

HEIDENHAIN

Webinar



Optimized Contour Milling

TNC 640

Option #167

WEBINAR





CONTENT

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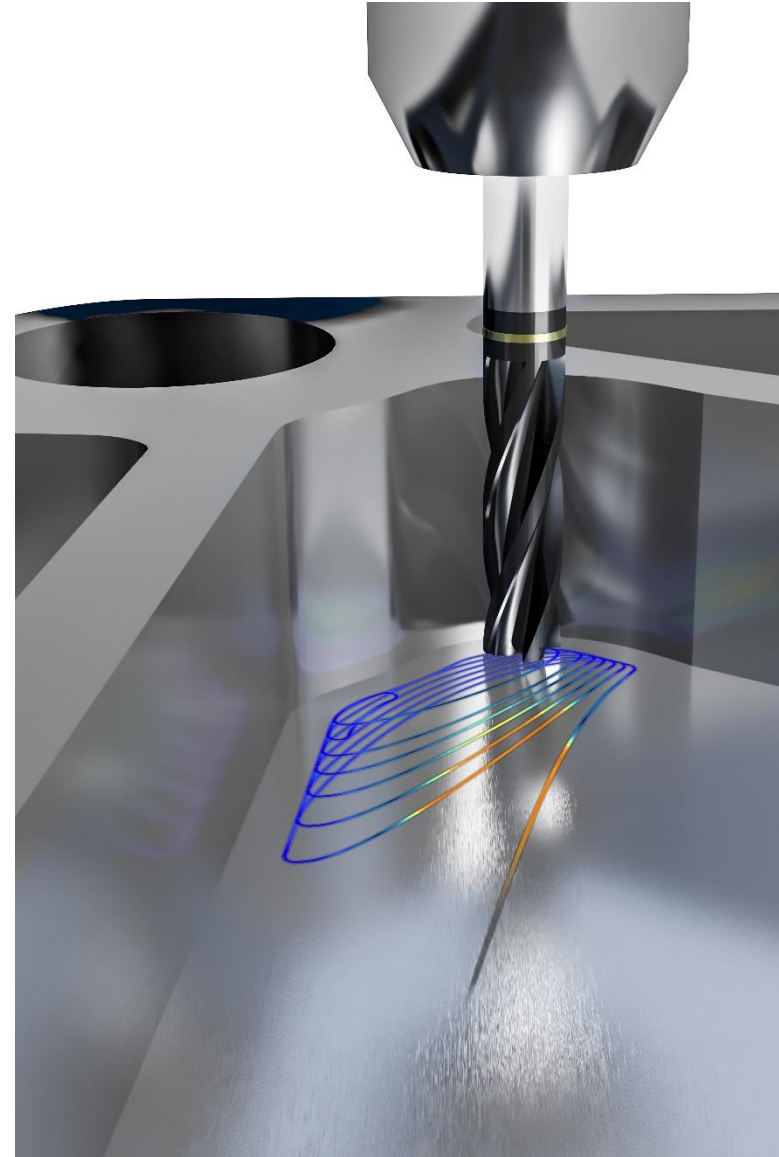


1 Application possibilities at a glance



Application possibilities at a glance

- Workshop-oriented programming of any pockets and islands
- Uniform engagement conditions allow significantly increased cutting parameters
- Particularly precise maintenance of the web overlap - even at inside corners





2 **Optimized Contour Milling** Option #167



Optimized Contour Milling Option #167

- Easy programming
- Open, closed or partially open
Outer frame
- Constant pressure angle
- Residual material detection

Manual operation Test Run

Test Run
⚠ Plunging not possible at position (-4.331994, 15.270749)

TNC: \Webinar_OCM\Part1_1297910.H

```
Q351=+1 ;CLIMB OR UP-CUT
12 L X+0 Y+0 Z+50 R0 FMAX M3 M99
13 ;
14 CYCL DEF 273 OCM FINISHING FLOOR
    Q370=+1 ;TOOL PATH OVERLAP
    Q385=+2000 ;FINISHING FEED RATE
    Q568=+0.3 ;PLUNGING FACTOR
    Q253= MAX ;F PRE-POSITIONING
    Q200=+2 ;SET-UP CLEARANCE
    Q438=-1 ;ROUGH-OUT TOOL
15 L X+0 Y+0 Z+50 R0 FMAX M3 M99
16 ;
17 CYCL DEF 274 OCM FINISHING SIDE
    Q338=+0 ;INFEEED FOR FINISHING
    Q385=+1800 ;FINISHING FEED RATE
    Q253= MAX ;F PRE-POSITIONING
    Q200=+2 ;SET-UP CLEARANCE
    Q14=+0 ;ALLOWANCE FOR SIDE
    Q438=-1 ;ROUGH-OUT TOOL
    Q351=+1 ;CLIMB OR UP-CUT
18 L X+0 Y+0 Z+50 R0 FMAX M3 M99
19 ;
20 M30
21 END PGM PART1_1297910 MM
```

00:03:45 F MAX

VIEW OPTIONS OFF ON STOP AT START START SINGLE RESET + START



3 Programming



Programming

- Set contours, e.g.
 - Closed frame
 - Island

Manual operation
Test Run
TNC 640

```

TNC:\Webinar_OCM\FRAMES\PART1.h
0 BEGIN PGM PART1 MM
1 BLK FORM 0.1 Z X+0 Y+0 Z-30
2 BLK FORM 0.2 X+100 Y+100 Z+0
3 ;
4 TOOL CALL "MILL_D16_ROUGH" Z S8000 F3000
5 CONTOUR DEF
  P1 = LBL "FRAME" I2 = LBL 2
6 CYCL DEF 271 OCM CONTOUR DATA
  Q203=+0 ;SURFACE COORDINATE
  Q201=-20 ;DEPTH
  Q368=+0 ;ALLOWANCE FOR SIDE
  Q369=+0 ;ALLOWANCE FOR FLOOR
  Q260=+100 ;CLEARANCE HEIGHT
  Q578=+0.2 ;INSIDE CORNER FACTOR
  Q569=+0 ;OPEN BOUNDARY
7 CYCL DEF 272 OCM ROUGHING
  Q202=+20 ;PLUNGING DEPTH
  Q370=+0.4 ;TOOL PATH OVERLAP
  Q207= AUTO ;FEED RATE MILLING
  Q568=+0.6 ;PLUNGING FACTOR
  Q253= AUTO ;F PRE-POSITIONING
  Q200=+2 ;SET-UP CLEARANCE
  Q438=-1 ;ROUGH-OUT TOOL
  Q577=+0.2 ;APPROACH RADIUS FACTOR
  Q351=+1 ;CLIMB OR UP-CUT
8 L X+0 Y+0 Z+50 R0 FMAX M3 M99
9 ;
10 M30
11 LBL "FRAME"
12 L X+10 Y+50
13 L Y+90
14 RND R10
15 L X+90
16 RND R10
          
```

00:01:42
F MAX

VIEW
OPTIONS
OFF ON

STOP
AT
START
START
SINGLE
RESET
+
START



Programming

- Set contours, e.g.
 - Partially opened frame
 - Island

Manual operation Test Run

TNC: \Webinar_OCM\FRAMES\PART2.h

```
0 BEGIN PGM PART2 MM
1 BLK FORM 0.1 Z X+0 Y+0 Z-30
2 BLK FORM 0.2 X+100 Y+100 Z+0
3 ;
4 TOOL CALL "MILL_D16_ROUGH" Z S8000 F3000
5 CONTOUR DEF
  P1 = LBL "FRAME" I2 = LBL 2 I3 = LBL 3
6 CYCL DEF 271 OCM CONTOUR DATA
  Q203=+0 ;SURFACE COORDINATE
  Q201=-20 ;DEPTH
  Q368=+0 ;ALLOWANCE FOR SIDE
  Q369=+0 ;ALLOWANCE FOR FLOOR
  Q260=+100 ;CLEARANCE HEIGHT
  Q578=+0.2 ;INSIDE CORNER FACTOR
  Q569=+1 ;OPEN BOUNDARY
7 CYCL DEF 272 OCM ROUGHING
  Q202=+20 ;PLUNGING DEPTH
  Q370=+0.4 ;TOOL PATH OVERLAP
  Q207= AUTO ;FEED RATE MILLING
  Q568=+0.6 ;PLUNGING FACTOR
  Q253= AUTO ;F PRE-POSITIONING
  Q200=+2 ;SET-UP CLEARANCE
  Q438=-1 ;ROUGH-OUT TOOL
  Q577=+0.2 ;APPROACH RADIUS FACTOR
  Q351=+1 ;CLIMB OR UP-CUT
8 L X+0 Y+0 Z+50 R0 FMAX M3 M99
9 ;
10 M30
11 LBL "FRAME"
12 L X+0 Y+0
13 L X+100
14 L Y+100
15 L X+0
16 L Y+0
```

00:01:56 F MAX

VIEW OPTIONS OFF ON STOP AT START START SINGLE RESET + START



Programming

- Set contours, e.g.
 - Open frame
 - Island

Manual operation
Test Run
TNC 640

```

TNC:\Webinar_OCM\FRAMES\PART3.h
0 BEGIN PGM PART3 MM
1 BLK FORM 0.1 Z X+0 Y+0 Z-30
2 BLK FORM 0.2 X+100 Y+100 Z+0
3 ;
4 TOOL CALL "MILL_D16_ROUGH" Z S8000 F3000
5 CONTOUR DEF
  P1 = LBL "FRAME" I2 = LBL 2
6 CYCL DEF 271 OCM CONTOUR DATA
  Q203=+0 ;SURFACE COORDINATE
  Q201=-20 ;DEPTH
  Q368=+0 ;ALLOWANCE FOR SIDE
  Q369=+0 ;ALLOWANCE FOR FLOOR
  Q260=+100 ;CLEARANCE HEIGHT
  Q578=+0.2 ;INSIDE CORNER FACTOR
  Q569=+1 ;OPEN BOUNDARY
7 CYCL DEF 272 OCM ROUGHING
  Q202=+20 ;PLUNGING DEPTH
  Q370=+0.4 ;TOOL PATH OVERLAP
  Q207= AUTO ;FEED RATE MILLING
  Q568=+0.6 ;PLUNGING FACTOR
  Q253= AUTO ;F PRE-POSITIONING
  Q200=+2 ;SET-UP CLEARANCE
  Q438=-1 ;ROUGH-OUT TOOL
  Q577=+0.2 ;APPROACH RADIUS FACTOR
  Q351=+1 ;CLIMB OR UP-CUT
8 L X+0 Y+0 Z+50 R0 FMAX M3 M99
9 ;
10 M30
11 LBL "FRAME"
12 L X+0 Y+0
13 L X+100
14 L Y+100
15 L X+0
16 L Y+0
          
```

00:01:05
F MAX

VIEW
OPTIONS

OFF ON

STOP
AT

START

START
SINGLE

RESET
+
START



Programming

■ Roughing

- Path overlap (constant pressure angle on the tool)

Manual operation **Programming** TNC 640 HEIDENHAIN

TNC:\Webinar_OCM\FRAMES\PART1.h
 →Path overlap factor?

```

4 TOOL CALL "MILL_D16_ROUGH" Z S8000 F3000
5 CONTOUR DEF
  P1 = LBL "FRAME" I2 = LBL 2
6 CYCL DEF 271 OCM CONTOUR DATA
  Q203=+0 ;SURFACE COORDINATE
  Q201=-20 ;DEPTH
  Q368=+0 ;ALLOWANCE FOR SIDE
  Q369=+0 ;ALLOWANCE FOR FLOOR
  Q260=+100 ;CLEARANCE HEIGHT
  Q578=+0.2 ;INSIDE CORNER FACTOR
  Q569=+0 ;OPEN BOUNDARY
7 CYCL DEF 272 OCM ROUGHING
  Q202=+20 ;PLUNGING DEPTH
  Q370=0.4 TOOL PATH OVERLAP
  Q207= AUTO ;FEED RATE MILLING
  Q568=+0.6 ;PLUNGING FACTOR
  Q253= AUTO ;F PRE-POSITIONING
  Q200=+2 ;SET-UP CLEARANCE
  Q438=-1 ;ROUGH-OUT TOOL
  Q577=+0.2 ;APPROACH RADIUS FACTOR
  Q351=+1 ;CLIMB OR UP-CUT
8 L X+0 Y+0 Z+50 R0 FMAX M3 M99
9 ;
10 M30
11 LBL "FRAME"
12 L X+10 Y+50
13 L Y+90
14 RND R10
15 L X+90
16 RND R10
17 L Y+10
18 RND R10
19 L X+10
  
```

$k = r_T \times Q370$

SET STANDARD VALUES



Programming

- Roughing (rest material)
 - Q438=-1 The tool radius is taken from Cycle 272

Manual operation Programming

TNC: \Webinar_OCM\RESUDAL_MATERIAL\PART1.h

→ Number/name of rough-out tool?

```

4 TOOL CALL "MILL_D16_ROUGH" Z S8000 F3000
5 CONTOUR DEF
  P1 = LBL "POCKET"
6 CYCL DEF 271 OCM CONTOUR DATA
  Q203=+0 ;SURFACE COORDINATE
  Q201=-20 ;DEPTH
  Q368=+0 ;ALLOWANCE FOR SIDE
  Q369=+0 ;ALLOWANCE FOR FLOOR
  Q260=+100 ;CLEARANCE HEIGHT
  Q578=+0.2 ;INSIDE CORNER FACTOR
  Q569=+0 ;OPEN BOUNDARY
7 CYCL DEF 272 OCM ROUGHING
  Q202=+20 ;PLUNGING DEPTH
  Q370=+0.4 ;TOOL PATH OVERLAP
  Q207= AUTO ;FEED RATE MILLING
  Q568=+0.6 ;PLUNGING FACTOR
  Q253= AUTO ;F PRE-POSITIONING
  Q200=+2 ;SET-UP CLEARANCE
  Q438=-1 ;ROUGH-OUT TOOL
  Q577=+0.2 ;APPROACH RADIUS FACTOR
  Q351=+1 ;CLIMB OR UP-CUT
8 L X+0 Y+0 Z+50 R0 FMAX M3 M99
9 ;
10 ;STEP2
11 TOOL CALL "MILL_D10_ROUGH" Z S10000 F2000
12 L X+0 Y+0 Z+50 R0 FMAX M3 M99
13 ;
14 ;STEP3
15 TOOL CALL "MILL_D4_ROUGH" Z S10000 F2000
16 L X+0 Y+0 Z+50 R0 FMAX M3 M99
17 ;
18 M30
19 LBL "POCKET"
  
```

Q438 ≥ 0

Q438 = -1

T	NAME	R
xx	MILL_R	xx

I_T =

BEGIN PGM
 ...
 I_T = CYCL DEF 272
 ...
 CYCL DEF 272

TOOL NUMBER	TOOL NAME	QS

SELECT



Programming

- Roughing (rest material)
 - Q438=-1 The tool radius is taken from Cycle 272
- Tool end mill D16

```
TNC:\Webinar_OCM\RESUDAL_MATERIAL\PART1.h
Q578=+0.2 ;INSIDE CORNER FACTOR
Q569=+0 ;OPEN_BOUNDARY
7 CYCL DEF 272 OCM ROUGHING
Q202=+20 ;PLUNGING DEPTH
Q370=+0.4 ;TOOL_PATH_OVERLAP
Q207= AUTO ;FEED_RATE_MILLING
Q568=+0.6 ;PLUNGING_FACTOR
Q253= AUTO ;F_PRE-POSITIONING
Q200=+2 ;SET-UP_CLEARANCE
Q438=-1 ;ROUGH-OUT_TOOL
Q577=+0.2 ;APPROACH_RADIUS_FACTOR
Q351=+1 ;CLIMB_OR_UP-CUT
8 L X+0 Y+0 Z+50 R0 FMAX M3 M99
9 ;
10 ;STEP2
11 TOOL CALL "MILL_D10_ROUGH" Z S10000 F2000
12 L X+0 Y+0 Z+50 R0 FMAX M3 M99
13 ;
14 ;STEP3
15 TOOL CALL "MILL_D4_ROUGH" Z S10000 F2000
16 L X+0 Y+0 Z+50 R0 FMAX M3 M99
17 ;
18 M30
19 LBL "POCKET"
20 L X+50 Y+10
21 L X+90
22 RND R2
23 L X+50 Y+90
24 RND R2
25 L X+10 Y+10
26 RND R2
27 L X+50
28 LBL 0
29 END PGM PART1 MM
```

00:00:48 F MAX



Programming

- Roughing (rest material)
 - Q438=-1 The tool radius is taken from Cycle 272
- Tool end mill D10
Remaining material from the D16 is removed

The screenshot displays the Heidenhain TNC 640 control interface. The top bar shows "Manual operation" and "Test Run" modes. The main window is divided into a text editor on the left and a 3D CAD model on the right. The text editor shows a CNC program for a part named "PART1.h". The 3D model shows a rectangular block with a triangular pocket being milled, with a blue tool bit positioned above it. The bottom status bar shows the time "00:01:04" and feed rate "F MAX". The bottom control bar includes buttons for "VIEW OPTIONS", "OFF/ON" (with a printer icon), a stop button, "START SINGLE", and "RESET + START".

```
TNC:\Webinar_OCM\RESUDAL_MATERIAL\PART1.h
Q370=+0.4 ;TOOL PATH OVERLAP
Q207= AUTO ;FEED RATE MILLING
Q568=+0.6 ;PLUNGING FACTOR
Q253= AUTO ;F PRE-POSITIONING
Q200=+2 ;SET-UP CLEARANCE
Q438=-1 ;ROUGH-OUT TOOL
Q577=+0.2 ;APPROACH RADIUS FACTOR
Q351=+1 ;CLIMB OR UP-CUT
8 L X+0 Y+0 Z+50 R0 FMAX M3 M99
9 ;
10 ;STEP2
11 TOOL CALL "MILL_D10_ROUGH" Z S10000 F2000
12 L X+0 Y+0 Z+50 R0 FMAX M3 M99
13 ;
14 ;STEP3
15 TOOL CALL "MILL_D4_ROUGH" Z S10000 F2000
16 L X+0 Y+0 Z+50 R0 FMAX M3 M99
17 ;
18 M30
19 LBL "POCKET"
20 L X+50 Y+10
21 L X+90
22 RND R2
23 L X+50 Y+90
24 RND R2
25 L X+10 Y+10
26 RND R2
27 L X+50
28 LBL 0
29 END PGM PART1 MM
```




Programming

- Roughing (rest material)
 - Q438=-1 The tool radius is taken from Cycle 272
 - Tool end mill D4
Remaining material from the D10 is removed

The screenshot displays the Heidenhain TNC 640 control interface. The top bar shows "Manual operation" and "Test Run" buttons. The main window is divided into a code editor on the left and a 3D model on the right. The code editor shows the following G-code program:

```
TNC:\Webinar_OCM\RESUDAL_MATERIAL\PART1.h
Q200=+2 ;SET-UP CLEARANCE
Q438=-1 ;ROUGH-OUT TOOL
Q577=+0.2 ;APPROACH RADIUS FACTOR
Q351=+1 ;CLIMB OR UP-CUT
8 L X+0 Y+0 Z+50 R0 FMAX M3 M99
9 ;
10 ;STEP2
11 TOOL CALL "MILL_D10_ROUGH" Z S10000 F2000
12 L X+0 Y+0 Z+50 R0 FMAX M3 M99
13 ;
14 ;STEP3
15 TOOL CALL "MILL_D4_ROUGH" Z S10000 F2000
16 L X+0 Y+0 Z+50 R0 FMAX M3 M99
17 ;
18 M30
19 LBL "POCKET"
20 L X+50 Y+10
21 L X+90
22 RND R2
23 L X+50 Y+90
24 RND R2
25 L X+10 Y+10
26 RND R2
27 L X+50
28 LBL 0
29 END PGM PART1 MM
```

The 3D model on the right shows a rectangular block with a triangular pocket. The pocket is highlighted in green, and the tool path is shown in blue. The interface also includes a status bar at the bottom with a timer (00:01:20) and speed (F MAX), and a control panel with buttons for "VIEW OPTIONS", "OFF", "ON", "STOP AT", "START", "START SINGLE", and "RESET + START".



Programming

■ Finishing

- Optimum approach and departure movements

Manual operation Test Run

TNC: \Webinar_OCM\FINISHING\PART1.h

```
0 BEGIN PGM PART1 MM
1 BLK FORM 0.1 Z X+0 Y+0 Z-30
2 BLK FORM 0.2 X+100 Y+100 Z+0
3 ;
4 TOOL CALL "MILL_D16_ROUGH" Z S8000 F3000
5 CONTOUR DEF
  P1 = LBL "FRAME" I2 = LBL 2 I3 = LBL 3
6 CYCL DEF 271 OCM CONTOUR DATA
  Q203=+0 ;SURFACE COORDINATE
  Q201=-20 ;DEPTH
  Q368=+0.5 ;ALLOWANCE FOR SIDE
  Q369=+0 ;ALLOWANCE FOR FLOOR
  Q260=+100 ;CLEARANCE HEIGHT
  Q578=+0.2 ;INSIDE CORNER FACTOR
  Q569=+1 ;OPEN BOUNDARY
7 CYCL DEF 272 OCM ROUGHING
  Q202=+20 ;PLUNGING DEPTH
  Q370=+0.4 ;TOOL PATH OVERLAP
  Q207= AUTO ;FEED RATE MILLING
  Q568=+0.6 ;PLUNGING FACTOR
  Q253= AUTO ;F PRE-POSITIONING
  Q200=+2 ;SET-UP CLEARANCE
  Q438=-1 ;ROUGH-OUT TOOL
  Q577=+0.2 ;APPROACH RADIUS FACTOR
  Q351=+1 ;CLIMB OR UP-CUT
8 L X+0 Y+0 Z+50 R0 FMAX M3 M99
9 ;
10 STOP
11 CYCL DEF 274 OCM FINISHING SIDE
  Q338=+0 ;INFEEED FOR FINISHING
  Q385= AUTO ;FINISHING FEED RATE
  Q253= AUTO ;F PRE-POSITIONING
  Q200=+2 ;SET-UP CLEARANCE
  Q14=+0 ;ALLOWANCE FOR SIDE
```

00:02:09 F MAX

VIEW OPTIONS OFF ON STOP AT START START SINGLE RESET + START

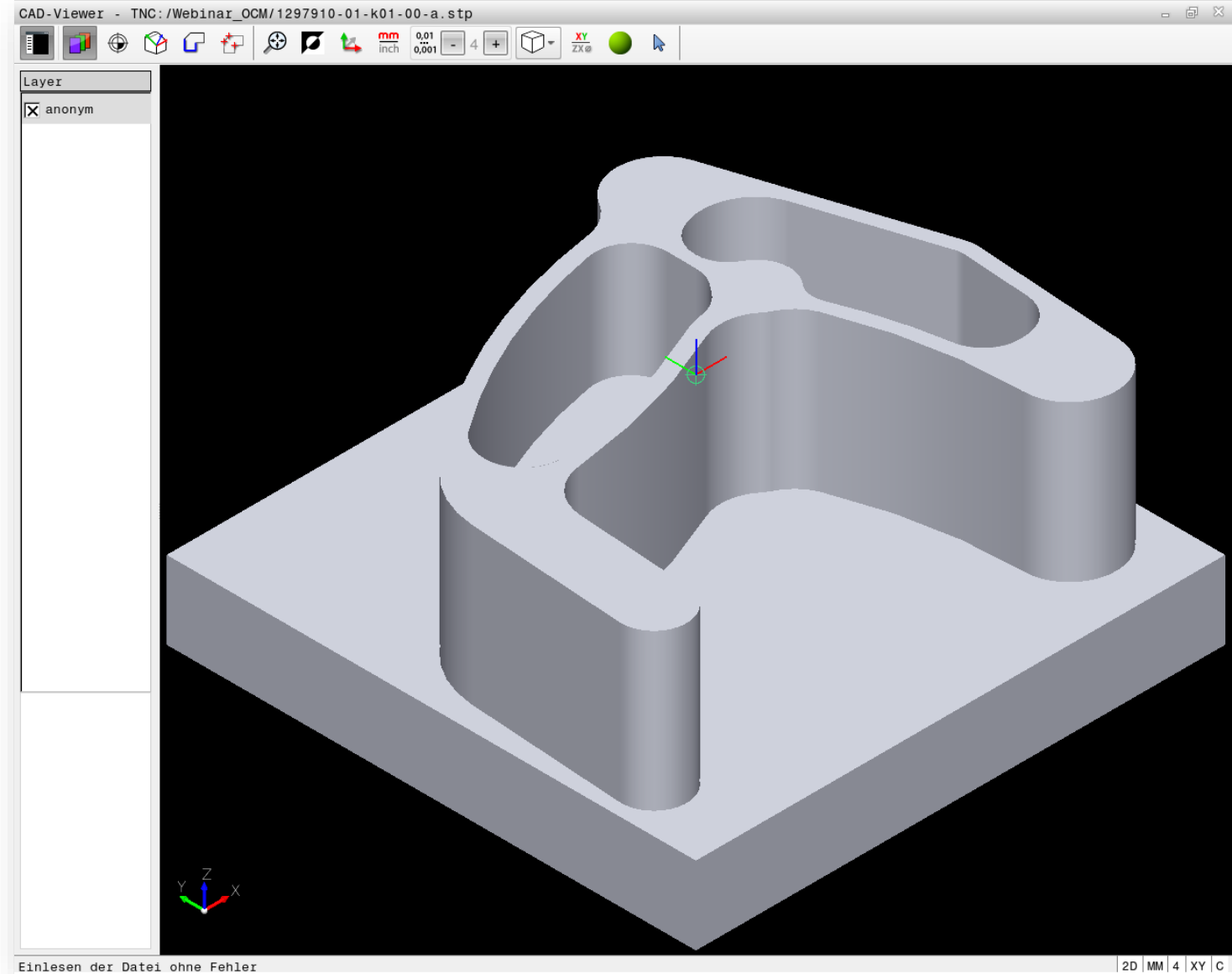


4 Application example



Application example

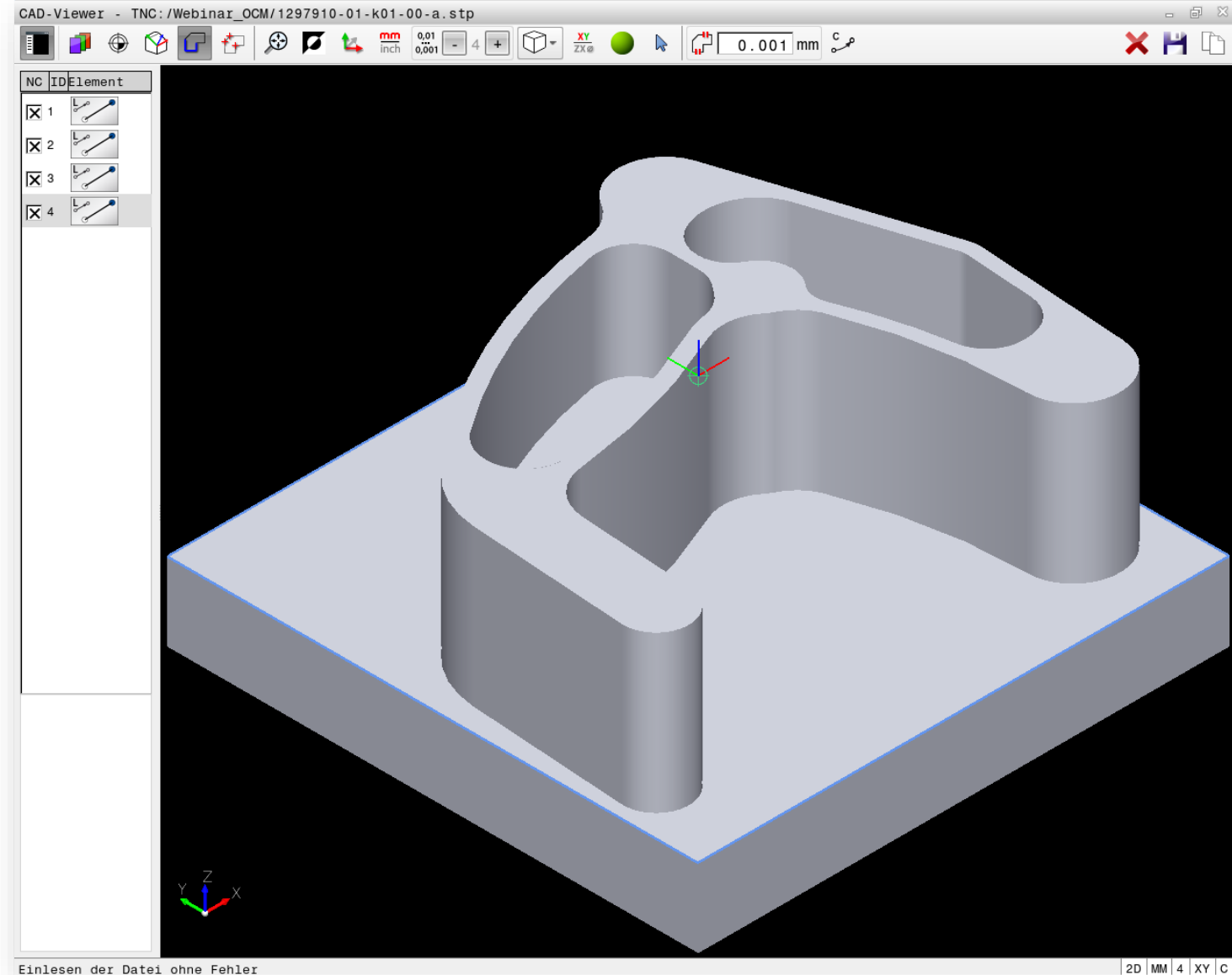
- Select contours
- Roughing T D16
- Residual material T D10
- Finishing





Application example

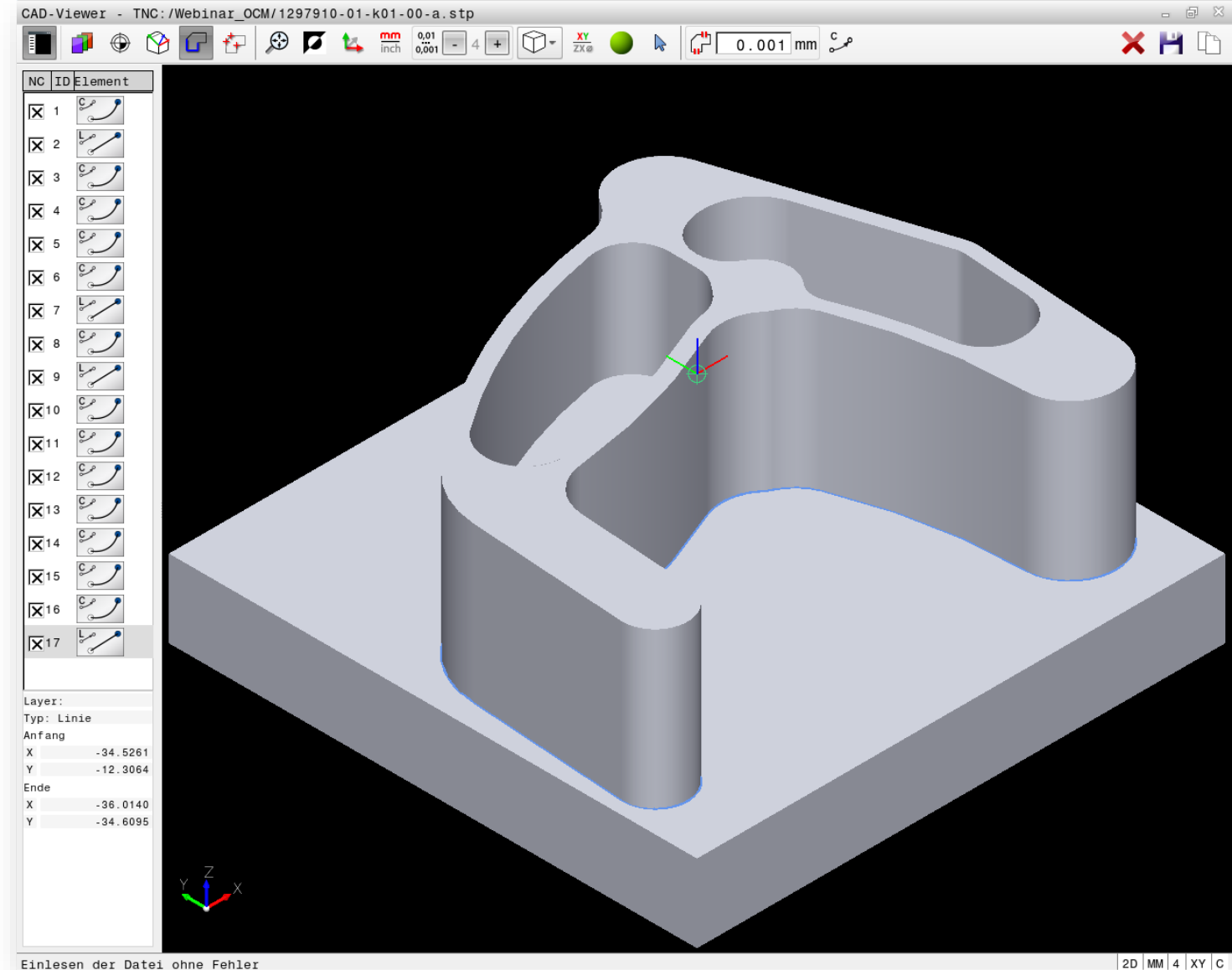
- Select contours
 - External contour FRAME
- Roughing T D16
- Residual material T D10
- Finishing





Application example

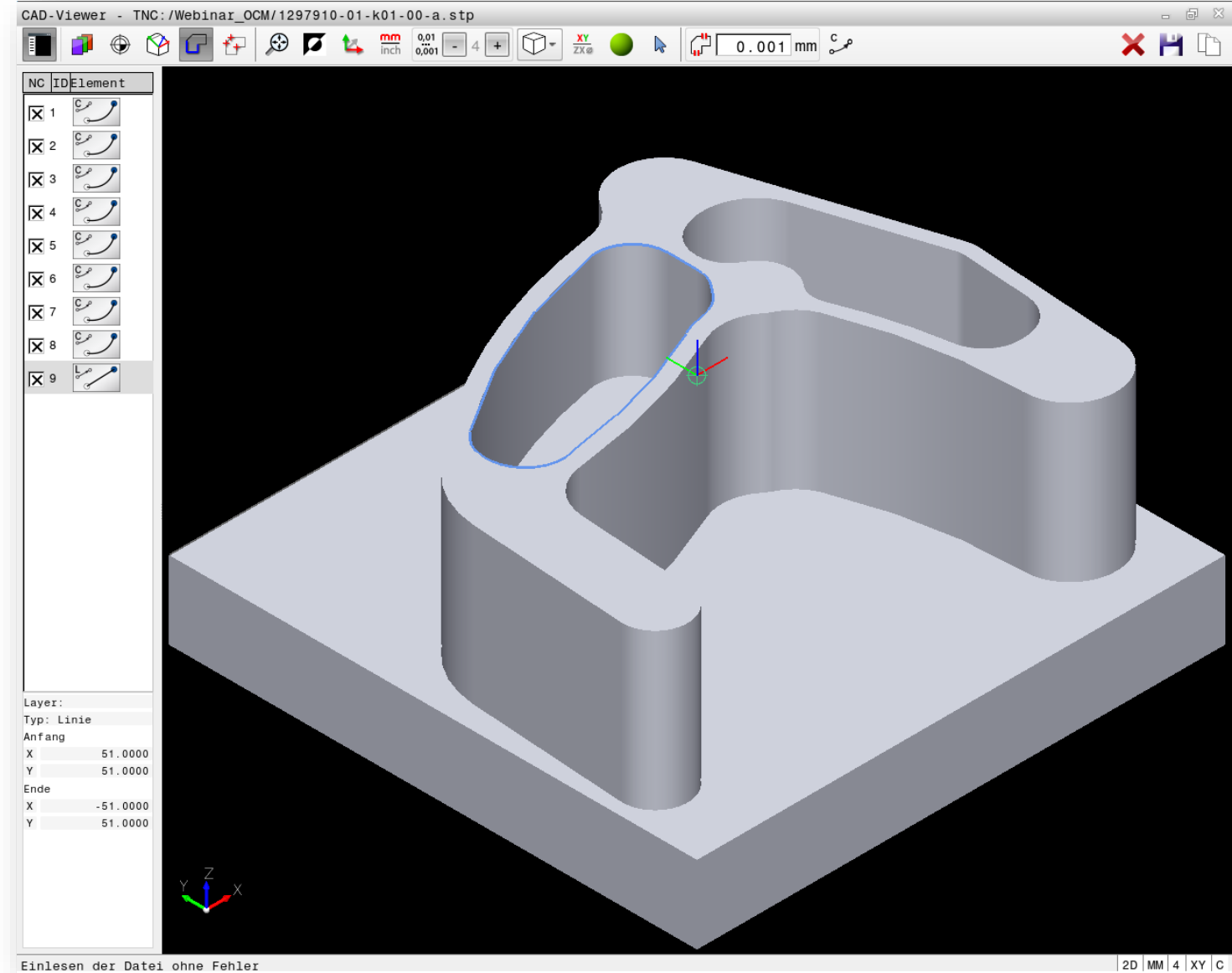
- Select contours
 - Island contour ICELAND
- Roughing T D16
- Residual material T D10
- Finishing





Application example

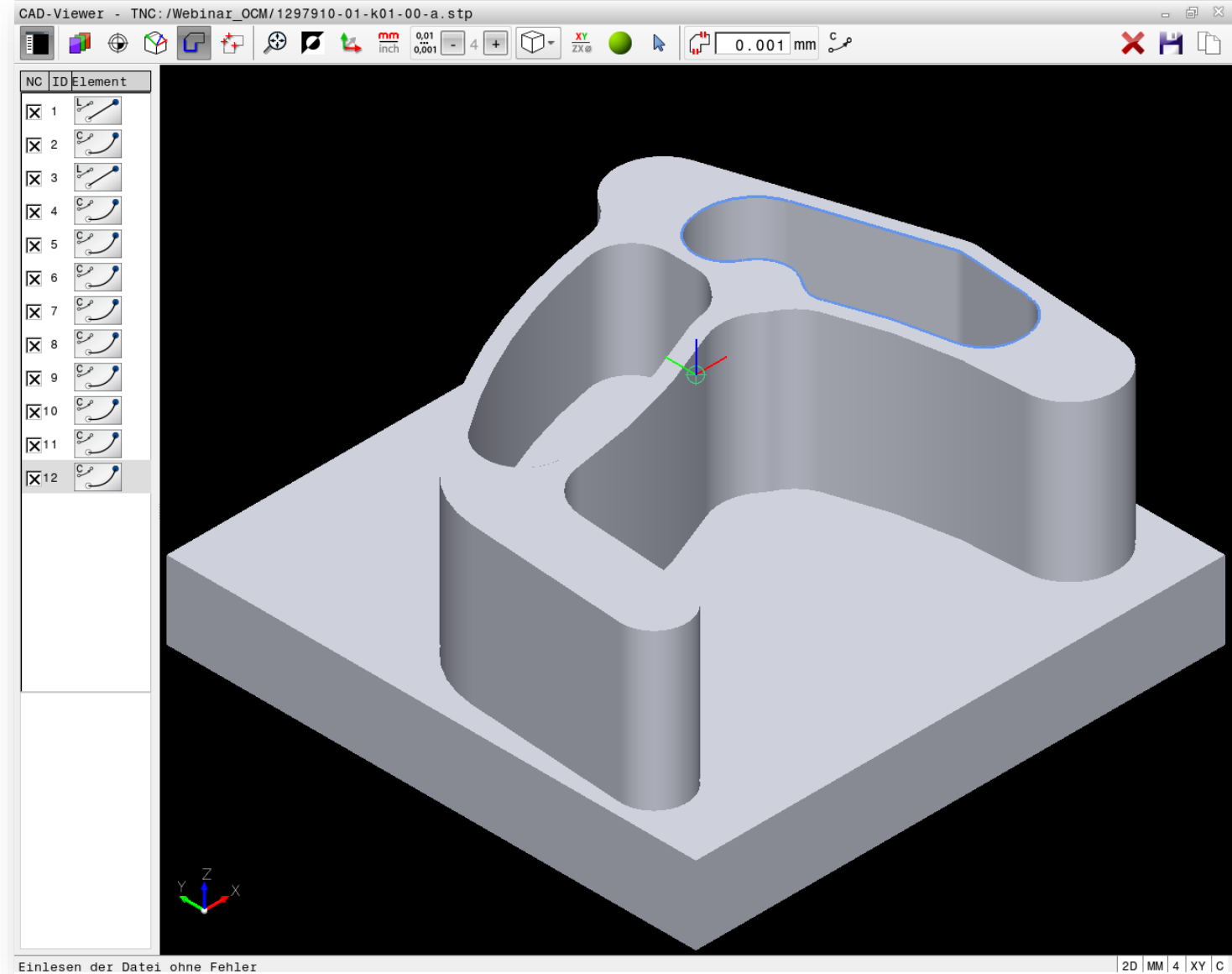
- Select contours
 - Bag 1
- Roughing T D16
- Residual material T D10
- Finishing





Application example

- Select contours
Bag 2
- Roughing T D16
- Residual material T D10
- Finishing





Application example

- Select contours
 - Contour Def
 - Combining four contours
- Roughing T D16
- Residual material T D10
- Finishing

The screenshot displays the Heidenhain TNC 640 control interface. The top bar shows "Manual operation" and "Programming" modes. The main window is divided into a text editor on the left and a 2D coordinate system on the right. The text editor shows the following program code:

```
TNC:\Webinar_OCM\PART_1297910.H  
→PART_1297910.H  
0 BEGIN PGM PART_1297910 MM  
1 BLK FORM 0.1 Z X-50 Y-50 Z-40  
2 BLK FORM 0.2 X+50 Y+50 Z+0  
3 ;  
4 TOOL CALL "MILL_D16_ROUGH" Z S10000 F6000  
5 CONTOUR DEF  
  P1 = "TNC:\Webinar_OCM\FRAME.H" I2 =  
  "TNC:\Webinar_OCM\ISLAND.H" P3 =  
  "TNC:\Webinar_OCM\POCKET1.H" P4 =  
  "TNC:\Webinar_OCM\POCKET2.H"  
6 END PGM PART_1297910 MM
```

The 2D coordinate system on the right shows a Cartesian coordinate system with X and Y axes. The X-axis ranges from -4 to 4, and the Y-axis ranges from -6 to 6. A red circle is centered at the origin (0,0). The interface also includes a bottom toolbar with buttons for "DECLARE CONTOUR", "CONTOUR DEF", "SEL CONTOUR", "CONTOUR FORMULA", "PATTERN DEF", "SEL PATTERN", and a "DECLARE CONTOUR" button.



Application example

- Select contours
- **Roughing T D16**
- Residual material T D10
- Finishing

Manual operation Programming

TNC: \Webinar_OCM\PART_1297910.H
→ PART_1297910.H

```
3 ;
4 TOOL CALL "MILL_D16_ROUGH" Z S10000 F6000
5 CONTOUR DEF
  P1 = "TNC:\Webinar_OCM\FRAME.H" I2 =
  "TNC:\Webinar_OCM\ISLAND.H" P3 =
  "TNC:\Webinar_OCM\POCKET1.H" P4 =
  "TNC:\Webinar_OCM\POCKET2.H"
6 CYCL DEF 271 OCM CONTOUR DATA
  Q203=+0 ;SURFACE COORDINATE
  Q201=-30 ;DEPTH
  Q368=+0.5 ;ALLOWANCE FOR SIDE
  Q369=+0.5 ;ALLOWANCE FOR FLOOR
  Q260=+25 ;CLEARANCE HEIGHT
  Q578=+0.2 ;INSIDE CORNER FACTOR
  Q569=+1 ;OPEN BOUNDARY
7 CYCL DEF 272 OCM ROUGHING
  Q202=+30 ;PLUNGING DEPTH
  Q370=+0.25 ;TOOL PATH OVERLAP
  Q207= AUTO ;FEED RATE MILLING
  Q568=+0.6 ;PLUNGING FACTOR
  Q253= MAX ;F PRE-POSITIONING
  Q200=+2 ;SET-UP CLEARANCE
  Q438=-1 ;ROUGH-OUT TOOL
  Q577=+0.2 ;APPROACH RADIUS FACTOR
  Q351=+1 ;CLIMB OR UP-CUT
8 L X+0 Y+0 Z+50 R0 FMAX M3 M99
9 ;
10 END PGM PART_1297910 MM
```

TNC 640 HEIDENHAIN

Y
X

6
4
2
0
-2
-4

6
4
2
0
-2
-4

FIND START START SINGLE RESET + START



Application example

- Select contours
- Roughing T D16
- Residual material T D10
- Finishing

The screenshot displays the Heidenhain TNC 640 control interface. The top bar shows 'Manual operation' and 'Programming' modes. The main window is divided into a text editor on the left and a graphical coordinate system on the right. The text editor shows the following program code:

```
TNC:\Webinar_OCM\PART_1297910.H  
→PART_1297910.H  
Q253= MAX ;F PRE-POSITIONING  
Q200=+2 ;SET-UP CLEARANCE  
Q438=-1 ;ROUGH-OUT TOOL  
Q577=+0.2 ;APPROACH RADIUS FACTOR  
Q351=+1 ;CLIMB OR UP-CUT  
8 L X+0 Y+0 Z+50 R0 FMAX M3 M99  
9 ;  
10 TOOL CALL "MILL D10 ROUGH" Z S12000 F4000  
11 CYCL DEF 272 OCM ROUGHING  
Q202=+15 ;PLUNGING DEPTH  
Q370=+0.25 ;TOOL PATH OVERLAP  
Q207= AUTO ;FEED RATE MILLING  
Q568=+0.6 ;PLUNGING FACTOR  
Q253= MAX ;F PRE-POSITIONING  
Q200=+2 ;SET-UP CLEARANCE  
Q438=-1 ;ROUGH-OUT TOOL  
Q577=+0.2 ;APPROACH RADIUS FACTOR  
Q351=+1 ;CLIMB OR UP-CUT  
12 L X+0 Y+0 Z+50 R0 FMAX M3 M99  
13 ;  
14 END PGM PART_1297910 MM
```

The graphical coordinate system on the right shows a 2D view with X and Y axes. A red circle is centered at the origin (0,0). The axes are scaled from -6 to 6. The bottom of the interface features a row of function buttons: SELECT BLOCK, CUT OUT BLOCK, INSERT BLOCK, COPY BLOCK, FIND, and several INSERT/REMOVE buttons.



Application example

- Select contours
- Roughing T D16
- Residual material T D10
- **Finishing**

Manual operation Programming

TNC: \Webinar_OCM\PART_1297910.H
→ PART_1297910.H

```
Q253= MAX ;F PRE-POSITIONING
Q200=+2 ;SET-UP CLEARANCE
Q438=-1 ;ROUGH-OUT TOOL
Q577=+0.2 ;APPROACH RADIUS FACTOR
Q351=+1 ;CLIMB OR UP-CUT
12 L X+0 Y+0 Z+50 R0 FMAX M3 M99
13 ;
14 CYCL DEF 273 OCM FINISHING FLOOR
Q370=+1 ;TOOL PATH OVERLAP
Q385=+3000 ;FINISHING FEED RATE
Q568=+0.3 ;PLUNGING FACTOR
Q253= MAX ;F PRE-POSITIONING
Q200=+2 ;SET-UP CLEARANCE
Q438=-1 ;ROUGH-OUT TOOL
15 L X+0 Y+0 Z+50 R0 FMAX M3 M99
16 ;
17 CYCL DEF 274 OCM FINISHING SIDE
Q338=+15 ;INFEED FOR FINISHING
Q385=+300 ;FINISHING FEED RATE
Q253= MAX ;F PRE-POSITIONING
Q200=+2 ;SET-UP CLEARANCE
Q14=+0 ;ALLOWANCE FOR SIDE
Q438=-1 ;ROUGH-OUT TOOL
Q351=+1 ;CLIMB OR UP-CUT
18 L X+0 Y+0 Z+50 R0 FMAX M3 M99
19 ;
20 M30
21 END PGM PART_1297910 MM
```

SELECT BLOCK CUT OUT BLOCK INSERT BLOCK COPY BLOCK FIND INSERT REMOVE INSERT REMOVE INSERT LAST NC BLOCK



Application example

- Select contours
- Roughing T D16
- Residual material T D10
- Finishing

Manual operation ⇒ Test Run

Test Run
⚠ Plunging not possible at position (-4.331994, 15.270749)

TNC: \Webinar_OCM\Part1_1297910.H

```
Q351=+1 ;CLIMB OR UP-CUT
12 L X+0 Y+0 Z+50 R0 FMAX M3 M99
13 ;
14 CYCL DEF 273 OCM FINISHING FLOOR
    Q370=+1 ;TOOL PATH OVERLAP
    Q385=+2000 ;FINISHING FEED RATE
    Q568=+0.3 ;PLUNGING FACTOR
    Q253= MAX ;F PRE-POSITIONING
    Q200=+2 ;SET-UP CLEARANCE
    Q438=-1 ;ROUGH-OUT TOOL
15 L X+0 Y+0 Z+50 R0 FMAX M3 M99
16 ;
17 CYCL DEF 274 OCM FINISHING SIDE
    Q338=+0 ;INFEEED FOR FINISHING
    Q385=+1800 ;FINISHING FEED RATE
    Q253= MAX ;F PRE-POSITIONING
    Q200=+2 ;SET-UP CLEARANCE
    Q14=+0 ;ALLOWANCE FOR SIDE
    Q438=-1 ;ROUGH-OUT TOOL
    Q351=+1 ;CLIMB OR UP-CUT
18 L X+0 Y+0 Z+50 R0 FMAX M3 M99
19 ;
20 M30
21 END PGM PART1_1297910 MM
```

00:03:45 F MAX

VIEW OPTIONS OFF ON STOP AT START START SINGLE RESET + START



Application example

- Select contours
- Roughing T D16
- Residual material T D10
- Finishing

Manual operation Test Run

TNC: \Webinar_OCM\Part1_1297910.H

```

0 BEGIN PGM PART1_1297910 MM
1 BLK FORM 0.1 Z X-50 Y-50 Z-40
2 BLK FORM 0.2 X+50 Y+50 Z+0
3 ;
4 TOOL CALL "MILL_D16_ROUGH" Z S10000 F5000
5 CONTOUR DEF
  P1 = "TNC:\Webinar_OCM\FRAME.H" I2 =
  "TNC:\Webinar_OCM\ISLAND.H" P3 =
  "TNC:\Webinar_OCM\POCKET1.H" P4 =
  "TNC:\Webinar_OCM\POCKET2.H"
6 CYCL DEF 271 OCM CONTOUR DATA
  Q203=+0 ;SURFACE COORDINATE
  Q201=-30 ;DEPTH
  Q368=+0.3 ;ALLOWANCE FOR SIDE
  Q369=+0.5 ;ALLOWANCE FOR FLOOR
  Q260=+25 ;CLEARANCE HEIGHT
  Q578=+0.2 ;INSIDE CORNER FACTOR
  Q569=+1 ;OPEN BOUNDARY
7 CYCL DEF 272 OCM ROUGHING
  Q202=+30 ;PLUNGING DEPTH
  Q370=+0.25 ;TOOL PATH OVERLAP
  Q207= AUTO ;FEED RATE MILLING
  Q568=+0.6 ;PLUNGING FACTOR
  Q253= MAX ;F PRE-POSITIONING
  Q200=+2 ;SET-UP CLEARANCE
  Q438=-1 ;ROUGH-OUT TOOL
  Q577=+0.2 ;APPROACH RADIUS FACTOR
  Q351=+1 ;CLIMB OR UP-CUT
8 L X+0 Y+0 Z+50 R0 FMAX M3 M99
9 ;
10 TOOL CALL "MILL_D10_ROUGH" Z S12000 F2000
11 CYCL DEF 272 OCM ROUGHING
  Q202=+30 ;PLUNGING DEPTH
  Q370=+0.2 ;TOOL PATH OVERLAP
  
```

00:05:08 F MAX

VIEW OPTIONS OFF ON STOP AT START START SINGLE RESET + START



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