PCET's & NMVPM's

Nutan College of Engineering & Research (NCER)

(Affiliated to Dr. Babasaheb Ambedkar Technological University, Lonere)

CAD/CAM Assignment No:5 on

Turning Operation

By

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(2021-2022)

Assignment No: 5

Turning Operation

2 Jobs on CNC Turning Operation with Programs.

2 JOB or Workpiece

Problem Definition:-

Write NC part program to generate the profile as shown in fig. Assume suitable data for feed and speed etc. All dimensions are in mm.

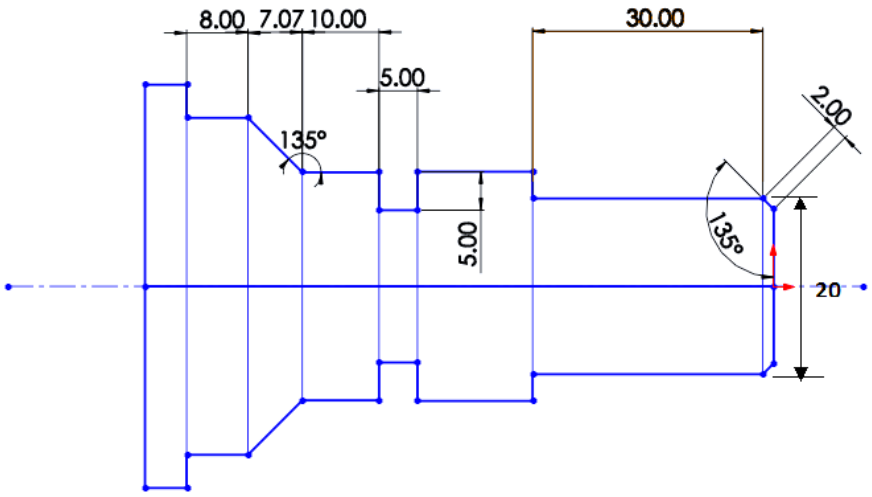

Fig No. 1

Procedure:

Sketching and Machine Setup:

Press F9 to activate the axes.

- Sketch the upper half of the object in quadrant II.
- From the Main Menu, select Machine type > Lathe > Default.
- In Operation Manager, select Properties > Stock Setup.
- Under the section 'Stock', select Properties.
- Select 'Make from two points.
- Select the bottom right & top left corners of the sketch.

- Increase ‘Length’ from 83 to 85 and change ‘Position along Z-axes to 2 (to allow facing operation).
- Click on ‘OK’.
- Under the section ‘Chuck Jaws’, select ‘Properties’.
- Select ‘Make from two points.
- Select 2 appropriate points as the chuck location.
- Click on ‘OK’

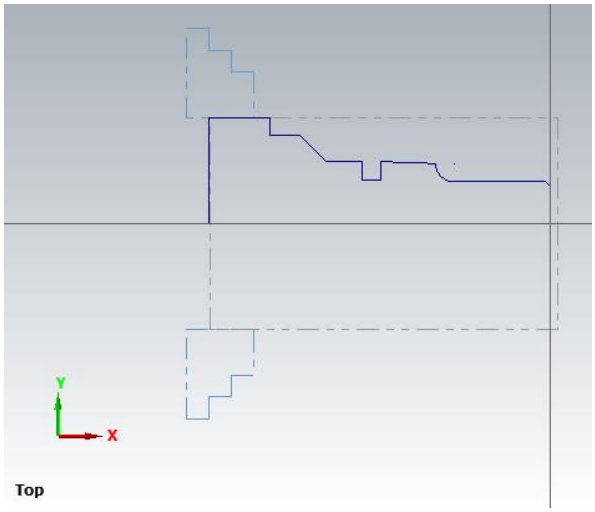

Fig. No.2 Stock Setup

2. Facing Operation

- From the Main Menu, select Toolpaths > Facing.
- Enter an arbitrary name under ‘T and click ‘OK’
- In ‘Lathe Facing Properties’, select a suitable tool.
- Under the ‘Facing Parameters’ tab, click on ‘Select Points’.
- Select the boundary corner points on the stock which is to be removed by facing.
- Check ‘Rough Stepover’ and enter value as ‘0.1’
- Click on ‘OK’.

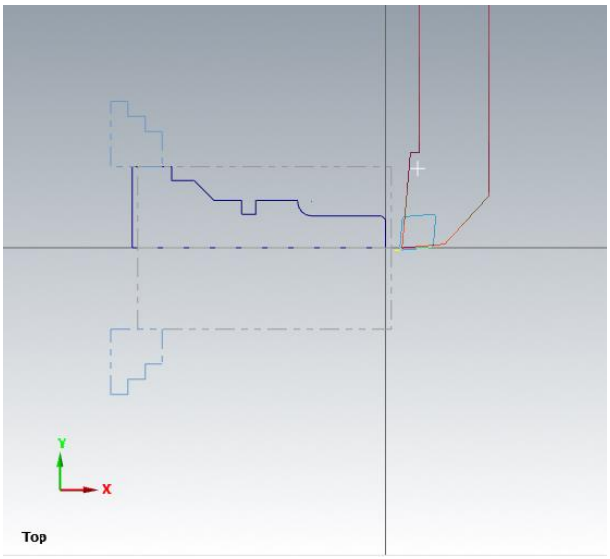

Fig. No. 3 Facing Operation

3. Rough Turning Operation

- From the Main Menu, select Toolpaths > Rough.
- In the chaining window, click on 'Chain'.
- Select the entry point and exit point of the tool from the sketch.
- Click on 'OK'.
- In 'Lathe Rough Properties', select a suitable roughing tool.
- Under the 'Rough Parameters' tab, enter the value for depth of cut as '0.5' and check 'Equal Steps'.
- Click on 'OK'.

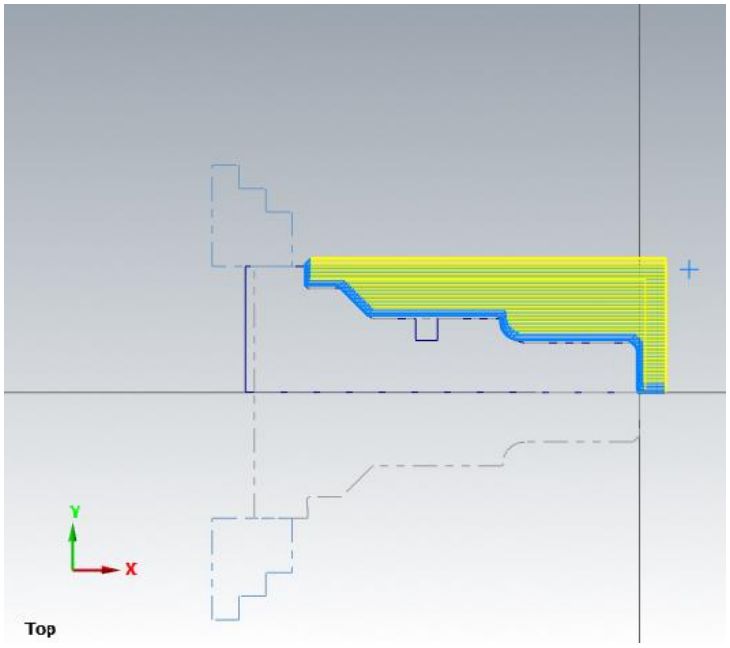

Fig. No. 4 Turning Operation

4. Grooving Operation:

- From the Main Menu, select Toolpaths > Groove
- In the chaining window, click on 'Chain'.
- Select the same chain as in the rough turning operation.
- Click on 'OK'.
- In 'Lathe Groove Properties', select a suitable grooving tool.
- Under the 'Groove Parameters' tab, remain the value as it is.

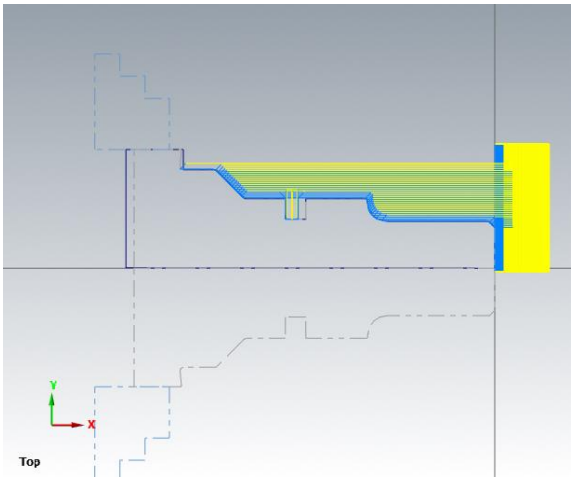

Fig. No. 5 Grooving Operation

5. <u>Threading Operation:</u>

- Under the Main Menu, select Tool paths > Thread.
- In 'Lathe Threading Properties', select a suitable roughing tool.
- Under thread shape parameters, enter the following parameters:
  i. Lead = 10 threads/inch Included angle = 60
  ii. Enter thread angle = 30 Major diameter = 40
  iii. Minor diameter = 38
- Select 'Start Position' and select the start point of the thread on the sketch.
- Select 'End Position' and select the end point of the thread on the sketch.
- Click on 'OK'

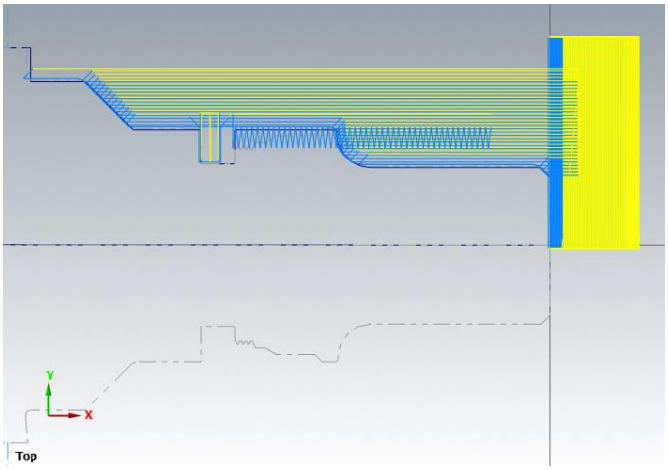

Fig. No. 6 Threading Operation

6. Drilling Operation:

- Under the Main Menu, select Toolpaths > Drill.
- In 'Lathe Drill Properties', enter the 'Toolpath Parameters' tab.
- Select Drilling Tool > Define Tool.
- Under the 'Tool Geometry' tab, enter the required values for tool diameter, tool length, etc.
- Under the 'Holders' tab, enter suitable values for the dimensions of the holder.
- Click on 'OK'.
- Select the 'Simple Drill-No Peck' tab.
- Enter the 'Depth Value" as '-10'.
- Select 'Drill Point' and select the entry point of the drill from the sketch.
- Click on 'OK'.

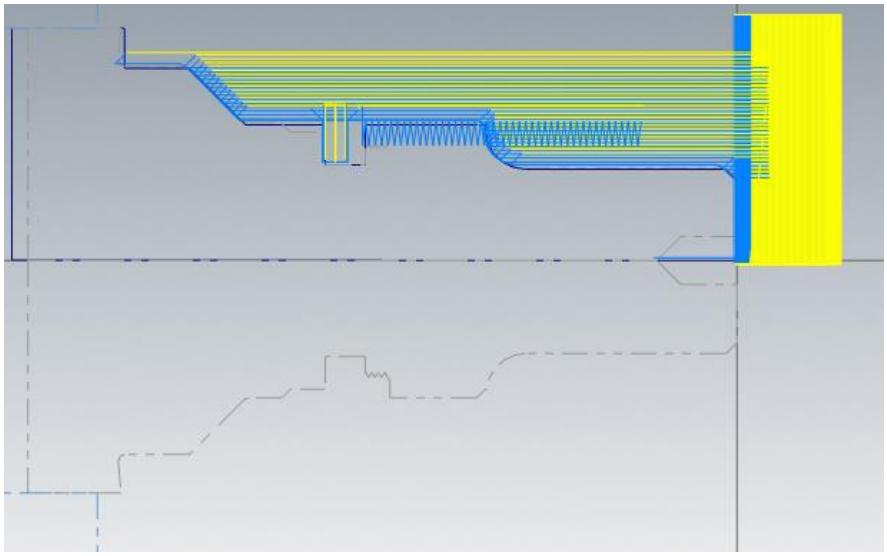

Fig. No. 7 Drilling Operation

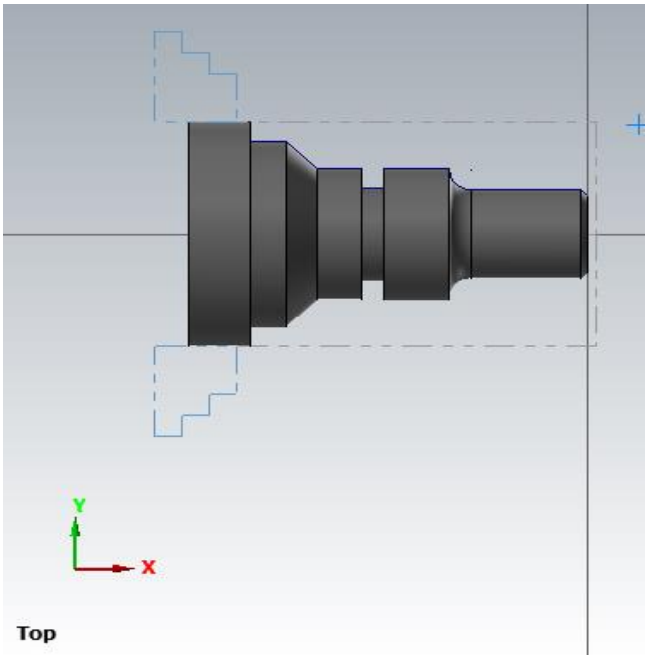

Fig. No. 8: 3D Geometry of Component

NC Part Program

```
%
O0000
(PROGRAM NAME - EXP 5)
(DATE=DD-MM-YY - 13-09-17 TIME=HH:MM - 12:53)
(MCX FILE - Z:\EXP 5.EMCX-9)
(NC FILE - C:\USERS\VAIDEHI.ADIVEREKAR\DESKTOP\EXP 5.NC)
(MATERIAL - ALUMINUM MM - 2024)
G21
(TOOL - 1 OFFSET - 1)
(OD ROUGH RIGHT - 80 DEG.  INSERT - CNMG 12 04 08)
G0T0101
G18
G97 S1442M03
G0 G54 X60.704Z11.39
G50 S3600
G96 S275
G99 G1X-1.6F.25
```

```
G0Z13.39
X60.704
G0Z12.594
X60.704
Z-49.829
X24.1Z-49.737
G0X37.143
Z-52.819
G0X37.143
```

```
G28 U0.V0.W0.M05
T4100
M01
(TOOL - 96 OFFSET - 96)
(OD THREAD RIGHT- LARGE INSERT - R166.0G-16MM01-200)
G0T9696
G18
M05
G0 G54 X38.Z-20.464
G76 P010029 Q0 R0
G76 X28.Z-46.404 P30000 Q13107 R0.F.8
G28 U0.V0.W0.
T9600
M01
(TOOL - 111 OFFSET - 111)
(SPOT TOOL  6. DIA.)
G0T11211
G18
G97 S1094M03
G0 G54 X0.Z5.
Z2.
G1Z-10.F.05
G0Z5.
G28 U0.V0.W0.M05
T11100
M30
%
```

2 JOB or Workpiece

Problem Definition:-

Write NC part program to generate the profile as shown in fig. Assume suitable data for feedand speed etc. All dimensions are in mm.

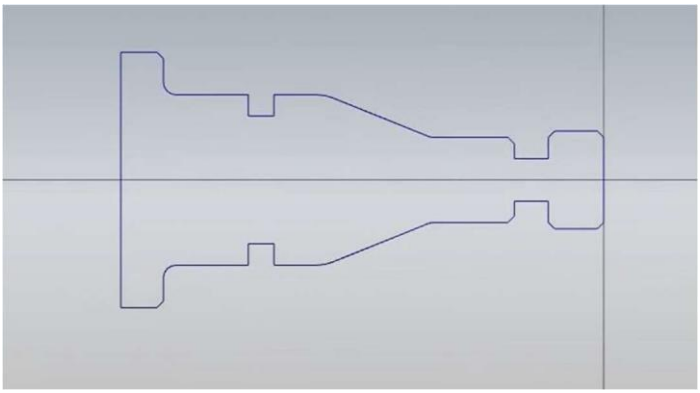

Fig No. 1

Procedure

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- Select the bottom right & top left corners of the sketch.
- Increase ‘Length’ from 83 to 85 and change ‘Position along Z-axis’ to 2 (to allow facing operation).
- Click on ‘OK’.
- Under the section ‘Chuck Jaws’, select ‘Properties’.
- Select ‘Make from two points’.
- Select 2 appropriate points as the chuck location.
- Click on ‘OK’

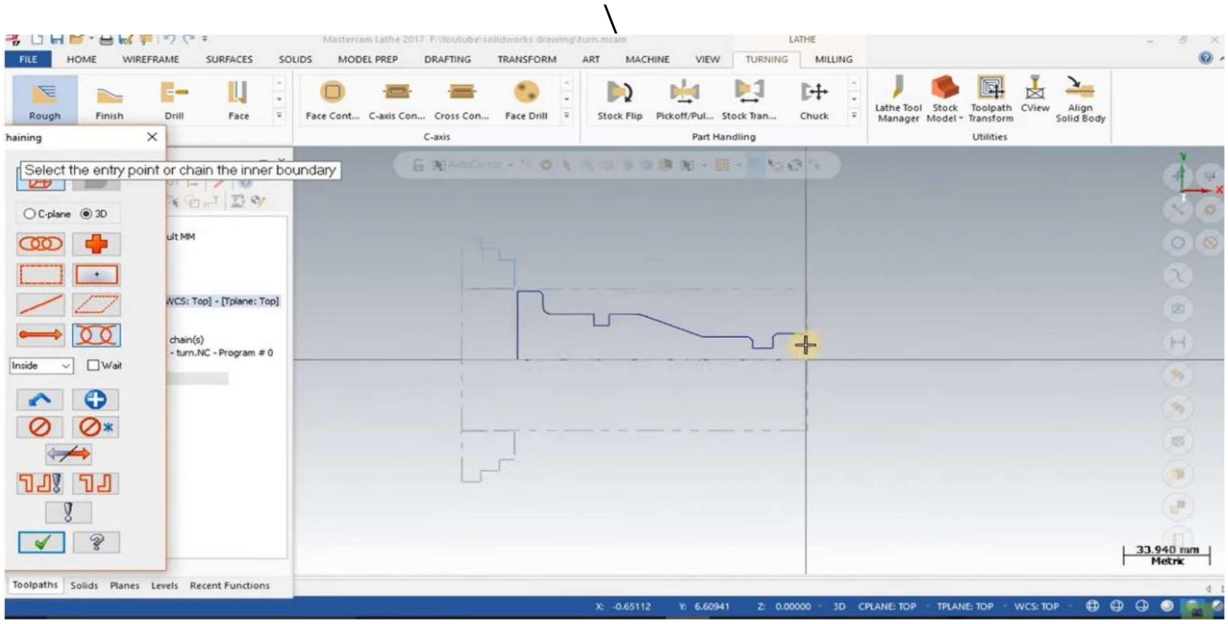

Fig. No.2 Stock Setup

2. Facing Operation

- From the Main Menu, select Toolpaths > Facing.
- Enter an arbitrary name under ‘T and click ‘OK’
- In ‘Lathe Facing Properties’, select a suitable tool.
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- Select the boundary corner points on the stock which is to be removed by facing.
- Check ‘Rough Stepover’ and enter value as ‘0.1’
- Click on ‘OK’.

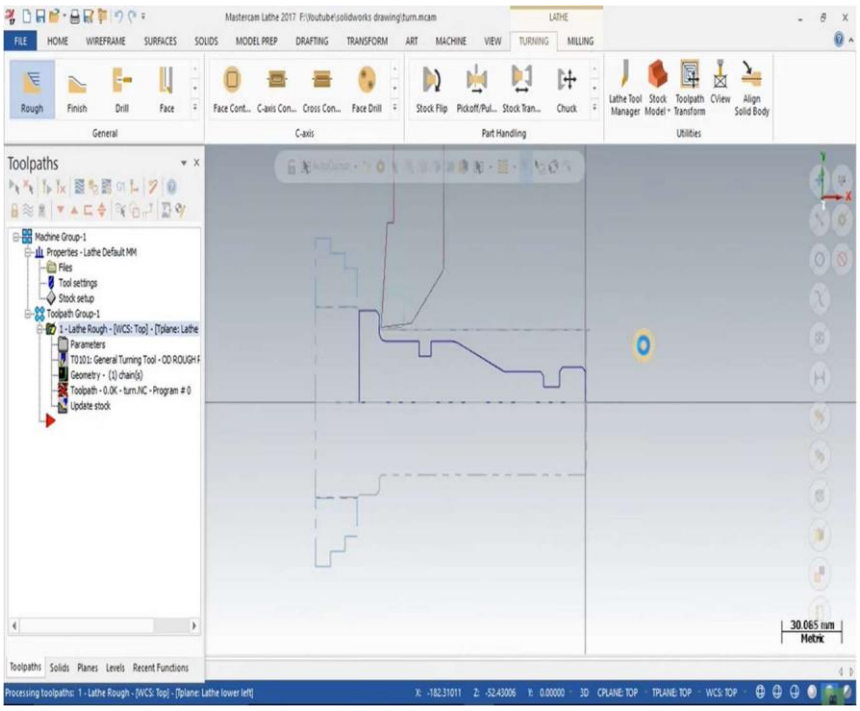


Fig. No. 3 Facing Operation

3. Rough Turning Operation

- From the Main Menu, select Toolpaths > Rough.
- In the chaining window, click on 'Chain'.
- Select the entry point and exit point of the tool from the sketch.
- Click on 'OK'.
- In 'Lathe Rough Properties', select a suitable roughing tool.
- Under the 'Rough Parameters' tab, enter the value for depth of cut as '0.5' and check 'Equal Steps'.
- Click on 'OK'.

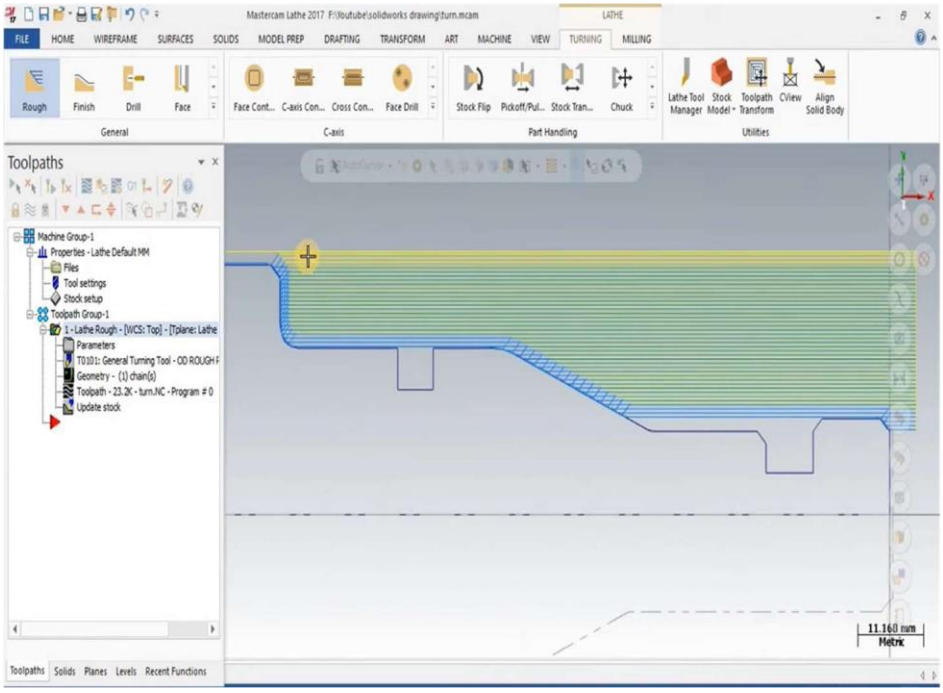


Fig. No. 4 Turning Operation

4. Drilling Operation

- Under the Main Menu, select Toolpaths > Drill.
- In 'Lathe Drill Properties', enter the 'Toolpath Parameters' tab.
- Select Drilling Tool > Define Tool.
- Under the 'Tool Geometry' tab, enter the required values for tool diameter, tool length, etc.
- Under the 'Holders' tab, enter suitable values for the dimensions of the holder.
- Click on 'OK'.
- Select the 'Simple Drill-No Peck' tab.
- Enter the 'Depth Value" as '-10'.
- Select 'Drill Point' and select the entry point of the drill from the sketch.
- Click on 'OK'.

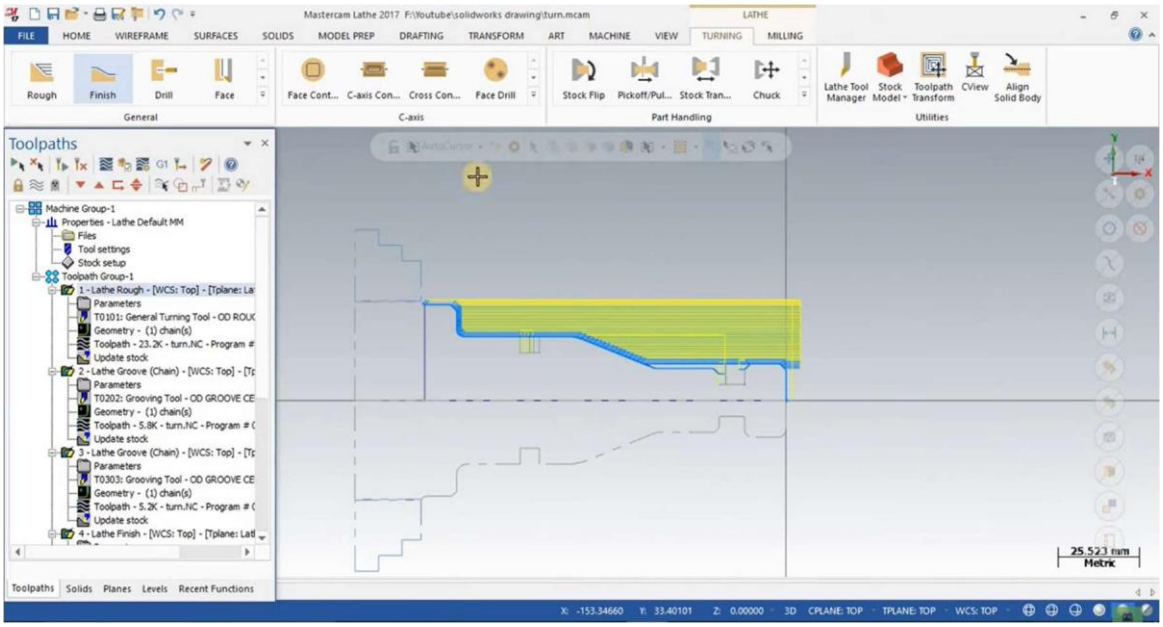


Fig. No. 5 Drilling Operation

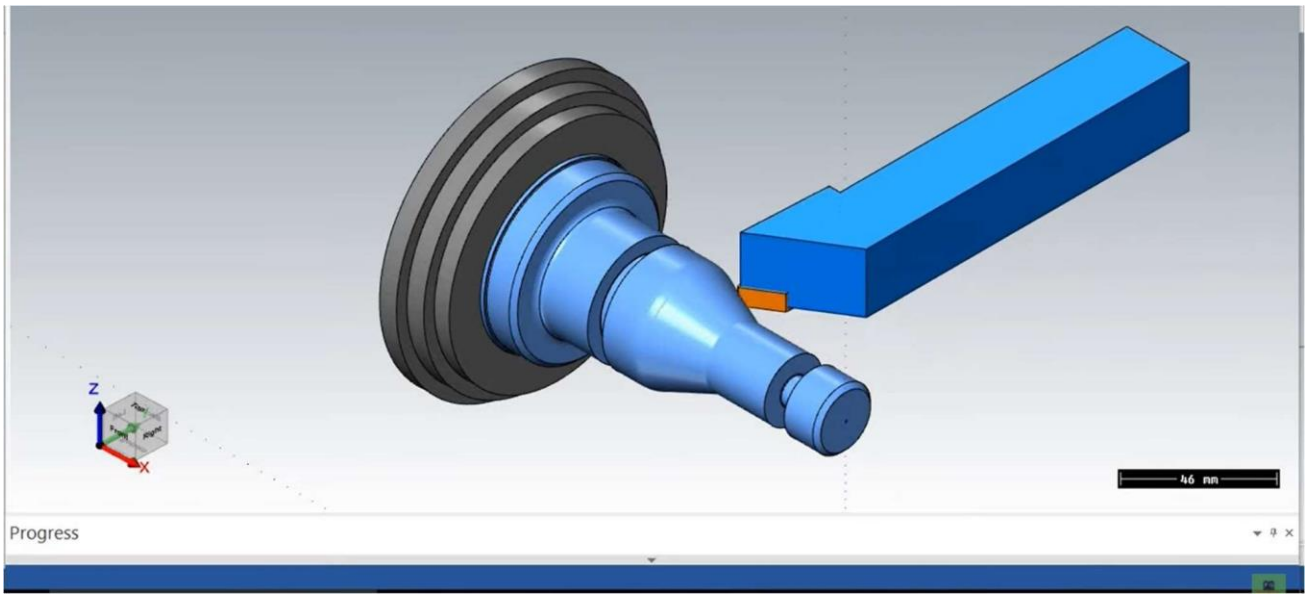
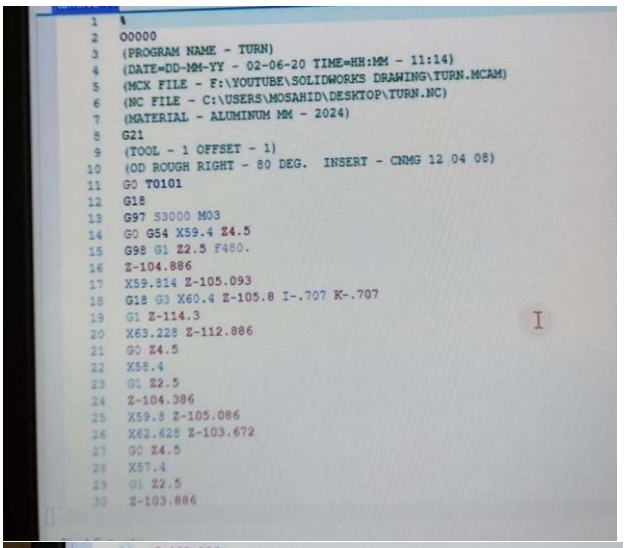
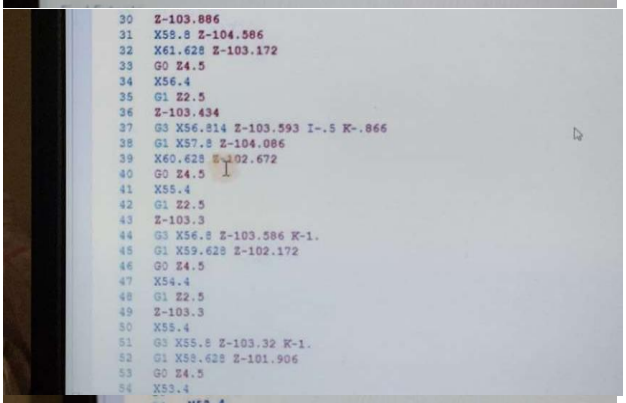


Fig. No. 6: 3D Geometry of Component

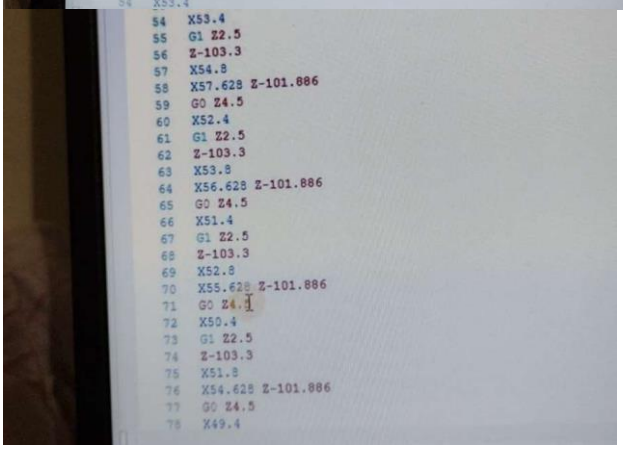
CNC Programing Parts:



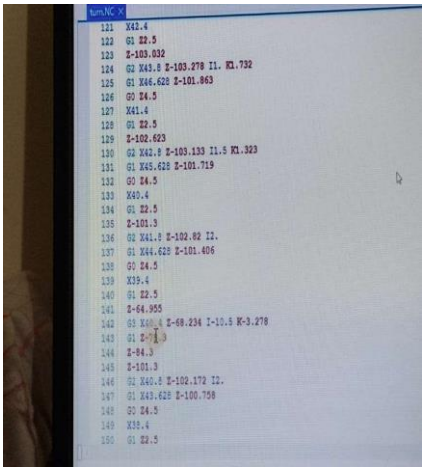
```
%
O0000
(PROGRAM NAME - TURN)
(DATE=DD-MM-YY - 02-06-20 TIME=HH:MM - 11:14)
(MCX FILE - F:\YOUTUBE\SOLIDWORKS DRAWING\TURN.MCAM)
(NC FILE - C:\USERS\MOSAHID\DESKTOP\TURN.NC)
(MATERIAL - ALUMINUM MM - 2024)
G21
(TOOL - 1 OFFSET - 1)
(OD ROUGH RIGHT - 80 DEG.  INSERT - CNMG 12 04 08)
G0 T0101
G18
G97 S3000 M03
G0 G54 X59.4 Z4.5
G98 G1 Z2.5 F480.
Z-104.886
X59.814 Z-105.093
G18 G3 X60.4 Z-105.8 I-.707 K-.707
G1 Z-114.3
X63.228 Z-112.886
G0 Z4.5
X58.4
G1 Z2.5
Z-104.386
X59.8 Z-105.086
X62.628 Z-103.672
G0 Z4.5
X57.4
G1 Z2.5
Z-103.886
```



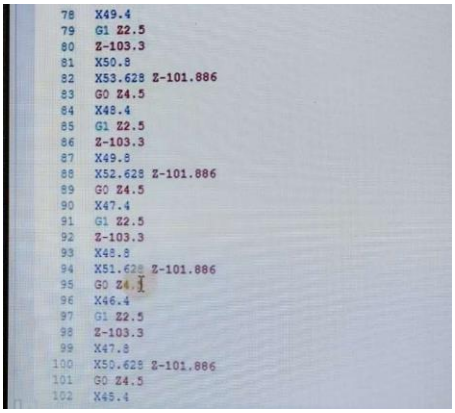
```
Z-103.886
X58.8 Z-104.586
X61.628 Z-103.172
G0 Z4.5
X56.4
G1 Z2.5
Z-103.434
G3 X56.814 Z-103.593 I-.5 K-.866
G1 X57.8 Z-104.086
X60.628 Z-102.672
G0 Z4.5
X55.4
G1 Z2.5
Z-103.3
G3 X56.8 Z-103.586 K-1.
G1 X59.628 Z-102.172
G0 Z4.5
X54.4
G1 Z2.5
Z-103.3
X55.4
G3 X55.8 Z-103.32 K-1.
G1 X58.628 Z-101.906
G0 Z4.5
X53.4
```



```
X53.4
G1 Z2.5
Z-103.3
X54.8
X57.628 Z-101.886
G0 Z4.5
X52.4
G1 Z2.5
Z-103.3
X53.8
X56.628 Z-101.886
G0 Z4.5
X51.4
G1 Z2.5
Z-103.3
X52.8
X55.628 Z-101.886
G0 Z4.5
X50.4
G1 Z2.5
Z-103.3
X51.8
X54.628 Z-101.886
G0 Z4.5
X49.4
```



```
X42.4
G1 Z2.5
Z-103.032
G2 X43.8 Z-103.278 I1. K1.732
G1 X46.628 Z-101.863
G0 Z4.5
X41.4
G1 Z2.5
Z-102.623
G2 X42.8 Z-103.133 I1.5 K1.323
G1 X45.628 Z-101.719
G0 Z4.5
X40.4
G1 Z2.5
Z-101.3
G2 X41.8 Z-102.82 I2.
G1 X44.628 Z-101.406
G0 Z4.5
X39.4
G1 Z2.5
Z-64.955
G3 X40.4 Z-68.234 I-10.5 K-3.278
G1 Z-91.3
Z-84.3
Z-101.3
G2 X40.8 Z-102.172 I2.
G1 X43.628 Z-100.758
G0 Z4.5
X38.4
G1 Z2.5
```



```
X49.4
G1 Z2.5
Z-103.3
X50.8
X53.628 Z-101.886
G0 Z4.5
X48.4
G1 Z2.5
Z-103.3
X49.8
X52.628 Z-101.886
G0 Z4.5
X47.4
G1 Z2.5
Z-103.3
X48.8
X51.628 Z-101.886
G0 Z4.5
X46.4
G1 Z2.5
Z-103.3
X47.8
X50.628 Z-101.886
G0 Z4.5
X45.4
```