24 hours a day, 365 days a year ! Easy, Safe and Fast unmanned machining

1. Start NC machining
   after just 5 click of CAM works

2. No need to worry about selecting tools and
   setting time through ATC machining with
   15 exclusive tools

3. Increase lifespan and decrease machining time
   with exclusive shrink fit holder and corner-R tool

4. Best ideal database for NC machining
   by various tools specification

5. Automatic Feedrate & RPM control
   by cutting load calculation

6. Automatic toolpath addition
   for excessive load to cut

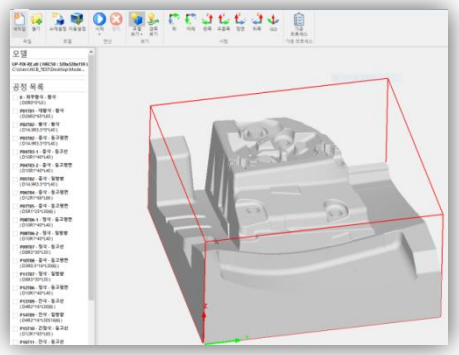
7. Automatic aircut delete
   for empty & little load to cut

8. Show the area of EDM or Over/ Less cutting

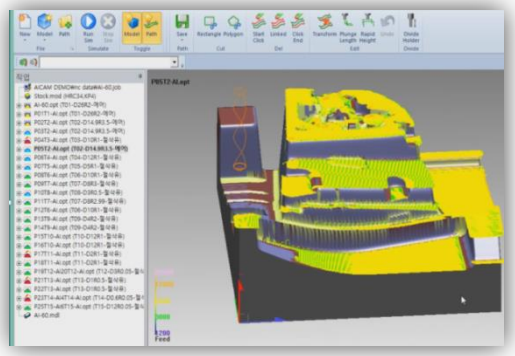
CONTENTS

I. AICAM Automation

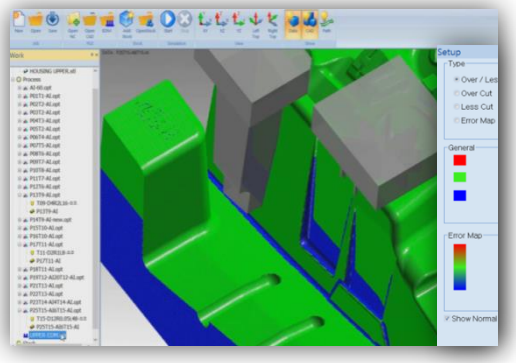
1 **Automatic toolpath creation**



2 **Optimization**



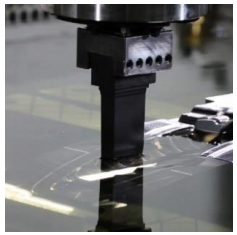
3 **Verification**

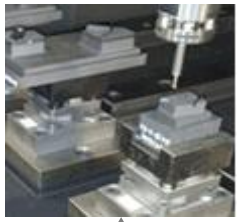


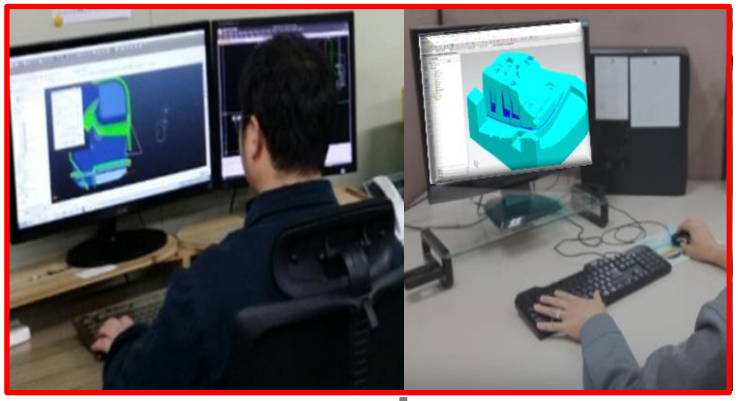
Machining of fifteen tool automation

Verify Electrode model Simulation

EDM





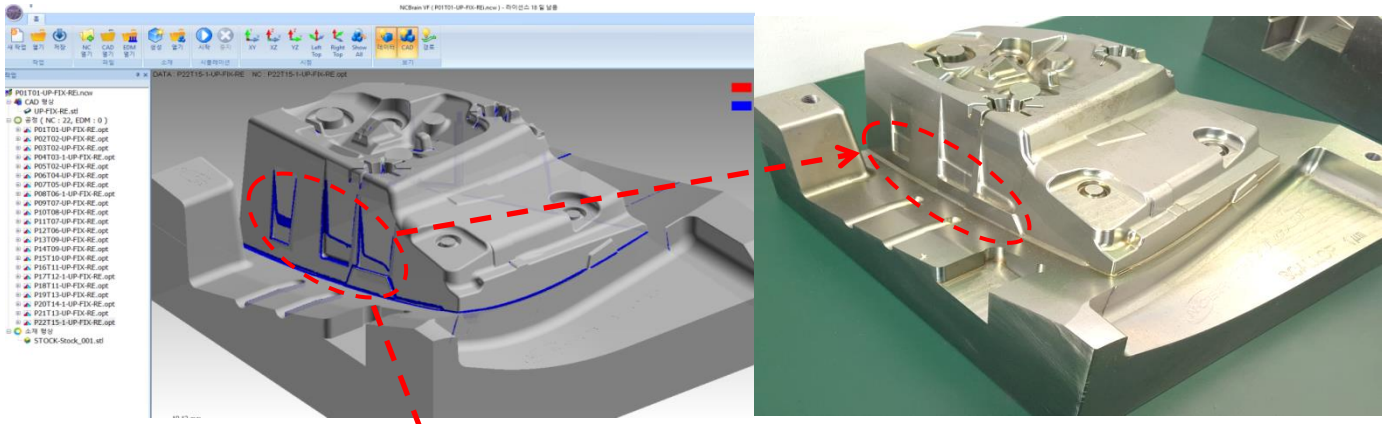


EDM operation

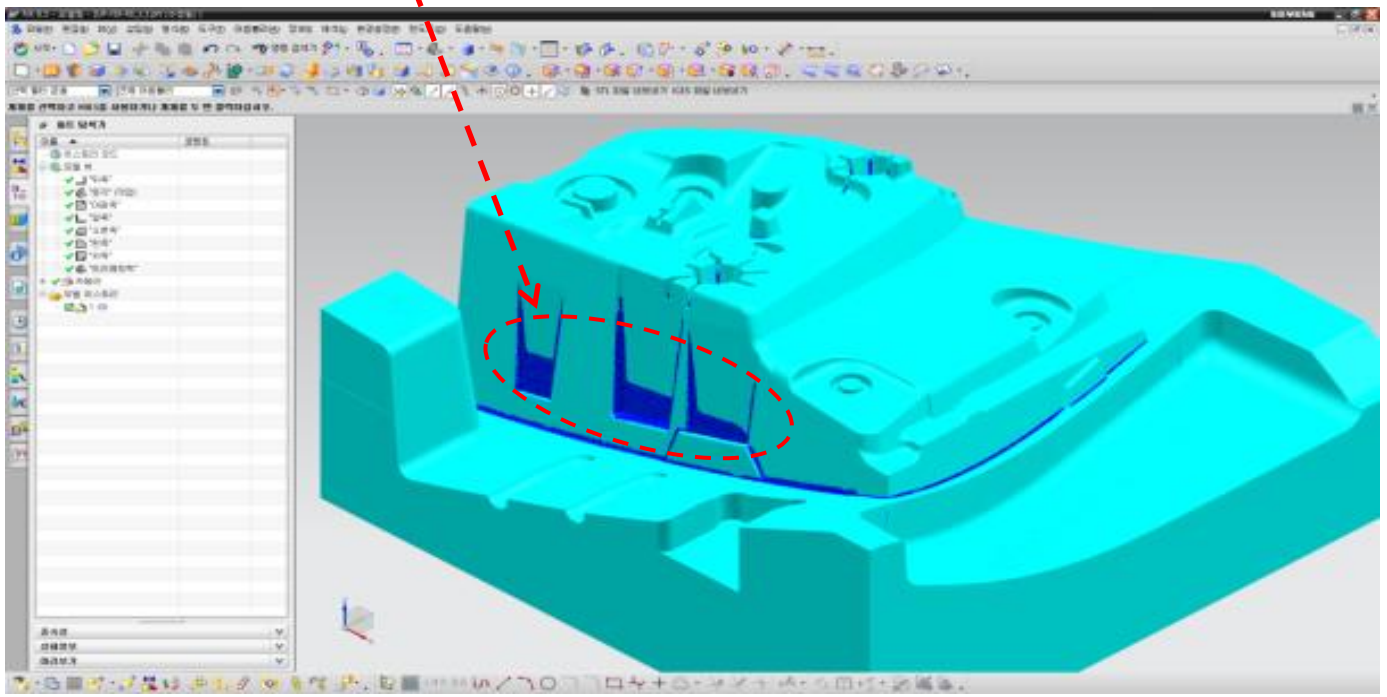
Use Process

1. Exporting a “STL file” from less cut which has blue color in AICAM
2. “STL file” deliver to CAD&CAM
3. Use of EDM modeling and additional CAM

AICAM verification



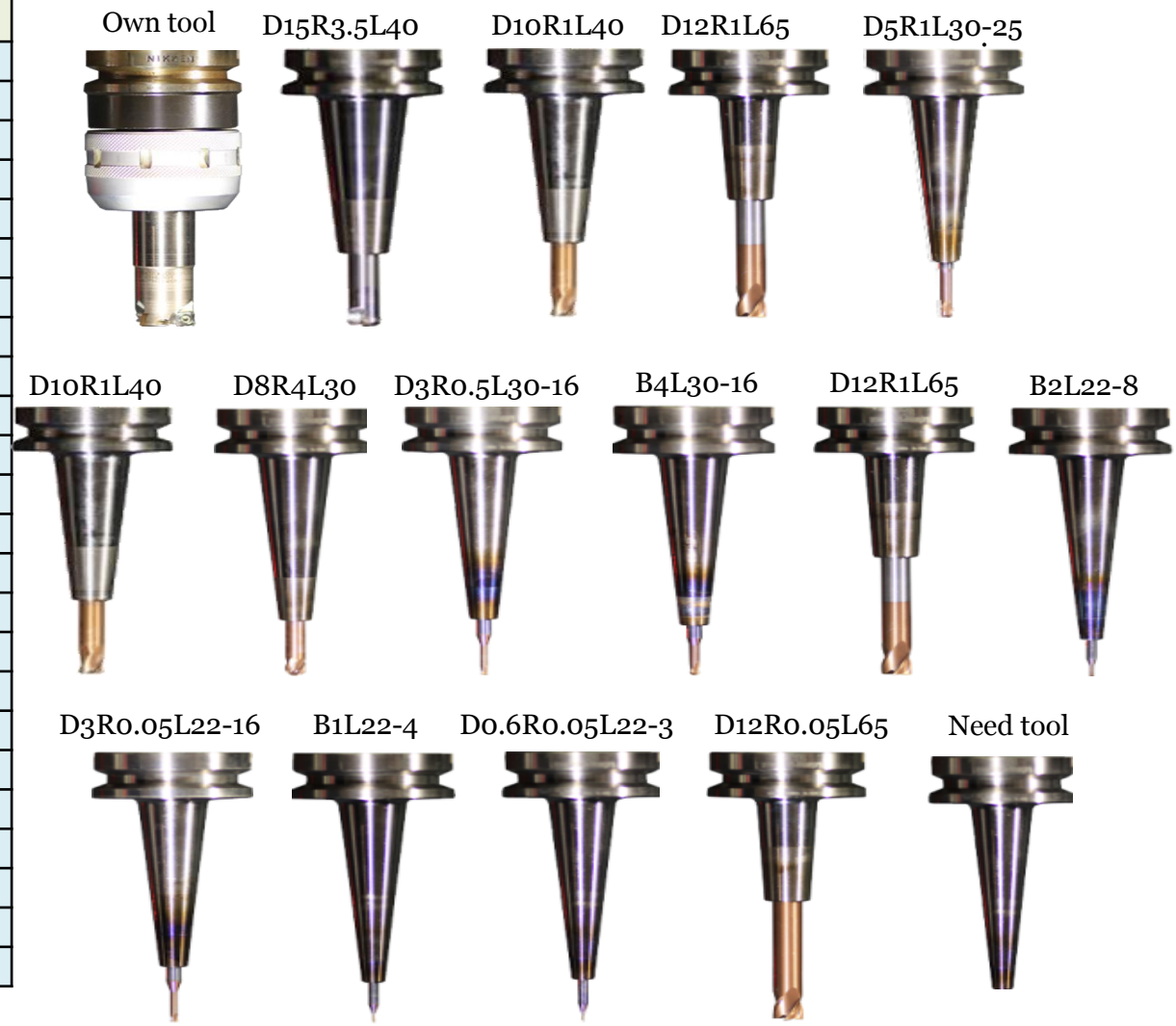
CAD&CAM



Machining Process 1

No	Process	Tool path	User's Tool
-	Outsourcing roughing	Roughing	Set virtual tool
P1T01	Roughing	Large Roughing	F26R2*L65
P2T02	Roughing	Roughing	F14.9R3.5*L40
P3T02	Semi-Finishing	Contour	F14.9R3.5*L40
P4T03	Semi-Finishing	Contour	F10R1*40*L40
P5T02	Semi-Finishing	One-way	F14.9R3.5*L40
P6T04	Semi-Finishing	Contour	F12R1*66*L66
P7T05	Semi-Finishing	Contour	F5R1*25*L30(6)
P8T06	Finishing	Contour	F10R1*40*L40
P9T07	Finishing	Contour	F8R3*30*L30
P10T08	Semi-Finishing	Contour	F3R0.5*16*L30(6)
P11T07	Finishing	One-way	F8R3*30*L30
P12T06	Finishing	Contour	F10R1*40*L40
P13T09	Rest-Machining	Contour	B4*16*L30(6)
P14T09	Rest-Machining	One-way	B4*16*L30(6)
P15T10	Finishing(Long)	Contour	F12R1*65*L65
P16T11	Rest-Machining	Contour	B2*8*L22(4)
P17T12	Edge-Machining	Contour	F3R0.05*16*L30(6)
P18T11	Rest-Machining	One-way	B2*8*L22(4)
P19T13	Rest-Machining	Contour	B1*4*L22(4)
P20T14	Rest-Machining	Contour	F0.6R0.05*3*L22
P21T13	Rest-Machining	One-way	B1*4*L22(4)
P22T15	Edge-Machining	Contour	F12R0.05*65*L65
P23T16	Add	Contour	Rib, D4 or less
P24T17	Add	Contour	User tool
P25T18	Add	One-way	User tool

15 types of Tools and Machining for 22 types of NC data



Machining Process 2

P1T01	Roughing

User Tool

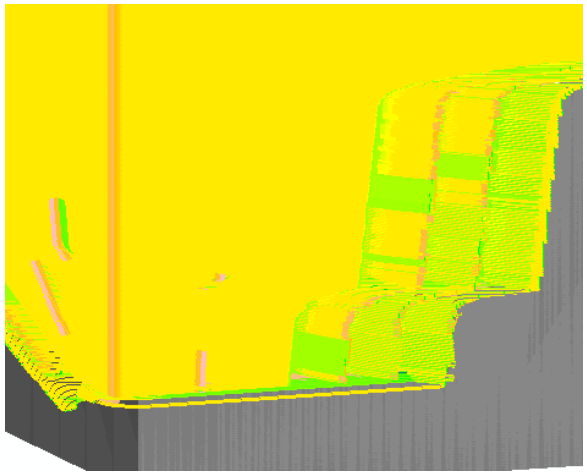
P2T02	Roughing

Overall Length 155
It can machine on lowest depth with this tool which is 5mm longer than other tool

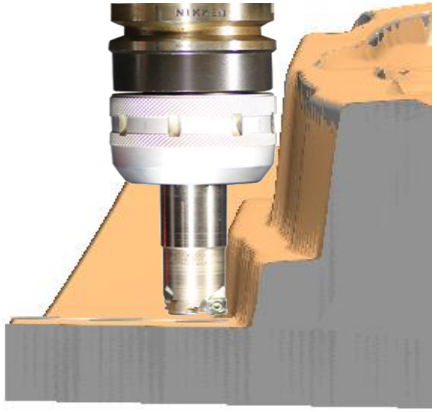
Angle 4.8°

D15R3.5L40
Roughing with small tool can machine corner well.
This tool which is short and small corner-r can machine strongly.
Reasonable TIP price

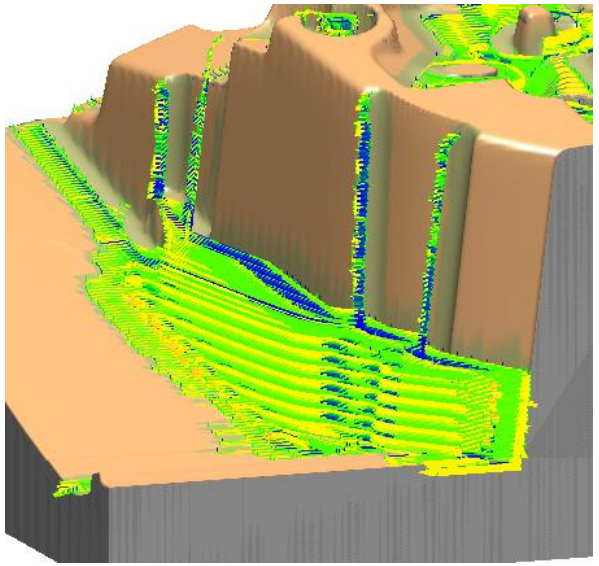
Delete Low load & Air-cut



Longer tool
ng time up and Machine quality down



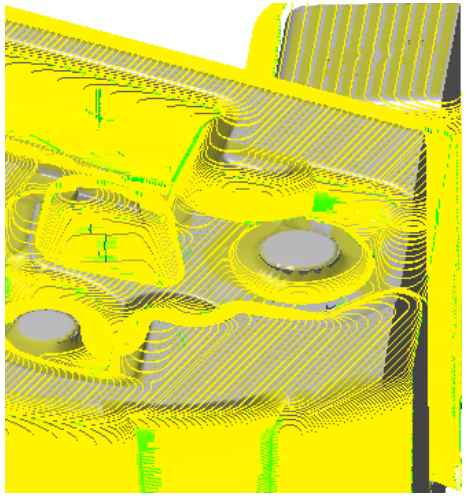
Holder Tooling
Fast and Stable



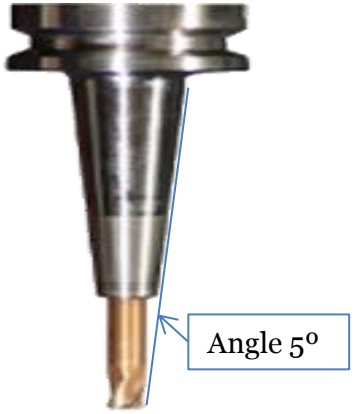
Machining Process 3

P3T02	Semi-Finishing

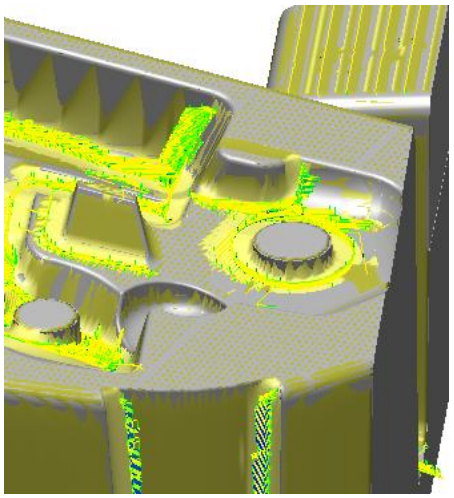
D15R3.5L40
Roughing clearance 0.3
Semi-Finishing(Contour) 0.06



P4T03	Rest-Semi-Finishing

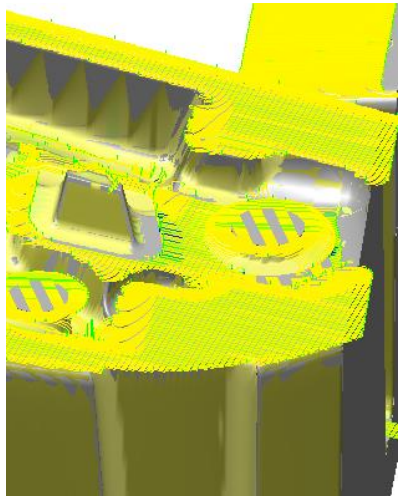


D10R1L40
After using tool number “P3”, Rest-Semi-Finishing for machining area with short tool

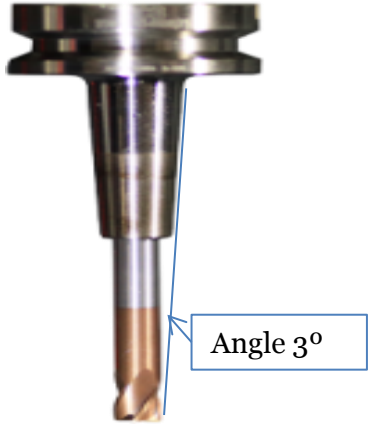


P5T02	Semi-Finishing	One-way

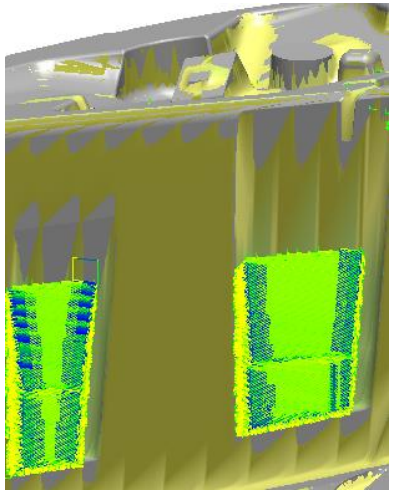
D15R3.5L40
Gentle slope area, Semi-Finishing
Plane clearance 0.03
Sidewall clearance 0.06



P6T04	Semi-Finishing	Contour

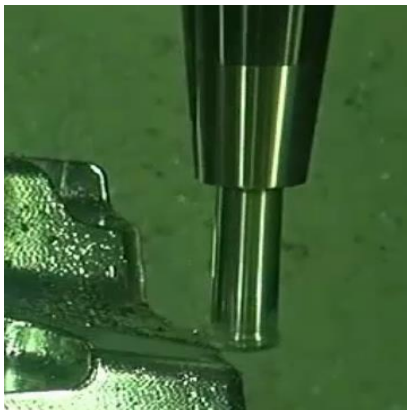


D12R1L65
After machining tool number “P3~P5”, Semi-Finishing for deep and small angle



Machining Process 4

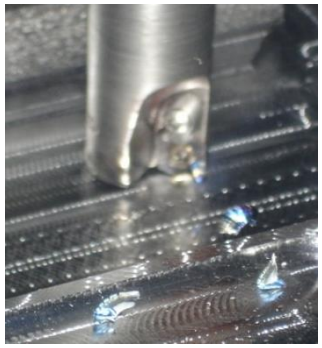
Bull nose cutter is 10 times cheaper than Ball Endmill & the machining speed is almost twice faster

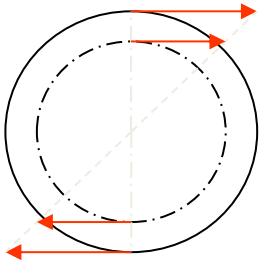
Semi-Finishing is very fast from this tool
which is cheap and efficient
Tip R3.5 price less than $3

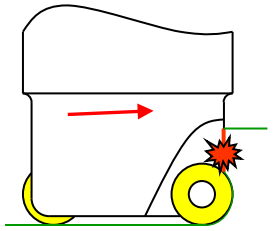


Semi-Finishing is very fast from this tool
which is cheap and efficient
Ball Tip or E/M more than $30

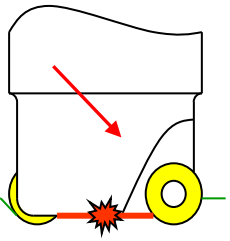


Steady cutting speed
More chip cut

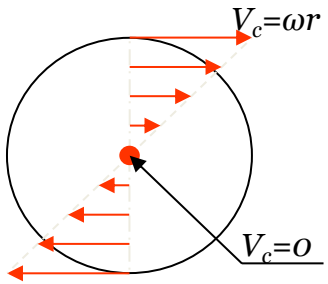


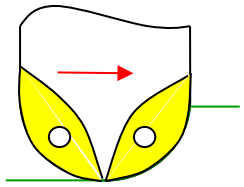


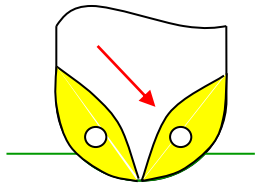
R
Tool



Different cutting speed
Less chip cut





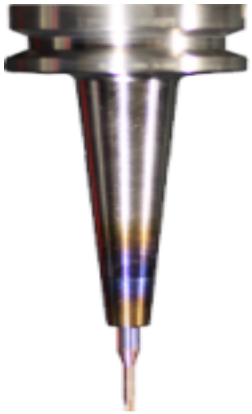


Machining Process 5

P7T05	Semi-Finishing	Contour

Length is 5 times bigger than diameter
Stable Z-pitch 0.15~0.05

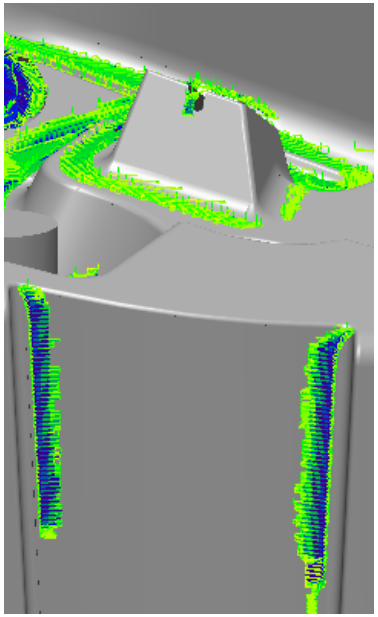
P10T08	Semi-Finishing	Contour

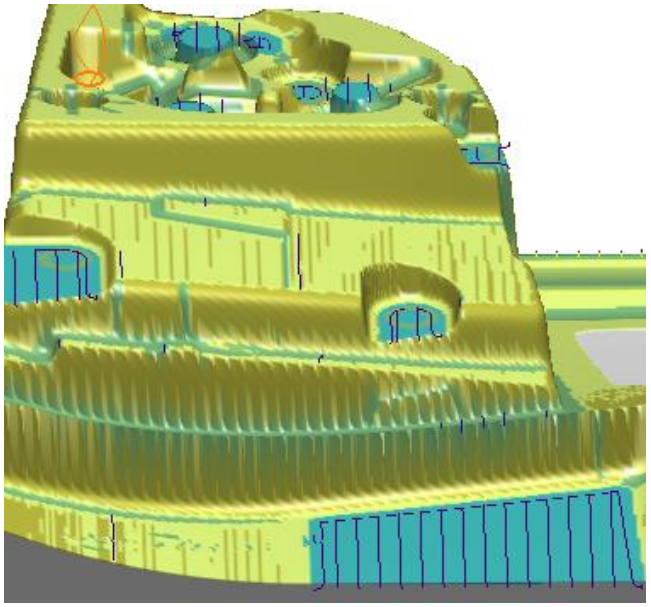


After machining tool number “P8~P9”, “P10” is same machining with “P7”

P8T06	Finishing	Bottom

D10R1L40
Finishing for bottom area



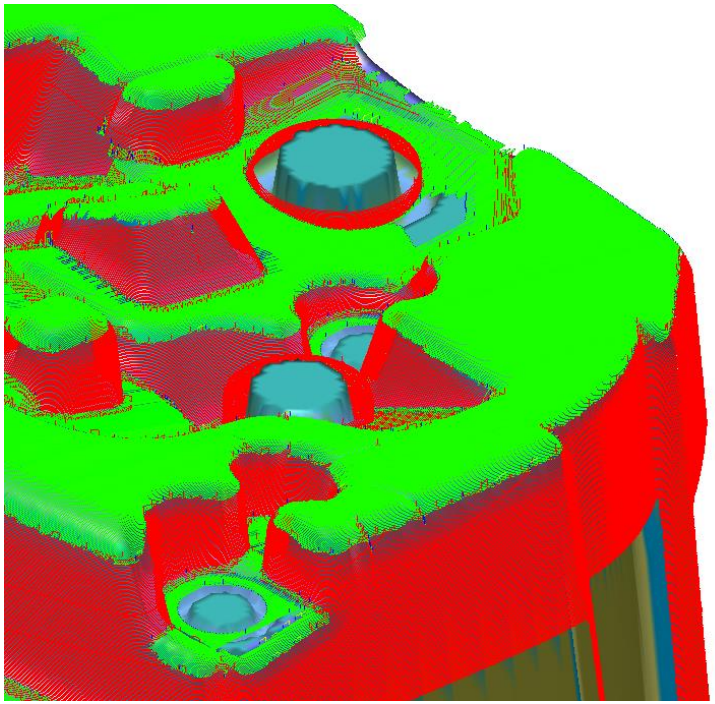


Machining Process 6

P9T07	Finishing	Contour
P11T07	Finishing	One-way

Finishing(Contour) for slope
Finish one way 60°

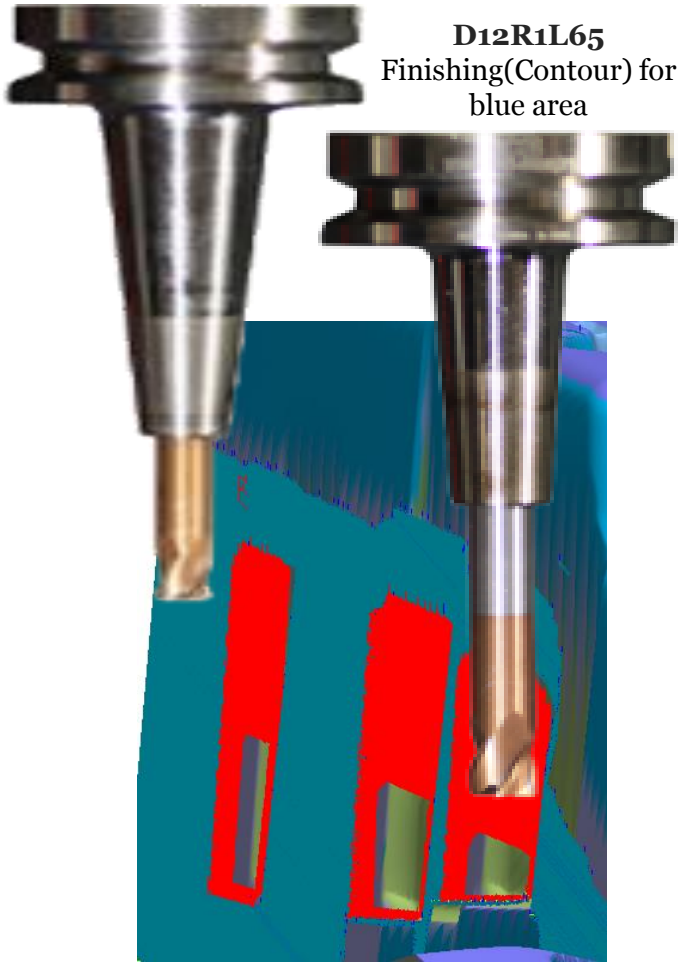
D8R3 amount of blade 6 (S12000 F3300)
Double faster machining, long tool life



P12T06	Finishing	Contour	F10R1*40*L40
P15T10	Finishing (Long)	Contour	F12R1*65*L65

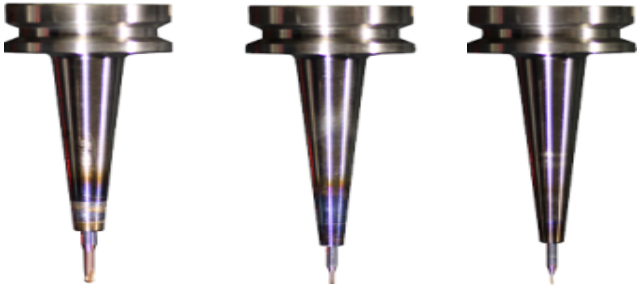
D10R1L40
Finishing(Contour) for blue area

D12R1L65
Finishing(Contour) for blue area

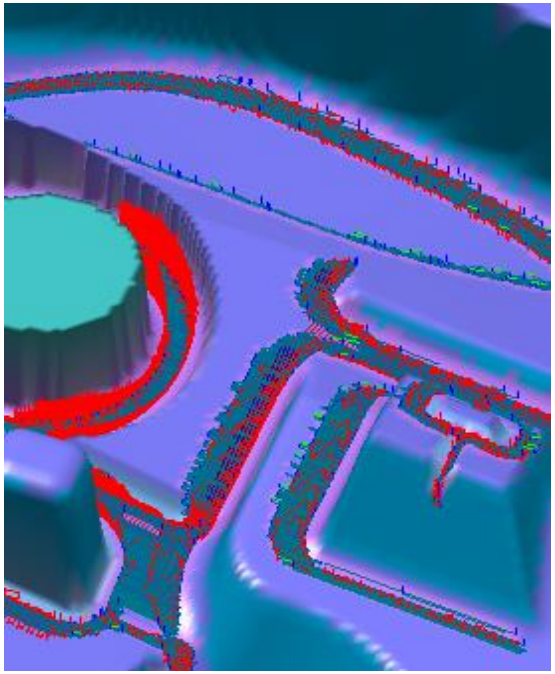


Machining Process 7

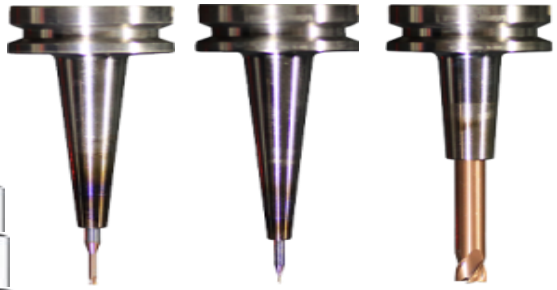
P13T09	Rest-Maching	Contour	B4*16*L30(6)
P14T09	Rest-Maching	One-way	B4*16*L30(6)
P16T11	Rest-Maching	Contour	B2*8*L22(4)
P18T11	Rest-Maching	One-way	B2*8*L22(4)
P19T13	Rest-Maching	Contour	B1*4*L22(4)
P21T13	Rest-Maching	One-way	B1*4*L22(4)



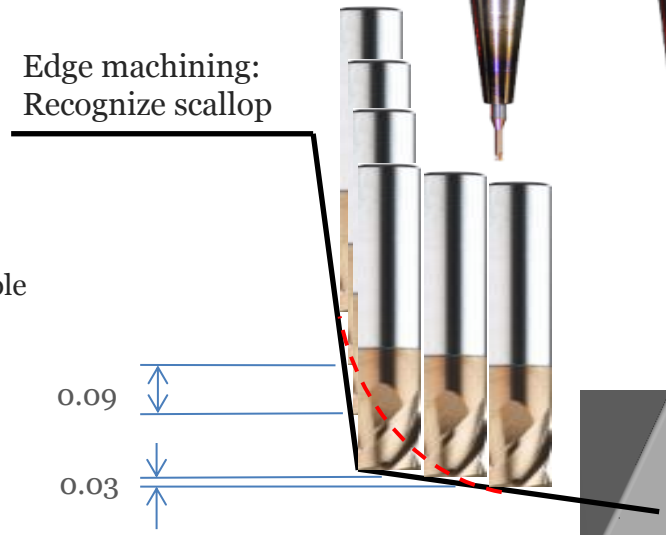
B4~B1 Contour(red color)→One-way Rest-Maching: stable

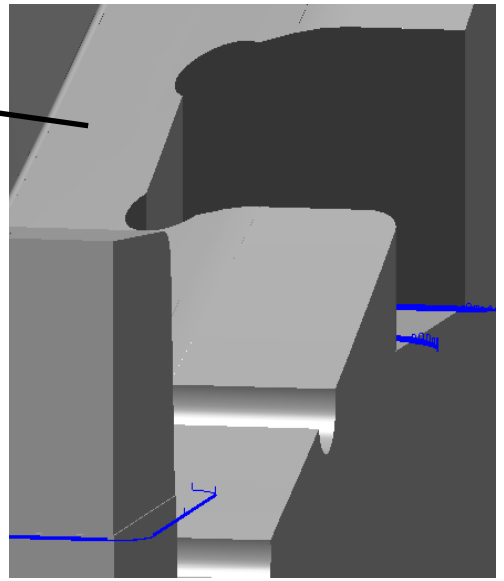


P17T12	Edge maching	Contour	F3R0.05*16*L30(6)
P20T14	Rest-Machingl	Contour	F0.6R0.05*3*L22
P22T15	Edge maching	Contour	F12R0.05*65*L65



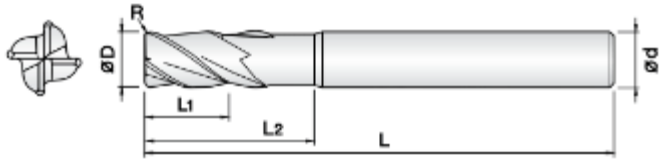
Edge machining:
Recognize scallop



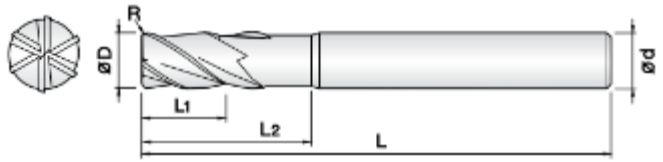


Simplification of Using Tool

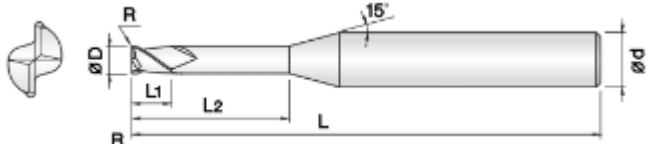
(Corner-R: 8ea)



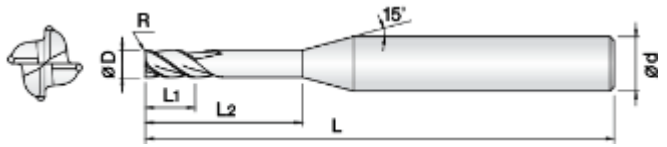
The number of blade	D	L1 (Length of cut)	L2(Effective length)	L(Overall length)	d(shank)
4	12XR1	12	66	100	12
4	10XR1	10	40	75	10



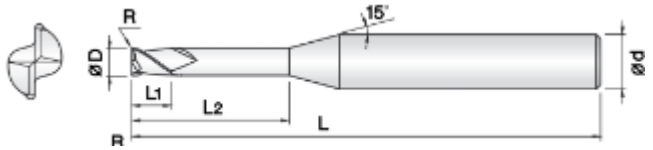
The number of blade	D	L1 (Length of cut)	L2(Effective length)	L(Overall length)	d(shank)
6	8XR3	8	30	60	8



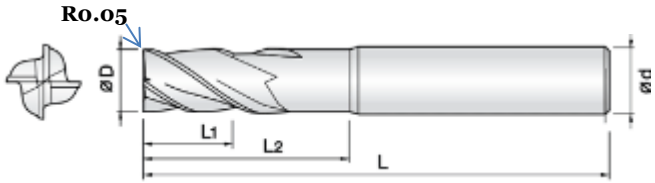
The number of blade	D	L1 (Length of cut)	L2(Effective length)	L(Overall length)	d(shank)
2	5XR1	5	25	50	6
2	3XR0.5	3	16	50	6



The number of blade	D	L1 (Length of cut)	L2(Effective length)	L(Overall length)	d(shank)
4	3XR0.05	3	16	50	6

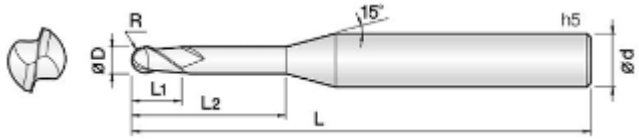


The number of blade	D	L1 (Length of cut)	L2(Effective length)	L(Overall length)	d(shank)
2	0.6XR0.05	0.6	3	40	4



The number of blade	D	L1 (Length of cut)	L2(Effective length)	L(Overall length)	d(shank)
4	12XR0.05	12	66	100	12

(Ball :3units)



The number of blade	D	L1 (Length of cut)	L2(Effective length)	L(Overall length)	d(shank)
2	4XR2	4	16	50	6
2	2XR1	2	8	40	4
2	1XR0.5	1	4	40	4

Machining Condition & Tool life

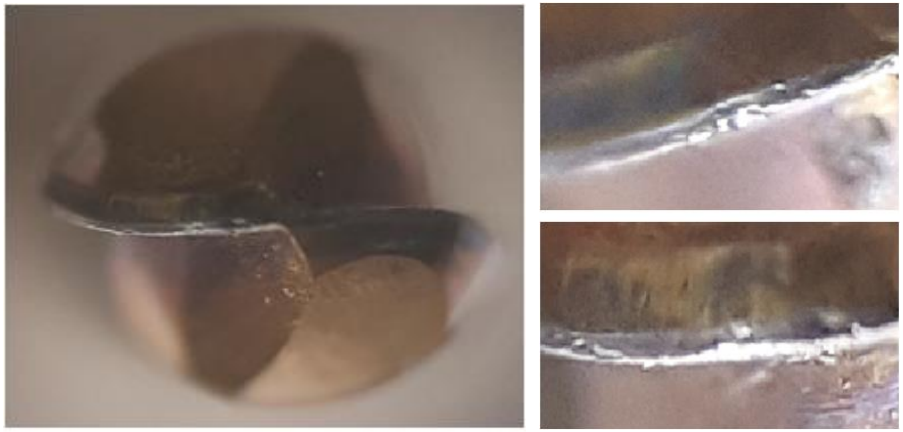
DATA BASE by characteristic of tool, NC, company

Order	Tool	Blade	Spindle	Feed	Tool life
T2	F14.9R3.5*L40	2	S3500~7000	F4000~7000	2h/400m
T3	F10R1*40*L40	4	S2500	F4000~7000	5h/600m
T4	F12R1*66*L66	4	S2000	F3000~6000	4h/500m
T5	F5R1*25*L30(6)	4	S4500	F3000~5000	3h/300m
T6	F10R1*40*L40	4	S6000~8000	F1000~2500	7h/800m
T7	F8R3*30*L30	6	S11000~12000	F3000~3500	8h/1000m
T8	F3R0.5*16*L30(6)	4	S6000	F2500~3000	3h/300m
T9	B4*16*L30(6)	2	S11000~14000	F2000~3000	5h/300m
T10	F12R1*65*L65	4	S6000	F2000~2500	5h/500m
T11	B2*8*L22(4)	2	S12000~17000	F1000~1300	3h/200m
T12	F3R0.05*12*L30(6)	4	S10000	F1500~2000	2h/200m
T13	B1*4*L22(4)	2	S17000	F1000~1200	3h/150m
T14	F0.6R0.05*3*L22	2	S17000	F600~700	2h/100m
T15	F12R0.05*65*L65	4	S6000	F1200~1500	2h/200m

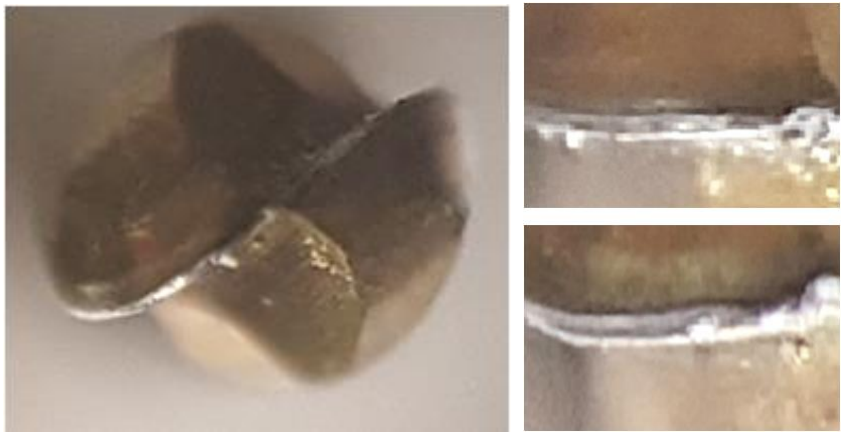
- Average life of tool
  - stock: HRC34 / finish scallop 2mm
- More than stock hardness of HRC42: Tool life can be a little different

Machining Condition & Tool life

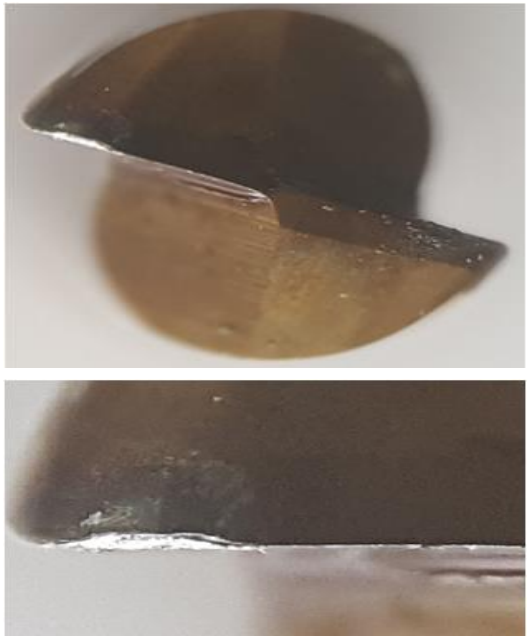
B2 Rest-Maching for 4hours



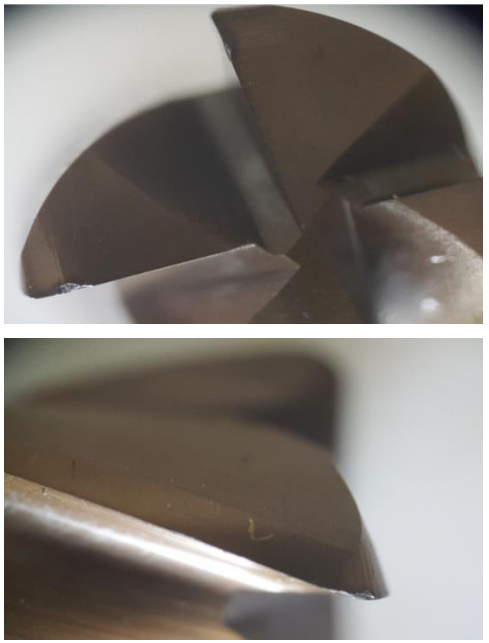
B1 Rest-Maching for 4 hours



D5R1 Semi-Finishing for 2hours



D10R1 Semi-Finishing for 3 hours



*Hardness:HRC36

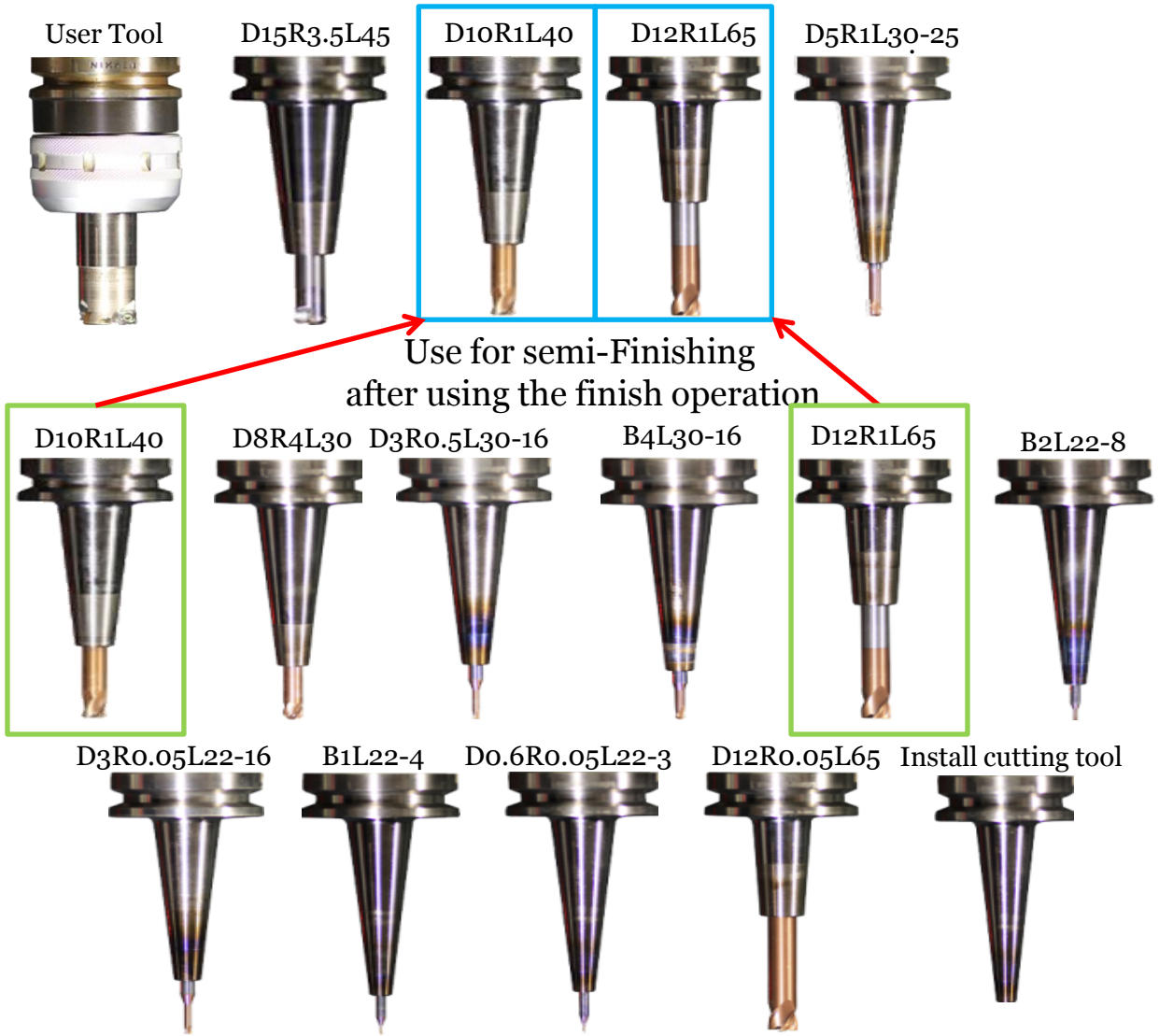
Machining Condition & Tool life

Diversity of Tool
→ Standardization & Simplification

Cost-save machining!!

Use Finish Tool to Semi-Finishing

- D10R1/D12R1 : Used for Finishing after Semi-finishing operation.
- Less D5 Tools : Cheap Price ($10~15), Use it once.

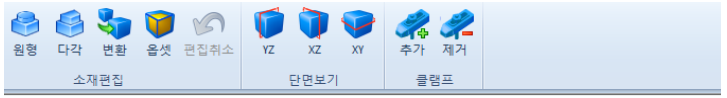


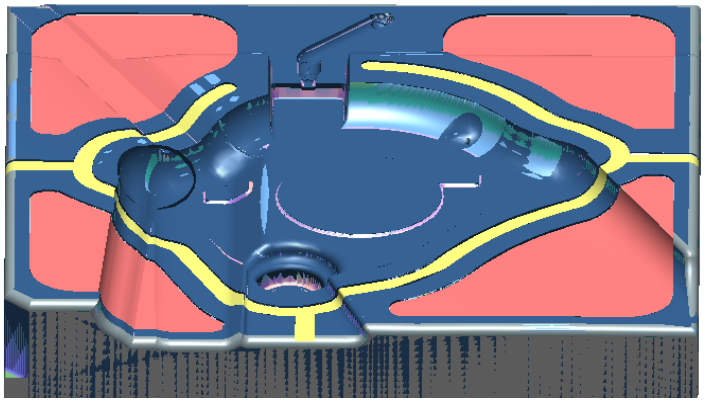
Change the Machining Process

No	Process	Tool-path	Tool
-	Outsourcing roughing	Rough	set virtual tool
P1T01	Roughing	Rrough	F26R2*L65
P2T02	**Roughing**	**Rough**	**F14.9R3.5*L40**
P3T02	**Semi-Finishing**	**Contour**	**F14.9R3.5*L40**
P4T03	**Semi-Finishing**	**Contour**	**F10R1*40*L40**
P5T02	**Semi-Finishing**	**One-way**	**F14.9R3.5*L40**
P6T04	Semi-Finishing	Contour	F12R1*66*L66
P7T05	**Semi-Finishing**	**Contour**	**F5R1*25*L30(6)**
P8T06	**Finishing**	**Isomatric plane**	**F10R1*40*L40**
P9T07	**Finishing**	**Contour**	**F8R3*30*L30**
P10T08	Semi-Finishing	Contour	F3R0.5*16*L30(6)
P11T07	**Finishing**	**One-way**	**F8R3*30*L30**
P12T06	**Finishing**	**Contour**	**F10R1*40*L40**
P13T09	**Rest-Maching**	**Contour**	**B4*16*L30(6)**
P14T09	**Rest-Maching**	**One-way**	**B4*16*L30(6)**
P15T10	Roughing(Long)	Contour	F12R1*65*L65
P16T11	Rest-Machining	Contour	B2*8*L22(4)
P17T12	**Edge Maching**	**Contour**	**F3R0.05*16*L30(6)**
P18T11	Rest-Maching	One-way	B2*8*L22(4)
P19T13	Rest-Maching	Contour	B1*4*L22(4)
P20T14	Rest-Maching	Contour	F0.6R0.05*3*L22
P21T13	Rest-Maching	One-way	B1*4*L22(4)
P22T15	Edge maching	Contour	F12R0.05*65*L65
P23T16	Addition	Contour	rib, small hall

- Delete ten tool-path from twenty-two:
only use **twelve tool-path**

- 140X130, depth of cutting: 20 simplification of process
- Color recognition:
  pink color - only semi-finish
  yellow color – only finish except Rest-Machining

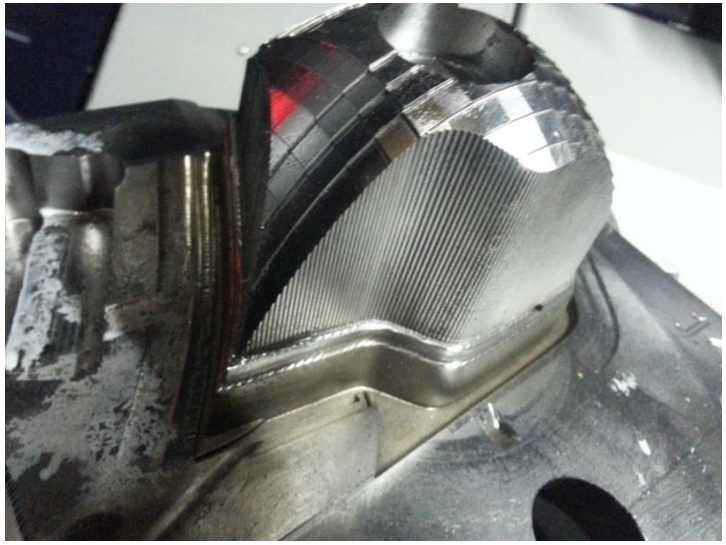




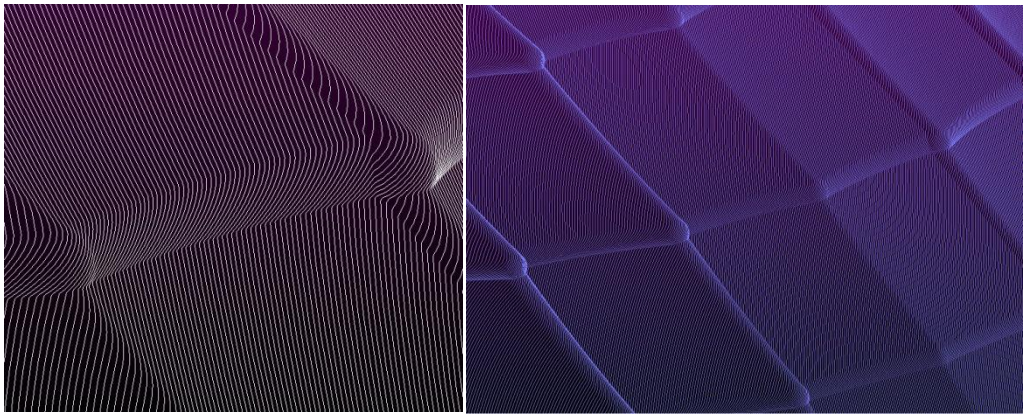
Add Manual CAM Data

No	Process	Tool-path	Tool
-	Outsourcing roughing	Rough	set virtual tool
P1T01	**Roughing**	**Rrough**	**F26R2*L65**
P2T02	**Roughing**	**Rough**	**F14.9R3.5*L40**
P3T02	**Semi-Finishing**	**Contour**	**F14.9R3.5*L40**
P4T03	**Semi-Finishing**	**Contour**	**F10R1*40*L40**
P5T02	**Semi-Finishing**	**One-way**	**F14.9R3.5*L40**
P6T04	**Semi-Finishing**	**Contour**	**F12R1*66*L66**
P7T05	**Semi-Finishing**	**Contour**	**F5R1*25*L30(6)**
P8T06	Finishing	Isomatric plane	F10R1*40*L40
P9T07	Finishing	Contour	F8R3*30*L30
P10T08	Semi-Finishing	Contour	F3R0.5*16*L30(6)
P11T07	Finishing	One-way	F8R3*30*L30
P12T06	Finishing	Contour	F10R1*40*L40
P13T09	Rest-Maching	Contour	B4*16*L30(6)
P14T09	Rest-Maching	One-way	B4*16*L30(6)
P15T10	Roughing(Long)	Contour	F12R1*65*L65
P16T11	Rest-Maching	Contour	B2*8*L22(4)
P17T12	Edge Maching	Contour	F3R0.05*16*L30(6)
P18T11	Rest-Maching	One-way	B2*8*L22(4)
P19T13	Rest-Maching	Contour	B1*4*L22(4)
P20T14	Rest-Maching	Contour	F0.6R0.05*3*L22
P21T13	Rest-Maching	One-way	B1*4*L22(4)
P22T15	Edge Maching	Contour	F12R0.05*65*L65

- Use only eight tool path of roughing & Semi-Finishing in AICAM
- Use manual CAM for finishing & rest machining



300X200 cutting depth:130 CornerR0.3

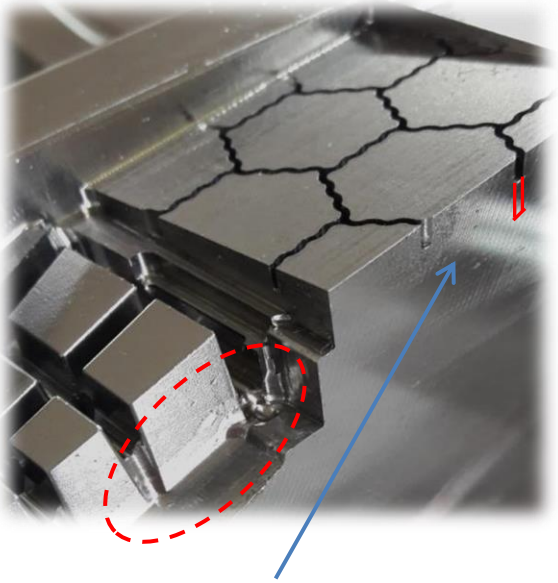


Manual CAM tool-path

Further Machining of Deep Rib and Slot

No	Process	Tool-path	Tool
-	Outsourcing roughing	Rough	Set virtual tool
P1T01	Roughing	Rrough	F26R2*L65
P2T02	Roughing	Rough	F14.9R3.5*L40
P3T02	Semi-Finishing	Contour	F14.9R3.5*L40
P4T03	Semi-Finishing	Contour	F10R1*40*L40
P5T02	Semi-Finishing	One-way	F14.9R3.5*L40
P6T04	Semi-Finishing	Contour	F12R1*66*L66
P7T05	Semi-Finishing	Contour	F5R1*25*L30(6)
P8T06	Finishing	Isomatric plane	F10R1*40*L40
P9T07	Finishing	Contour	F8R3*30*L30
P10T08	Semi-Finishing	Contour	F3R0.5*16*L30(6)
P11T07	Finishing	One-way	F8R3*30*L30
P12T06	Finishing	Contour	F10R1*40*L40
P13T09	Rest-Maching	Contour	B4*16*L30(6)
P14T09	Rest-Maching	One-way	B4*16*L30(6)
P15T10	Finishing(long)	Contour	F12R1*65*L65
P16T11	Rest-Maching	Contour	B2*8*L22(4)
P17T12	Edge maching	Contour	F3R0.05*16*L30(6)
P18T11	Rest-Maching	One-way	B2*8*L22(4)
P19T13	Rest-Maching	Contour	B1*4*L22(4)
P20T14	Rest-Maching	Contour	F0.6R0.05*3*L22
P21T13	Rest-Maching	One-way	B1*4*L22(4)
P22T15	Edge maching	Contour	F12R0.05*65*L65
P23T16	**Add**	**Contour**	**Machining of deep rib and slot**

*User can add any size and length of tool
Tool-path for cutting is made at AICAM



This tool has long effective length
No need EDM for additional machining

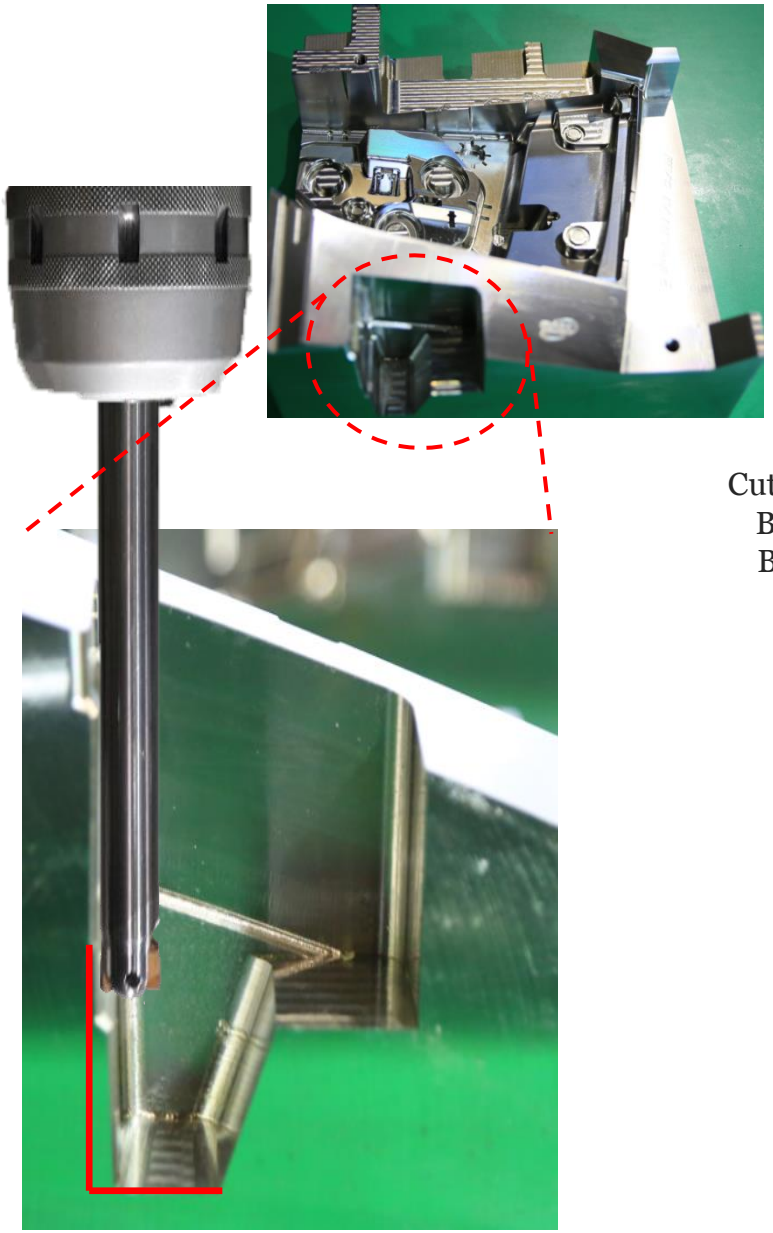
T16 D4 Shrink fit(only one)
Choose user tool → install

shank: 4

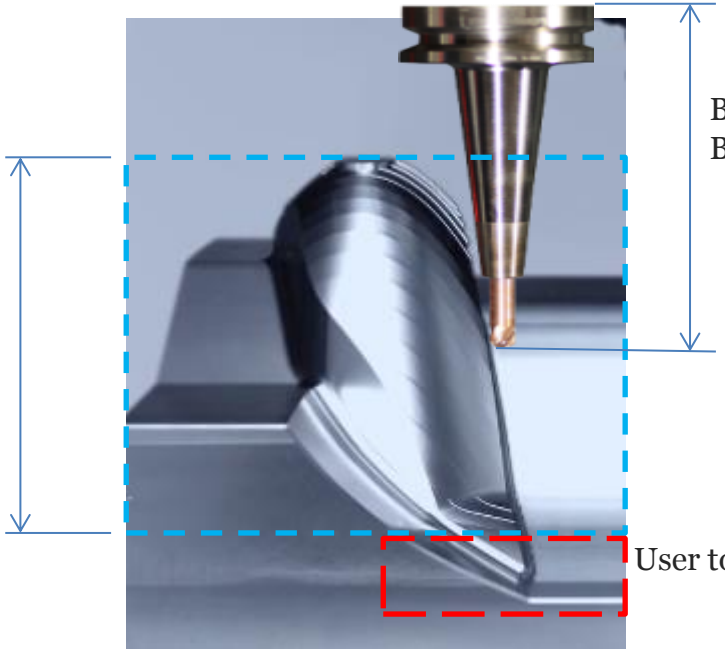
wire extension: 22

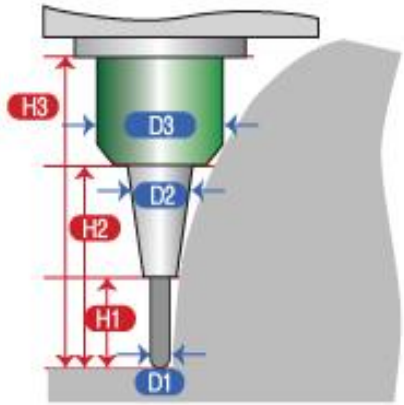
User selection:
size of tool & vaile blade

Further Machining of Deep Rib and Slot



P24T17	add	Contour	user tool
P25T18	add	One-way	user tool

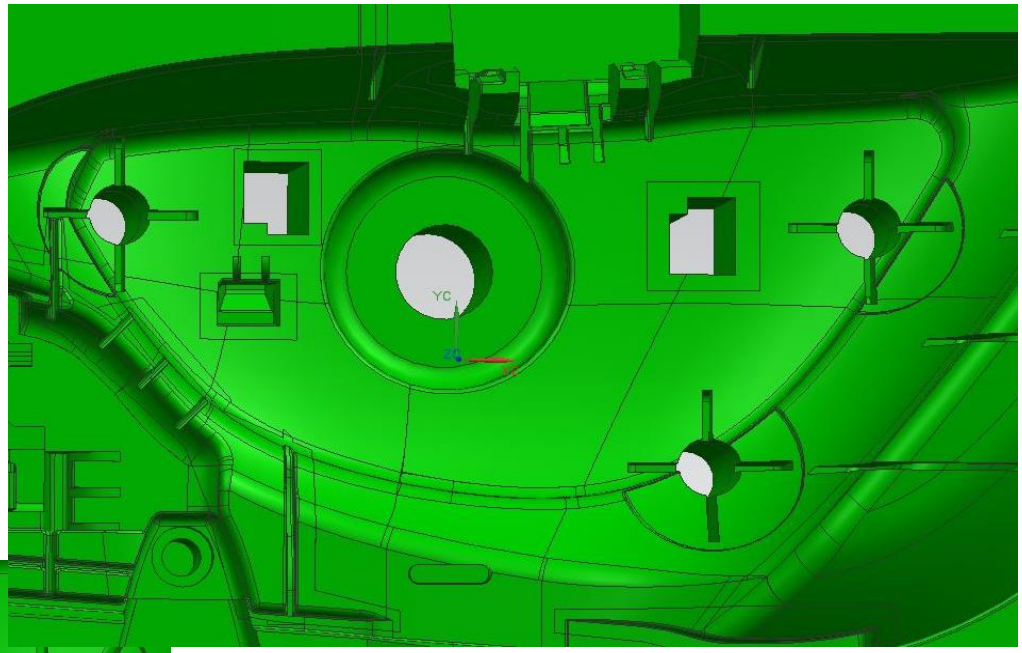


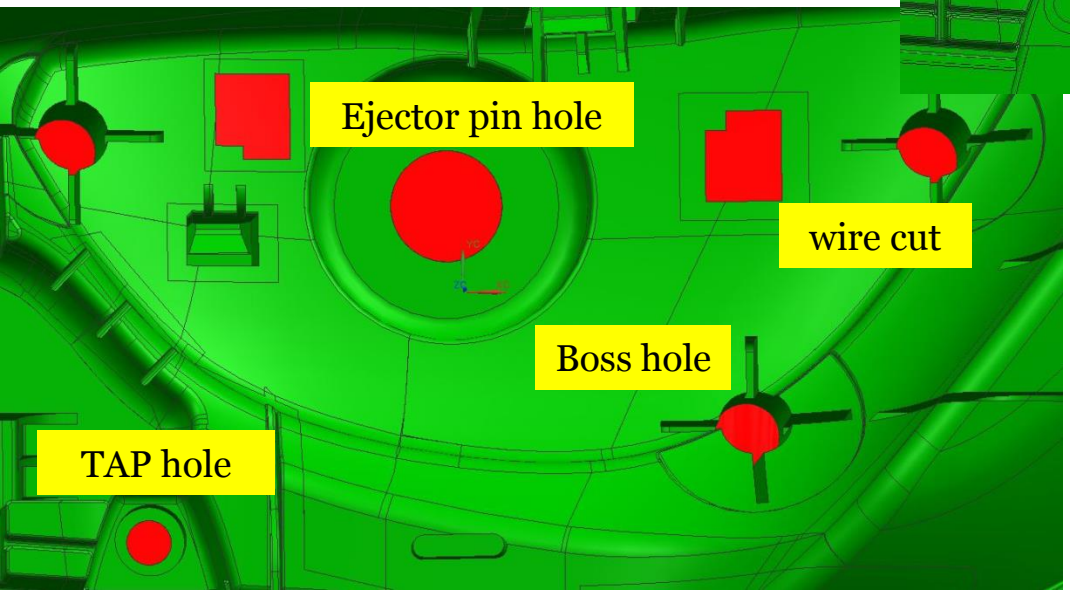


NCBrain's tool length information
or
divide length

Edit Model for Machining

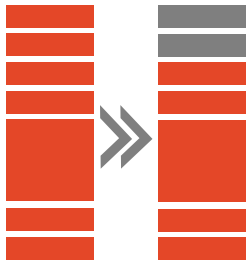
- Hole filling for Tap, Ejector pin, Boss, Wire hole
- No need to fill these rib and operation core



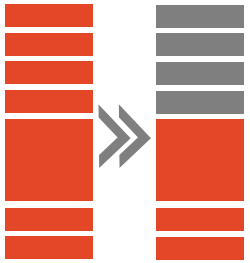


Analysis of Functional Effect

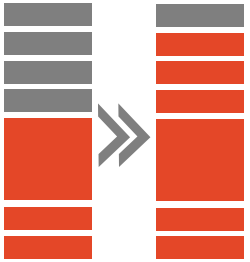
	Applied technology	Saving Time	Reduced tooling cost	Quality equalization
1	Holder Tooling	O	O	
2	Maximize bull-nose cutter	O	O	
3	Finish by 6 blade tool	O	O	
4	Machining by tool length	O	O	
5	15 types of shrink fit tool	O	O	O
6	Corner R & Flat R0.05 Tool	O	O	
7	Construction of data base	O	O	O
8	Auto feed control depending on load	O	O	
9	Toolpath creation on overload area	O	O	O
10	Low-load & air-cut deletion	O		
11	Verification of assembly			O
12	Unnecessary area & relief with color	O		
13	Thermal displacement and tool warping correction			O
14	Corner edge machining			O
15	Automatic addition of meshes and points			O
16	Cutting recognition on scallop			O
17	Auto Diff and EDM simulation			O



saving of machining time



Reduced tooling cost



Quality equalization

II. Compare Existing CAM & AICAM

- Current machining: countless functions of CAM + many kinds of tool + each person each know-how

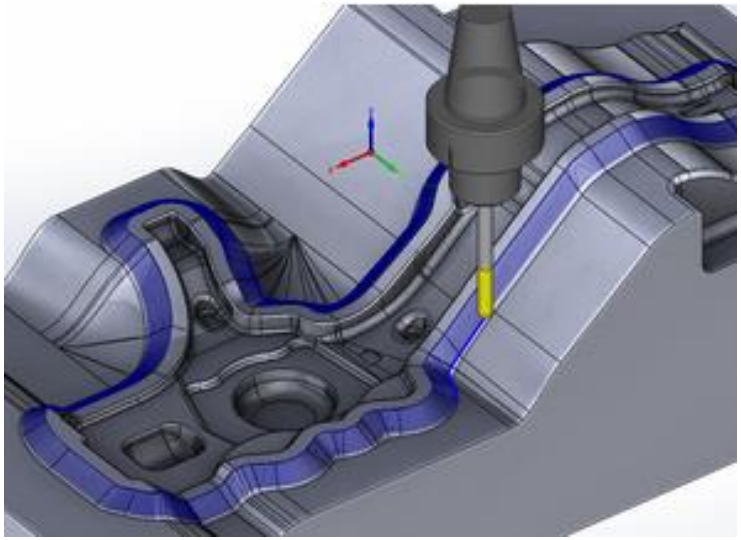
Process	Function	Existing CAM	AICAM
roughing	closed offset	O	O
	open offset	O	X
	Raster	O	X
Rest-roughing	standard: rest of the stock	O	X
	Standard: boundary	O	X
	Standard: previous process's tool path	O	X
semi finish-finish	use boundary	O	X
	Contour	O	O
	One-way (Raster)	O	O
	3D offset	O	X
	plane machining	O	X
	pattern machining	O	X
	surface machining	O	X
Rest-Maching	use boundary	O	X
	corner-along	O	X
	pencil	O	X
	multi-pencil	O	X
boundary	boundary automatic generation	O	X
	edit boundary	O	X
lead link	set entry & out	O	X
	set connection of tool path	O	X

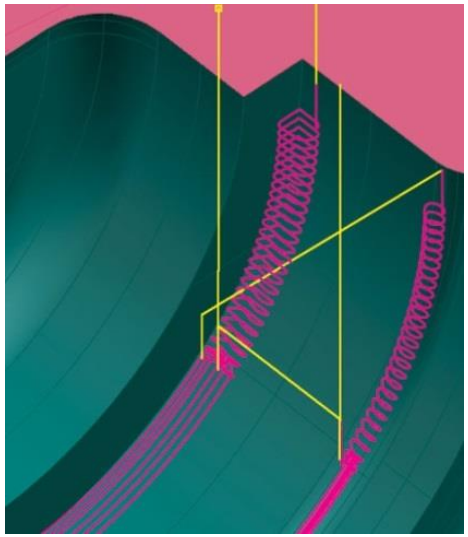
AICAM Automation

3 functions of CAM
+
NCBrain's DB
+
15 types of specially designed tools

No manual process in AICAM

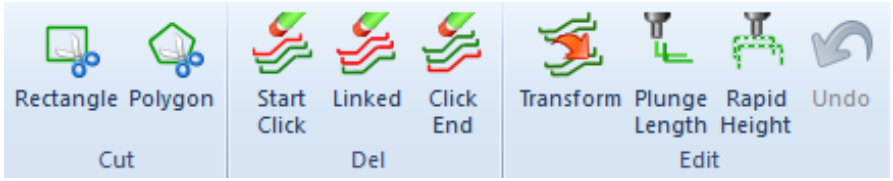
It’s required manual CAM for “Boundary patterns, Text….”

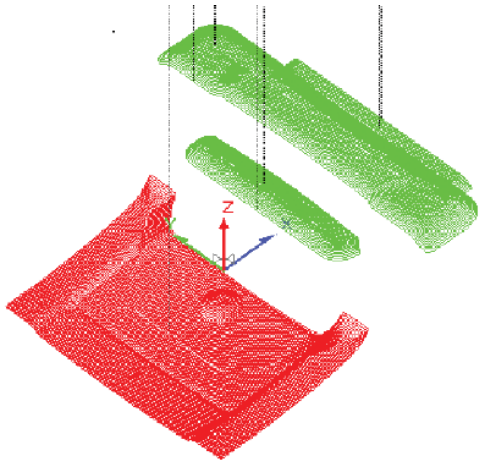


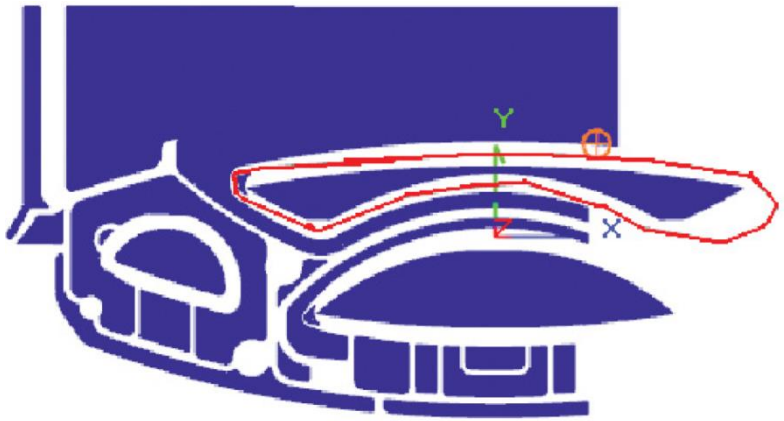


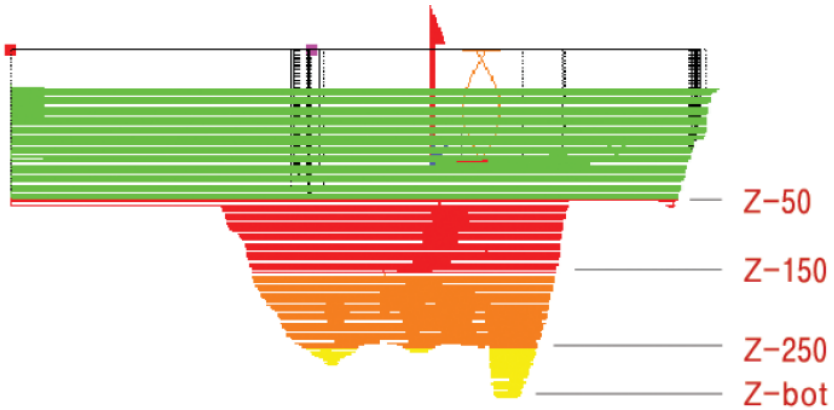
Edit on Tool path

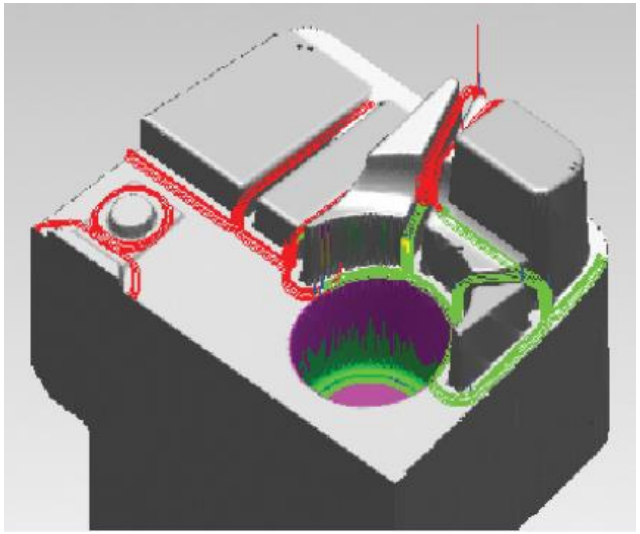
AICAM offer tool path edit function



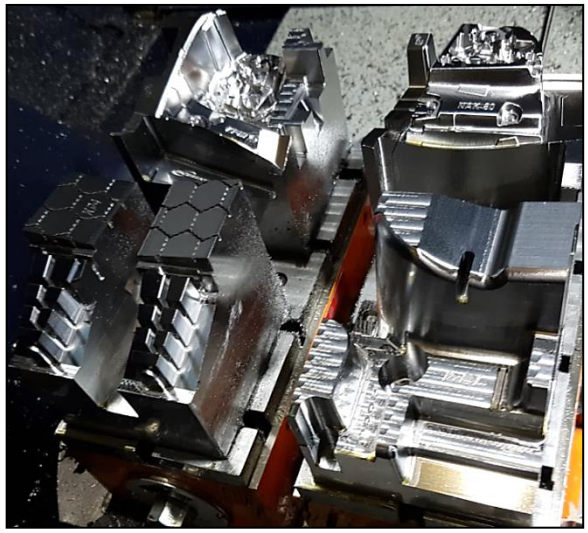








Manual process with Existing CAM



AICAM unmanned machining(70%)

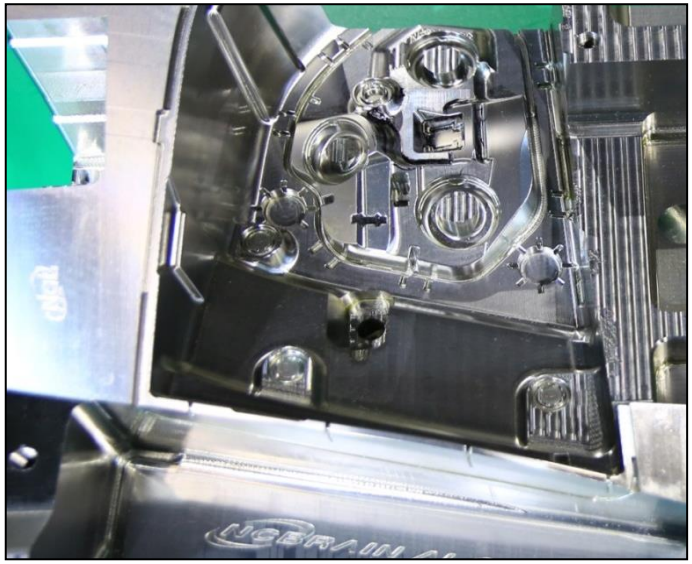
AICAM unmanned machining(10%)
+ Manual CAM

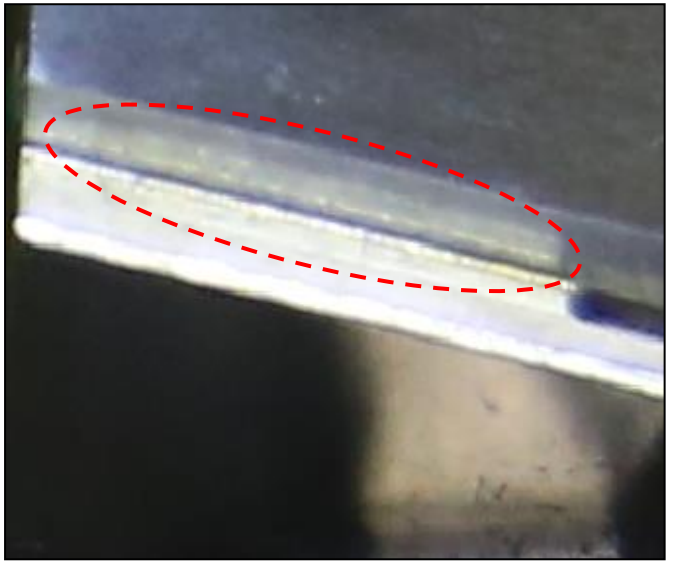
Welding repair X Small((50X50under)
transformation core
Manual CAM is much better

* This value changeable depending on the main product

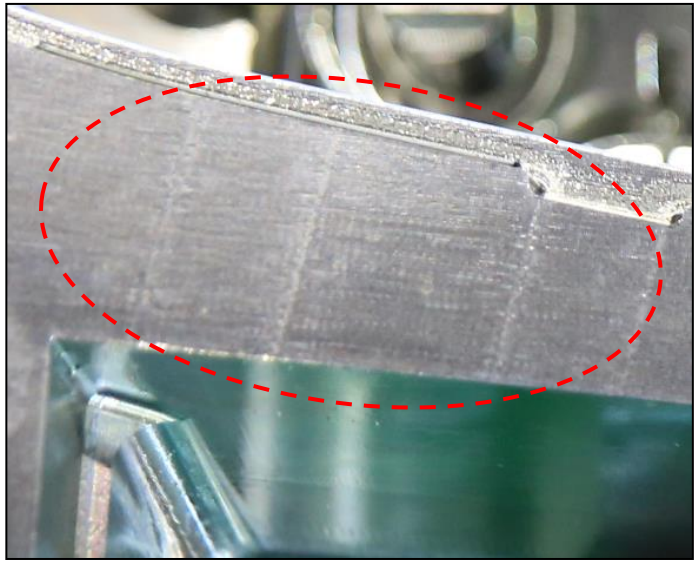
III. Introduce Addition Technology

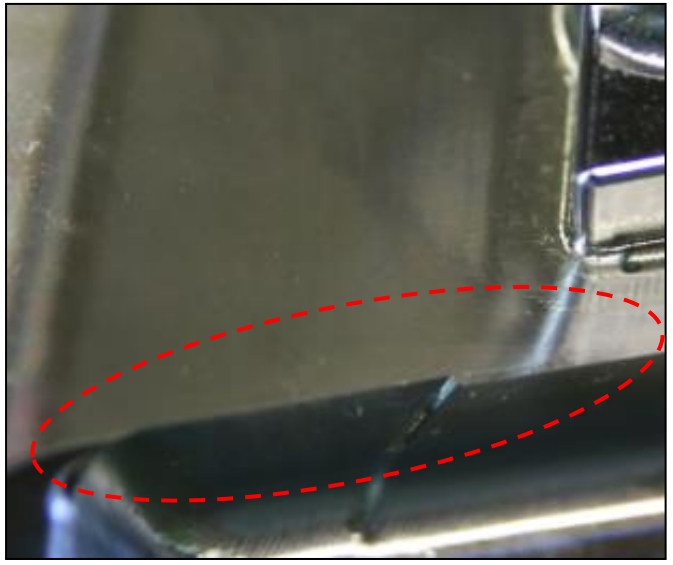
Corner-edge technology – Real machining in corner





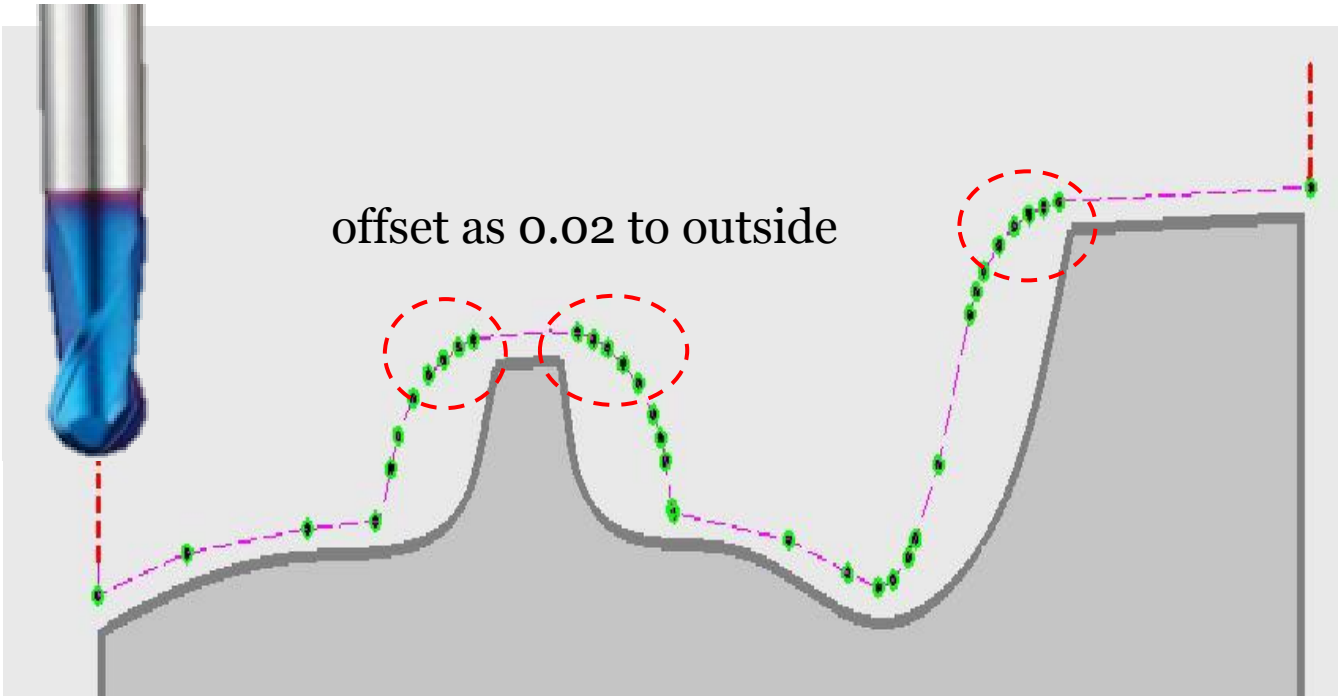
Air vent
0.02





Corner-edge Technology

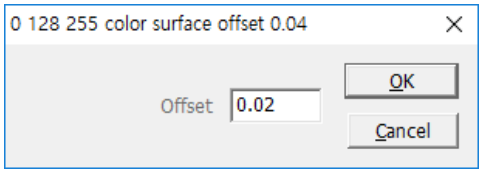
- Offset as 0.02 to outside in red circle area
- More delicate quality than before

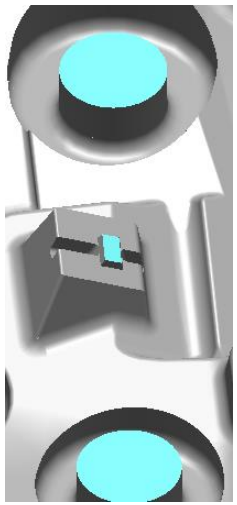


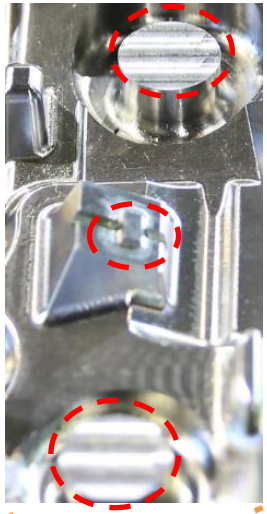
*Old model & large back lash machine(0M etc. of the 90s): NC is distorted over 0.05
For finish machining, you must make tool path of shape and parting separately.

Setting Over and Less-cutting in Assembly Area

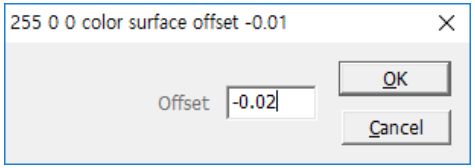
Die spot +0.02

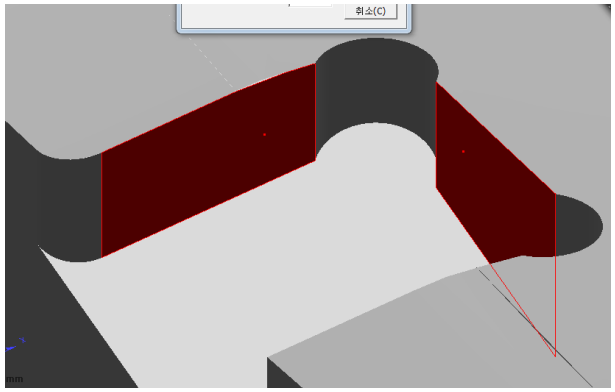




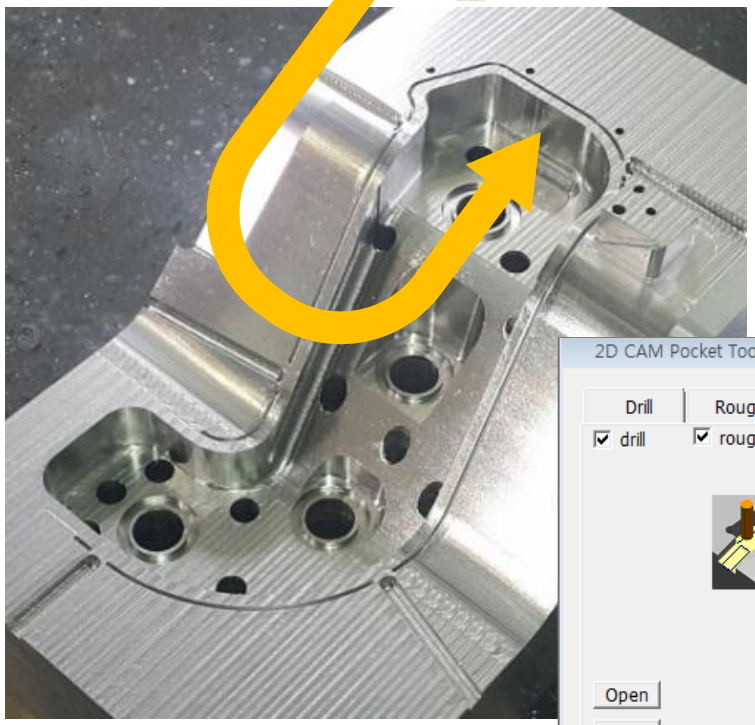


Assembly overcut -0.02





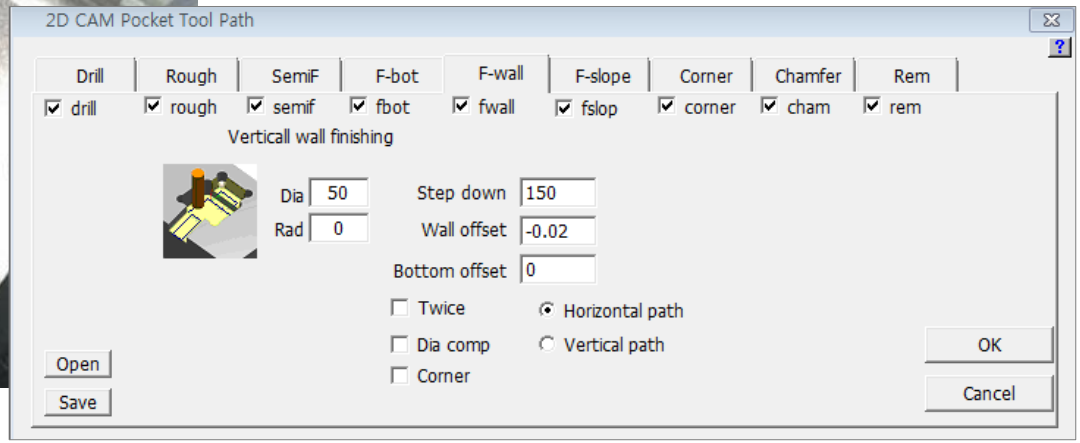
Additional Cutting in 2D Area



- Machining for verticalwall in pocket:
  AICAM→ one side -0.005 overcut machining
  D10→ operation as 9.99

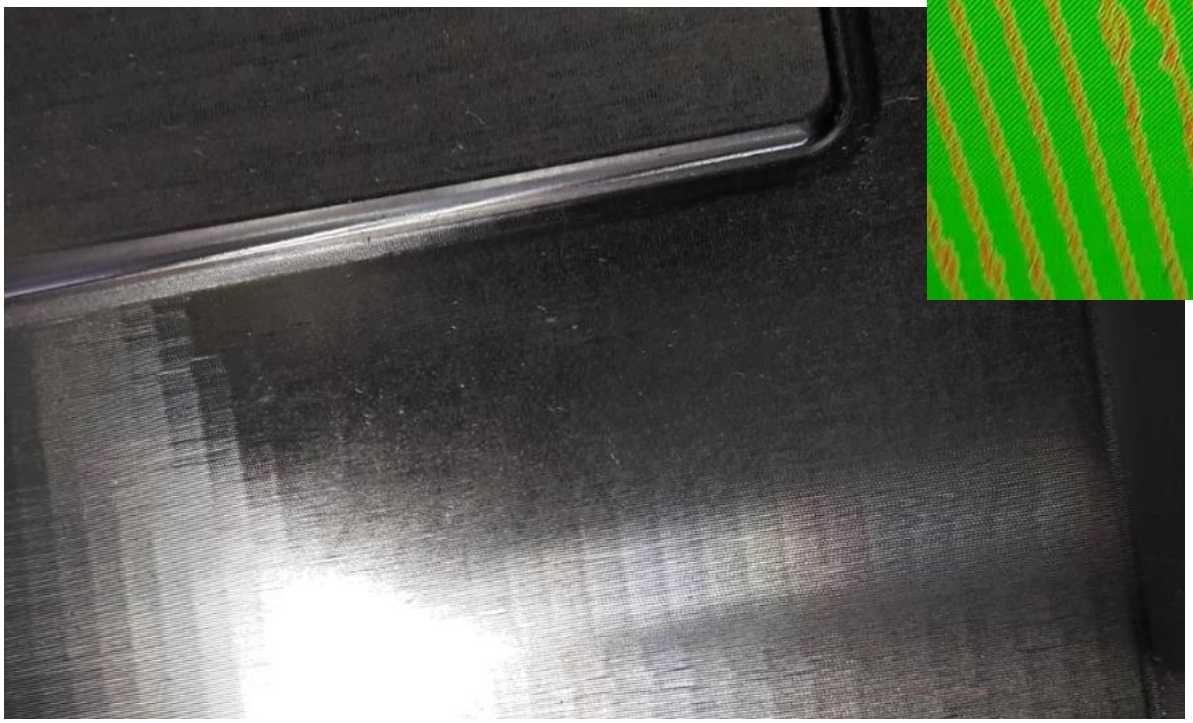
- Second machining of hall or O-ring part:
  use NCBrain 2D CAM option

Option↓

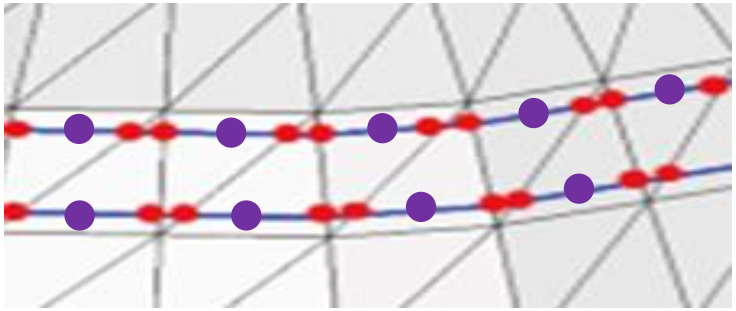


Quality of Point Tool path

- Large curved surface made low quality from the CAM which depends on the point distance
- CAM : need to use extra setting. operation time is too much. And It makes toolpaths
  on surface directly not mesh (Operation time more than 5~10times)

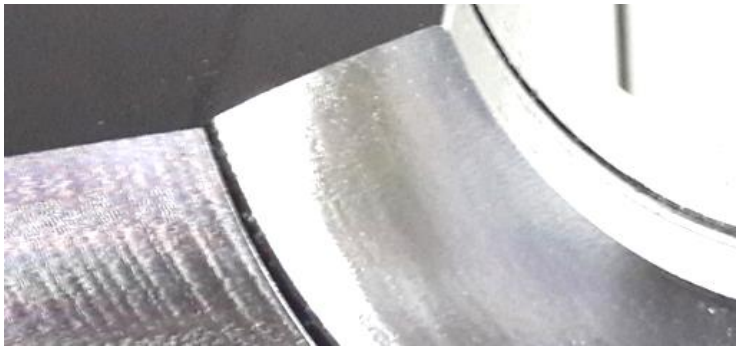


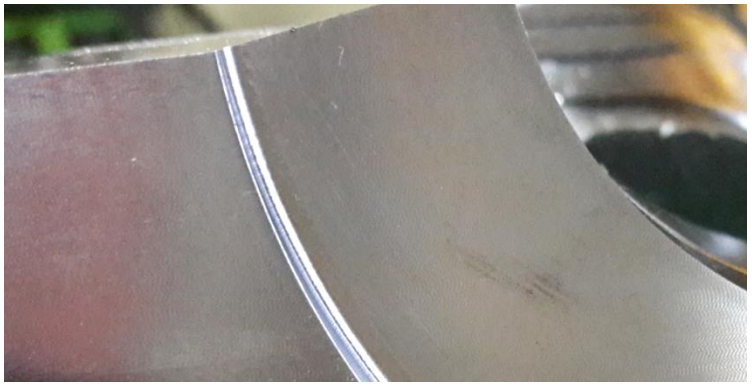
Point Add Machining Automatically



If point of corner path is long,
distance will be created by purple point to make better quality automatically

General machining

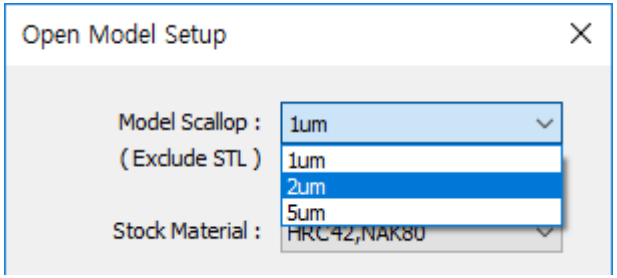


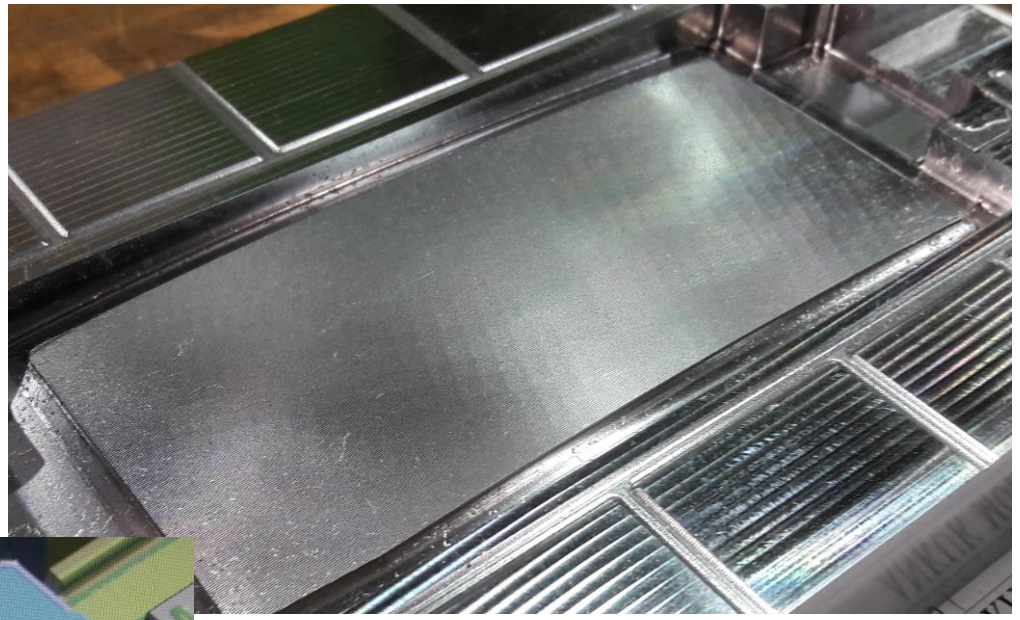


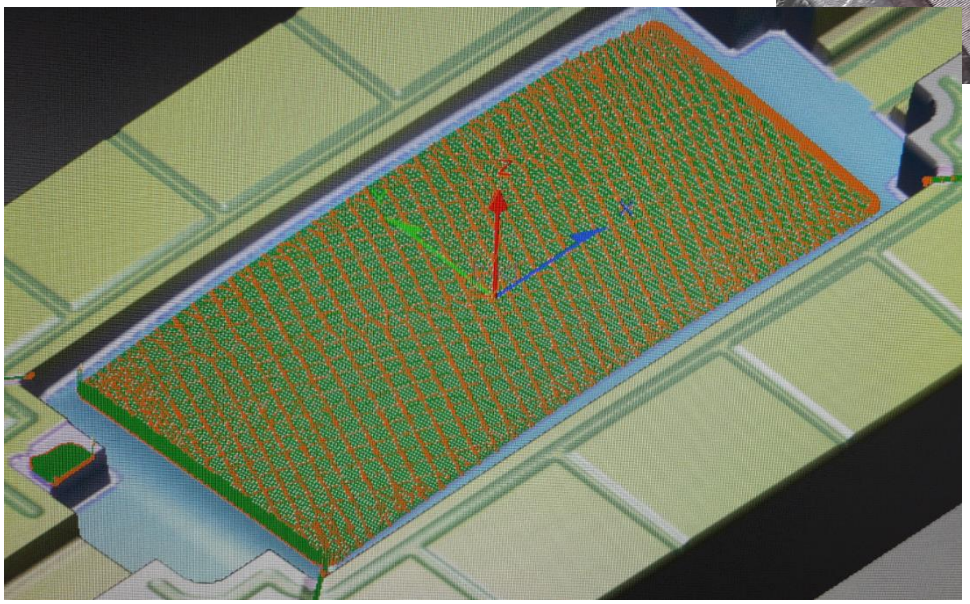
AICAM
Point Machining

Quality of Mesh Tool path

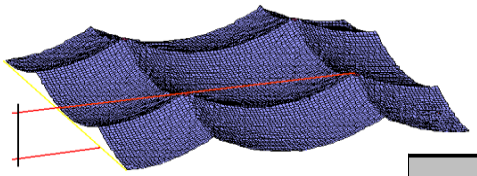
- Situation: two-way curves are angular
- Solution: designate precision(Exclude STL)





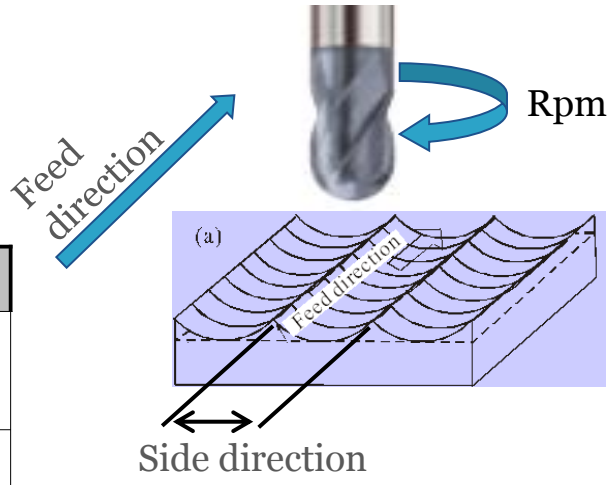


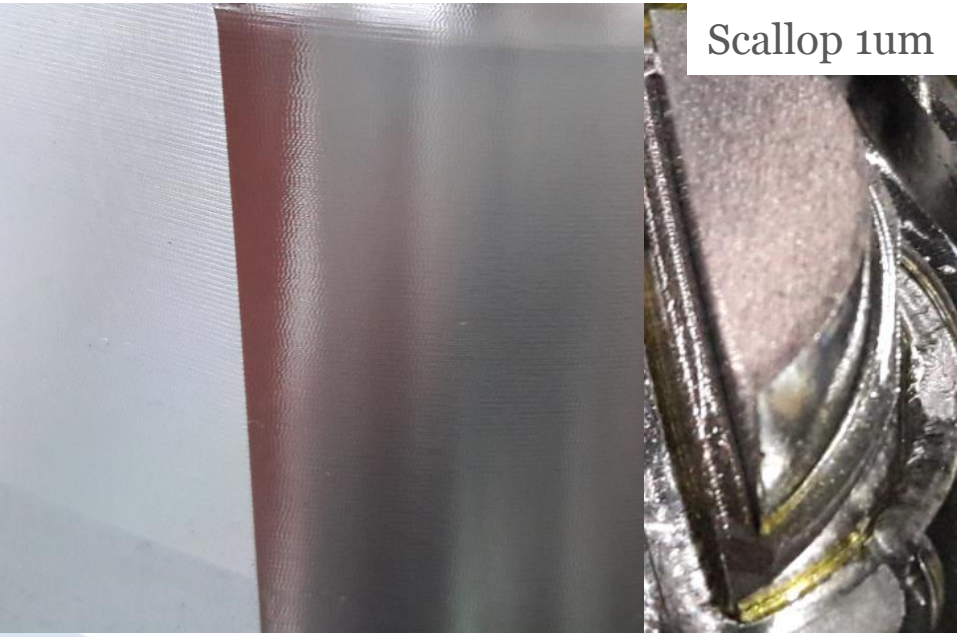
Pitch and Feedrate as Machining Scallop



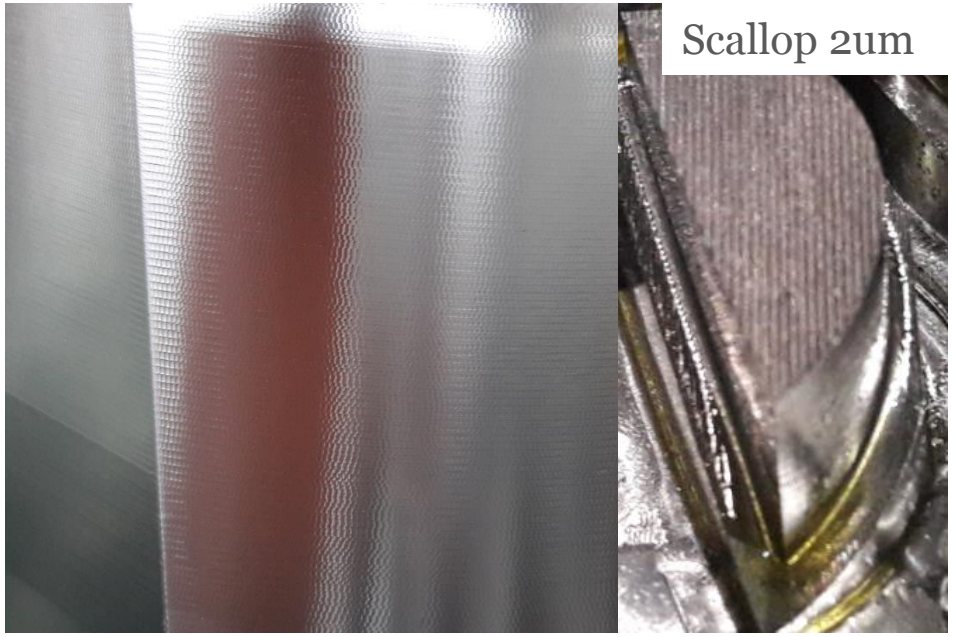
Scallop
Rz (μm)

Tool	Scallop 1um	Scallop 2um
D8r3	Pitch 0.12 S11000 F2300	Pitch 0.2 S11000 F3300
Ball4	Pitch 0.1 S14000 F1500	Pitch 0.15 S14000 F2100





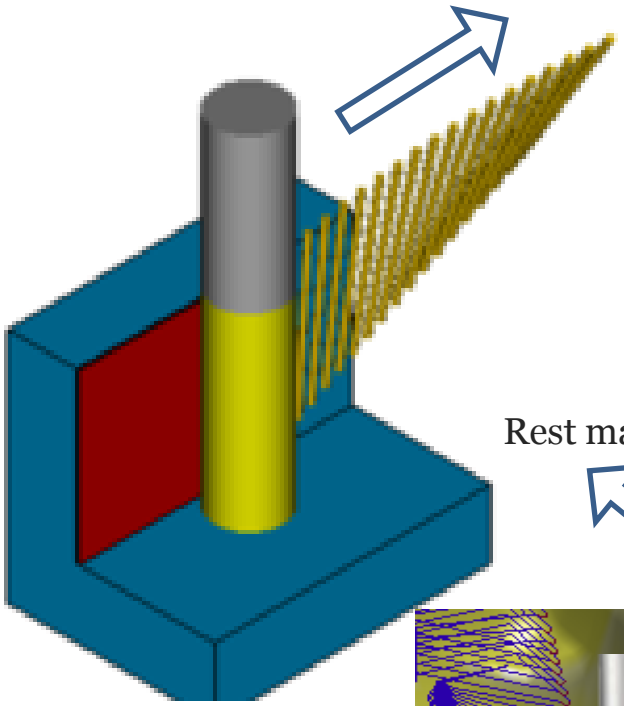
Scallop 1um



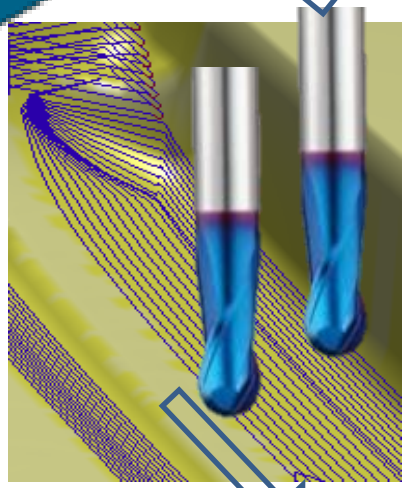
Scallop 2um

Zigzag Machining for Climb/Conventional Direction

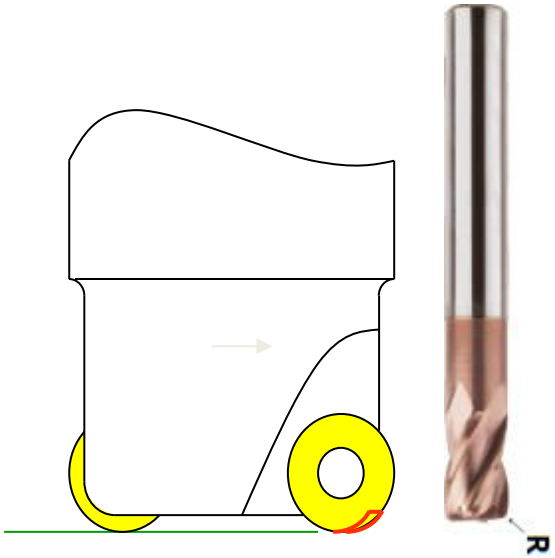
- Overload conventional machining on side part can occur tool breakage, decrease life span of tool and over cutting



Rest machining for climb



Rest machining for conventional

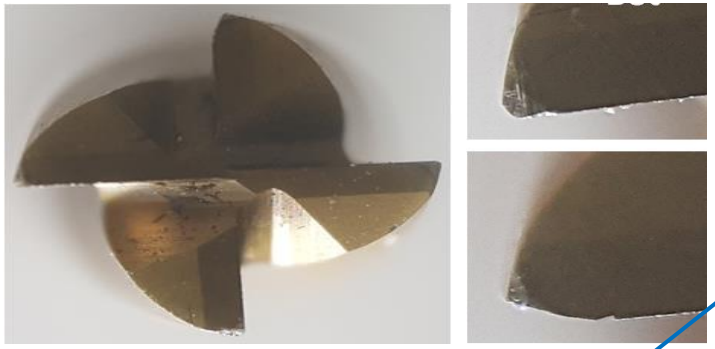


- AICAM is machining conventional/climb by blade of R cutter
- This function reduce machining time, increase life span of tool and quality

Usage of Flat Endmill (R0.05)

- These're comparing result between Flat Endmill and 0.05 of Radius tool condition after machining of 1 hour corner angles
- Using radius 0.05 makes lifespan 4 times longer

Tool wear more than 0.1 even after 30 minutes machining



Wear of flat endmill, more than R0.1

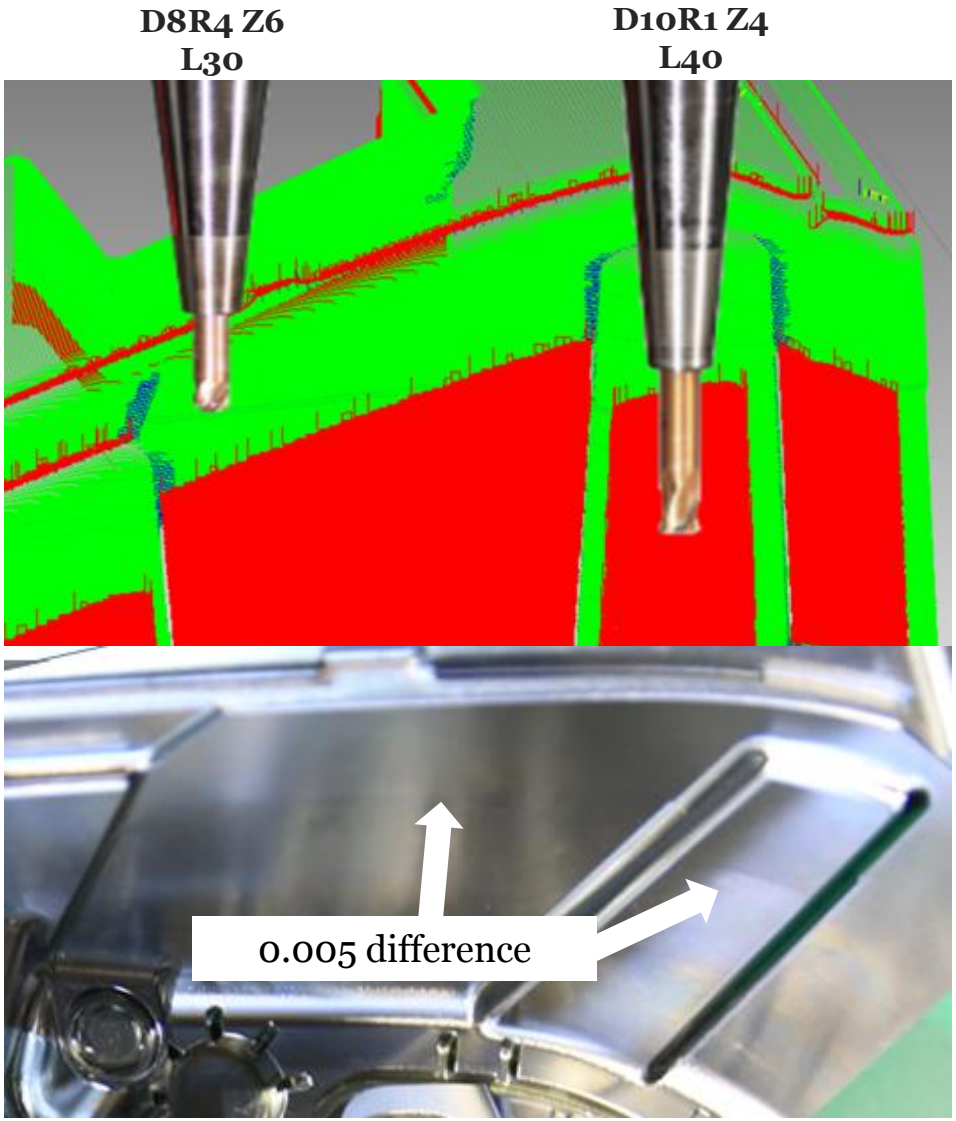
Core edging(R0.1)

Wire cutting(R0.1)

EDM(R0.1)

Finishing by tool length

- Finishing time is 2 times faster and tool life is increased by using 6-blade tool instead of 2-blade tool
- The difference between green color toolpath(D8R4) and red color toolpath(D10R1) is less than 0.005

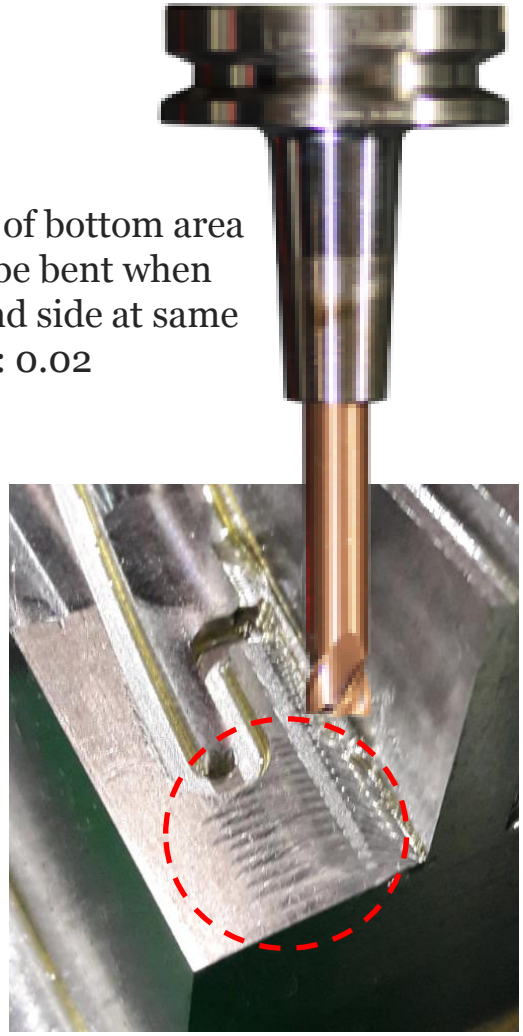


Compensation for Bend of Tool and Thermal Error of spindle

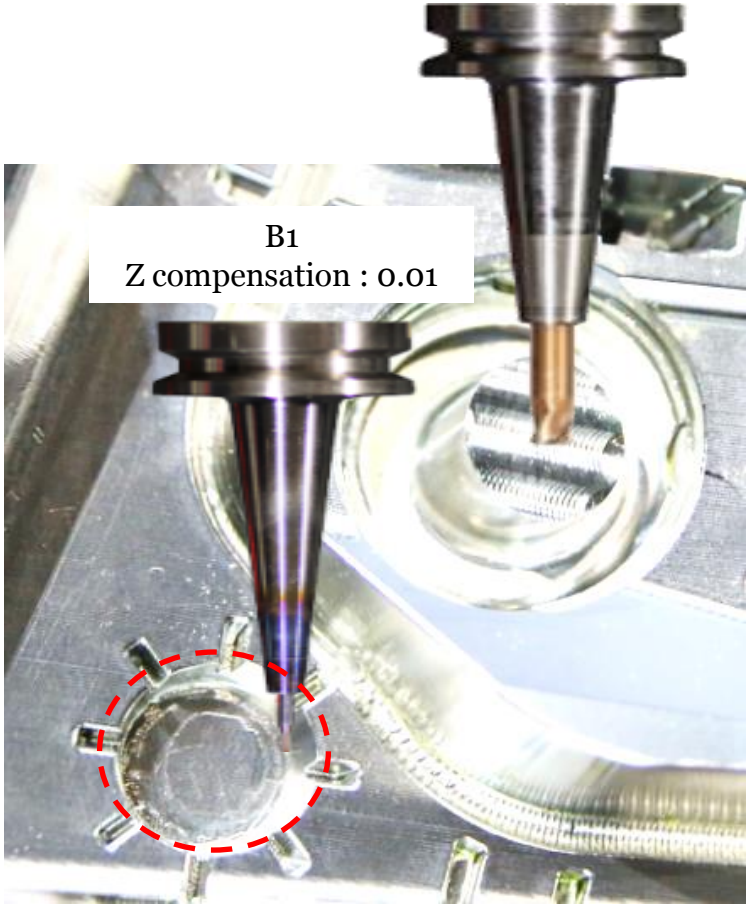
Z-axis is stretched Thermal error will occur by RPM to stretch Z value(0.01~0.02)
Revise Z value on rest finishing.(0~0.01)

- Z-axis compensation of bottom area
- The flat endmill will be bent when machining bottom and side at same time with long E/M. : 0.02

D12R1~R0.05
Z compensation : 0.02

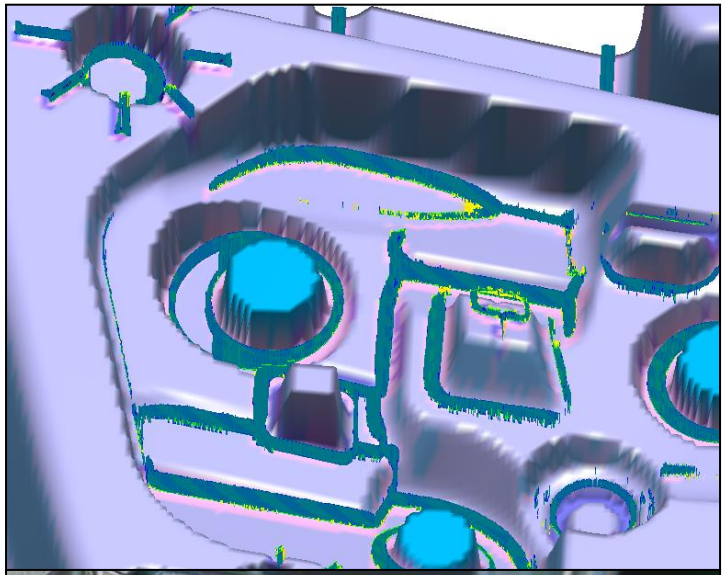


D10R1
Z compensation : 0

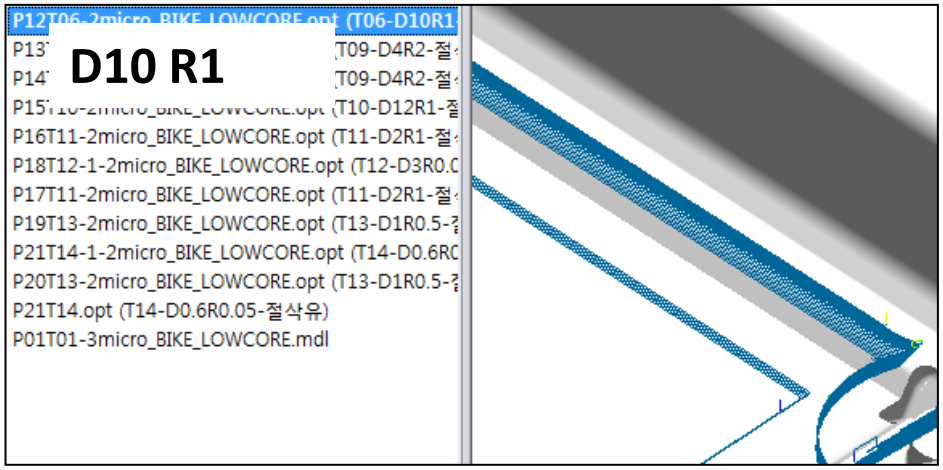


IV. Rest-Finishing for AICAM

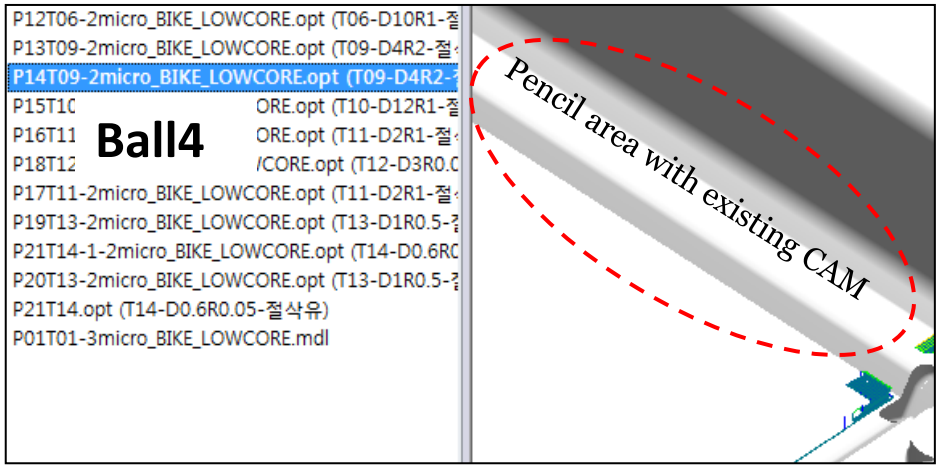
Reduce pencil Area



But Same quality!!

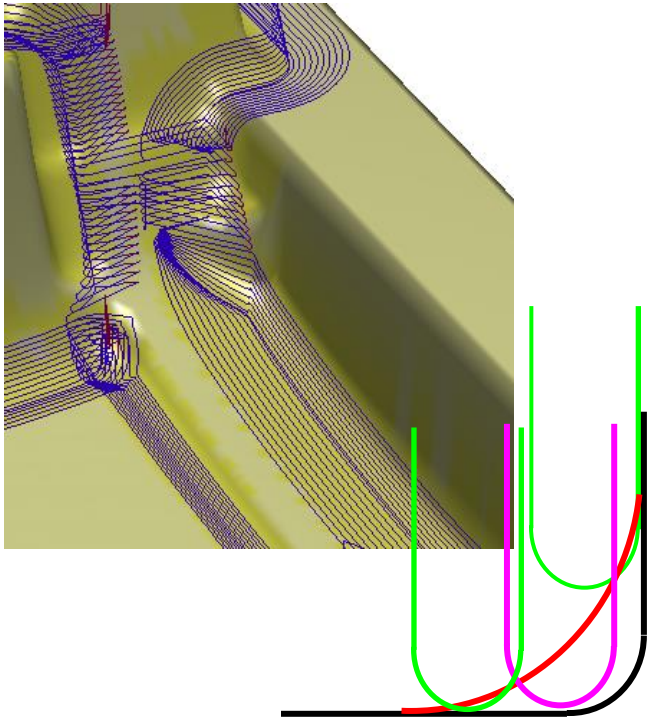


Reduce pencil area on ball Endmill by using corner R(20~30%)

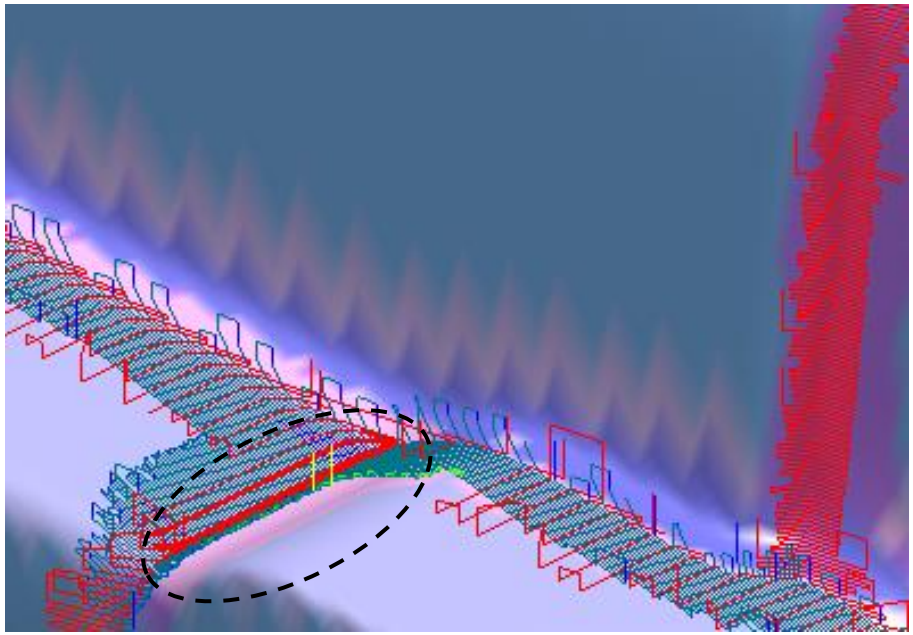


Time of One-way Isometric Pencil

- Take long time with zigzag machining (B4, B2, B1) in AICAM(20~30%)
- Reduce pencil tool breakage to 1/10



Tool will be broken on overload area like in purple color area

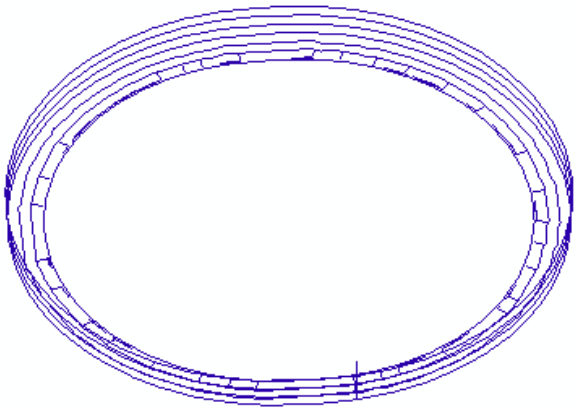


Add toolpath on isometric area and do one way machining
This will reduce tool breakage to 1/10

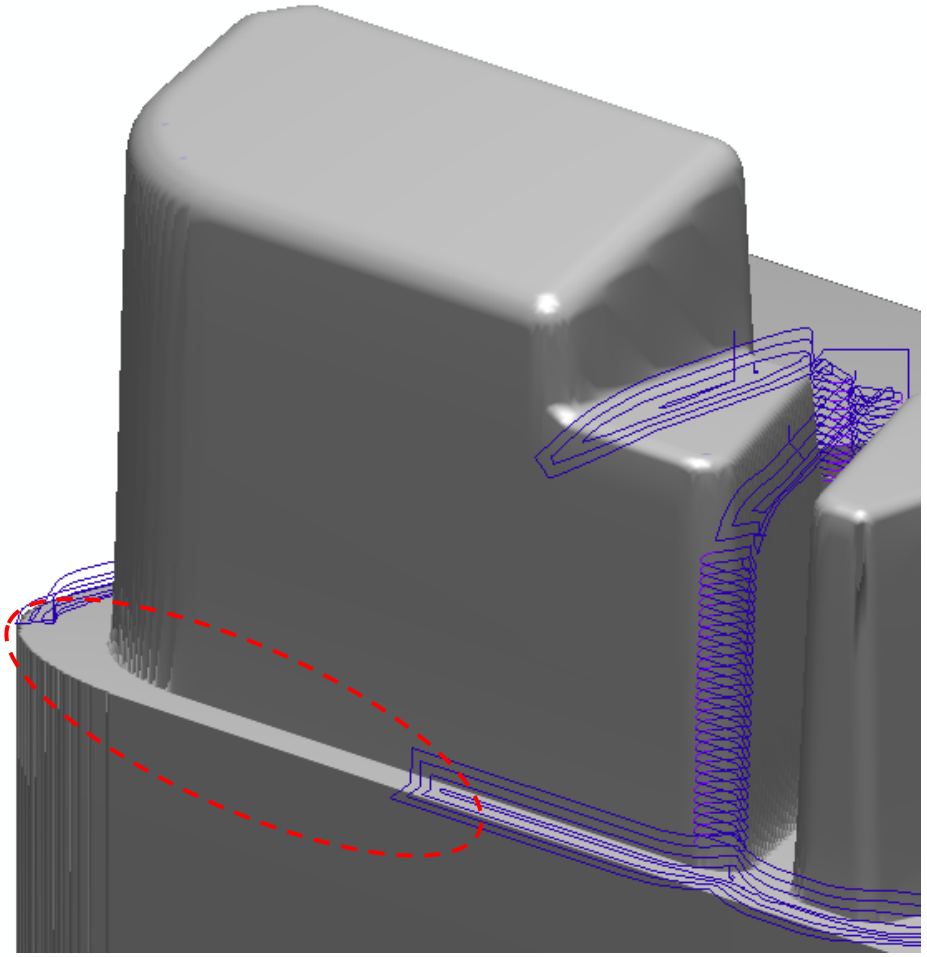
No Twisted or Crushed Tool path with AICAM

- This can be happen when create boundary without checking and modification by human

Twisted or crushed toolpath

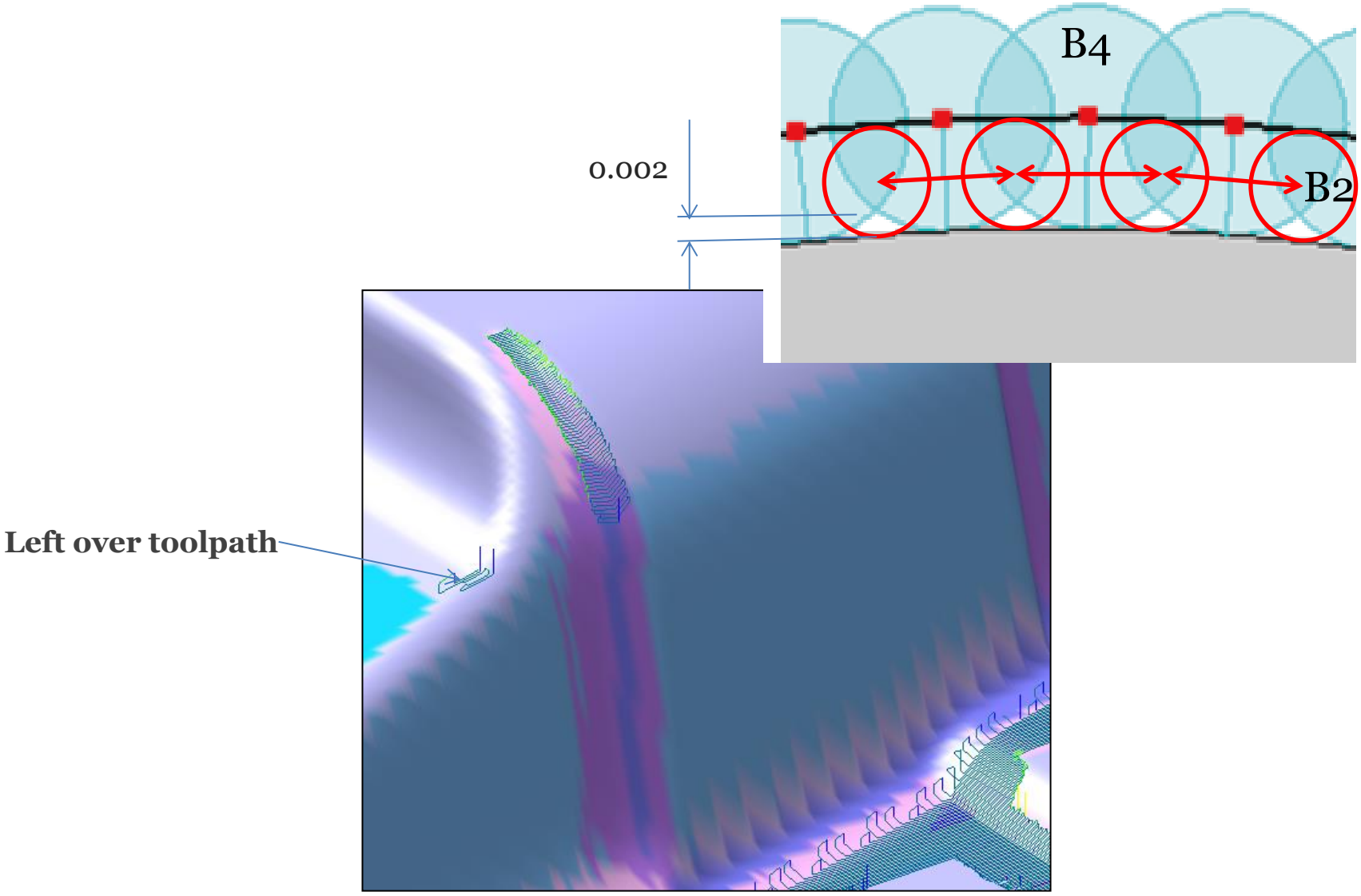


No toolpath



Left Over Toolpath on Finishing Process

- This happens when the point of toolpath and value of scallop is different(offset 0.002)
- This part will machined on same location, so there will be no problem with precision



V. Product Information

NCBrain AICAM Product component

1. NCBrain CAM

Tool path creation

2. NCBrain Simulator

Optimization

3. NCBrain VF

AUTO-DIFF

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4. Exclusive Shrink Fit Holder

6 Types(15ea) CRN coating

5. Exclusive E/M

11 Types(55ea)

6. Exclusive Cutter/TIP

1 Bull-nose/TIP(10ea)

NCBrain AICAM Package

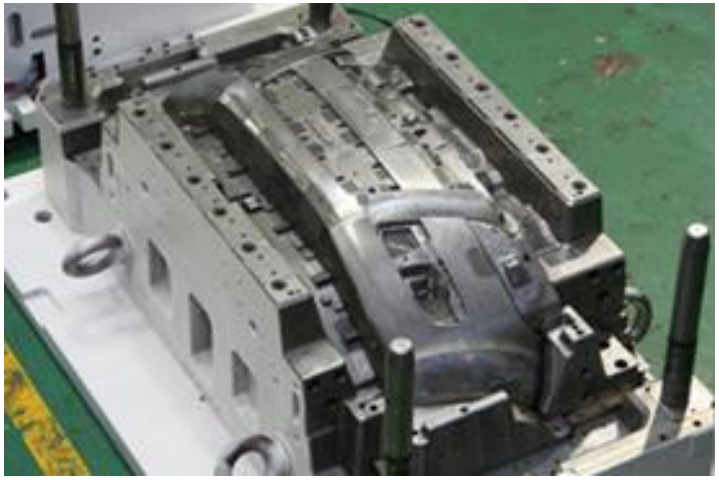
Coverage

Division	BT30,HSK40	BT40,HSK63	BT50,HSK100
Depth	Z96	Z150	Z202
RPM	22,000~4,2000	12,000~20,000	6,000~1,0000
MIN Tool	D 0.5	D 0.6	D 1

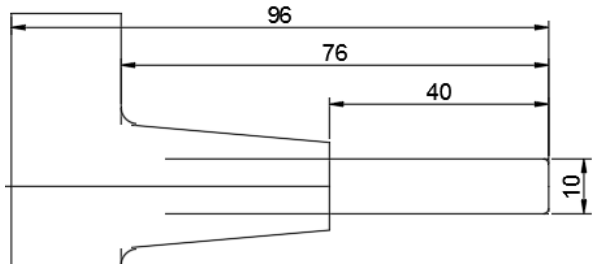
*More than 16 ATC

More than 1X1M size can be down
(Door trim is possible)

1. Roughing & semi-finishing by AICAM
2. The other work by CAM S/W
3. Optimization by NCBrain

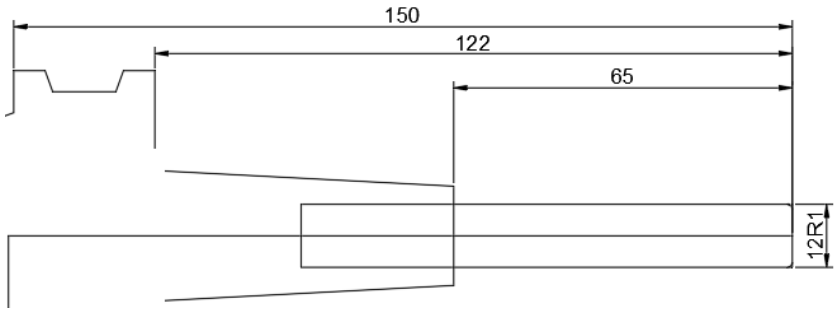


Holder types depending on maximum depth

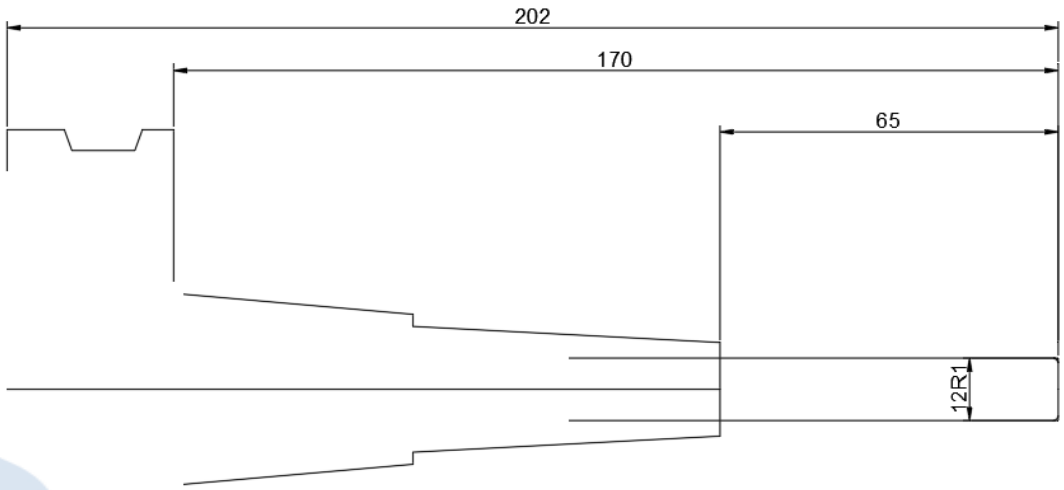


Depth:96

Depth	Holder			
96	BT30	HSK40E	HSK50E	HSK63F
150	BT40	BBT40	JSK63A	
202	BT50	BBT50	HSK100A	
Etc.	SK Type….			



Depth:150



Depth:202

Recommended PC specification

	Less than 500 X 500 BT40	Less than 1000 X 1000 BT50
OS	At least Windows 7	
CPU	Core i5	Core i7
VGA	Working with basic graphic card	
HDD	500GB	1TB
RAM	16GB	32GB

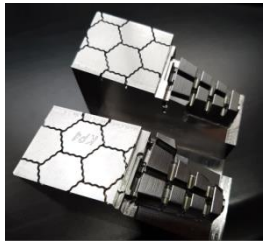
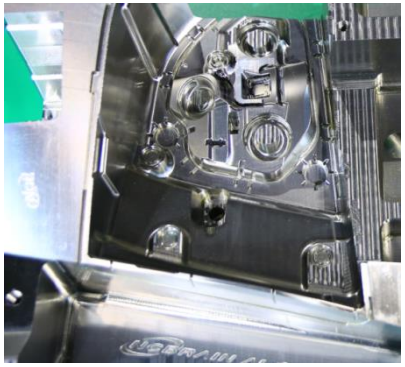
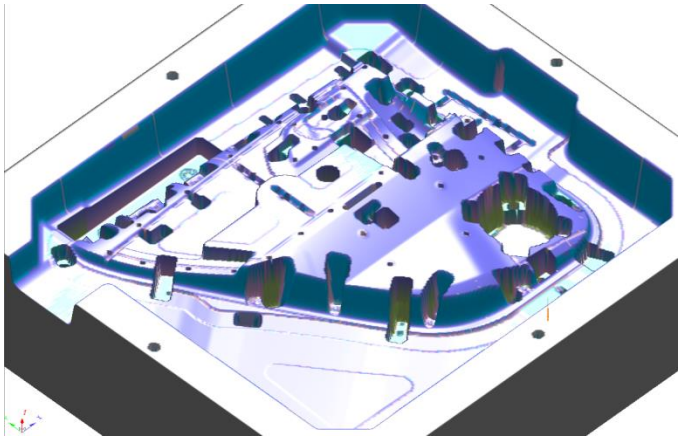
- **Shutdown main power or error occur during calculation**
  Save the toolpath until calculated, recalculate after reboot

- **Interface (agreement of technology)**
  Integration development of interface(IGES, STEP, X_T , STL) with Module Works which is number one company in interface world wide.

- **Development period of AICAM**
  14 months (Start in Oct 2105) + 14 years knowhow of NCBrain

- **Intellectual property rights**
  5 degrees that related to NCBrain AICAM
  (1 degree is pending at the moment)

Calculation Time by Size of the Stock

Content	Small size 100 X 100	Middle size 320 X 320	Large size 1000 X 1000
			
PC spec.	CPU i3 RAM 8G	CPU i5 RAM 16G	CPU i7 RAM 32G
Cal. time	2hrs	10hrs	30hrs

- Create roughing and semi-finishing tool fast
- Calculation time is based on plane & Scallop by 2um(1.5 ~ 2 times longer than 2um when set as 1um)
- Verification of over/less cutting by VF(0.001)
- Calculation time : 10 times faster than AICAM
- Great quality and speed compare to other software

Recommended Use License

Ex) ALL : 6 NC machines - AICAM Usage : 2~3 machines

Excluding roughing, 2D milling and repairing
Require at least 16 Tool change magazine, T1 ~ T16 should be empty

- Recommend to be used in new 3D milling for 2~3 machines out of below machines.

MAKINO V77

DOOSAN VM84

HWA-SIRIUS1250

DMC 103V

MAKINO V33

EXERON-HSC500

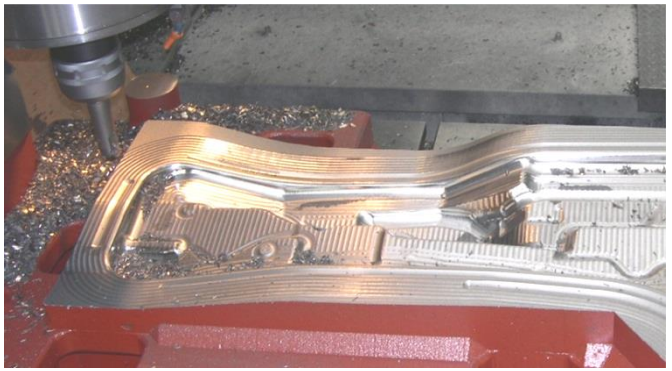
Development Plan of next version

Deep machining of W axis

Head recognition Deep processing

3+2 axis

Press



Automation Graphite