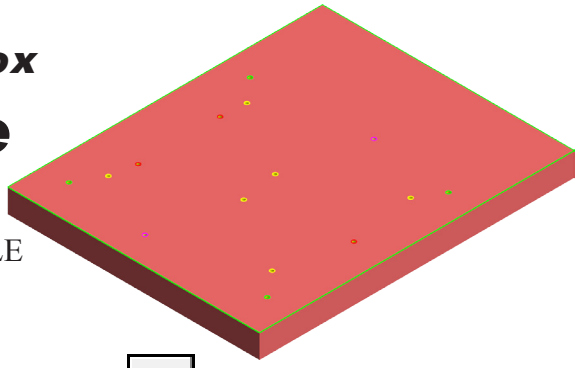
Jewelry Box
Fixture



A. Sketch Fixture Rectangle.

Step 1. If necessary start a new Mastercam file, click FILE Menu > New .

Step 2. Click CREATE Menu > Rectangle or click Rectangle Tool in toolbar.

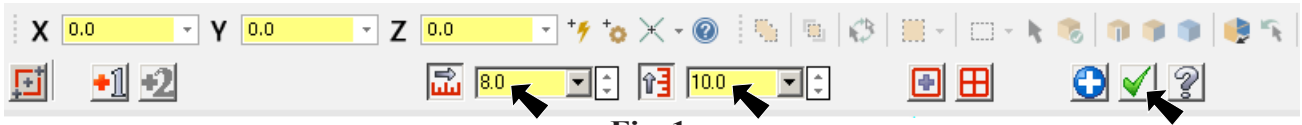


Fig. 1

Step 3. In the Rectangle ribbon bar set:

Width **8** **Fig. 1**

Height **10**

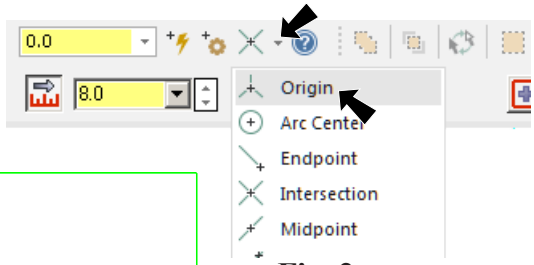


Fig. 2

Step 4. Click the down arrow in Auto Cursor ribbon bar and click Origin to place rectangle, **Fig. 2**.

Step 5. Click OK in ribbon bar to fix rectangle and close ribbon bar, **Fig. 1** and **Fig. 3**.

Step 6. Fit (**Alt-F1**).

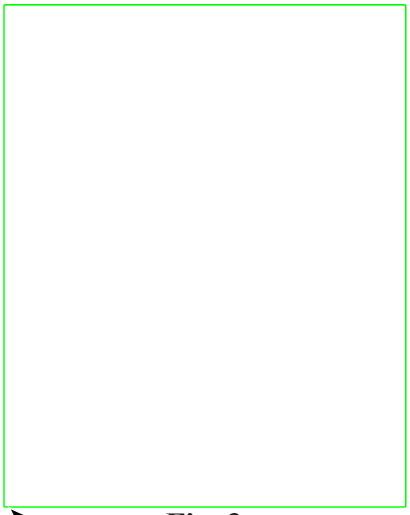


Fig. 3

B. Save As "FIXTURE"

Step 1. Click FILE Menu > Save As.

Step 2. Key-in **FIXTURE** for the filename and press ENTER.

C. Extrude Solid.

Step 1. Change to Isometric View (**Alt-7**).

Step 2. Click SOLIDS Menu > Extrude.

Step 3. Click Chain in Chaining dialog box, **Fig. 4**.

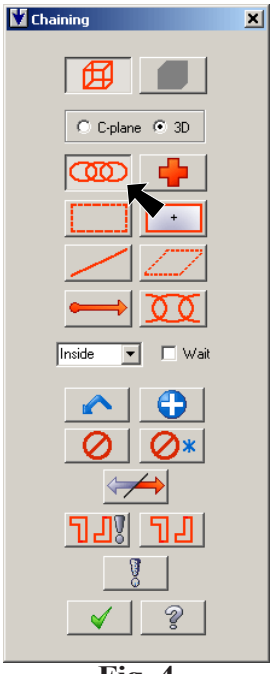


Fig. 4

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http://www.cudacountry.net email:cudacountry@hotmail.com

Step 4. Click a **line of rectangle** to chain, **Fig. 5**.

Step 5. Click OK in Chaining dialog box.

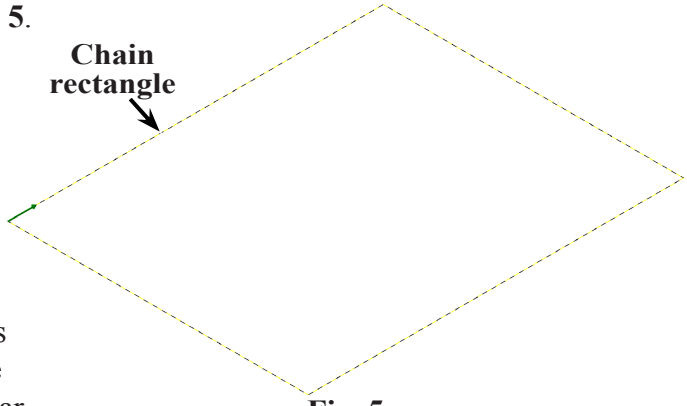


Fig. 5

Step 6. In Extrude Chain dialog box:
Select **Create Body**, **Fig. 6**
Set **Distance .75**
The direction arrow on chain points in the direction of extrude, **Fig. 7**. The direction arrow should **point down**, if arrow points in opposite direction click **Reverse direction** , **Fig. 6**.
Click OK .

Step 7. Fit **(Alt-F1)**.

Step 8. Use **F9** to toggle Origin/ Axis display on and off to confirm Origin, **Fig. 8**.

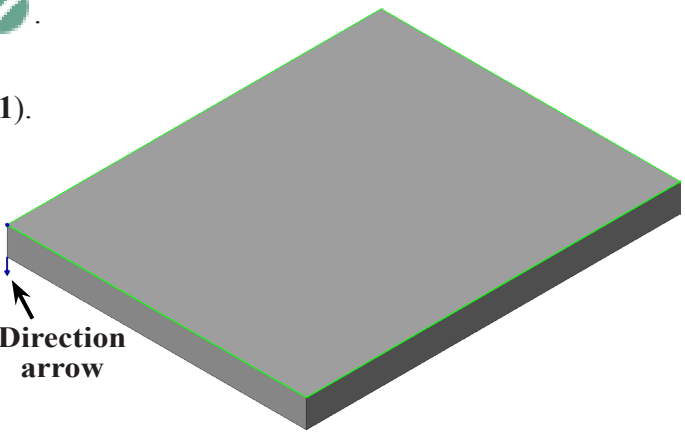


Fig. 7

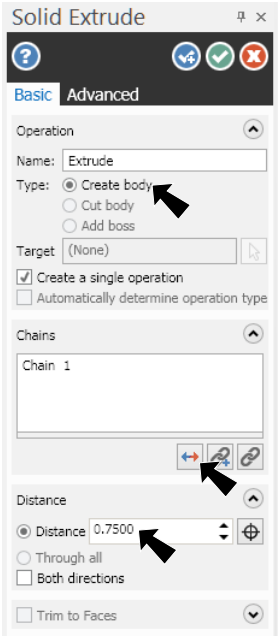


Fig. 6

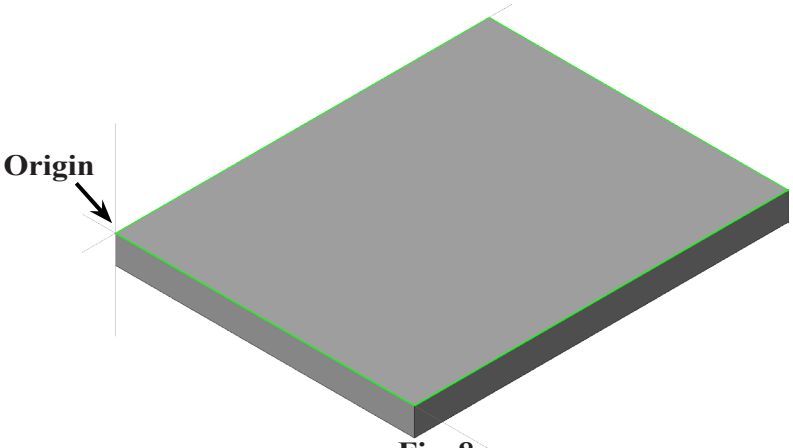


Fig. 8

D. Circles.

Step 1. Change to Top View (**Alt-1**).

Step 2. Confirm Wireframe color in Status Bar at bottom of screen is **green** (**10**), **Fig. 8**.

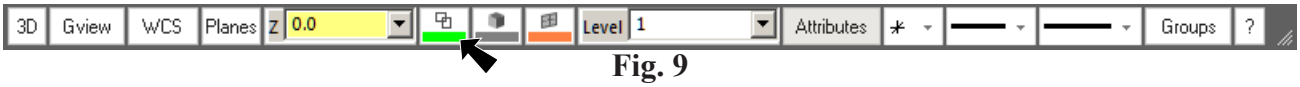


Fig. 9

Step 3. Click CREATE Menu > Arc > Circle Center Point.

Step 4. Key-in **.125 for diameter** and click Diameter to **lock**, **Fig. 10**. The field turns red when locked.

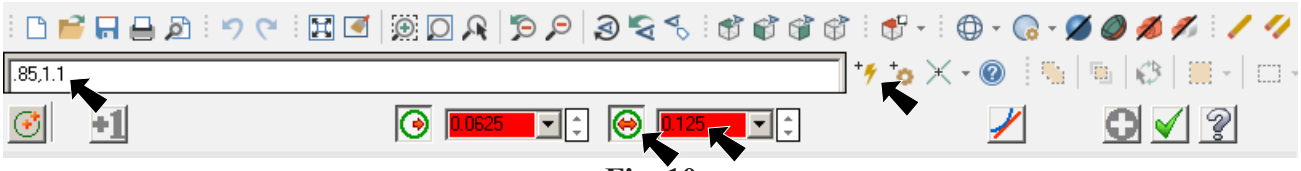


Fig. 10

Step 5. Click Fast Point (**spacebar**) to the right of the X, Y, and Z fields in Auto Cursor ribbon bar, **Fig. 10**.

Step 6. Key-in the X, Y coordinates into the Fast Point long field and press **ENTER** after keying in coordinate. Then, press **spacebar** to enter next coordinates, **Fig. 10** and **Fig. 11**.

Stock Screw Holes
.85, 1.1
7.15, 1.1
.85, 6.85
7.15, 6.85
press ENTER twice

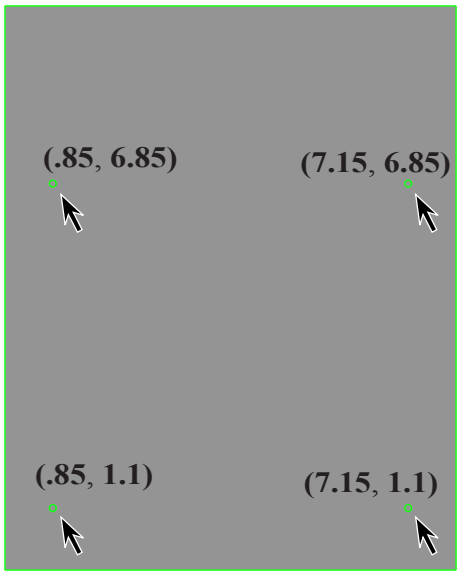


Fig. 11

Step 7. Click Wireframe color in Status Bar at bottom of screen. Key-in **12 for red** color number and press ENTER.

Step 8. Key-in the X, Y coordinates into the Fast Point
Base Screw Holes, **Fig. 12**
1.45, 2.7
7, 4
1.45, 5.3
press ENTER twice

Step 9. Click Wireframe color in Status Bar at bottom of screen. Key-in **14 for yellow** color number and press ENTER.

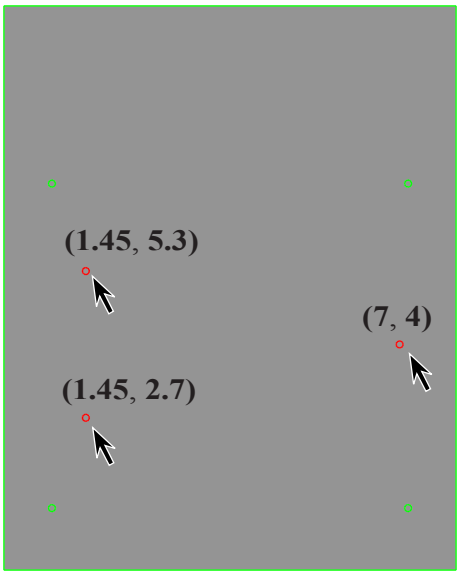


Fig. 12

Step 10. Key-in the X, Y coordinates into the Fast Point
Lid Screw Holes, **Fig. 13**
1.3, 1.9
4.1, 3.4
6.5, 1.9
1.5, 6.1
3.9, 4.6
6.7, 6.1
press ENTER twice

Step 11. Click Wireframe color in Status Bar. Key-in **13 for magenta** color number and press ENTER.

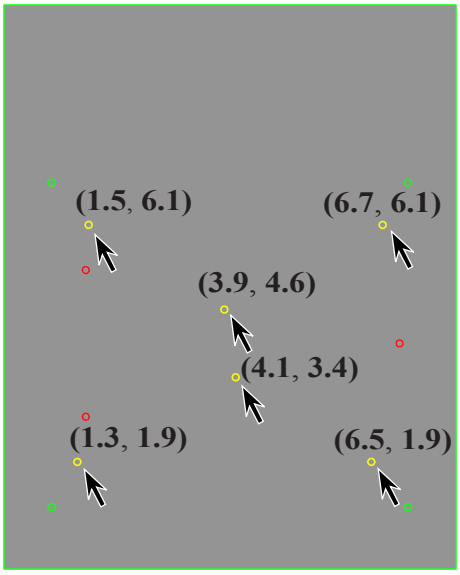


Fig. 13

Step 12. Key-in the X, Y coordinates into the Fast Point
Pin Holes, **Fig. 14**
3.5, .865
4.5, 7.135
Click OK in ribbon bar to fix circle and close ribbon bar.

Step 13. Save (**Alt-F S**).

Tip:
Use ANALYZE Menu > Entity Properties to confirm circle coordinates.

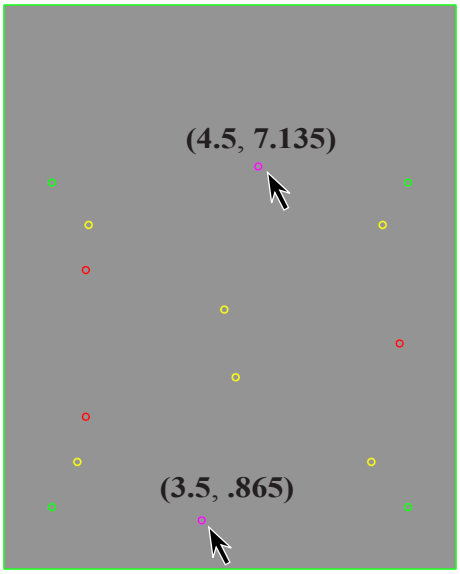
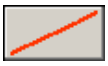


Fig. 14

E. Cut Pin Holes.

Step 1. Change to Isometric View (**Alt-7**).

Step 2. Click SOLIDS Menu > Extrude.

Step 3. Click Single  in Chaining dialog box, **Fig. 15**.

Step 4. Click **both Pin holes (magenta)** to chain, **Fig. 16**.

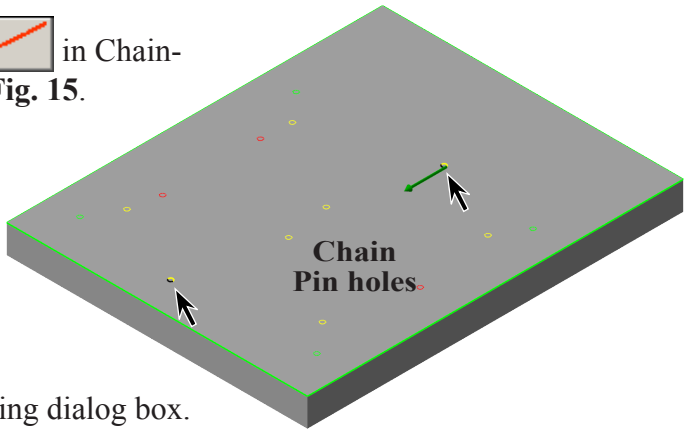


Fig. 16

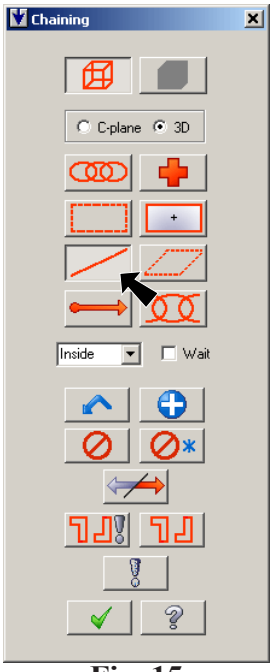


Fig. 15

Step 5. Click OK in Chaining dialog box.

Step 6. In Extrude dialog box, **Fig. 17**
Select **Cut Body**
Select **Distance**
Set **Distance .375**

The direction arrows on Extrude cut chain indicates direction of extrude cut, **Fig. 18**. The chain direction arrow should **point down**, if arrow points in opposite direction click **Reverse direction** , **Fig. 17**.

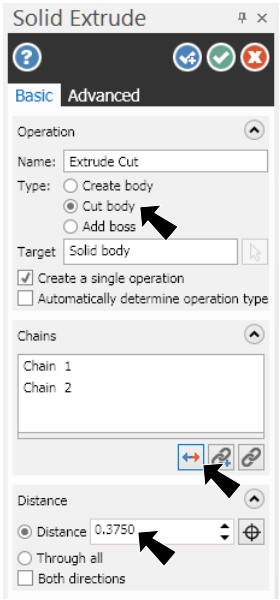


Fig. 17

Click **OK and Create New Operation** .

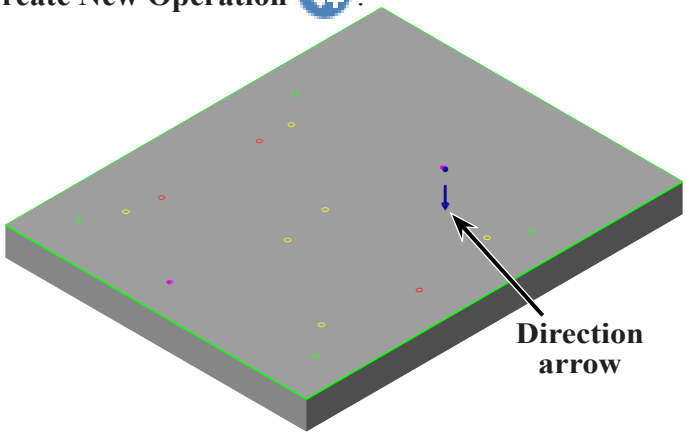


Fig. 18

F. Cut Screw Holes.

Step 1. Click Polygon in Chaining dialog box.

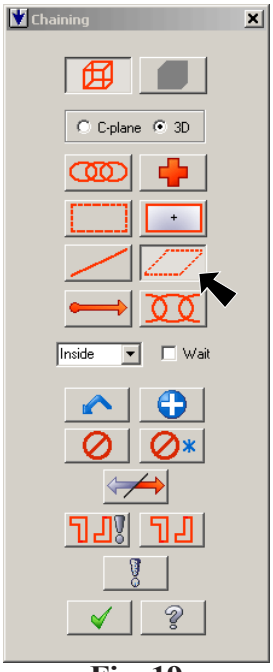


Fig. 19

Step 2. Create a polygon selection around all circles except Pin holes, **Fig. 20**. To make the selection, click the positions 1 thru 6 to surround the all circles except Pin circles with a polygon. Try starting at Position 1 and working around. Double click or press ENTER to end selection.

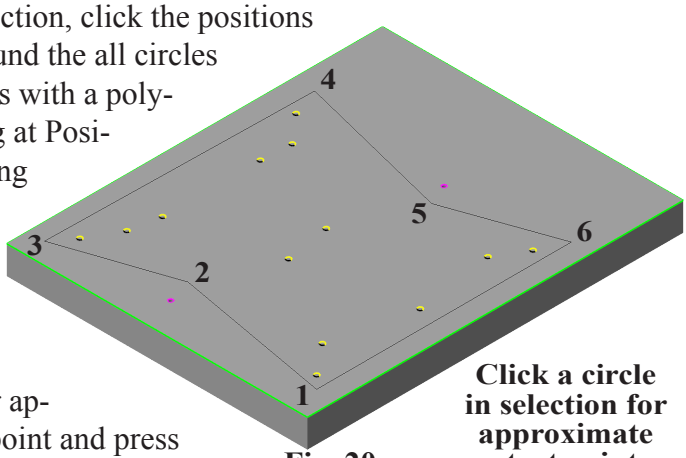


Fig. 20

Click a circle in selection for approximate start point

Step 3. Click a circle for approximate start point and press ENTER, **Fig. 20**.

Step 4. Click OK in Chaining dialog box.

Step 5. In Extrude dialog box, **Fig. 21**

Select **Cut Body**

Select **Distance**

Set **Distance .7**

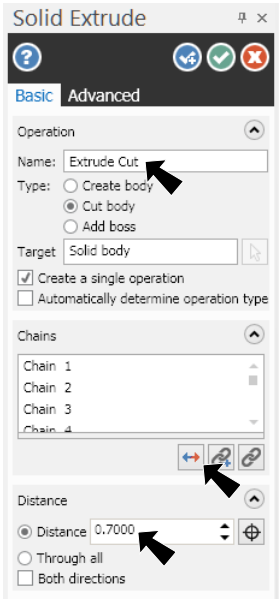


Fig. 21

The direction arrow should **point down**, **Fig. 22**.

Click OK .

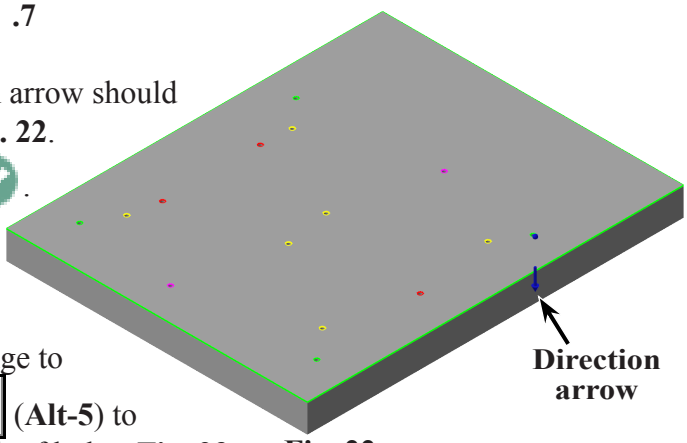


Fig. 22

Step 6. Turn **on** Wireframe (**Alt-S**) and change to Right View (**Alt-5**) to confirm the depth of holes, **Fig. 23**.

Step 7. Turn **on** Shading (**Alt-S**).

Step 8. Save (**Alt-F S**).

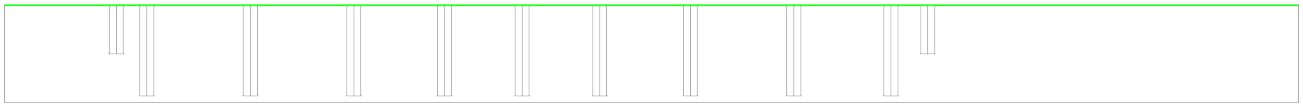


Fig. 23

G. Create TOP CUT WCS.

Step 1. Change to Isometric View (**Alt-7**).

Step 2. Click **WCS** in the Status Bar at the bottom of the graphics area and **Plane Manager** from the menu, **Fig. 24**.

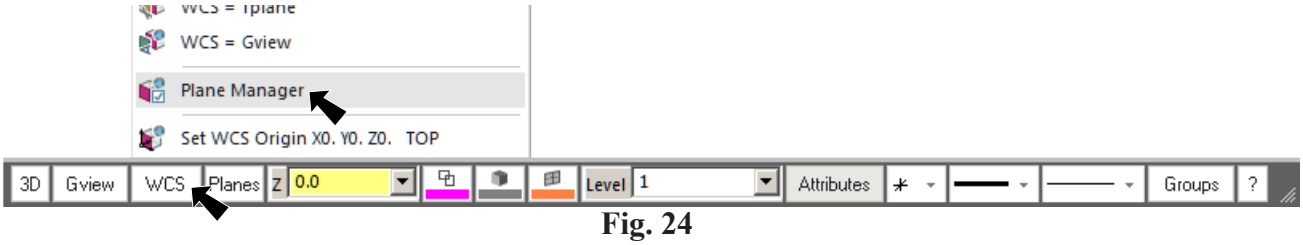


Fig. 24

Step 3. Click **Top plane** in the list of names and click **Copy** button in the Plane Manager dialog, **Fig. 25**.

Step 4. Rename Top-1 to **TOP CUT**. To rename, double click the plane name and key-in the new name, **Fig. 26**.

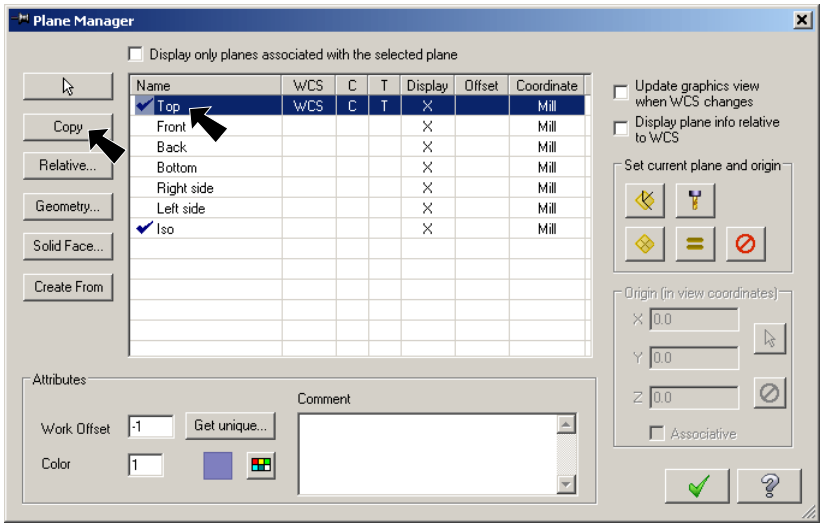


Fig. 25

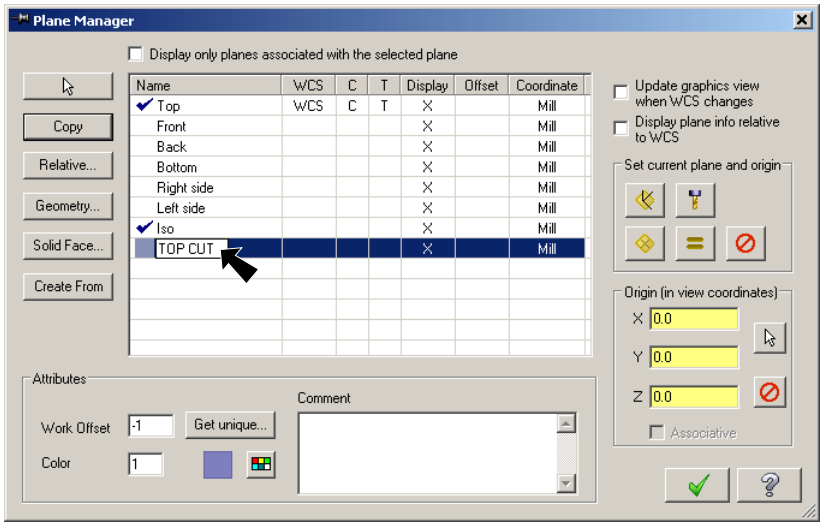


Fig. 26

Step 5. Set:

Origin X 4
Origin Y 4
Origin Z 0
Fig. 27.

Step 6. Click **Set All** button , **Fig. 27**.

Step 7. Confirm the TOP CUT origin, **Fig. 28**.

Don't click OK.

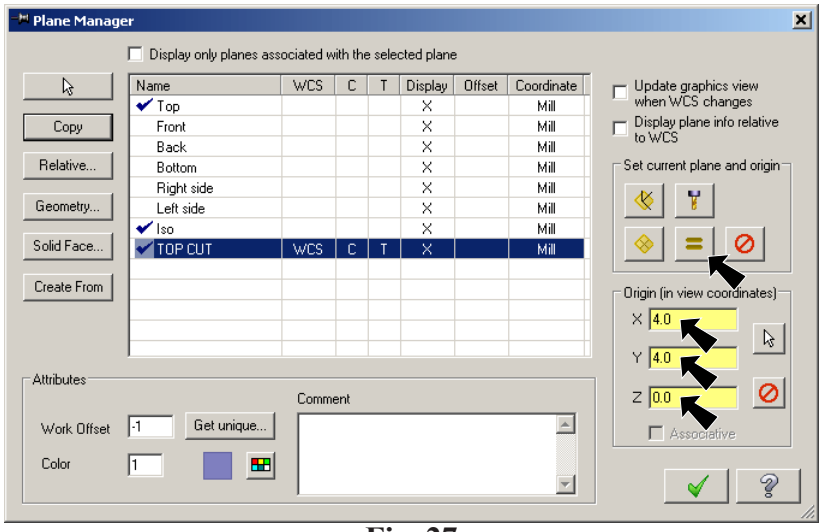


Fig. 27

H. Create BOTTOM CUT WCS.

Step 1. Click **Bottom plane** in the list of names and click **Copy** button in the Plane Manager dialog, **Fig. 29**.

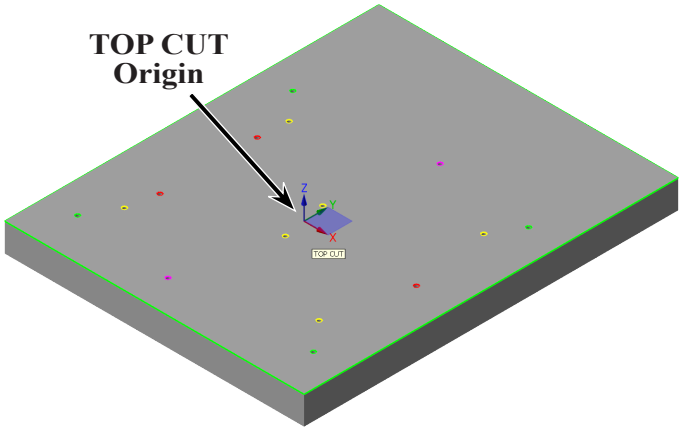


Fig. 28

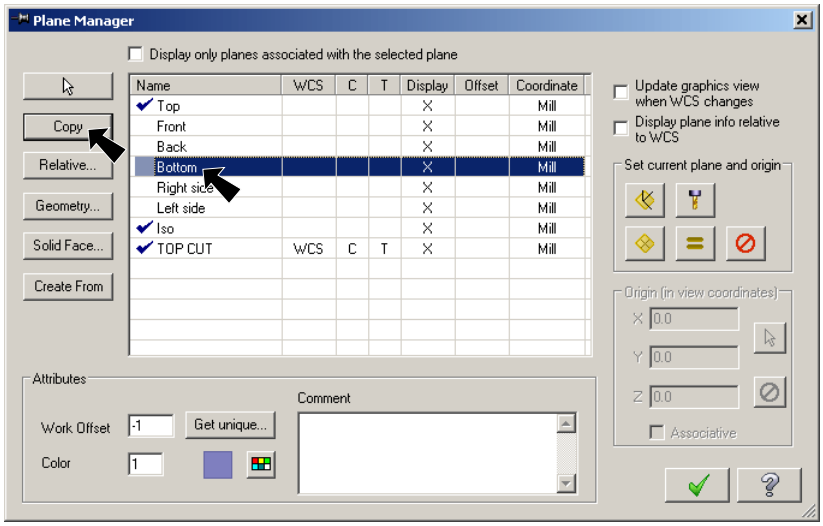


Fig. 29

Step 2. Rename Bottom-1 to **BOTTOM CUT**. To rename, double click the plane name and key-in the new name, **Fig. 30**.

Step 3. Set:
Origin X -4
Origin Y 4
Origin Z .75
Fig. 31.

Step 4. Change to Isometric View (**Alt-7**).

Step 5. Click **Set All** button , **Fig. 31**.

Step 6. Confirm the BOTTOM CUT origin, **Fig. 32**.

Step 7. Click OK .

Step 8. Save . Use **Alt-F S**.

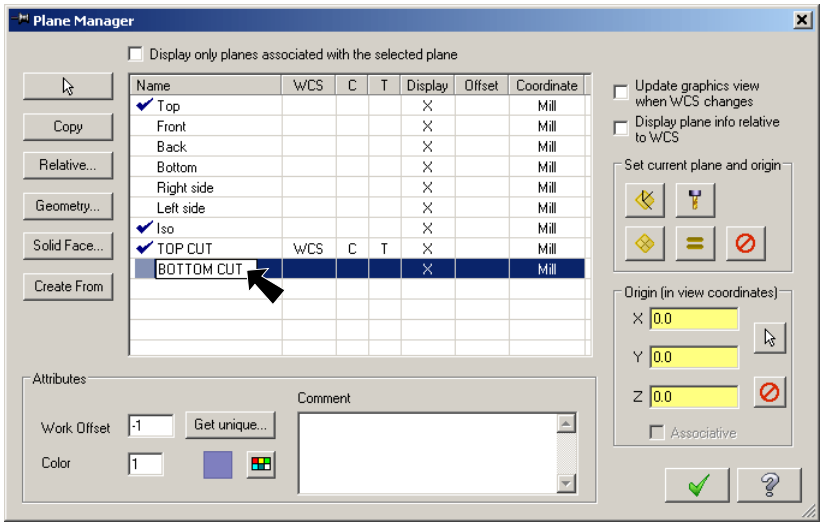


Fig. 30

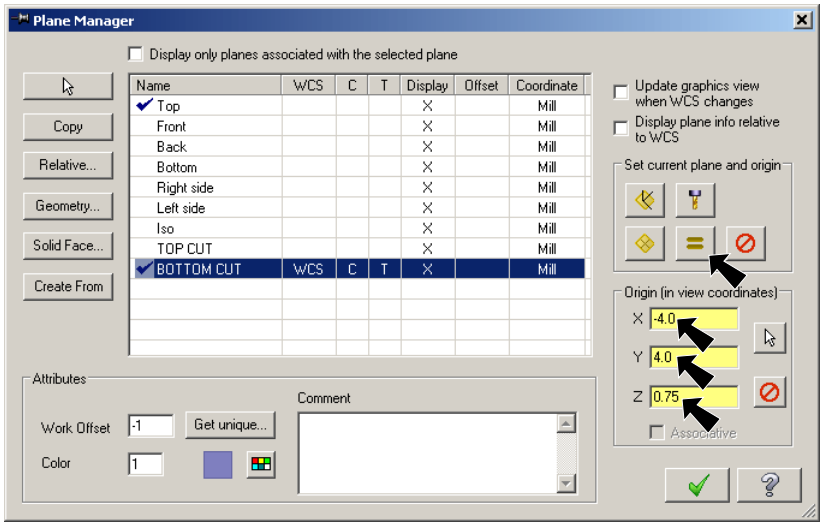


Fig. 31

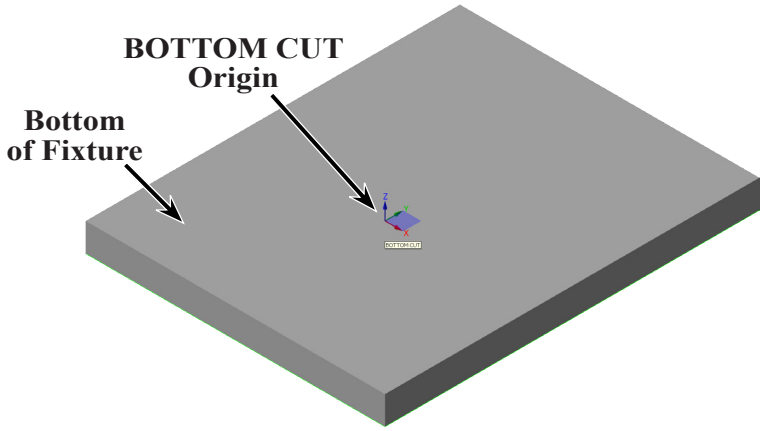


Fig. 32

I. Create Bottom Cut Rectangle.

Step 1. Click Wireframe color in Status Bar. Key-in **10 for green** color number and press ENTER.

Step 2. Click CREATE Menu > Rectangular Shapes.

Step 3. In Rectangular Shapes Options set:

Base Point **Fig. 33**

Width **7**

Height **7.25**

Click **center Anchor point**

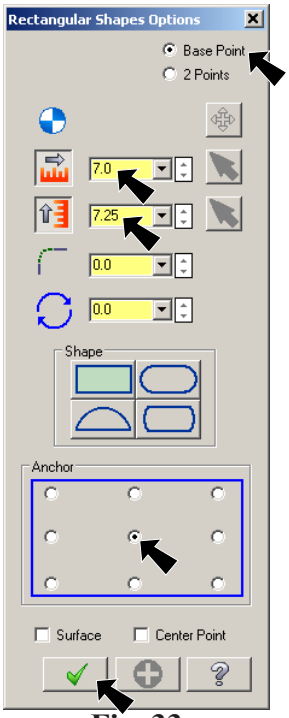


Fig. 33

Step 4. Click down arrow in Auto Cursor ribbon bar and click **Origin** to place rectangle, **Fig. 34** and **Fig. 35**.

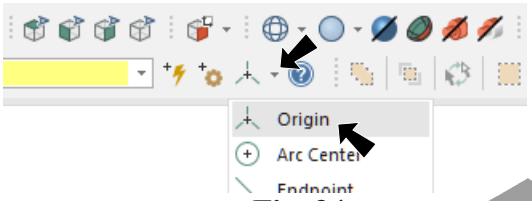


Fig. 34

Click OK Rectangular Shapes dialog box to fix rectangle and close dialog box.

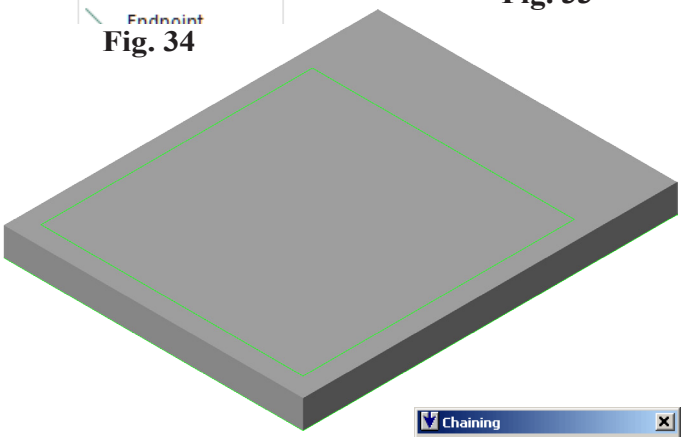


Fig. 35

Step 5. Save . Use **Alt-F S**.

J. Cut Pocket.

Step 1. Click SOLIDS Menu > Extrude.

Step 2. Click Chain in Chaining dialog box, **Fig. 36**.

Step 3. Click **rectangle** to chain, **Fig. 37**.

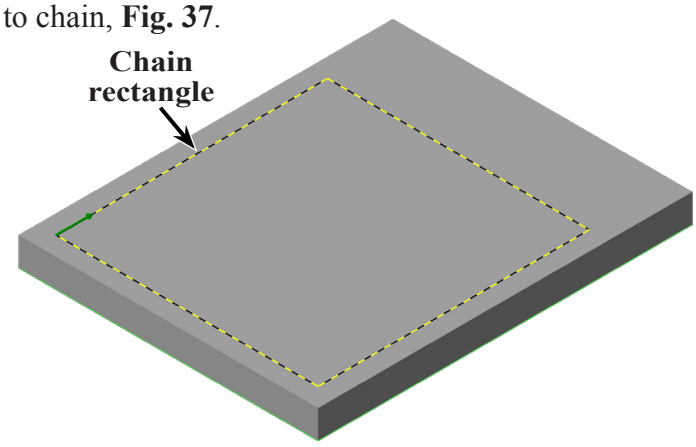


Fig. 37

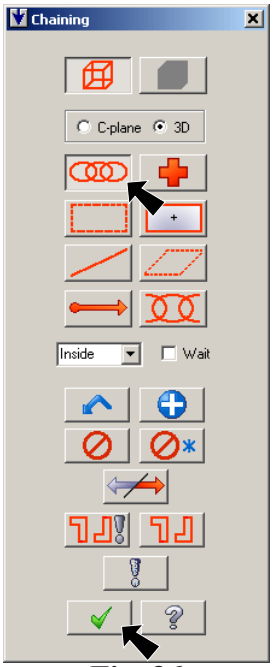


Fig. 36

Step 4. Click OK in Chaining dialog box.

Step 5. In Extrude dialog box, **Fig. 38**
Select **Cut Body**
Select **Distance**
set **Distance .15**

The direction arrows on Extrude cut chain indicates direction of extrude cut, **Fig. 39**. The chain direction arrow should **point down**, if arrow points in opposite direction click **Reverse direction** , **Fig. 38**. Click OK .

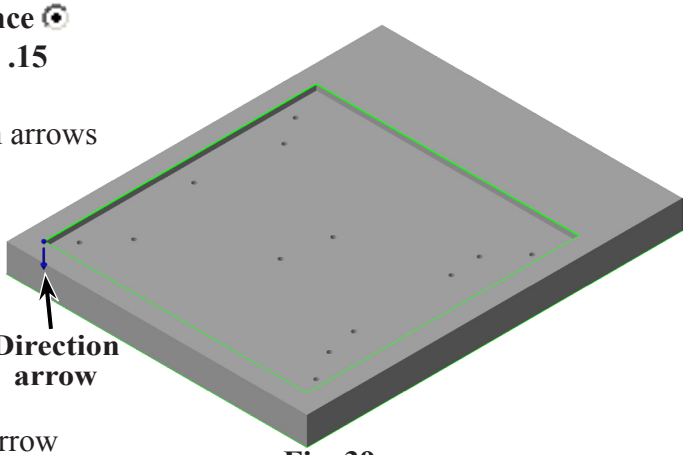


Fig. 39

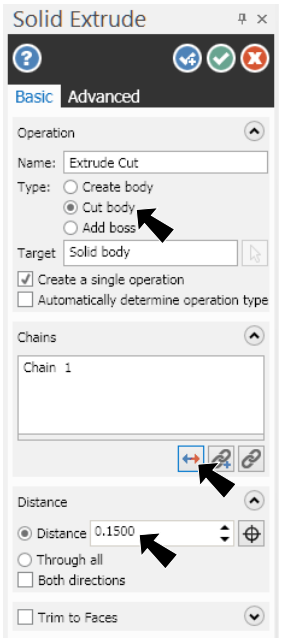


Fig. 38

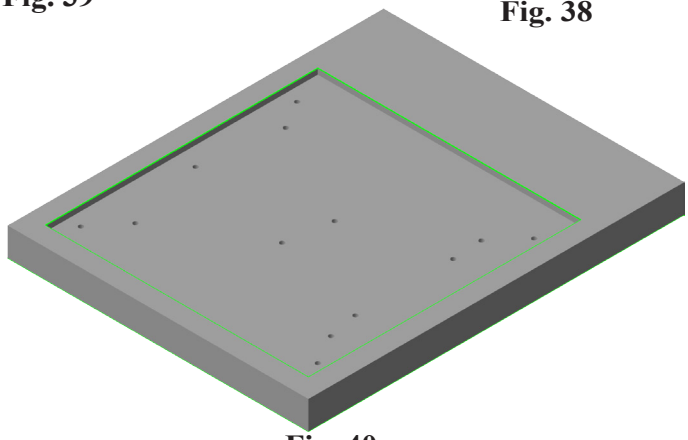


Fig. 40

Step 6. Save (**Alt-F S**).

K. Machine Type and Stock Setup.

Step 1. If necessary, display Toolpaths Manager. Use **Alt-O**.

Step 2. If a Machine Group is **not** displayed in the Toolpaths Manager, **Fig. 41**, click MACHINE TYPE Menu > Mill > Default.

Step 3. Expand **Properties** (click the +) in the Toolpaths Manager and click **Stock Setup** in the Toolpaths Manager, **Fig. 41**.

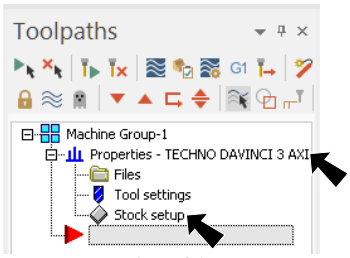


Fig. 41

Step 4. Confirm Stock Plane is **Top**, **Fig. 42**.

Step 5. Confirm **Display** is checked.

Step 6. Click **All Entities** button in the Stock Setup.

Step 7. Confirm X, Y and Z stock dimensions:
X 8
Y 10
Z .75

Step 8. Confirm Stock Origin coordinates:
X 4
Y 5
Z 0

Step 9. Click OK in the Machine Group Properties.

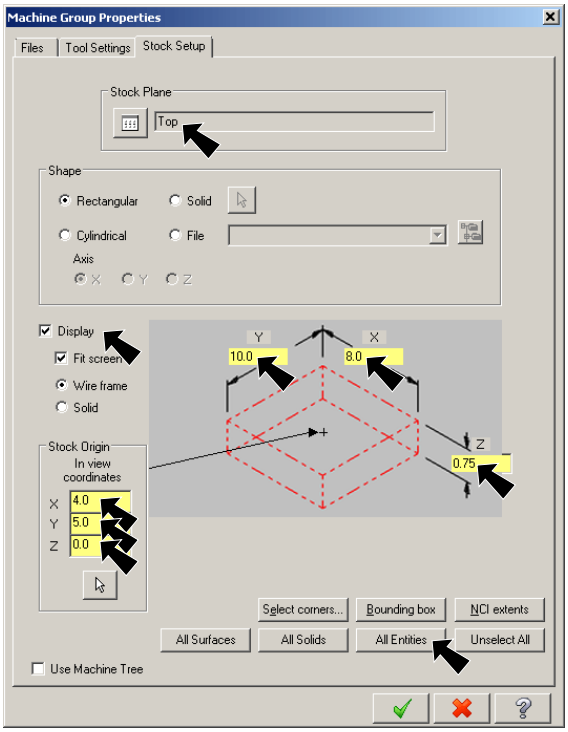


Fig. 42

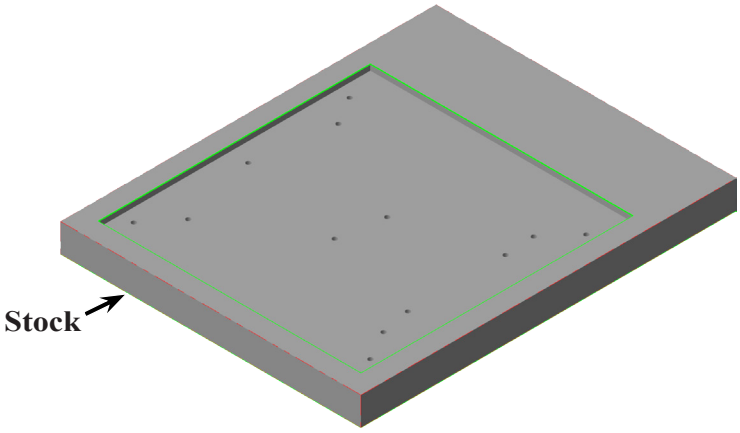


Fig. 43

L. OptiRough Toolpath.

Step 1. Click TOOLPATHS Menu > Surface High Speed > **Dynamic OptiRough**.

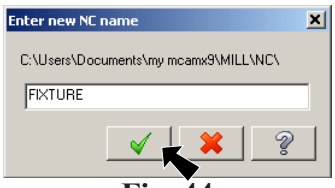


Fig. 44

Step 2. Click OK in the NC name dialog, **Fig. 44**.

Step 3. Click the **solid body** to select as Drive Surfaces, **Fig. 45**. The solid will highlight when selected.

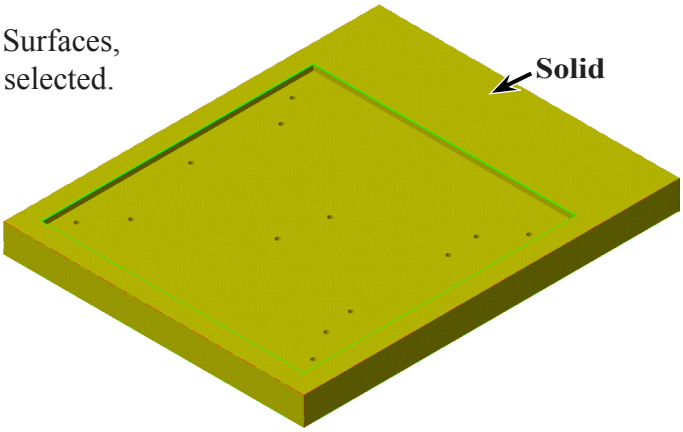


Fig. 45

Step 4. Click **End Selection** **(ENTER)** in ribbon bar to accept solid as drive surfaces.

Step 5. Click **Containment boundary Select** button in the Toolpath/ surface selection dialog box, **Fig. 46**.

Step 6. Click **Chain** **(C)** in Chaining dialog box, **Fig. 47**.

Step 7. Click any **line of bottom cut rectangle** to chain rectangle, **Fig. 48**.

Step 8. Click OK in Chaining dialog box, **Fig. 47**.

Step 9. Click OK in Toolpath/surface selection dialog box, **Fig. 46**.

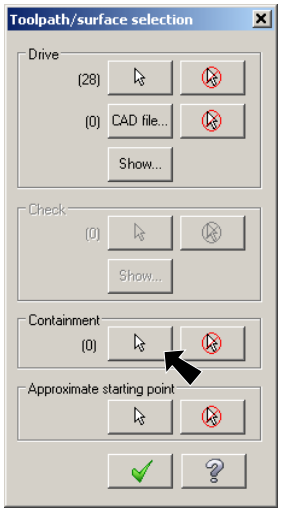


Fig. 46

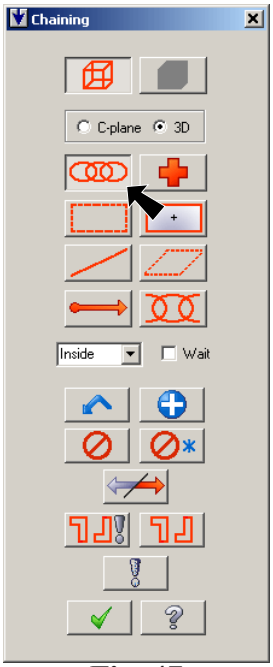


Fig. 47

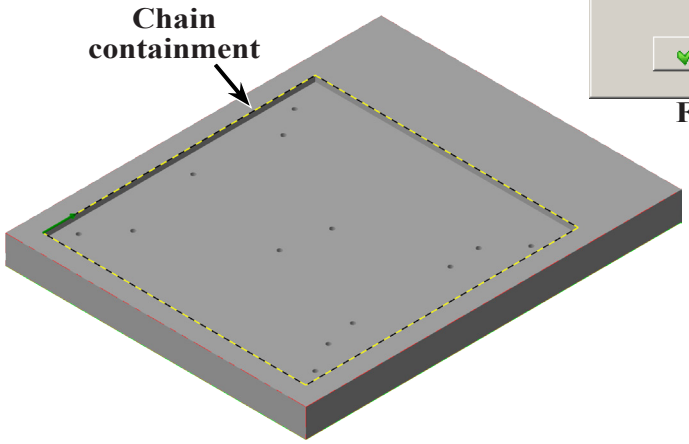


Fig. 48

Step 10. Select **Toolpath Type** from the tree control and confirm:
Dynamic OptiRough toolpath
Drive surfaces
Containment boundary
Fig. 49.

Step 11. Select **Tool** from the tree control and:

Click **Select library tool** button
Fig. 50.

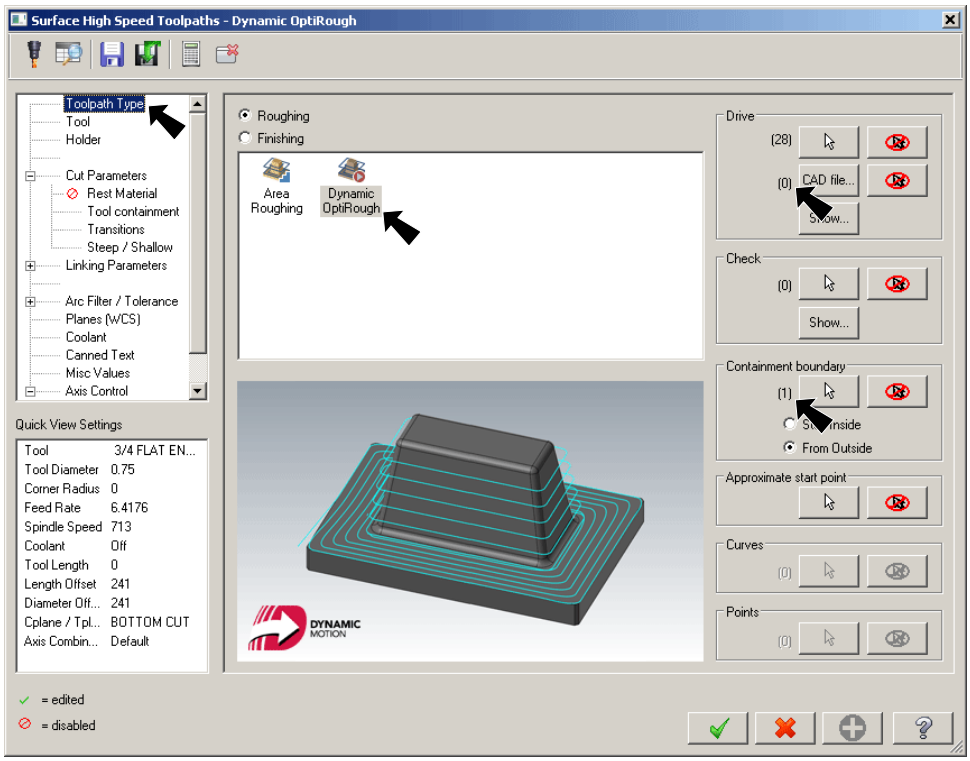


Fig. 49

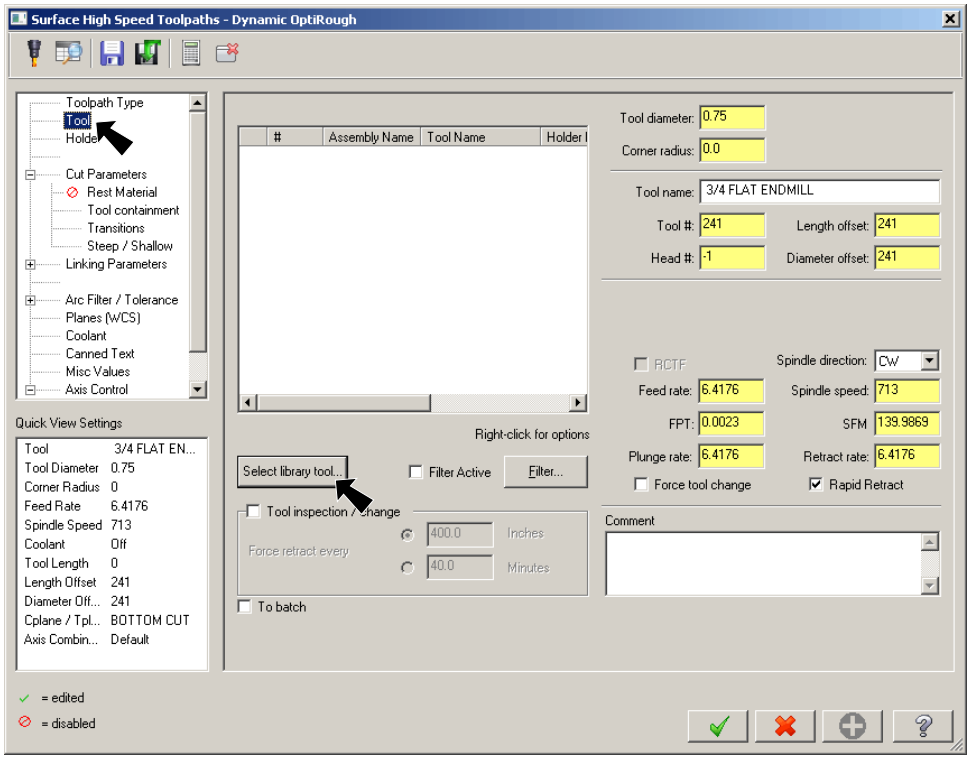


Fig. 50

Step 12. Click **Filter** button **Fig. 51**.

Step 13. Click **None** button under **Tool Types** **Fig. 52**.

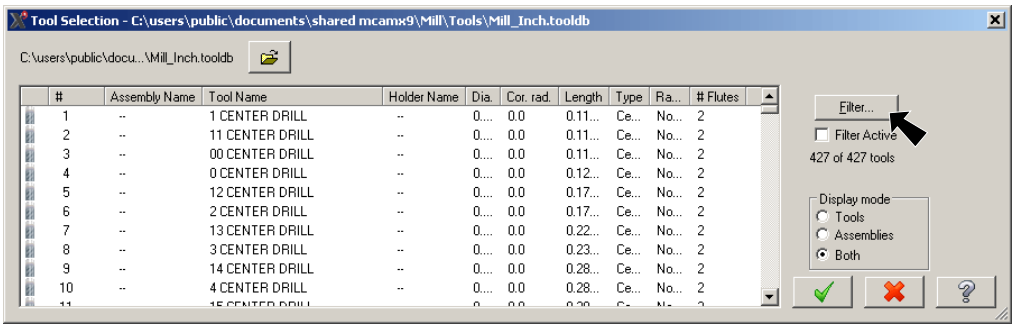


Fig. 51

Step 14. Click **Endmill1 Flat** button (first button top row) and click OK **Fig. 52**.

Step 15. Click **285 1/4 FLAT ENDMILL** and click OK, **Fig. 53**.

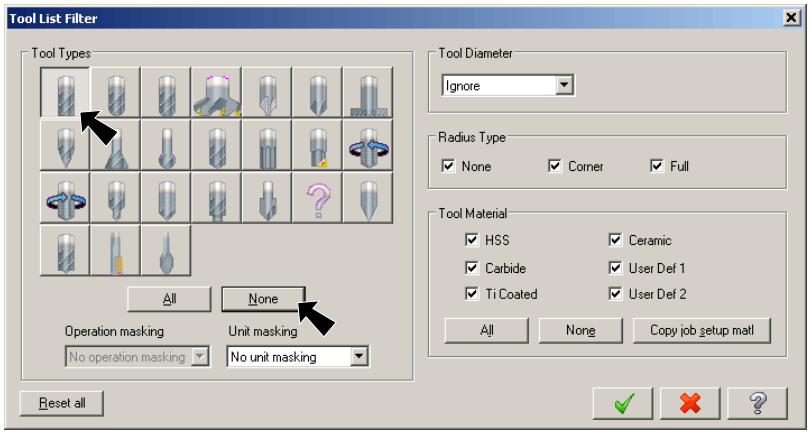


Fig. 52

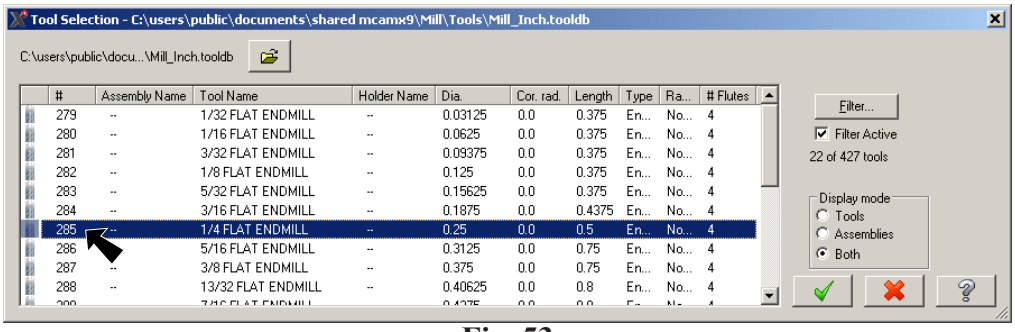


Fig. 53

Step 16. Back in **Tool** page set:

Feed rate 40

Plunge rate 20
Fig. 54.

Step 17. Select **Cut Parameters** from tree control and set:

Stepdown 60

Stock to leave on Walls and Floors 0
Fig. 55.

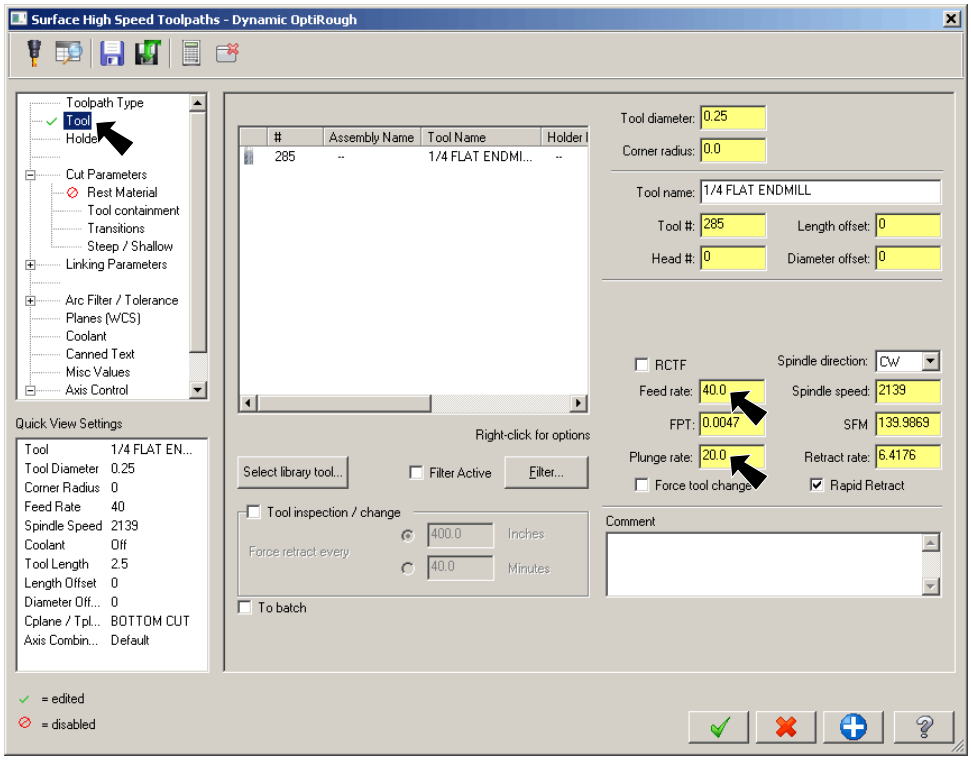


Fig. 54

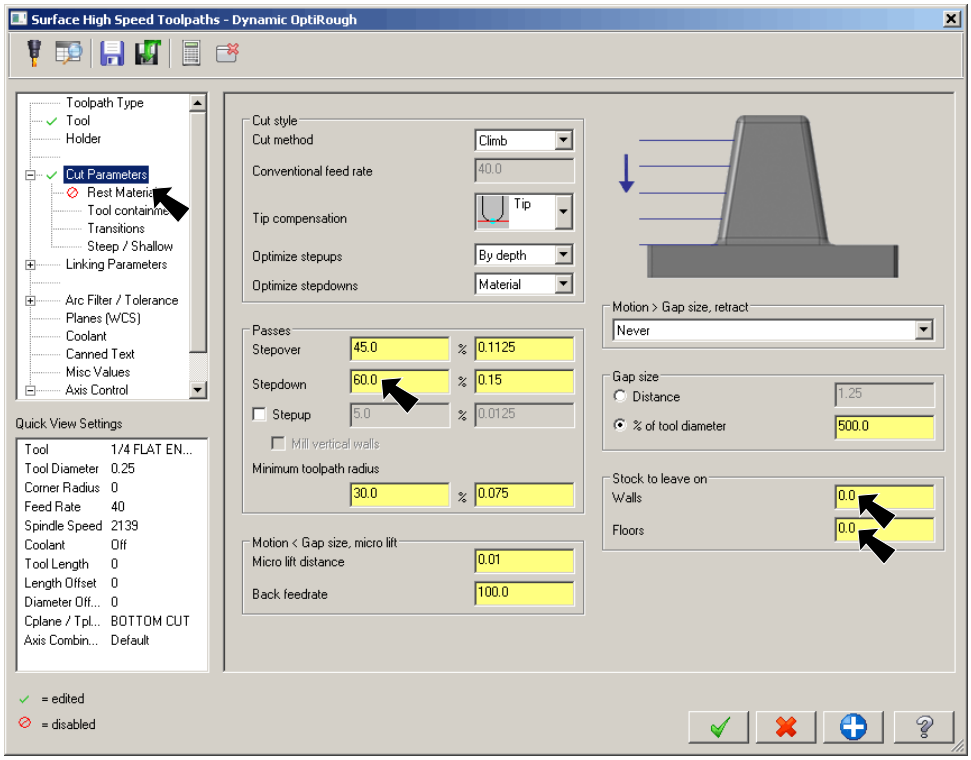


Fig. 55

Step 18. Select **Transitions** from tree control and set:

Plunge angle 10
Fig. 56.

Step 19. Select **Linking Parameters** from tree control and set:

Clearance plane 1

All leads 0
Fig. 57.

Step 20. Click OK in Dynamic OptiRough dialog box.

Step 21. Allow Mastercam to calculate toolpath.

Step 22. Save (**Alt-F S**).

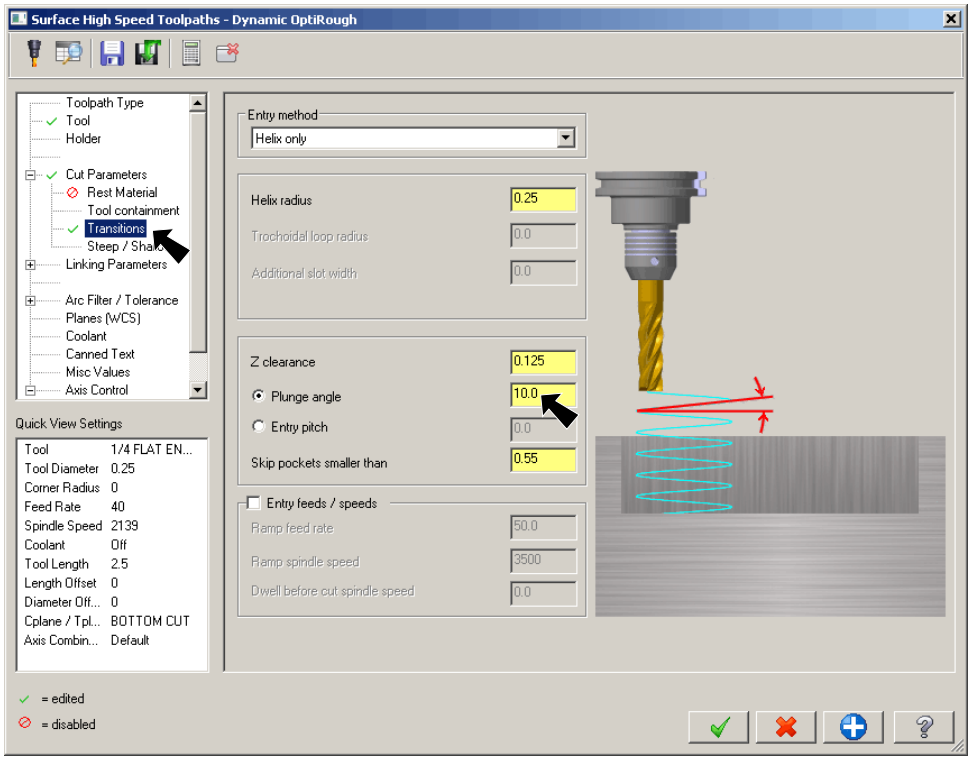


Fig. 56

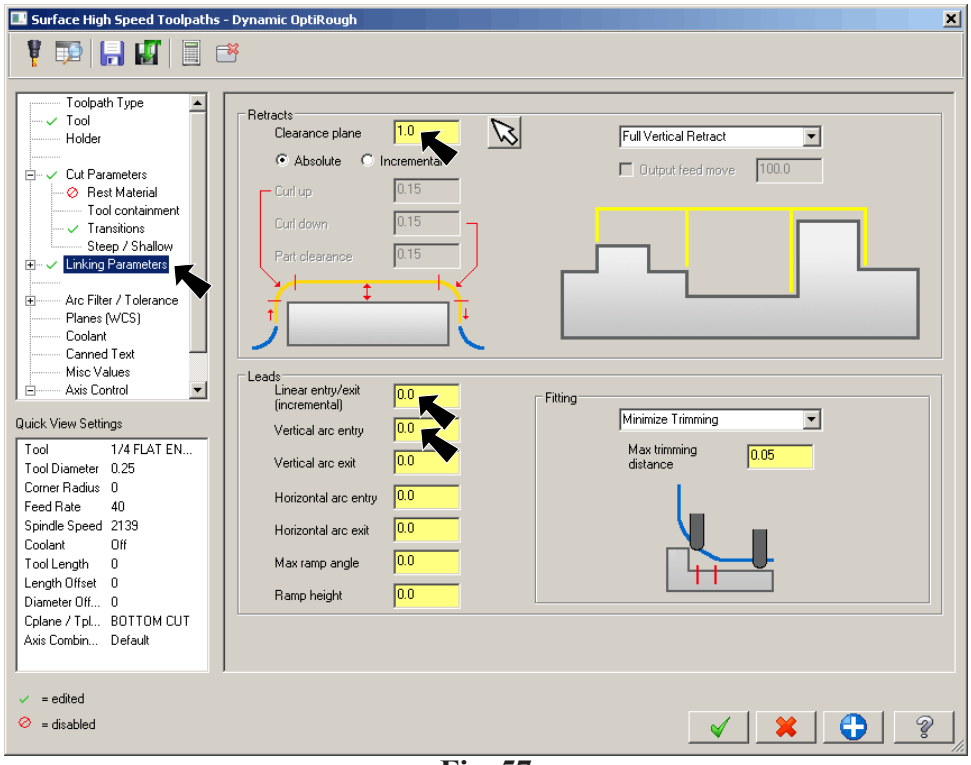


Fig. 57

M. Verify OptiRough Toolpath.

Step 1. Click **Verify** in the Toolpaths Manager, **Fig. 58**.

Step 2. Click **Play** **(R)** in VCR bar along bottom of window.

Step 3. Note **Total Time** to run program under Toolpath Info in the Move List panel (**roughly 13 minutes**), **Fig. 59**.

Step 4. Switch back to Mastercam (**Alt-Tab**).

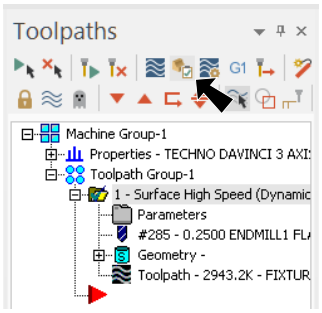


Fig. 58

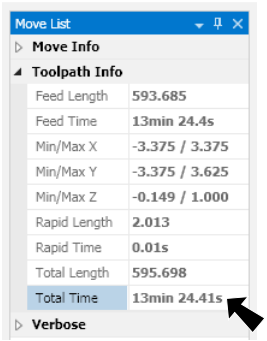


Fig. 59

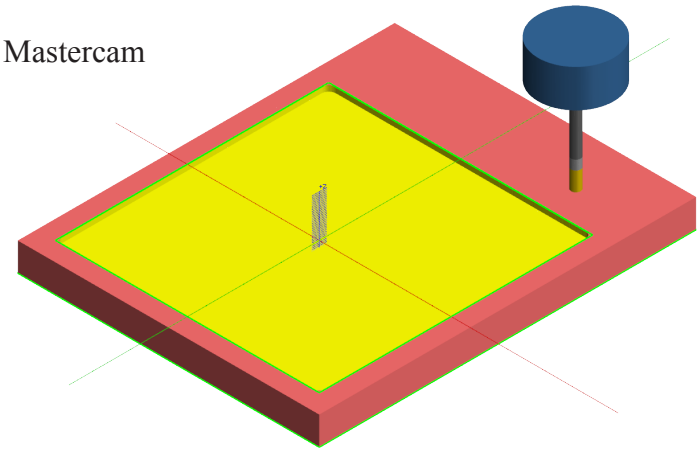


Fig. 60

N. Switch to TOP CUT WCS.

Step 1. If necessary, use **Alt-T** to turn off toolpath display.

Step 2. Click **WCS** in the Status Bar at the bottom of the graphics area and **Plane Manager** from the menu.

Step 3. Click **TOP CUT** in the Plane Manager dialog, **Fig. 61**.

Step 4. Click **Set All** button , **Fig. 61**.

Step 5. Click OK .

Step 6. Change to Isometric View **(Alt-7)**.

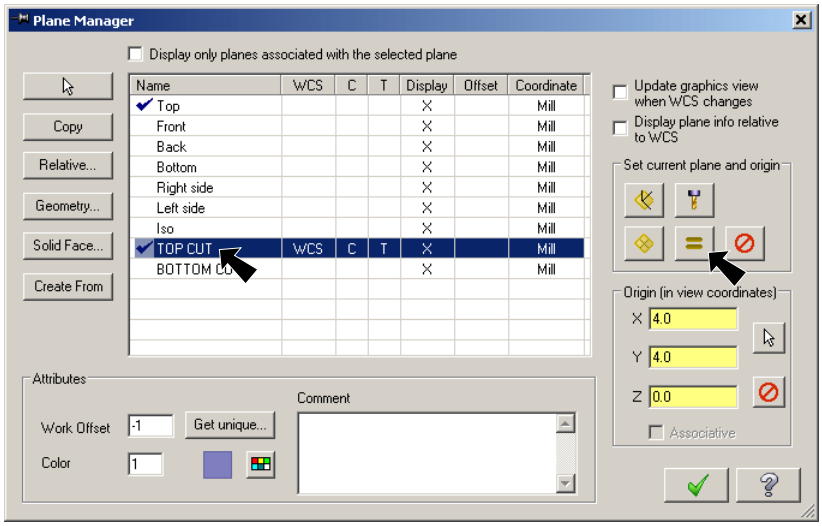


Fig. 61

O. FBM Drill Toolpath.

Step 1. Click TOOLPATHS Menu > **FBM Drill**.

Step 2. Select **Hole Detection** from the tree control and set:

Confirm: Limit search to plane **Top** **Fig. 62**.

Step 3. Select **Spot Drilling** from the tree control set:

Uncheck **Spot Drilling** check box **Fig. 63**.

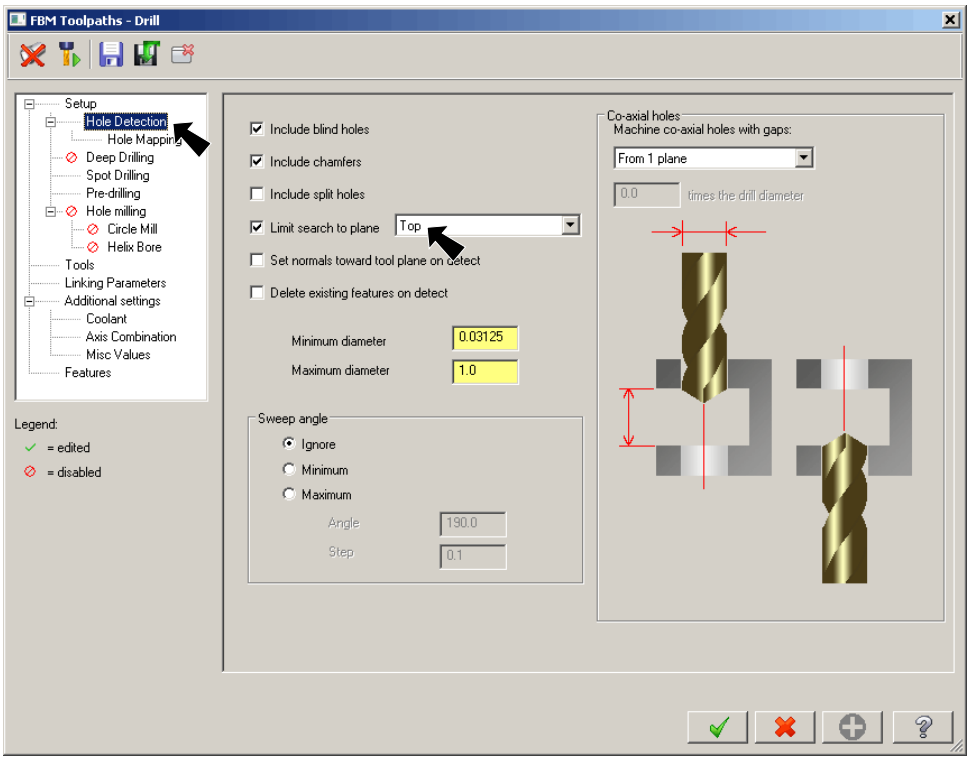


Fig. 62

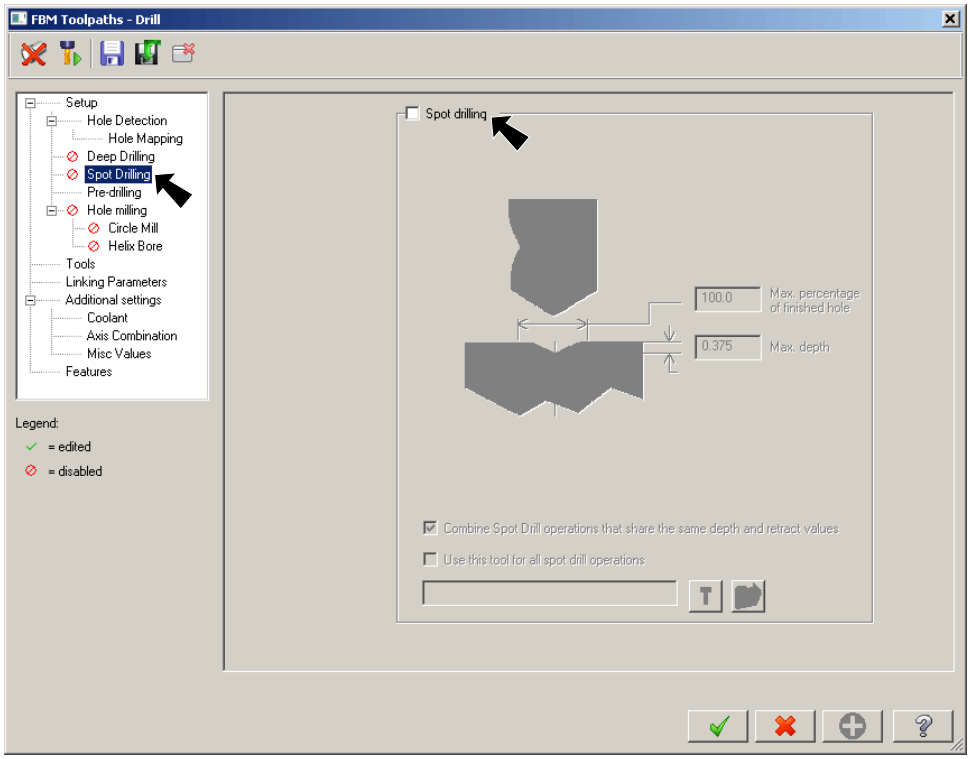


Fig. 63

Step 4. Select **Pre-drilling** from the tree control set:

Uncheck **Pre-drilling** check box
Fig. 64.

Step 5. Click **Detect** button at the top of the dialog box to detect the holes **Fig. 64**.

Step 6. Confirm:
15 holes
2 holes .375 depth
the others **.6 depth**.

Click OK
Fig. 65.

Step 7. Save (**Alt-F S**).

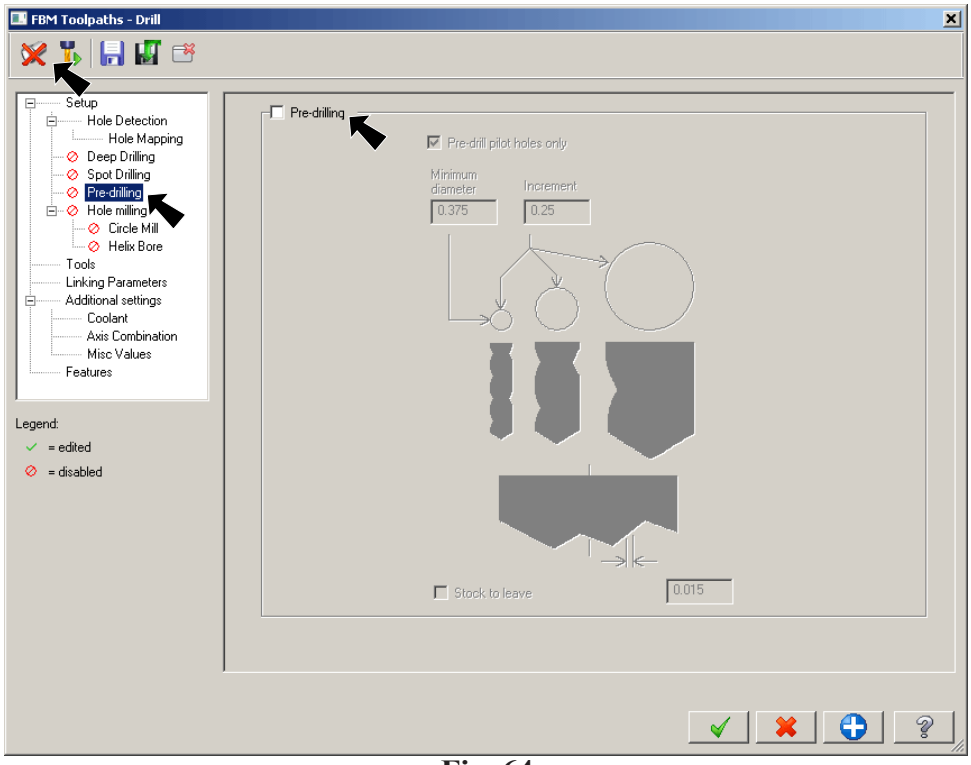


Fig. 64

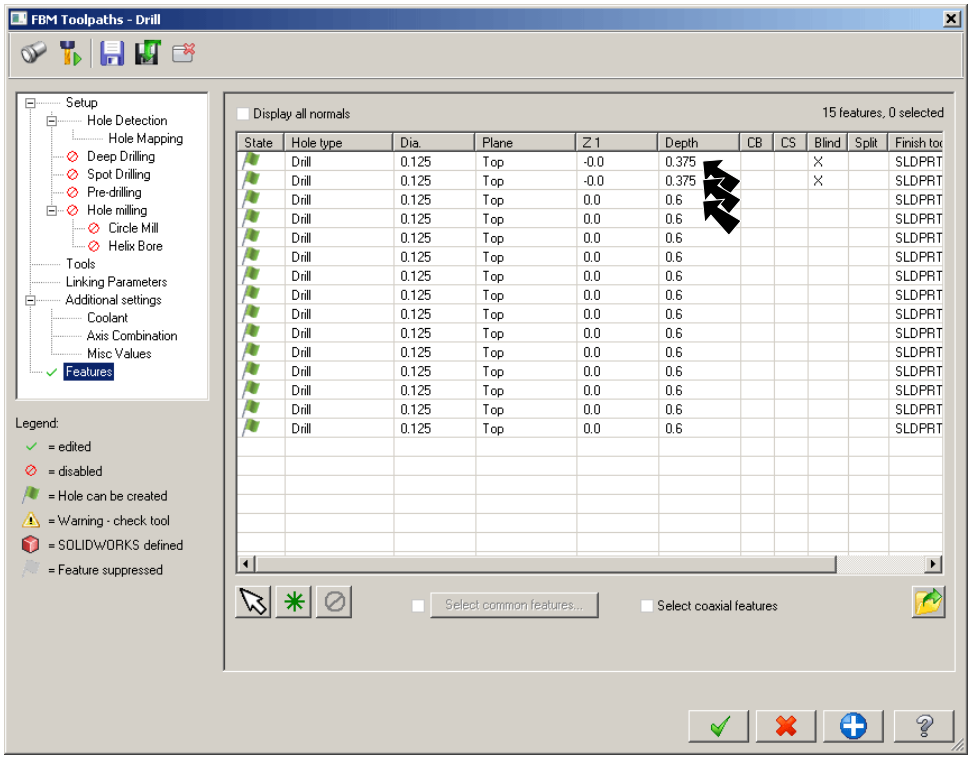


Fig. 65

P. Backplot.

Step 1. Turn **on** Wireframe (**Alt-S**).

Step 2. In Toolpaths Manager click **FBM Drill** to select toolpath group, **Fig. 66**.

Step 3. Click **Backplot** in Toolpaths Manager, **Fig. 66**.

Step 4. Turn on (button depressed) **Display tool** and **Display rapid moves** , **Fig. 67**.

Step 5. Click **Play** in the Backplot VCR bar.

Step 6. Click OK to close Backplot.

Step 7. Turn **on** Shading (**Alt-S**).

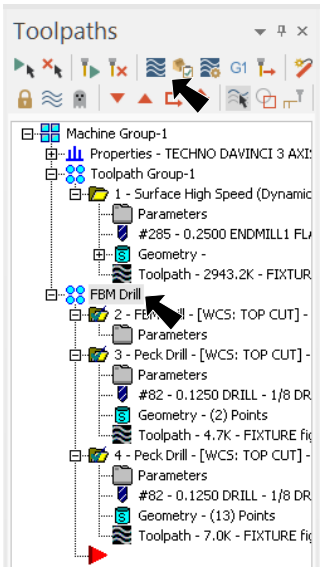


Fig. 66

Fig. 67

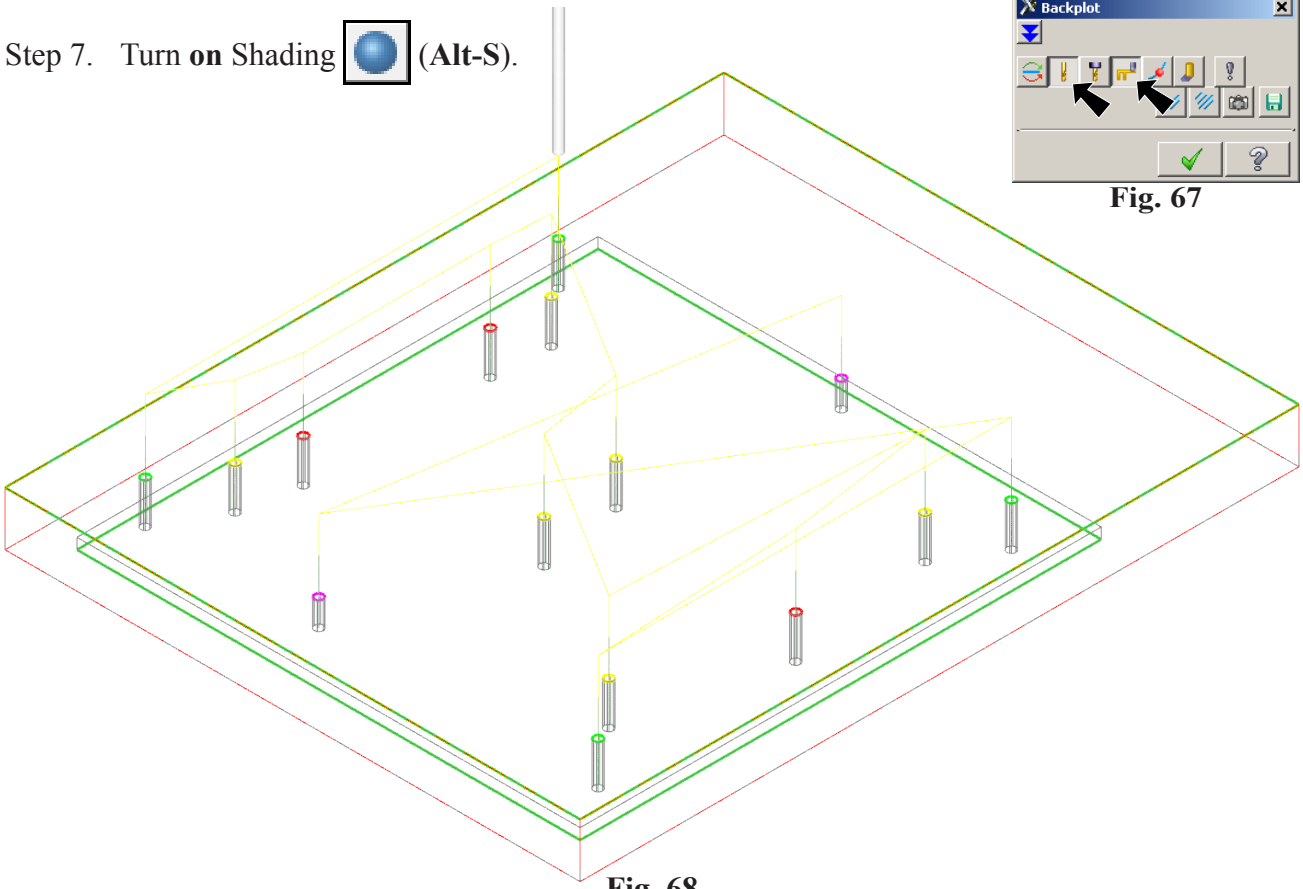


Fig. 68