CUTPRO
SHOP-PRO
MACHPRO

Maximize material removal rates, accuracy and performance of machining operations with cost effective CutPro, Shop-Pro and MACHpro Software Modules

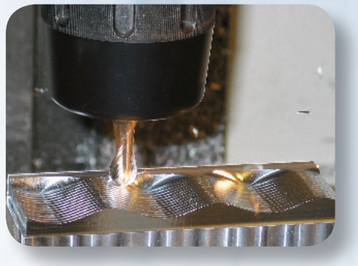
Benefits

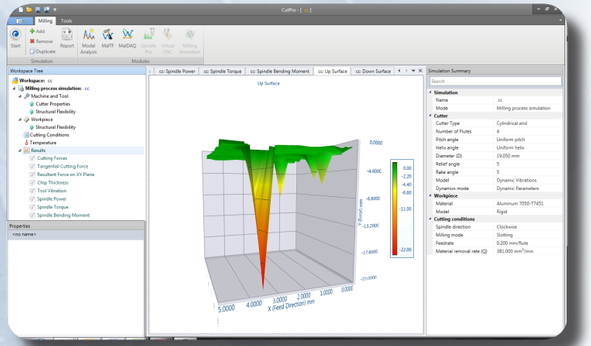
- Achieve high performance machining
- Increase throughput
- Increase tool life
- Reduce scrap part rate
- Reduce equipment maintenance
- Minimize valuable engineering time
- Eliminate costly trials and errors

CutPro provides the best solution for productivity and includes nine Modules:

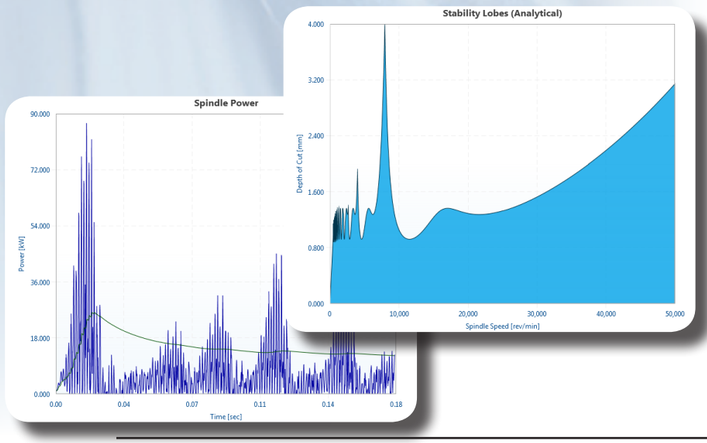
- Advanced Milling Process Module;
- Boring and Turning Process Module;
- Drilling Process Module;
- Temperature Module;

- Modal Analysis;
- MalTF;
- MalDAQ;
- SpindlePro;
- Virtual CNC Module.





CutPro Milling Process Module predicts and optimizes milling operations with any cutter and insert geometry for higher material removal rates.



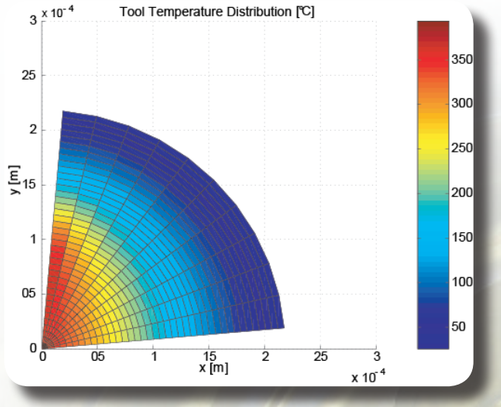
Features

- Simulates the stability lobes and predicts optimum depth of cuts, feed and spindle speeds
- Calculates the effect of process damping on stability during low speed machining
- Predicts forces, power, torque and vibrations
- Predicts surface form errors
- Designs and simulates the performance of variable pitch and indexable cutters
- Has integrated FFT analysis
- Has a data base with an automated user material identification and data base entry mechanism

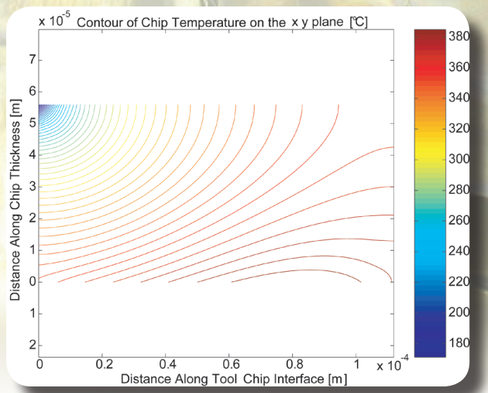
Temperature Module

Features

- Ability to maintain tool temperature under 900°C for Carbide and 1200°C for CBN tools
- Optimal spindle speeds, feeds and depth of cuts are achieved in machining Titanium, Nickel and high strength alloys

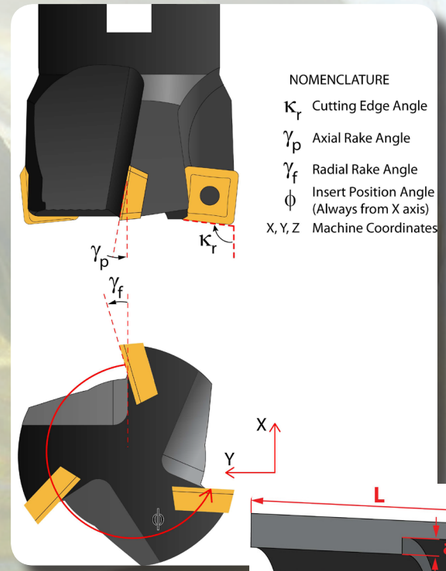


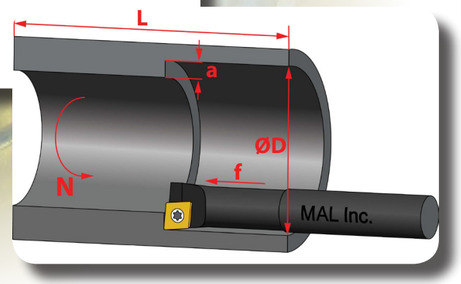
CutPro Temperature Module predicts tool and chip temperature fields in turning and milling processes.



Boring and Turning Process Module

CutPro Boring and Turning Modules predict torque, power, force, and chatter vibration free spindle speeds and depth of cuts.





Features

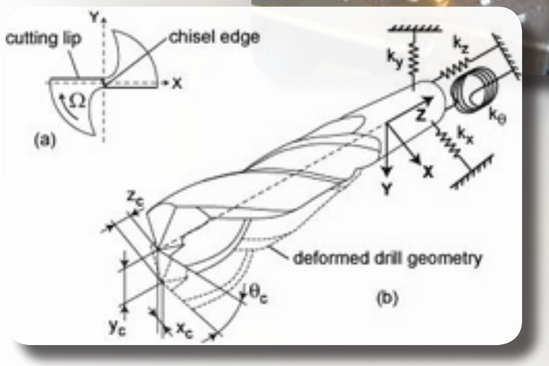
- Predicts forces, power and torque for given cutting conditions
- Simulates stability lobes with process damping effect for single point and multi-inserted boring heads
- Designs and simulates performance of variable pitch boring heads tuned to specific workpiece material and machine tool spindle
- Shares the same extensive work material data base used in Milling Module

Drilling Process Module

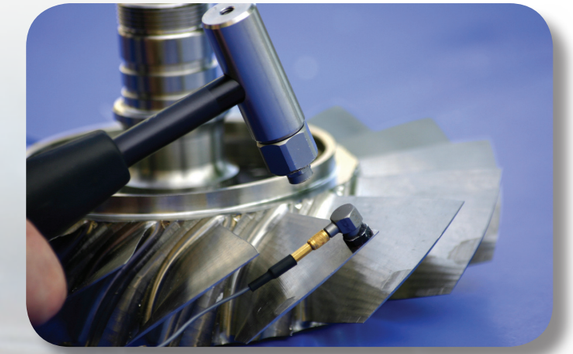
Features

- Handles twist drills with user defined geometry with lip grinding errors
- Uses common work material data base
- Accepts dynamics parameters of the machine tool and workpiece manually by the user or in variety of formats
- Predicts and analyzes cutting forces, torque and power, static deflection of the tool, hole errors, vibration time history, chatter stability with whirling, regenerative cutting and process damping effects

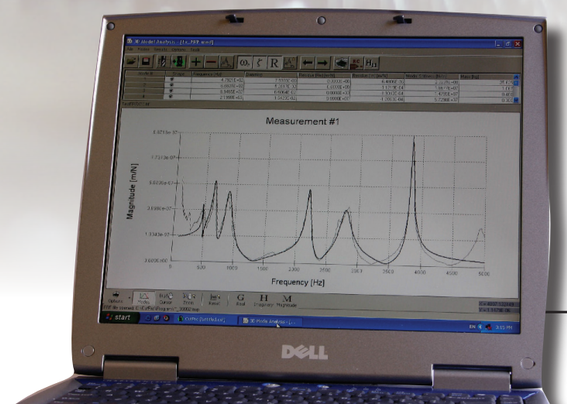
CutPro Drilling Module allows simulation of cutting forces, torque, power, and tool deflections during the hole-making process.



Modal Analysis Software



CutPro Modal Analysis allows identifying stiffness, damping, natural frequency, mode shapes, and weak tool and fixture connections in just a few minutes.



Features

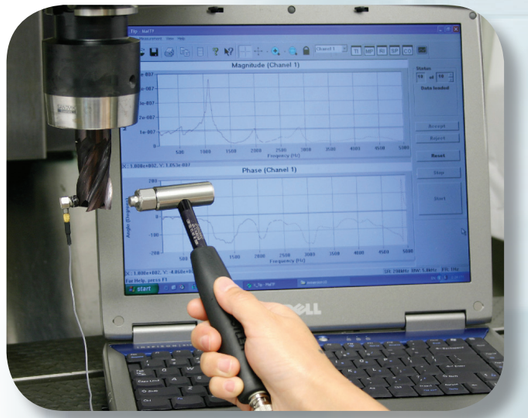
- Predicts natural frequency, damping ratio, residues, modal stiffness and mass from Frequency Response Function (FRF) measurements
- Predicts the FRF of very flexible, difficult to measure tools from impact tests
- Predicts and displays one and two dimensional mode shapes and modal parameters
- Accepts the measurement data in acceleration or displacement units; Metric and Imperial units; FRF measurements files in MalTF, ASCII, HP SDF and UFF formats
- Has a built-in report generator with graphical results

MalTF: Impact Modal (TAP) Testing Software

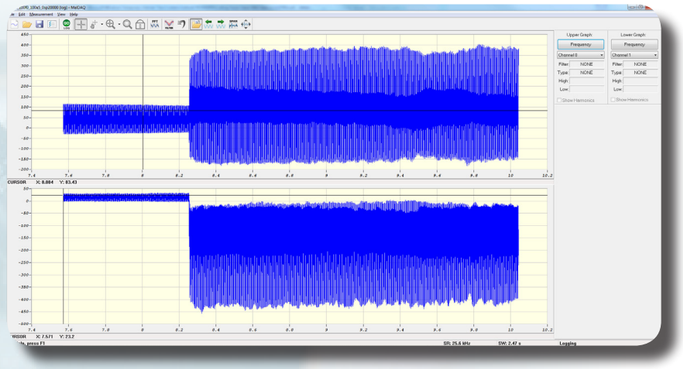
Features

- Has a user-friendly graphical interface
- Has a built-in expert measurement quality control system with voice feedback and an engineering report generation system with graphical results
- Allows simultaneous testing at multiple measurement points
- Supports impact force and shakers as exciters and accelerometer, velocity and displacement sensors as vibration output devices
- Displays Magnitude & Phase, Real & Imaginary parts of the measured FRFs
- Stores the FRF data in binary or standard ASCII formats

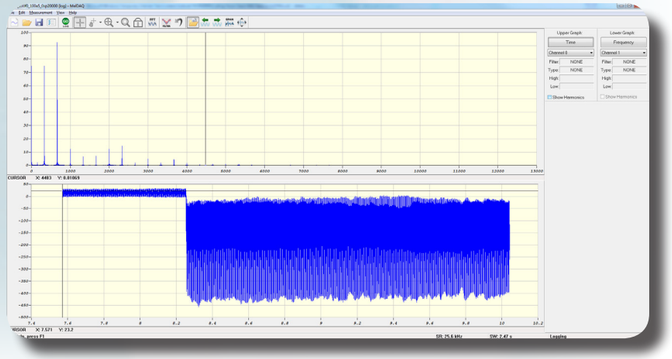
CutPro MalTF allows tap testing the machine and fixtures in a few minutes.



MalDAQ: Data Acquisition Software



CutPro MalDAQ is an easy to use multi-channel data acquisition software with built-in signal analysis features.



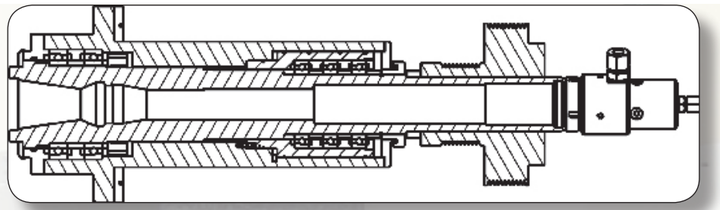
Features

- Collects up to eight channels of sensor data simultaneously
- Logs and streams data to the hard disk
- Has the FFT analysis of data windows to identify vibration frequencies and tool run outs
- Stores data in binary or ASCII test formats
- Allows scaling data into any measurement unit
- Has a user-friendly graphical interface

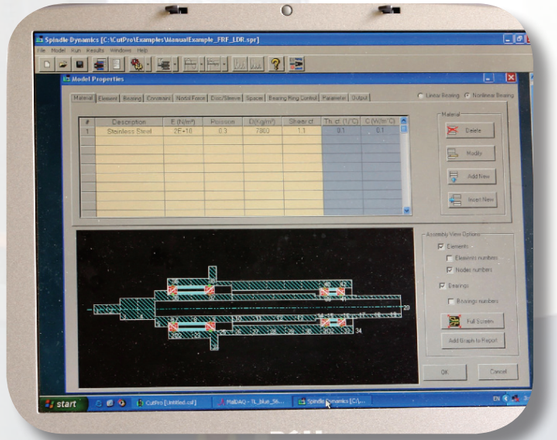
SpindlePro - Spindle Analysis Module

Features

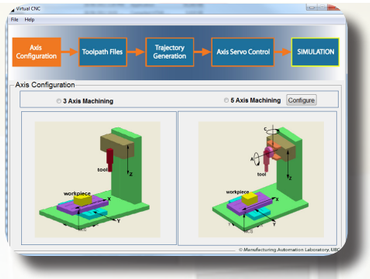
- Predicts deflection at any location on the spindle, contact loads and moments at the bearings, and housing supports under any load or cutting forces
- Has damped and undamped modal analysis
- Predicts Frequency Response Function (FRF) at any location of the spindle and cutting tool that can be used for the chatter stability of the spindle
- Considers Gyroscopic and Centrifugal spindle speed on the bearing stiffness
- Has an EXPERT SPINDLE DESIGN SYSTEM (ESDS)
- Has a user-friendly graphical interface and a built-in report generator

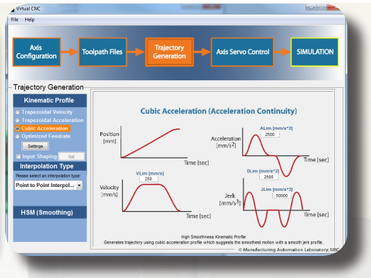


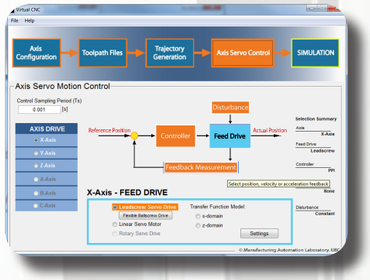
CutPro SpindlePro Module is an advanced engineering software for the optimization and virtual testing of spindles at the design stage.

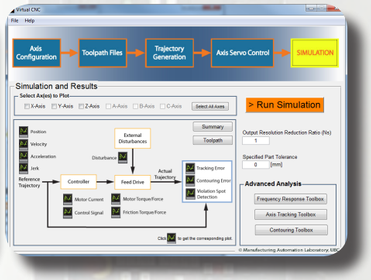


Virtual CNC Module









CutPro Virtual CNC Module allows the rapid prototyping, performance analysis and real time control of multi-axis CNC systems. It is ideal for educational institutions and CNC-machine tool designers.

Features

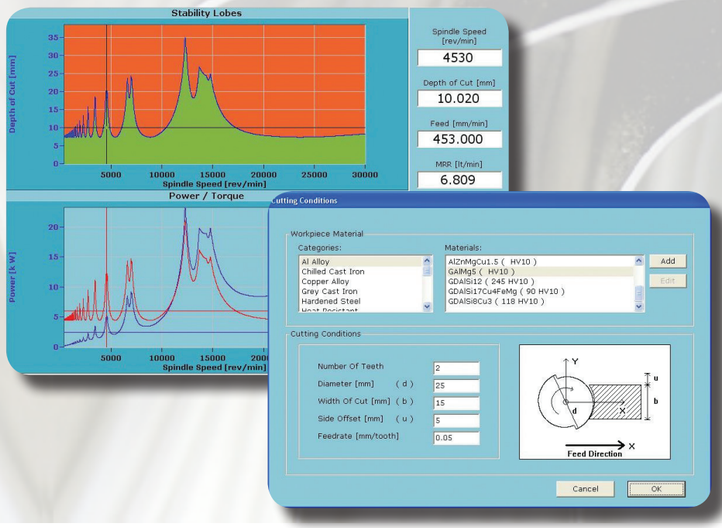
- Allows the selection of trajectory generation style, axis control type, amplifier settings, position, velocity and acceleration feedback sensors and their resolutions
- Indicates violation locations along the tool path
- Has P, PI, PID, Pole Placement, Sliding Mode Control Algorithms with Feed Forward friction compensation
- Provides time and frequency domain response of individual drives along with testing the CNC on ISO standard tests
- Handles up to five Axis machine tool drives and has a built-in Finite Element Model of drive mechanism
- Automated conversion of Virtual CNC into a real time CNC for dSPACE™ platforms in MATLAB and Simulink™ environments

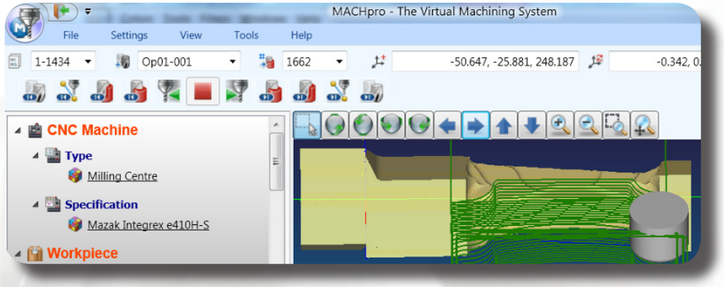
Benefits

- Material removal rates significantly increased
- Integrated expert system automatically diagnoses machining problems
- Can be used by machine tool operators and production engineers
- Technological base for users to switch from Shop-Pro to CutPro
- Can be learned and applied in minutes
- Available in seven languages (EN, DE, ES, FR, IT, JA, ZH)

Shop-Pro is a simplified shop version of CutPro, which covers the entire measurement and optimization of machining operation.

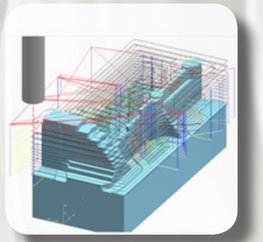
It is a cost effective and practical chatter avoidance tool kit to achieve high speed - high performance machining within minutes.

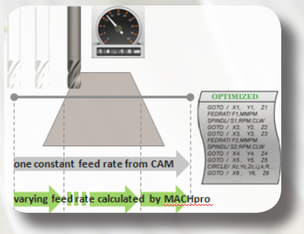




MACHpro is the most advanced process simulation and NC program optimization software.

It enables engineers to visualize and simulate real-world performance of machining operations early in the process planning stage.





Benefits

- Flexibility to automatically optimize and improve critical processes prior to actual machining process
- Production time and costs are reduced
- Quality increased
- Untapped productivity opportunities within existing equipment, tooling and machining processes released
- MACHpro-Turning Module, physics based turning process simulation with same features, is coming soon

MAL Inc.

MAL Manufacturing Automation Laboratories Inc. has been developing sophisticated engineering solutions for the machining industry since 1996.

MAL Inc. offers manufacturing engineering services to supplement clients with limited time, human resources, or expertise. MAL Inc. can implement client specific strategies to release productive potential of existing equipment, tooling and processes.

Industry Sector Market Interests: Manufacturing, Aerospace, Automotive, Power Generation, Die and Mould, Medical.

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MAL Inc. offers industrial training course to train manufacturing engineers in the practical applications of the product.

Key Subjects of the Course:

1. Fundamental Mechanics of Metal Cutting;
2. Metal Database Preparation;
3. Cutting Force Measurements and Instrumentation;
4. Modal Testing and Machine Tool Dynamics;
5. Chatter Vibration Diagnosis and Avoidance;
6. Differential-Pitch Tool Design for Special Applications;
7. Heat Generation and Temperature Prediction in Metal Cutting;
8. Advanced Chatter Vibration Prediction Methods.

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Start your experience with MAL Inc. by contacting our experts at **sales@malinc.com** and we promise to find a solution that best suits your needs.

Technical Support

No question is too simple or too complex; we are here to help. Please contact one of our technical support engineers at **support@malinc.com.**

malinc.com

For more information on our products and services, please visit our website.

Testimonials

"...CutPro is commonly used in our work shops to ensure that tools run at good cutting conditions and that different designs of cutting tools are compared under equal conditions."
Mikael Lundblad, Sr.Research Engineer at SANDVIK Coromant

"...After we optimized the programs, the operators do not need hearing protection anymore, and at the same time the cycle time was reduced by 50%, and tool life improved."
Jochem Roukema, Asco Aerospace Canada

"...CutPro really makes money for us."
Hartford Industrial Co.Ltd., Taiwan

manufacturing automation laboratories

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