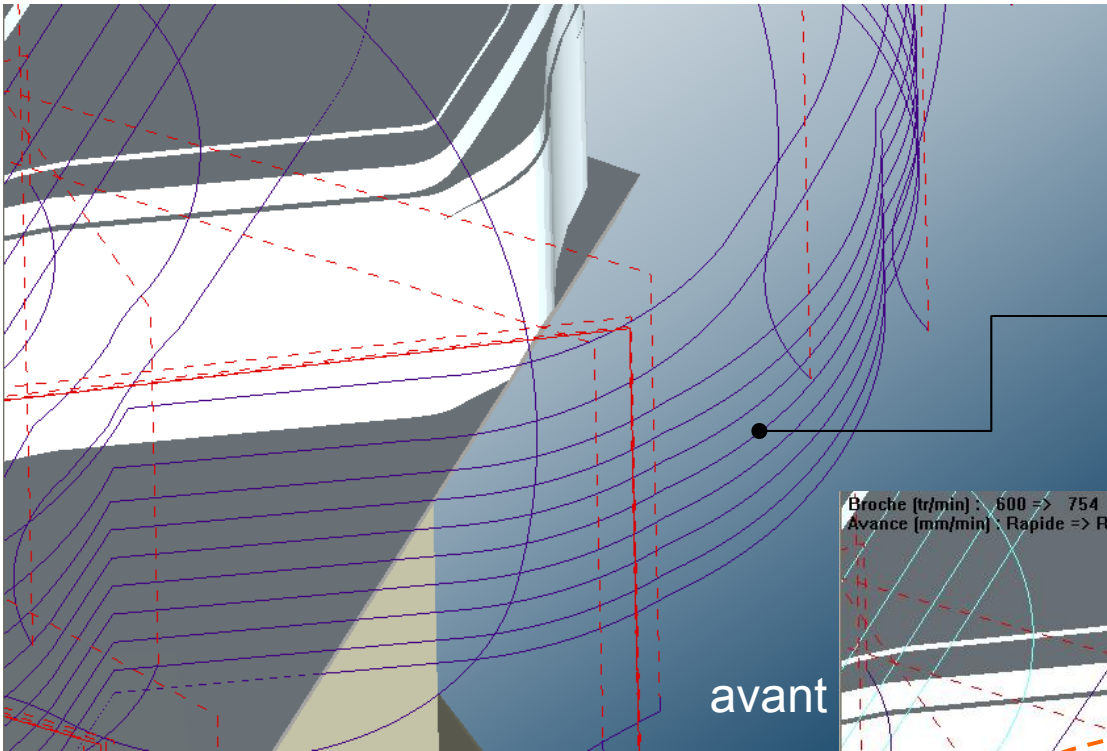


Principle: minimize machining motions out of the material and replace them by rapid motions





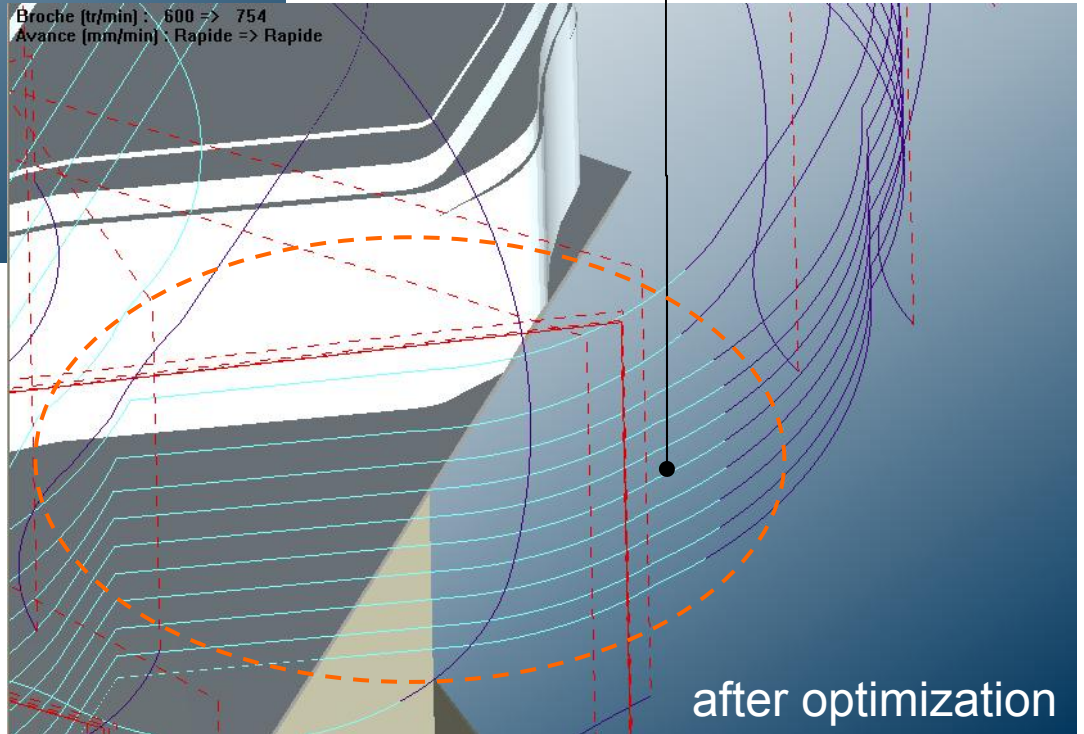




Circular interpolation

Broche (tr/min) : 600 => 754
Avance (mm/min) : Rapide => Rapide

avant



after optimization



- Gains
 - Cycle time reduction
 - Improvement of machining quality
 - Increase of tool life
 - Fast ROI
 - ▶ Ex.: 12% of gain = almost 1 machine hour per day
- OPTITOOL special features
 - Fast implementation
 - No testing campaign
 - Possibility to customize TMP data
 - ▶ Company cutting know-how management