CUTTING TOOL
SOLUTIONS FOR ANALYZING CUTTING TOOLS
HOW THIRD WAVE SYSTEMS GETS YOUR PRODUCTS TO MARKET FASTER

REDUCE TOOL DESIGN DEVELOPMENT CYCLES
- Identify promising designs quickly
- Analyze fundamental drivers for tool failure and chip formation
- Access virtual test results from a single source

REDUCE ENGINEERING EFFORT
- Designed for non-FEA experts
- Machining specific user interface
- Analysis tools for fast results comparison

IMPROVE PART QUALITY
- Avoid chip gouging on finished surfaces
- Reduce tool and workpiece deflection
- Identify changes in fundamental drivers for workpiece residual stress

INCREASE DEVELOPMENT ROI
- Reduce trial-and-error testing
- Enable communication with customers through simulation results
- Eliminate blind customer prototype testing

OUR SOLUTIONS
ADVANCEDGE: Finite Element Analysis
AdvantEdge is used to understand the "whys" of tool performance by providing a virtual testing environment for evaluating tool designs. Users efficiently and affordably recognize promising prototypes and top performers while reducing design iterations and trial-and-error testing. AdvantEdge features a full suite for analysis including chip formation, temperature and stresses and forces on the tool and workpiece. The software has a validation process and material models built into the program specifically for metal cutting, which allows for confident decision making without physical testing.

To make reporting results easier, Third Wave Systems engineers developed a Report Generator that significantly reduces time spent documenting results, conclusions and standardizes work between users and allows for easy results distribution to management and customers.

PRODUCTION MODULE: NC Optimization
Production Module integrates physics-based material models, CAD/CAM data, tooling and workpiece geometries to analyze and optimize machining processes. The software allows users to analyze cutting forces for each line of toolpath, compare forces to optimization limits and raise/lower feeds to attain maximum allowable forces.

A dynamic user interface in AdvantEdge and Production Module simulate part machining and display tool position with corresponding forces, power consumption, and more — helping users better understand their machining processes and identify opportunities for improvement.
140+ VALIDATED MATERIALS DATABASE

AdvantEdge and Production Module have an expanding library of more than 140 materials that have been developed and validated by Third Wave Systems engineering staff using proprietary material characterization technology that our engineers convert into custom material models. Third Wave Systems’ expertise ensures the user can be confident of the results and analysis completed using Third Wave Systems modeling products.

CASE STUDY: LMT FETTE

LMT FETTE uses AdvantEdge to investigate and understand changes to cutting tool geometry. LMT independently verified the chip shape and force simulation results with experimental tests, validating their use of AdvantEdge in the design process. Using AdvantEdge simulation as part of the design process, the iterations needed to do product development were reduced by 50 percent, which decreased their time to market and reduced tool development costs.

Material: 42CrMo4
Cutting Tool: Solid carbide end mill

Consideration of Time to Market:
» Reduction of product development iterations using AdvantEdge simulations

To learn more about Third Wave Systems products and services, visit www.thirdwavesys.com. If you’d like to setup a live web demonstration for AdvantEdge or Production Module, contact us at sales@thirdwavesys.com, or +1-952-832-5515.

ABOUT THIRD WAVE SYSTEMS, INC. > Third Wave Systems develops and sells premier materials based modeling software and services for machining solutions. Innovative manufacturing companies implement these solutions to dramatically reduce costs of machined components, accelerate design cycles, improve part quality and get to market faster.
OSG utilized Third Wave Systems product, AdvantEdge, to develop a brand new line for stainless steel WDO Drills. Using AdvantEdge, OSG was able to study chip shape and evaluate improved drill geometries.

**Challenge:** The stainless steel chips evacuated from conventional drills are stringy and don’t have a consistent chip shape, which results in poor part quality.

**Approach:** Model the drill and chip(s) in AdvantEdge to determine chip characteristics and evaluate improved drill geometries.

**Results:** A new drill geometry was developed that includes an altered cutting edge and groove shape, which creates consistently divided chips.

Modify cutting edge and groove shape to create divided chips

Conventional Design

Improved WDO Design in AdvantEdge 3D

Stringy Chips

Consistent Chip Break