CAM-TOOL

CAD/CAM System for Molds & Dies

“V15.1 Explanations of Functions No.3” Chapter 3 and Chapter 4

For Chapter 1 and the first half of Chapter 2, please see “V15.1 Explanations of Functions No.1”.
For the second half of Chapter 2, please see “V15.1 Explanations of Functions No. □ ”.

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C&G SYSTEMS INC.
Product Planning Supervision Department, Sales Technology Division

List of V-UP Functions

CAM-TOOL

1. Development of Functions for Shortening CAM Operation Time

- Improvement of calculation process lists (improvements for creating new list, addition of common settings, addition of display columns, etc.)
- Automation of reset color for Solid Display
- Improvement of Multi support
- Show tool shape
- Information (Entity): Display of profiles used
- Effective length standards implemented for safety distance heights of tools
- Improvement of Tooling DB functions (addition of display columns for neck angles, improvement of input for Multi-taper, etc.)

2. Enhancements and Improvements of Cutting Paths

- Enhancement of fine and precision functions (Z-Level High Efficiency Rough Cutting, Z-Level Finishing)
- Enhancement of Z-level Finishing Functions (Support for Spherical Lenses)
- Low Lying Processing (Variable pitch path)
- Low Lying Processing (Enhancement of corner processing)
- Z-level Low Angle Finishing: Spiral cutting
- Scale calculation: Enhancement of supported cutting modes
- Scanning-line Cutting: Support for Fillet
- CL/5Axis Editor “Component Point Rearrangement” Utility
- Enhancement: Curve Cutting
- Improvement of 5Axis Conversion (Auto)
- Enhancement of cutting modes when using Barrel Cutter Tool
- Other function enhancement/specification changes
- 2.5D Side Cutting: Support for spirals
- 2.5D Rough Cutting: Last Step Over
- 2.5D Side Cutting: Last Step Over, Last Step Down
- 2.5D Re-machining: Combine processing
- 2.5S Approach: Avoid Interference with Surfaces
- Hole: Circular Hole-wall Cutting: Helical cutting
- Hole: Helical tapping: Support for original contour
- Hole: Support for Cross Hole Drilling using a gun drill
- Hole: Entity (Create All): Create work plane

List of V-UP Functions

CAM-TOOL

Chapter 3 and Chapter 4
"V15.1 Explanations of Functions No.3"
(This Document)

3. Enhancement of Cutting for Large/3D Objects

- ~~Addition of Re-machining area commands~~
- □ Merge solid from CAM-TOOL main unit
- □ Re-machining: Output pencil path
- ~~Improvement of connecting move~~

4. Other Function Enhancements

- Animation (Multi type)
- CL Editor: Load polygon entity
- Machining process list: Enhancement of NC output destination
- Initial settings for "Save as type"
- Enhancement of support for mpf output variables
- Binary support for mpf files and machine files
- □ Vericut I/F: Output of work/jig shape
- OM Inspect: Projecting direction of reference point to inspect
- Miscellaneous

5. Linkage with Host CAD

- Support for RGB colors

6. Surface Plus

- Enhancement of Fill Surface

7. Addition of New Option Functions

- Addition of Edit Polygon functions

8. Enhancement of Translator Functions

- IGES Import: Conversion of Entity106 elements to points
- IGES Import: Conversion of Entity406 strings to layer comments
- Parasolid Import: Support for x_b extension in file "Open" and "Add"
- RBG support for DXF Export

3. Enhancement of Cutting for Large/ 3D Objects

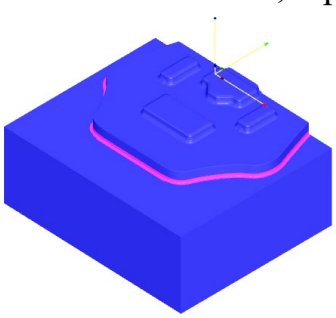
- Merge solid from CAM-TOOL main unit
- Re-machining: Output pencil path

Solid Merge from CAM-TOOL Main Unit

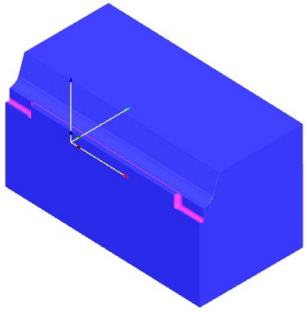
Overview

It is now possible to execute solid merge from the CAM-TOOL main unit. It is also possible to perform merge of Multi solids.

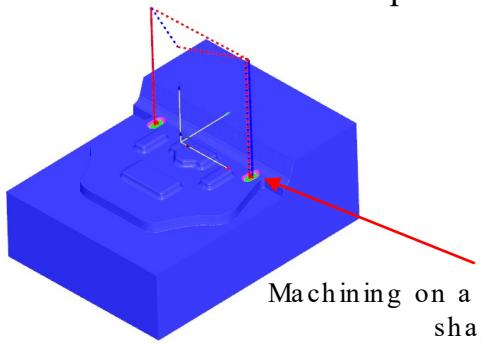
Solid merge is an effective means in situations such as when dividing a die part and performing machining separately, and then finally combining the parts and performing machining of the entire part. Conventionally, solid merge could only be executed from a machining process, but, in V15.1, it is now possible to execute it from the CAM-TOOL main unit. As a result, operations are reduced and the application range of solids is expanded.



Solid A
work-L140.cgsk



Solid B
work-L141.cgsk



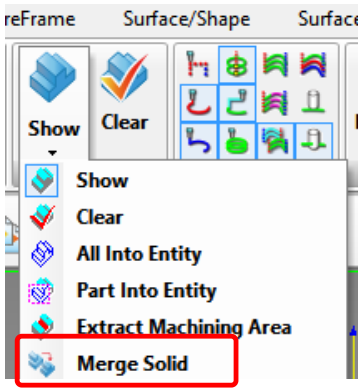
Solid Merge
work-L140+141.cgsk

Folder: V15.1\ V15.1-DEMO-03
Model file: V15.1-DEMO-03.gmd
Calculation process list:
V15.1-03-Solid-01.gc2 LAY = 140
V15.1-03-Solid-02.gc2 LAY = 141
V15.1-03-Solid-03.gc2 LAY = 145
Process: L145-25SA-01

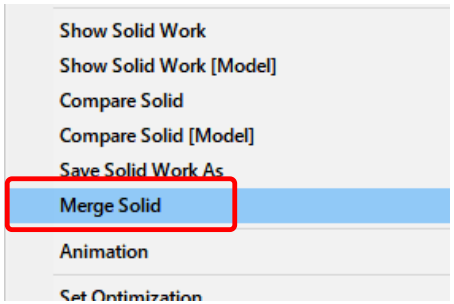
Operations reduced and application range of solids

Solid Merge from CAM-TOOL Main Unit

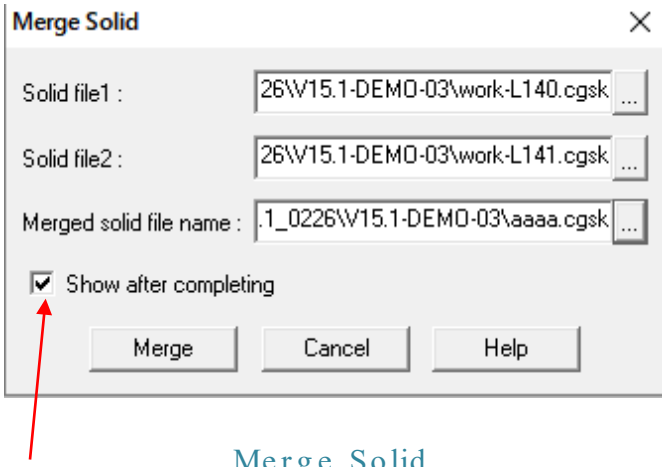
Operating method



CAM Menu



Calculation Process
Opt Status Menu



Merge Solid

Starts “Show Solid” command when checked
Solids can be displayed in the model view

Precautions

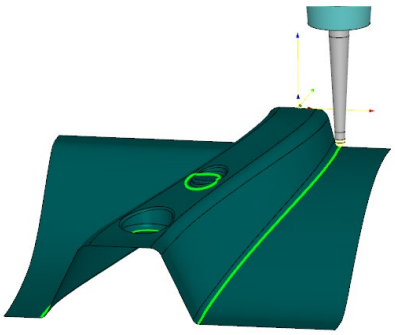
1. Target file types: cgsk (multi), gso (Z-map), gs5 (extension: Z-map)
2. Merge condition: Mesh position must be the same as the mesh width.

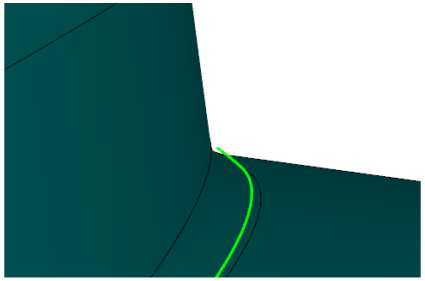
Re-machining - Output Pencil Path

Overview

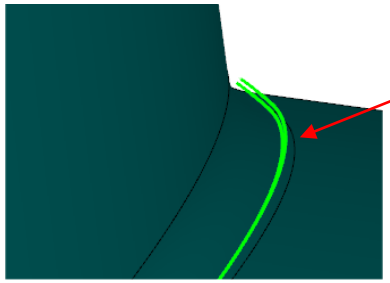
A function which outputs pencil paths has been added to the Re-machining Mode. It is now possible to easily output pencil paths by merely checking "Output pencil path" ON.

It is now possible to output pencil paths by simply checking the checkbox ON in the Machining tab. Also, it is possible to perform driving in machining by specifying the re-machining cutting amount.

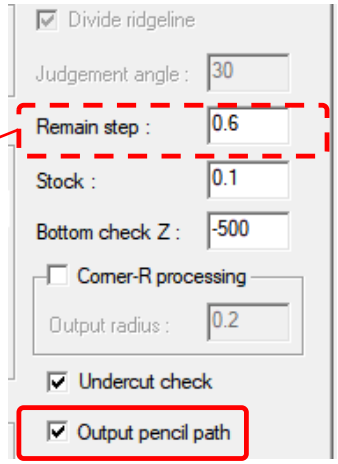


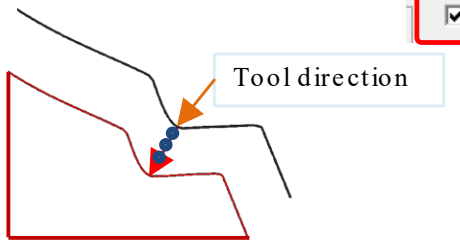


Pencil path



Specifies remain step





- Pencil path output, grayout processing
  - Specify right angle direction pitch
  - Specify ridgeline angle direction pitch
  - Divide ridgeline

Reduces number of CAM operations, and reduces

Folder: V15.1\ V15.1-DEMO-03
Model file: V15.1-DEMO-03.gmd
LAY = 100
Calculation process list:
V15.1-03.gc2
Process: L100-TOR-017, L100-TOR-018

4. Other Function Enhancements

- Animation (Multi type)
- CL Editor: Load polygon entity
- Machining process list: Enhancement of NC output destination
- Initial settings for “Save as type”
- ~~Enhancement of support for mpf output variables~~
- ~~Binary support for mpf files and machine files~~
- Vericut I/F: Output of work/jig shape
- OM Inspect: Projecting direction of reference point to inspect
- Miscellaneous

Animation (Multi Type)

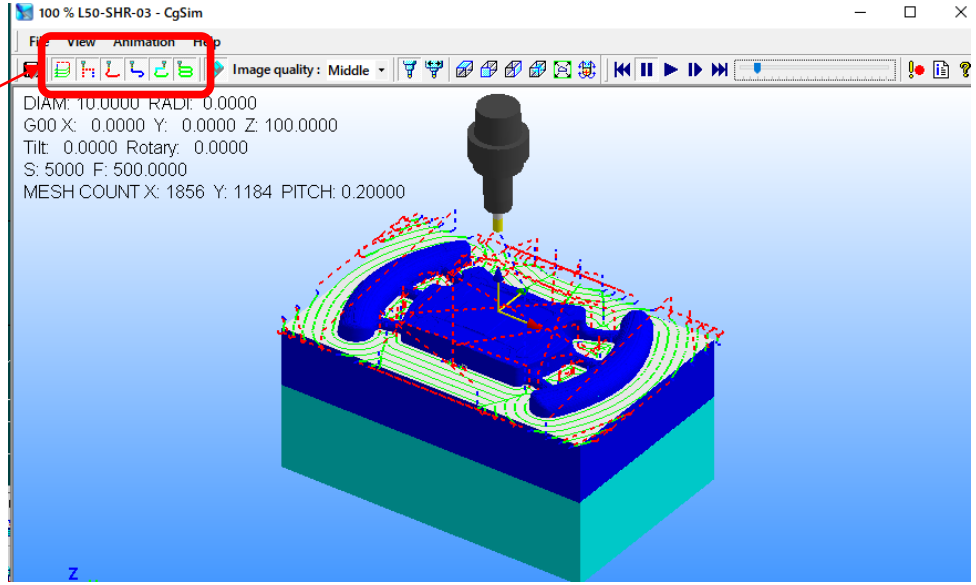
Overview

GUI has been updated, to improve operability. For example, the Multi type animation function have been enhanced, and a CL display function have been added to the screen.

CL display On/Off button added

GUI update

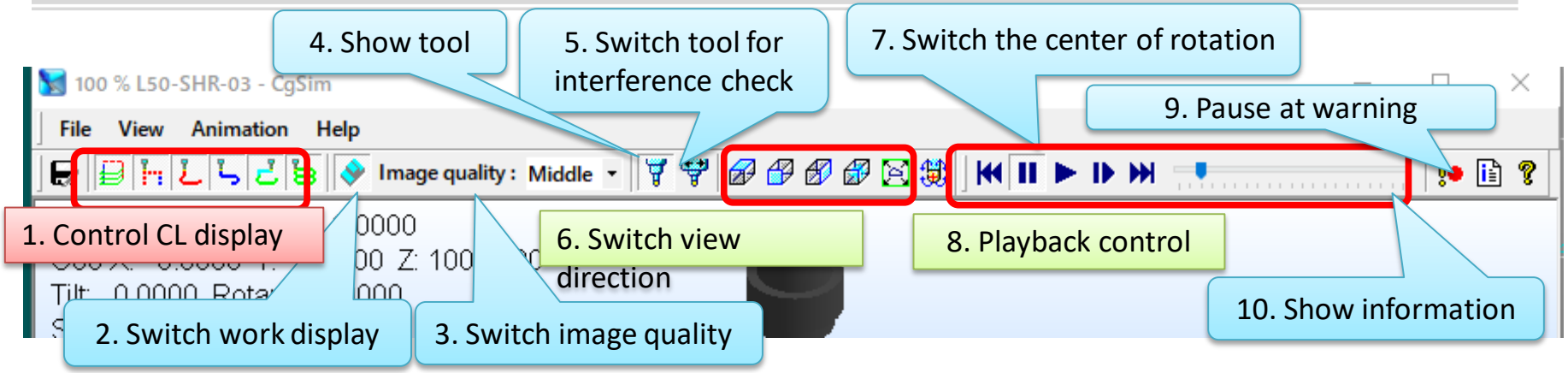
Operability close to that of machine simulation operations



Folder: V15.1\V15.1-DEMO-03
Model file: V15.1-DEMO-03.gmd
LAY = 50
Calculation process list: V15.1-03-Curv.gc2
Process: L50-TFA-01 and all subsequent

Improved operability and

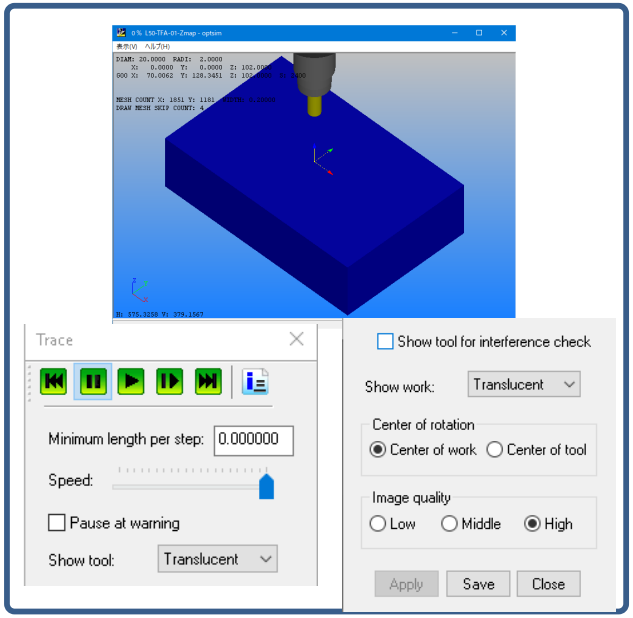
Animation (Multi Type)



Layout of icons and control bars in animation screen

Functions

1. CL: Display/hide cutting parts, approaches/escapes, etc.
2. Show work: Toggle between shading -> translucent -> none (not displayed)
3. Image quality: Toggle between low -> medium -> high
4. Tool: Toggle between shading -> translucent -> none (not displayed)
5. Tool: Toggle between tool according to safety value (tool for interference check) -> tool of actual size
6. Switch view direction, full size
7. Switches between work center and tool center as the center of rotation
8. Play, stop, speed control
9. Switch pause ON/OFF at warning in the event of an interference, etc.
10. Switches information display ON/OFF at lower half of screen



Reduces number of CAM operations, and reduces

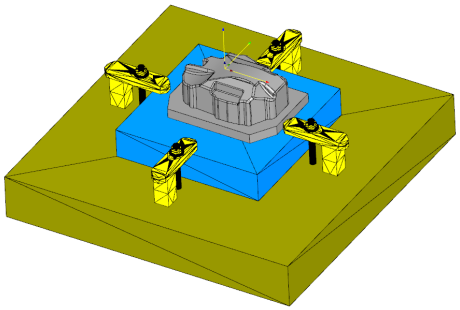
V14.2

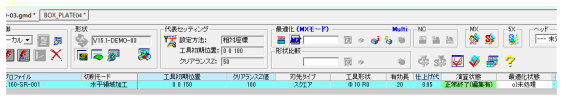
CL Editor: Load Polygon Entity

Overview

It is now possible to load polygon entities in CL Editor. Interference check and simulation settings have been simplified, which increases opportunities for interference checks and is useful for assuring safety in machining.

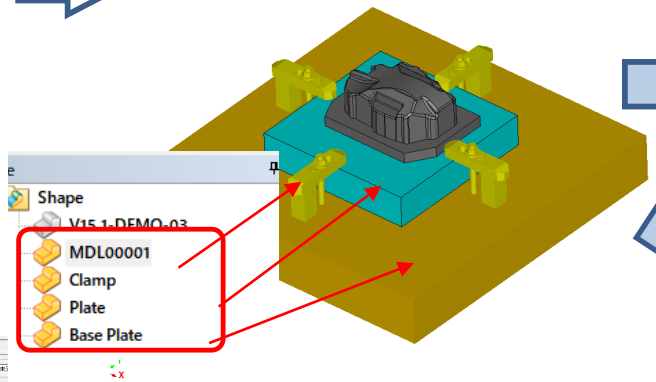
Polygon entity/copy



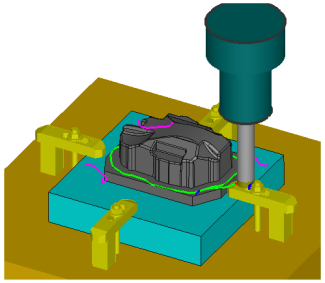


gmd file

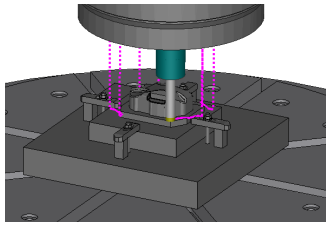
Polygon entity/load



CL (Simultaneous 5Axis) Editor



Check Interference



Machine Simulation

Folder: V15.1\V15.1-DEMO-03
Model file: V15.1-DEMO-03.gmd
LAY = 160, 161
Calculation process list: V15.1-03-POLYGON,CLedit-01.gc2
Process: L160-SR-001

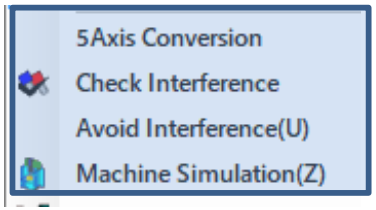
CL Editor: Load Polygon Entity

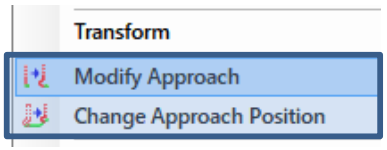
Function details

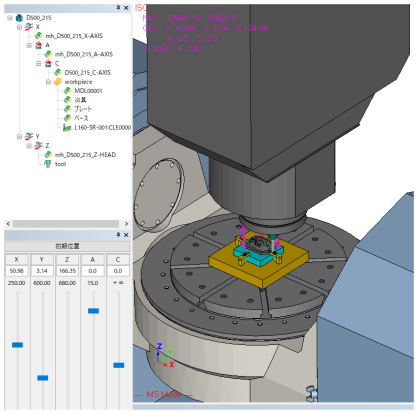
➢ Commands supported by polygon entities

1. CL (Simultaneous 5Axis) Editor

Supported commands
5Axis Conversion (Auto)
Check Interference
Avoid Interference
Modify Approach
Change Approach Position



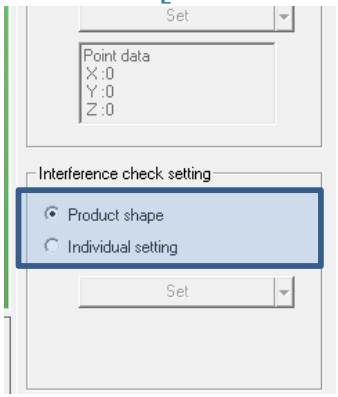


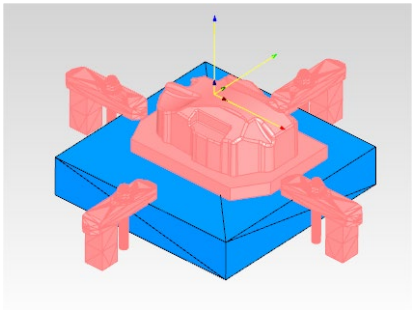


Machine Simulation

List of commands supported by “check shape”

2. CT main unit [Control Window]



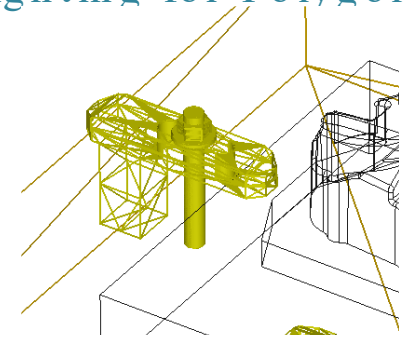


Polygon entity subject to embedded 5Axis “Interference check setting”

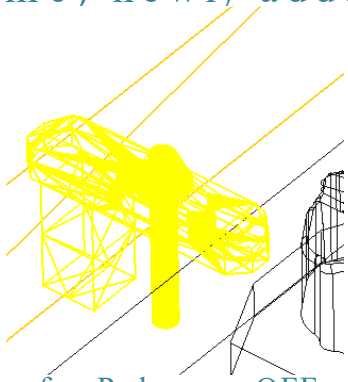
Folder: V15.1\V15.1-DEMO-03
Model file: V15.1-DEMO-03.gmd
LAY = 160, 161
No. 1 Calculation process list: V15.1-03-POLYGON,CLedit-01.gc2
Process: L160-SR-001, CL Editor
No. 2 Calculation process list: V15.1-03-POLYGON,CLedit-5.gc2

Function details

- Lighting for Polygon (Wireframe) newly added



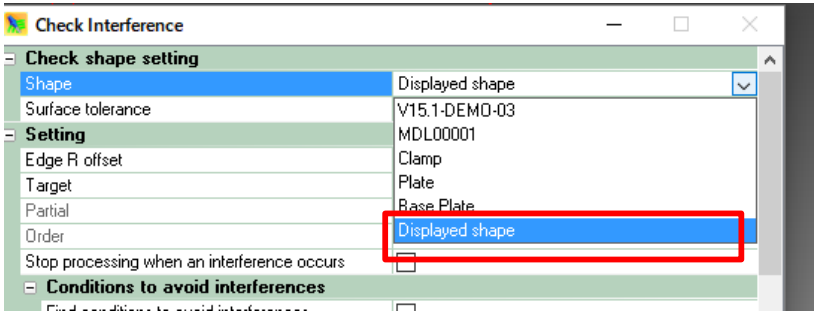
Lighting for Polygon: ON



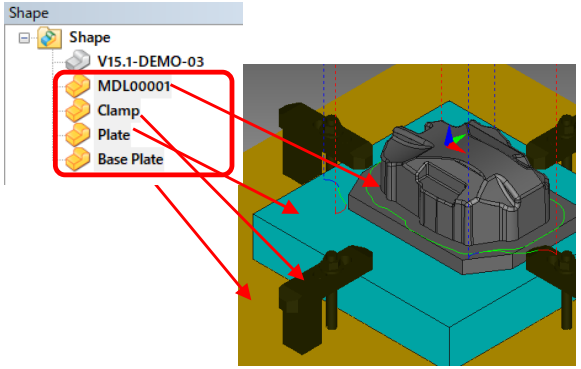
Lighting for Polygon: OFF

Environment Settings ON/ OFF

- CL (Simultaneous 5Axis) Editor



"Displayed shape" added to the "Shape" menu in Check shape setting



All displayed shapes are subject to check interference

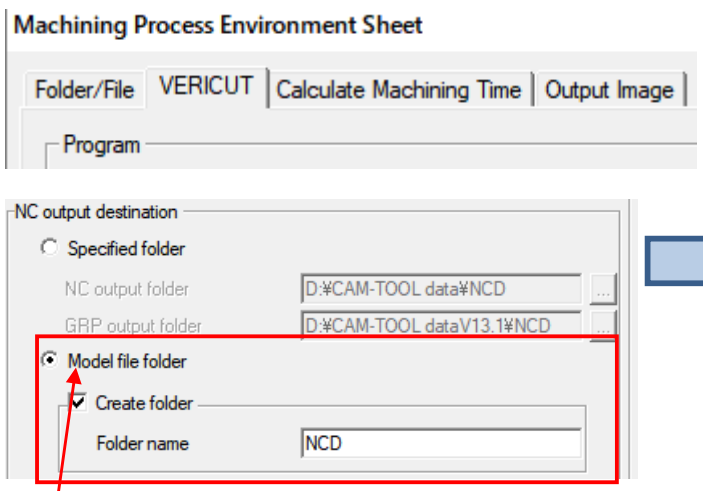
Precautions
Allowed size of shape data is up to 4 GB. An error message is displayed when the size exceeds 4 GB.
Error message: "File exceeds the shape size limit. Please reduce the number of surfaces in the shape."

Folder: V15.1\ V15.1-DEMO-03
Model file: V15.1-DEMO-03.gmd
LAY = 160
Calculation process list: V15.1-03-POLYGON,CLedit-5.gc2
Process: L160-TS-001

Machining Process List: Enhancement of NC

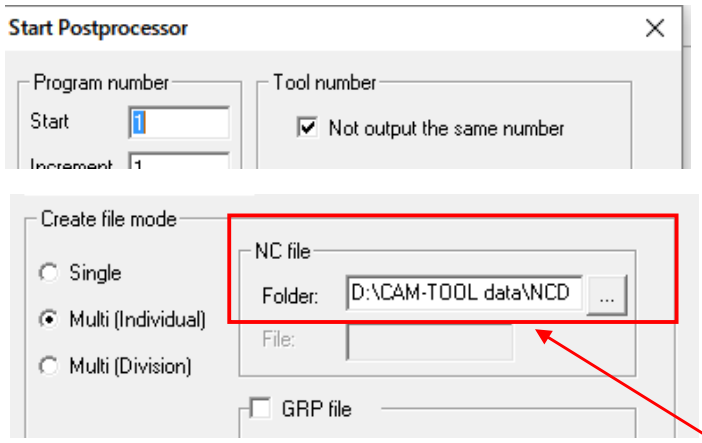
Overview

A function which sets the output destination of NC data to be the same folder as the model file has been newly added. This makes it possible to easily construct an environment in which model data, calculation process list, and NC data can be managed within a single model file folder.



Select model file folder

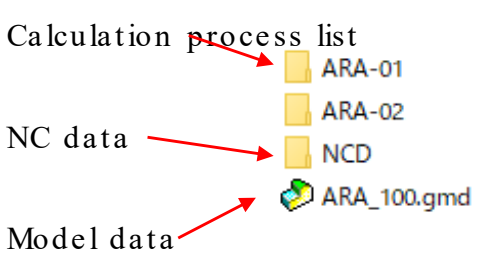
Machining Process Environment Sheet



The position of the NC file creation folder is fixed to the model file folde

Creation of NC data file

Managed together in the model file folder



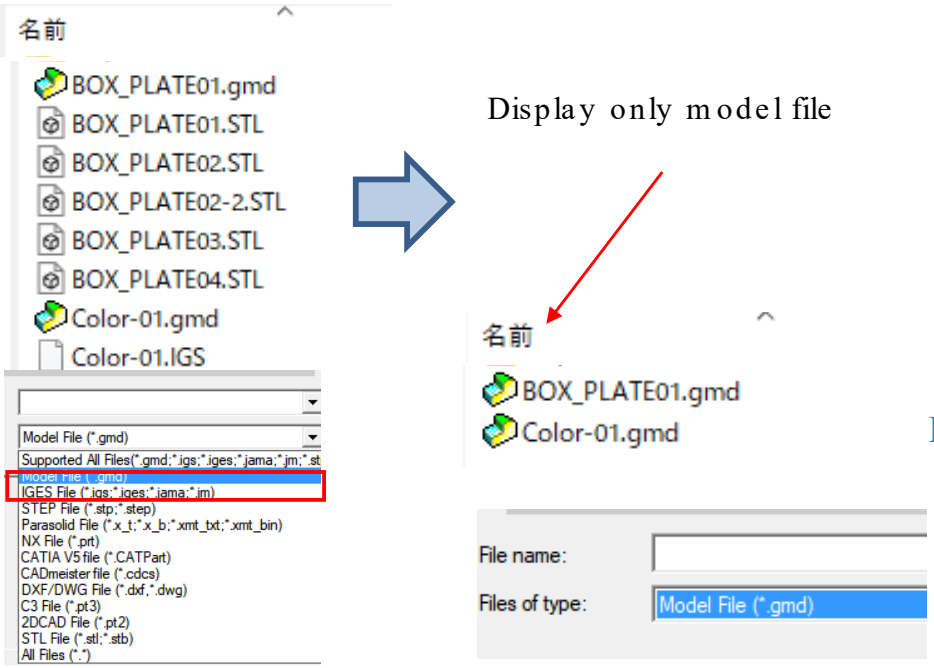
Model file folder

Initial Settings for “Save as type”

Overview

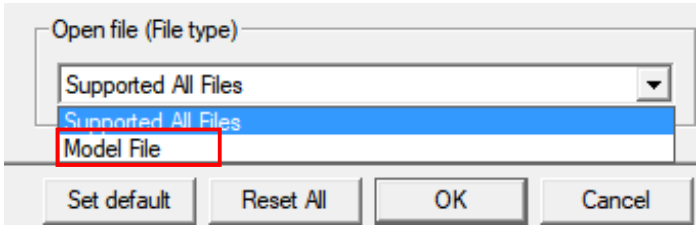
For files subject to the file “Open” and “Add” commands, it is now possible to select model (gmd) files.
Initial settings (default) are also available. Displaying only a model file makes it easier to select the target file.

■ File “Open” / “Add”



Type: Supported All Files　　Type: Model File

■ How to set initial settings (default)



Environment setting sheet/ Initial Setting S

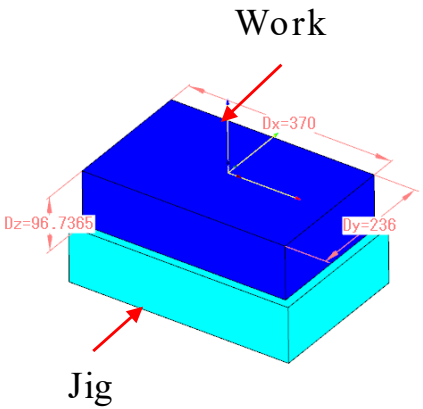
By making the initial setting, it is possible to select “Model File” as the file type when using file “Open”.

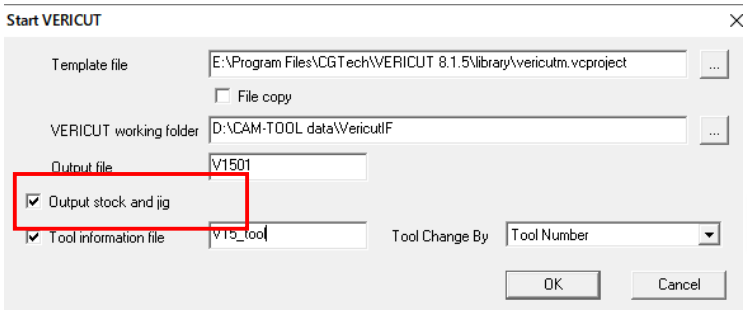
VERICUT I/F: Output of Work/Jig Shape

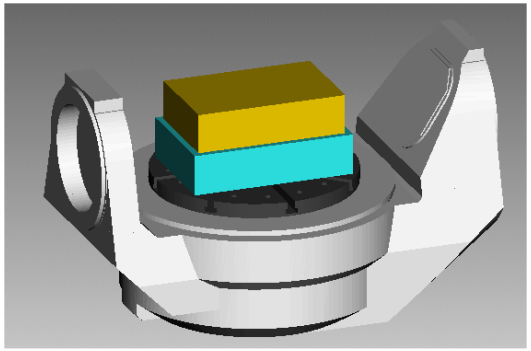
Overview

A function which outputs an initial work/jig set in CAM-TOOL to VERICUT has been added. This reduces the work for preliminary preparations.

With the Start VERICUT command, it is possible to output the STL file of a shape (Zmpa, Multi) set with a work or tool.







CAM-TOOL

Machining process,
Start VERICUT

VERICUT

The bottom surfaces of jigs and tools are arranged at the

*Advanced setting of the local coordinate system, G code offset, and other values are still required

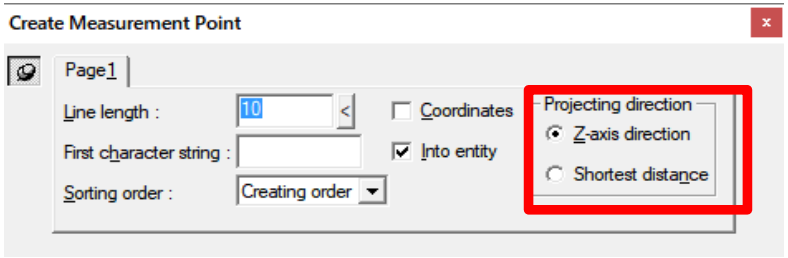
Reduces the work for preliminary

Folder: V15.1\V15.1-DEMO-01
Model file: V15.1-DEMO-01.gmd
LAY = 5, 30
Calculation process list: V15.1-01-ENZAN_RESET.gc2
Process: All process

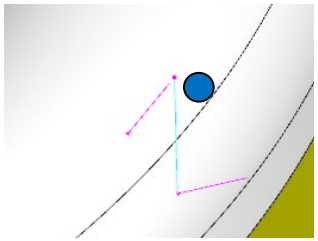
Overview

Z-axis direction projection has been newly added to the method for determining points to inspect, in addition to the conventional projection of entities over the shortest distance.

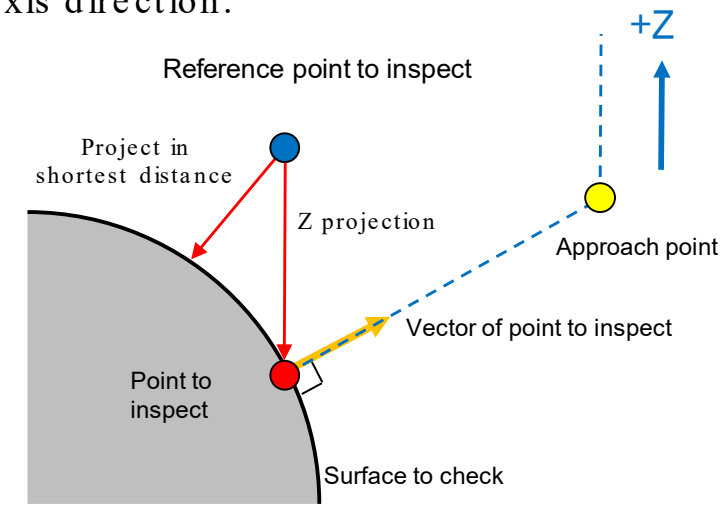
It is possible to set nice round values as the XY coordinates of the points to inspect by projecting the reference points to inspect in the Z-axis direction.



Create point to inspect



Examples of reference points to inspect and points to inspect



Reference point to inspect, projection

Reference point to inspect uses Z-axis projection, but the measurement path uses the normal direction path.

Folder: V15.1\ V15.1-DEMO-01
Model file: V15.1-DEMO-01.gmd
LAY = 1, 2, 40, 41, 51

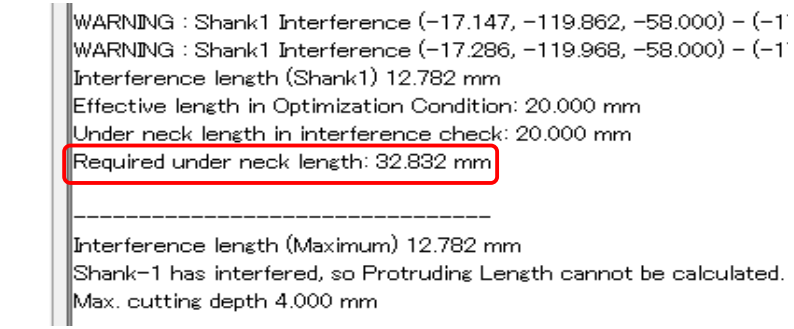
Improved manageability of points to

Automatic addition of ribbon menu commands

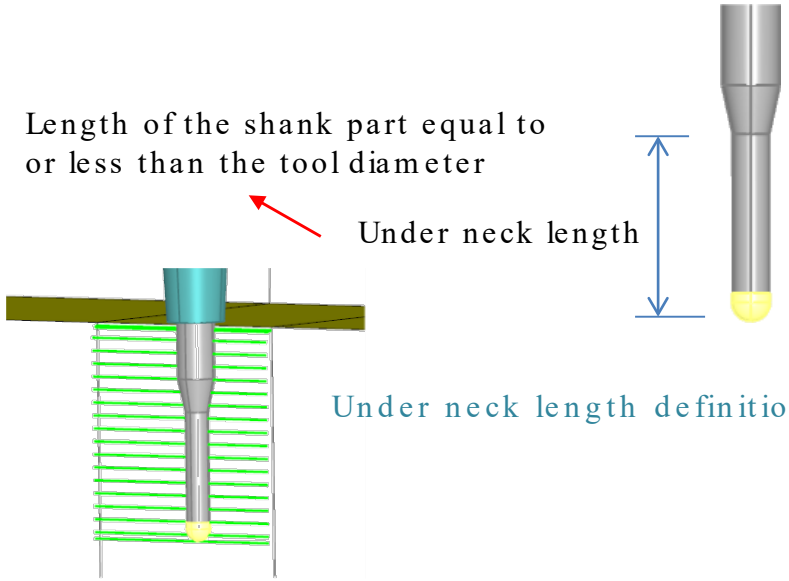
1. When upgrading the software or adding an optional license, the new tabs and commands are now automatically added by determining whether or not licenses have changed when starting CAM-TOOL.
2. Added tabs, groups, and commands are added to the end of existing menus. (Different from the positions in the event of a reset)
3. Items which have been voluntarily deleted in ribbon customization are not automatically added during the next start-up.
4. When a license no longer exists, the existing tabs and commands remain.

Z-map: Under neck length calculation

In V15.1, it is now possible to freely set the effective length. When the shank has interfered in the Z-map, a distinction is made between the set effective length and the under neck length. Therefore, the calculation result of the under neck length is displayed in Show Optimization Error.



Show Optimization Error



Under neck length definition

Folder: V15.1\ V15.1-DEMO-01
Model file: V15.1-DEMO-01.gmd
LAY = 1
Calculation process list: V15.1-01-Zmap.gc2
Process: L1-TZ-09-Z