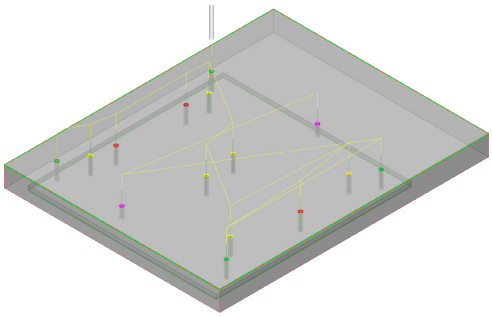
Jewelry Box
Fixture



A. Sketch Fixture Rectangle.

Step 1. If necessary start a new Mastercam file, click **New** (**Ctrl-N**) on the Quick Access Toolbar QAT.

Step 2. On the Wireframe tab WIREFRAME click **Rectangle** Rectangle.

Step 3. In the Rectangle function panel:
under Dimensions, **Fig. 1**
Width 8
Height 10 and press ENTER
Press **O key** on keyboard to select AutoCursor **Origin** override, **Fig 2**.
Click OK .

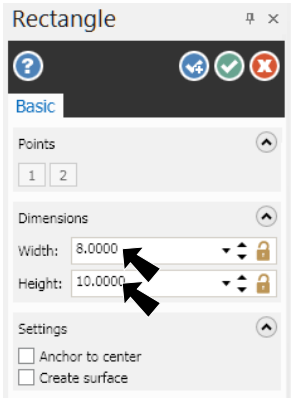


Fig. 1

Step 4. **Right click** the graphics window and click **Fit** (**Alt-F1**).

B. Save As "FIXTURE"

Step 1. Click **Save As** (**Ctrl-Shift-S**) on the Quick Access Toolbar QAT.

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

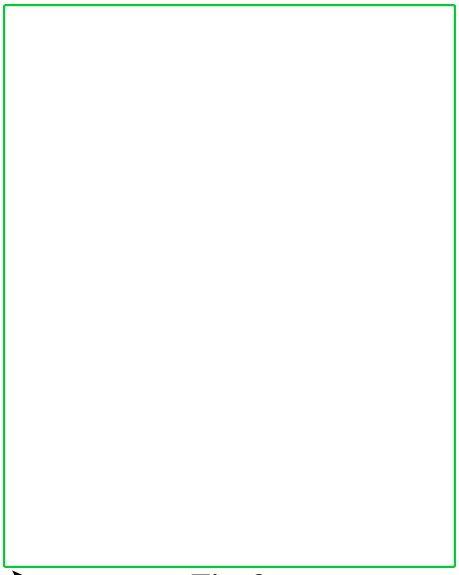
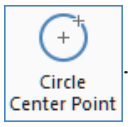


Fig. 2

C. Circles.

Step 1. On the Wireframe tab WIREFRAME click **Circle Center Point** 

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Step 2. In the Circle Center Point function panel:
under Size, **Fig. 3**
Click **Locked**
Diameter .125 and press ENTER.

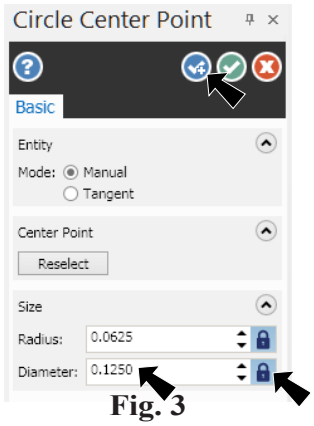


Fig. 3

Step 3. Press **spacebar** to activate AutoCursor **Fast Point** and key-in coordinates shown below into the Fast Point. Press **ENTER** after keying-in coordinate. Continue and key-in each set of coordinates, **Fig. 4**.

Stock Screw Holes
.85, 1.1
7.15, 1.1
.85, 6.85
7.15, 6.85

Click **OK and Create New Operation** or press ENTER **twice**.

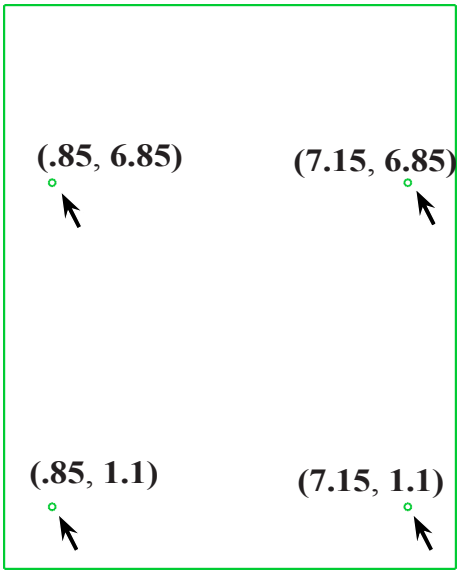


Fig. 4

Step 4. **Right click** in the graphics window and on the Mini Toolbar click **Wireframe Color** drop down arrow and select **red**, **Fig. 5**.

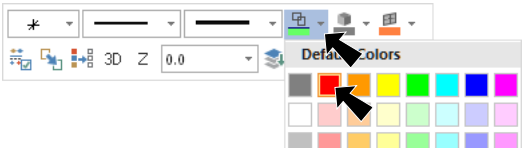


Fig. 5

Step 5. Key-in the X, Y coordinates into the **Fast Point**
Base Screw Holes, **Fig. 6**
1.45, 2.7
7, 4
1.45, 5.3
press ENTER **twice**.

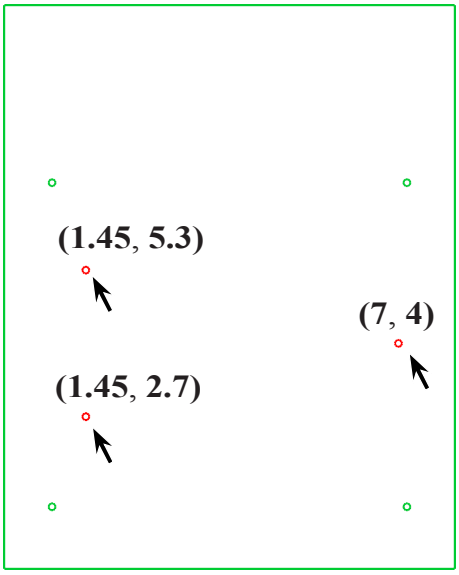


Fig. 6

Step 6. **Right click** in the graphics window and on the Mini Toolbar click **Wireframe Color** drop down arrow and select **yellow**, **Fig. 7**.

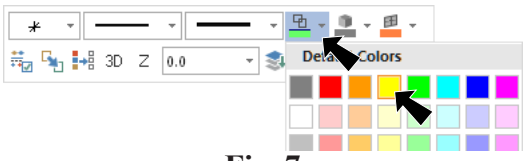


Fig. 7

Step 7. Key-in the X, Y coordinates into the **Fast Point**  **Lid Screw Holes**, **Fig. 8**

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**.

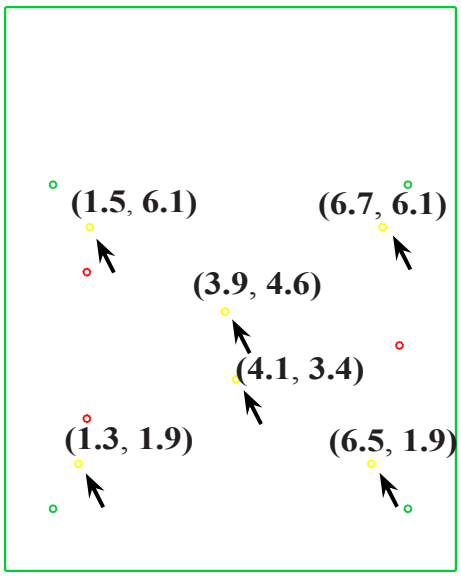


Fig. 8

Step 8. **Right click** in the graphics window and on the Mini Toolbar click **Wireframe Color**  drop down arrow and select **magenta**, **Fig. 9**.

Step 9. Key-in the X, Y coordinates into the **Fast Point**  **Pin Holes**, **Fig. 10**

3.5, .865
4.5, 7.135
Click OK  .

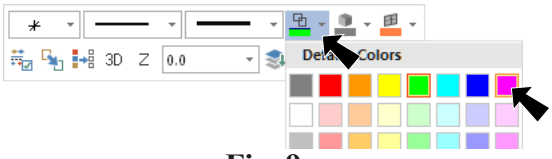


Fig. 9

Step 10. Save  (**Ctrl-S**).

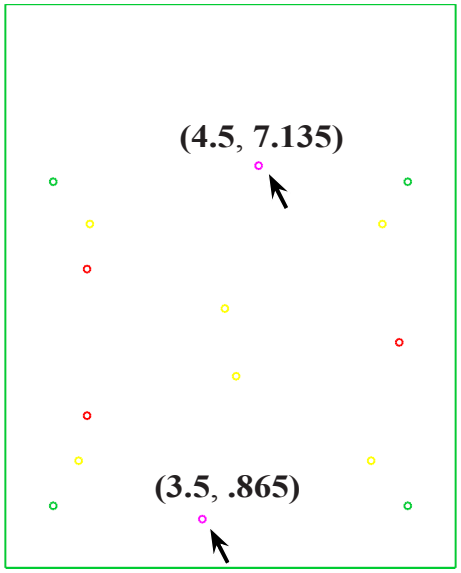


Fig. 10

Tip:
Use Analyze Entity (**F4**) to confirm circle coordinates.

Tip:

Green	Stock Screw Holes
Red	Base Screw Holes
Yellow	Lid Screw Holes
Magenta	Pin Holes

D. Extrude Solid.

Step 1. Change to the Isometric View. **Right click** in the graphics window and click Isometric (WCS) (**Alt-7**).

Step 2. On the Solids tab SOLIDS click **Extrude** Extrude.

Step 3. Click Chain in Chaining dialog box, **Fig. 11**.

Step 4. Click a **line of rectangle** to chain rectangle, **Fig. 12**.

Step 5. Click OK in Chaining dialog box.

Step 6. In the Solid Extrude function panel:
under Operation, **Fig. 13**
select **Create body**
under Distance
Distance .75 and press ENTER
The direction arrow should **point down**, **Fig. 14**. If arrow points in wrong direction, click Reverse All, **Fig. 13**.
Click **OK and Create New Operation**.

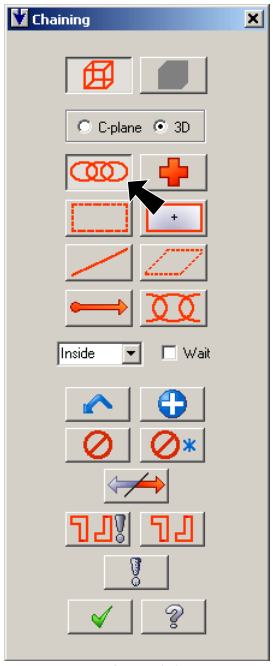


Fig. 11

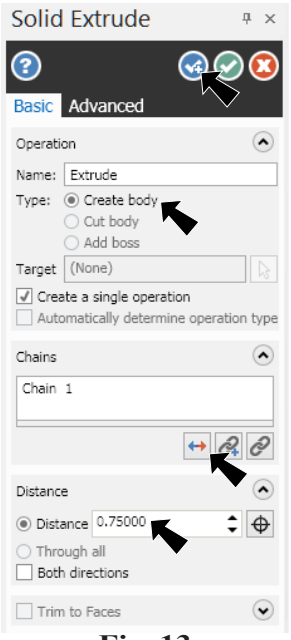


Fig. 13

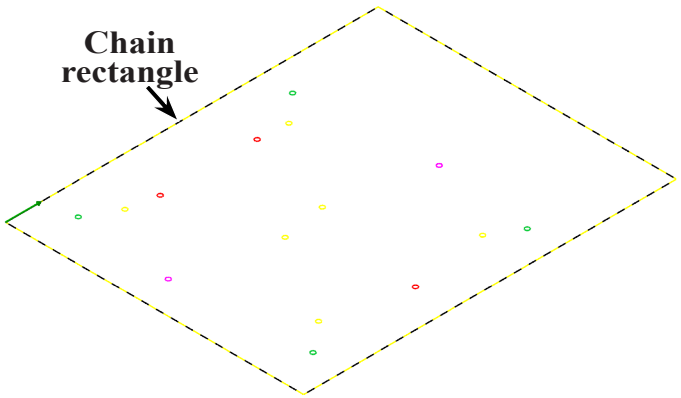


Fig. 12

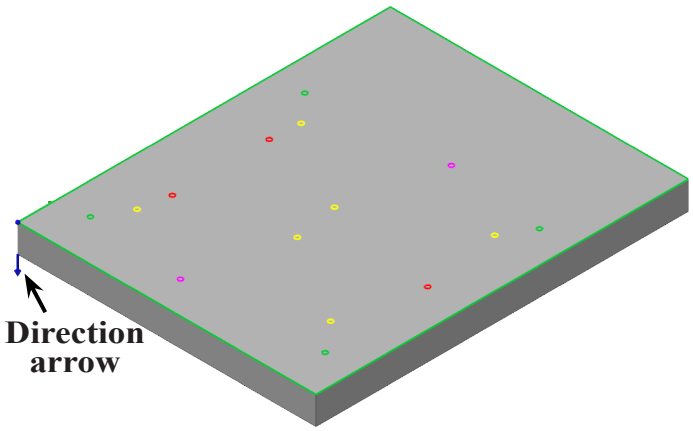
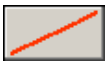


Fig. 14

E. Cut Pin Holes.

Step 1. Click Single  in Chaining dialog box, **Fig. 15**.

Step 2. Click **both Pin holes (magenta)** to chain, **Fig. 16**.

Step 3. Click OK  in Chaining dialog box.

Step 4. In the Solid Extrude function panel:
under Operation, **Fig. 17**
select **Cut Body**
under Distance
Distance .375 and press ENTER
The direction arrow should **point down**, **Fig. 18**. If arrow points in wrong direction, click Reverse All  , **Fig. 17**.
Click **OK and Create New Operation**  .

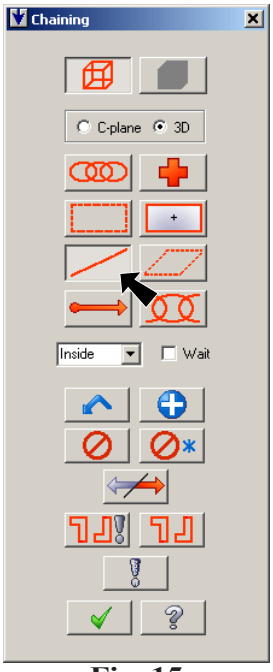


Fig. 15

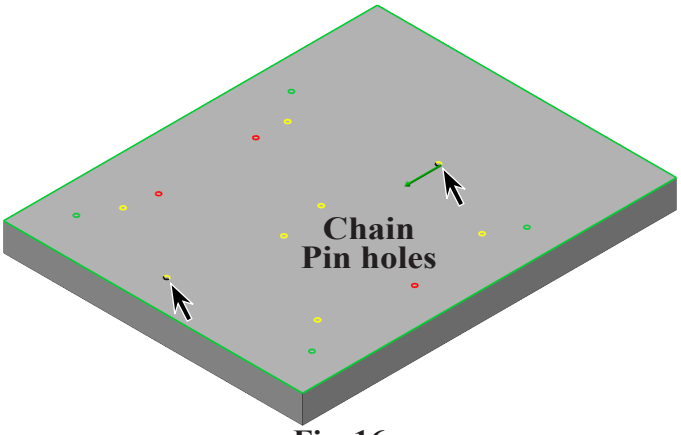


Fig. 16

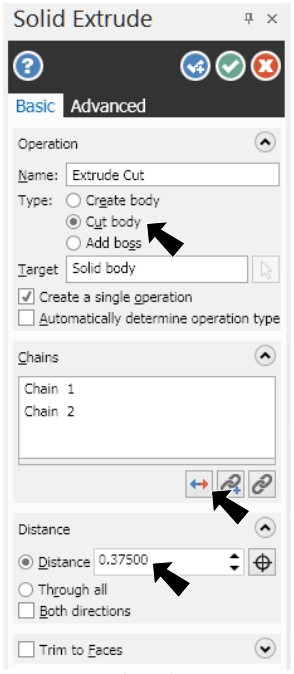


Fig. 17

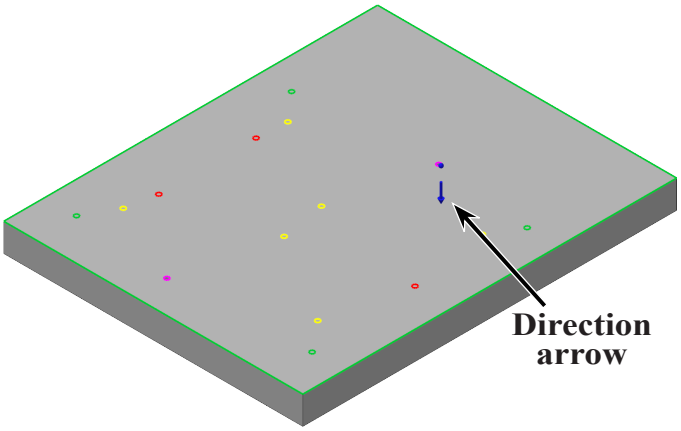


Fig. 18

F. Cut Screw Holes.

Step 1. Click Polygon  in Chaining dialog box.

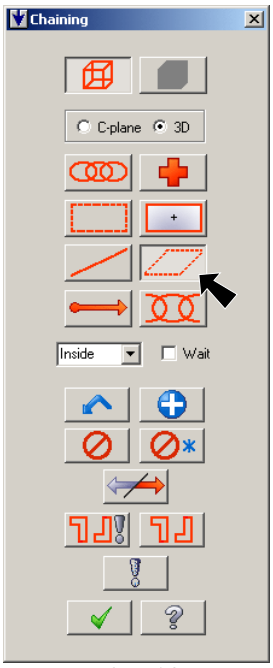


Fig. 19

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.

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

Step 4. Click OK  in Chaining dialog box.

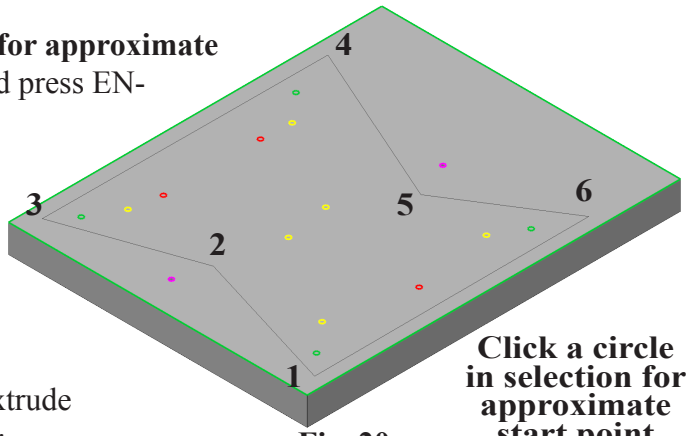


Fig. 20

Step 5. In the Solid Extrude function panel:
- under Operation, **Fig. 21**
  - select **Cut Body**
- under Chains
  - confirm **13 chains**
- under Distance
  - **Distance .7** and press ENTER

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

Click OK  .

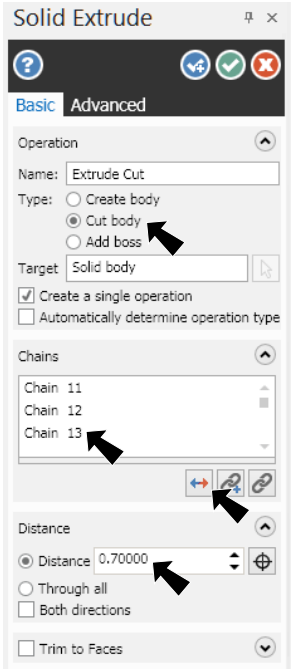


Fig. 21

Step 6. Save  (**Ctrl-S**).

Step 7. Use **Ctrl-T** to toggle **Translucency**.

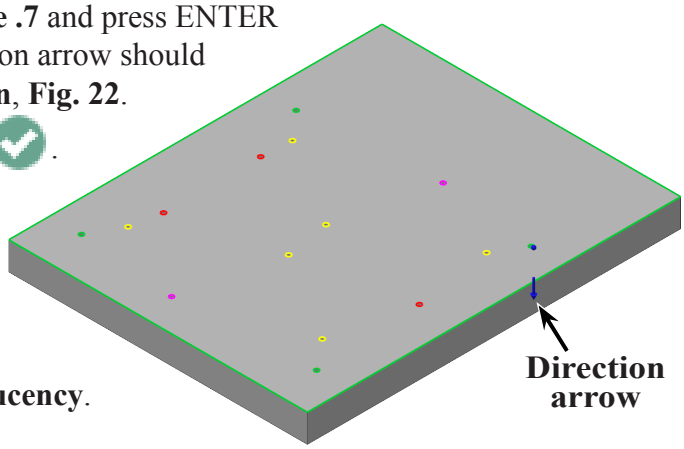
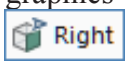


Fig. 22

Step 8. Change to Right View. **Right click** in the graphics window and click 

(**Alt-5**) to confirm the depth of holes, **Fig. 23**.


Fig. 23

G. Create TOP CUT WCS.

Step 1. Change to the Isometric View. **Right click** in the graphics window and click Isometric (WCS) (**Alt-7**).

Step 2. Display the **Planes Manger** (**Alt-L**).

Step 3. In the Planes Manger:

Click **Create a new plane** drop down and select **Relative to WCS > Top**, **Fig. 24**.

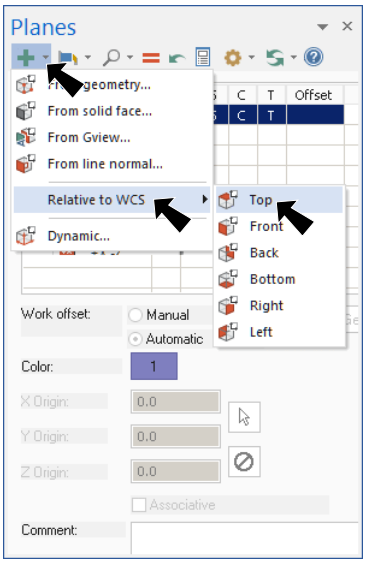


Fig. 24

Step 4. In the New Plane dialog box:

Key-in **TOP CUT** for name, **Fig. 25**

Origin X 4

Origin Y 4

Origin Z 0

Click OK.

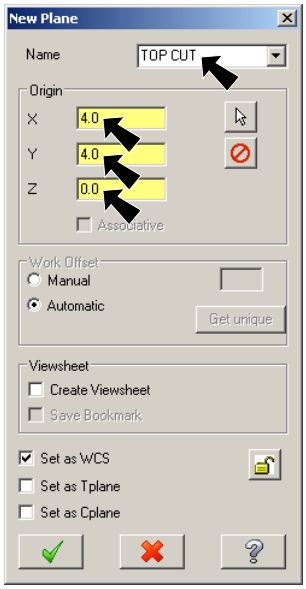


Fig. 25

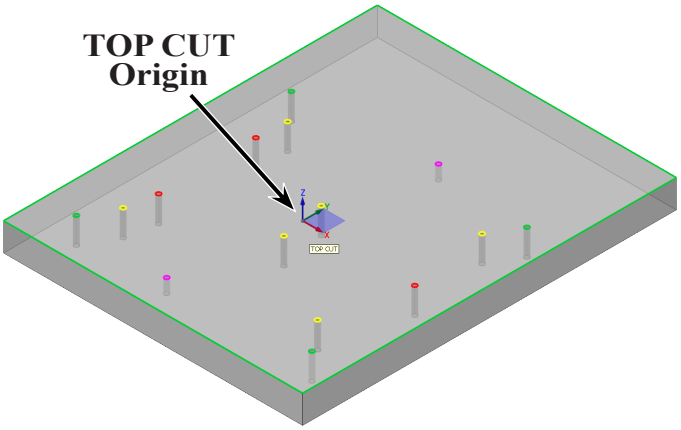


Fig. 26

H. Create BOTTOM CUT WCS.

Step 1. Back in the Planes Manger:

Click **Create a new plane** drop down and select **Relative to WCS > Bottom**, **Fig. 27**.

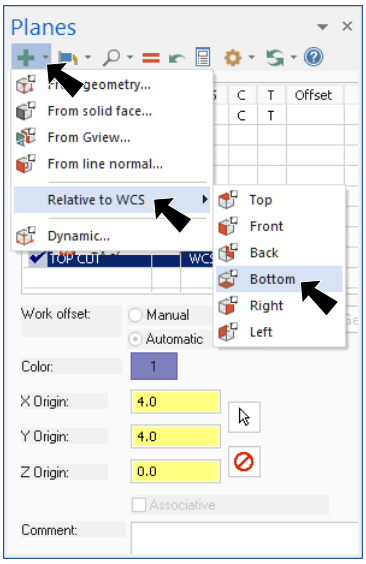


Fig. 27

Step 2. In the New Plane dialog box:

Key-in **BOTTOM CUT** for name, **Fig. 28**
Origin X -4
Origin Y 4
Origin Z .75
Click OK.

Step 3. Change to the Isometric View. **Right click** in the graphics window and click Isometric (WCS) (**Alt-7**).

Step 4. Back in the Planes Manager:

Click **Set All**, **Fig. 29**.

Step 5. Save (**Ctrl-S**).

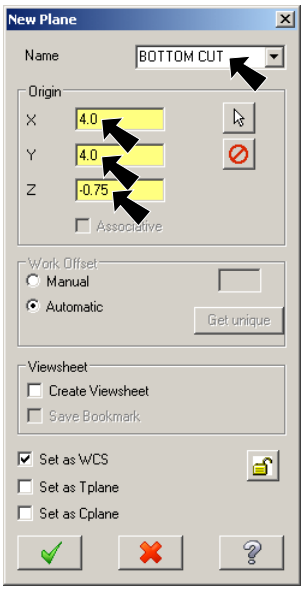


Fig. 28

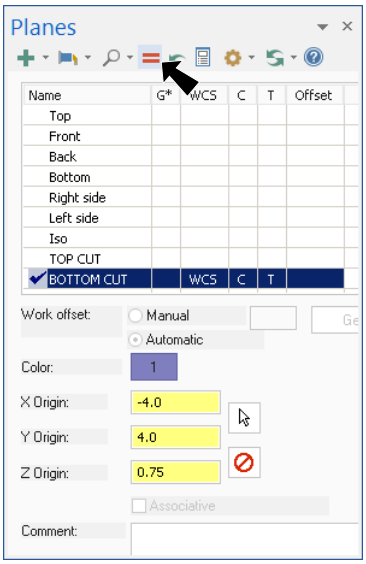


Fig. 29

Tip:

Click **Hide Levels Properties** in the Planes Manager, **Fig. 31**.

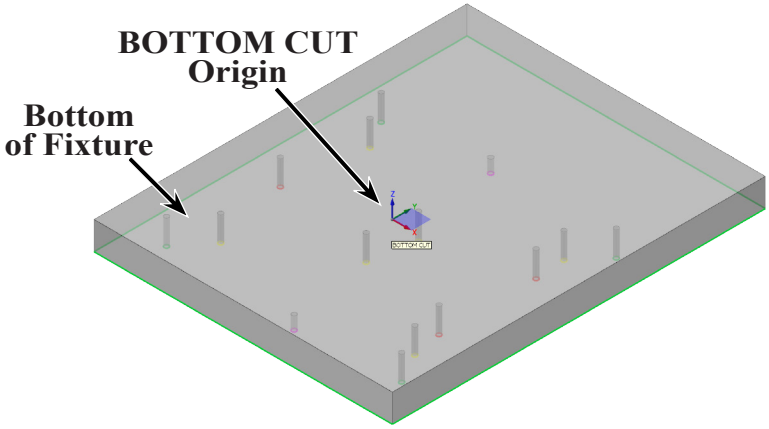


Fig. 30

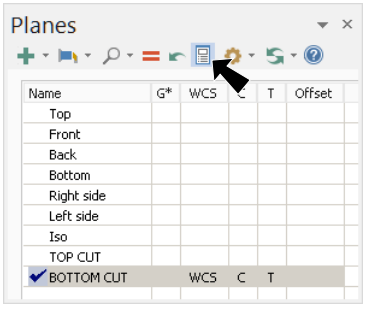


Fig. 31

I. Create Bottom Cut Rectangle.

Step 1. **Right click** in the graphics window and on the Mini Toolbar click **Wireframe Color** drop down arrow and select **green**, **Fig. 32**.

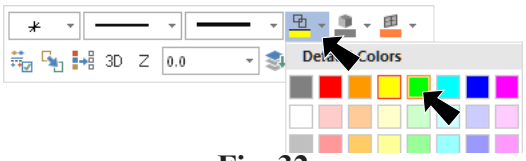


Fig. 32

Step 2. Use **Ctrl-T** to toggle **Translucency**.

Step 3. On the Wireframe tab WIREFRAME click **Rectangle** Rectangle.

Step 4. In the Rectangle function panel:
under Settings, **Fig. 33**
Check **Anchor to center**
under Dimensions
Width 7
Height 7.25 and press ENTER
Press **O key** on keyboard to select AutoCursor **Origin** override, **Fig 34**.
Click OK .

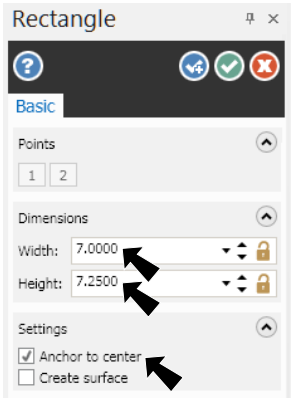


Fig. 33

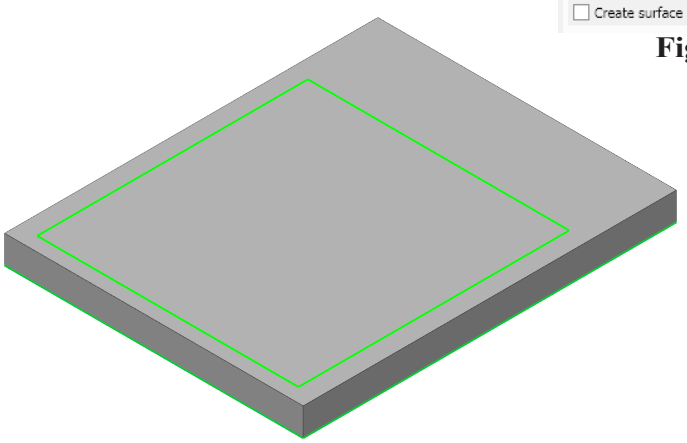


Fig. 34

J. Extrude Cut Pocket.

Step 1. On the Solids tab SOLIDS click **Extrude** Extrude.

Step 2. Click Chain in Chaining dialog box.

Step 3. Click a **line of rectangle** to chain rectangle, **Fig. 35**.

Step 4. Click OK in Chaining dialog box.

Step 5. In the Solid Extrude function panel:
under Operation, **Fig. 36**
select **Cut body**
under Distance
Distance .15 and press ENTER
The direction arrow should **point down**, **Fig. 37**. If arrow points in wrong direction, click Reverse All, **Fig. 36**.
Click OK.

Step 6. Save (**Ctrl-S**).

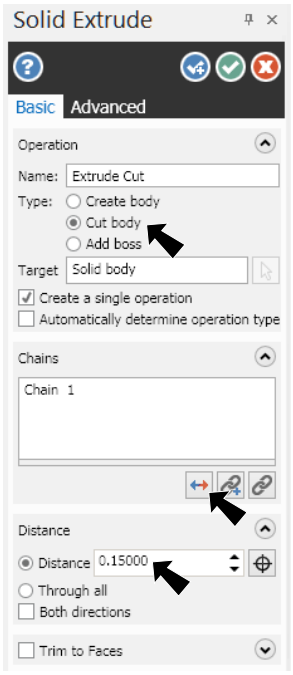


Fig. 36

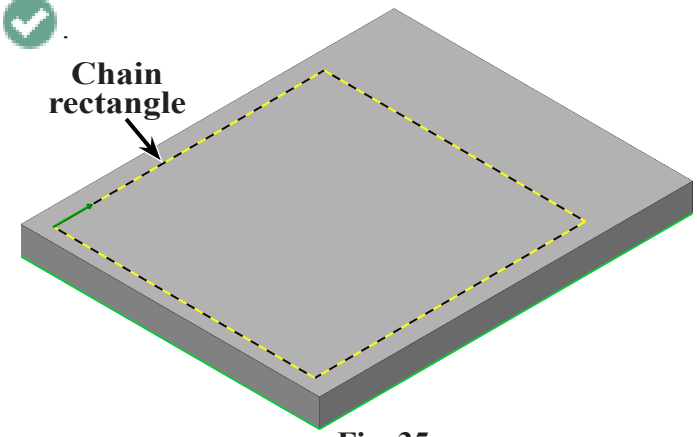


Fig. 35

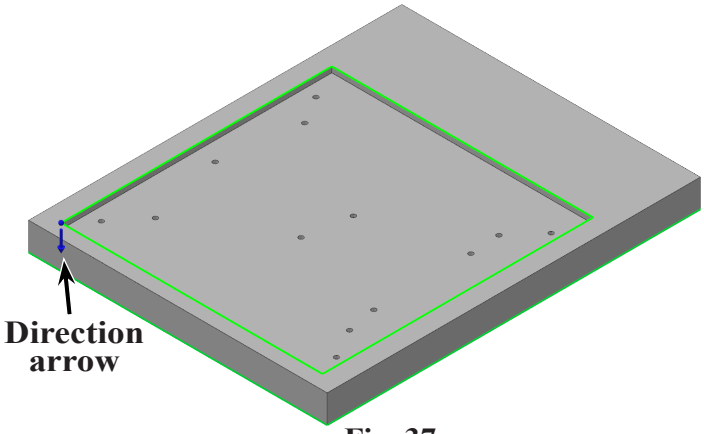


Fig. 37

K. Machine Type and Stock Setup.

Step 1. If necessary, display Toolpaths Manager. On the View tab VIEW click Toolpaths (**Alt-O**).

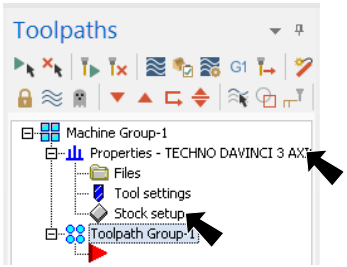


Fig. 38

Step 2. If Machine Group is **not** displayed in the Toolpaths Manager, **Fig. 38** on the Machine tab MACHINE, click Machine Mill > Default from the menu.

Step 3. Expand **Properties** (click +) in the Toolpaths Manager and click **Stock Setup** in the Toolpaths Manager, **Fig. 39**.

Step 4. Confirm Stock Plane is **BOTTOM CUT**, **Fig. 39**.

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 0
Y 1
Z 0

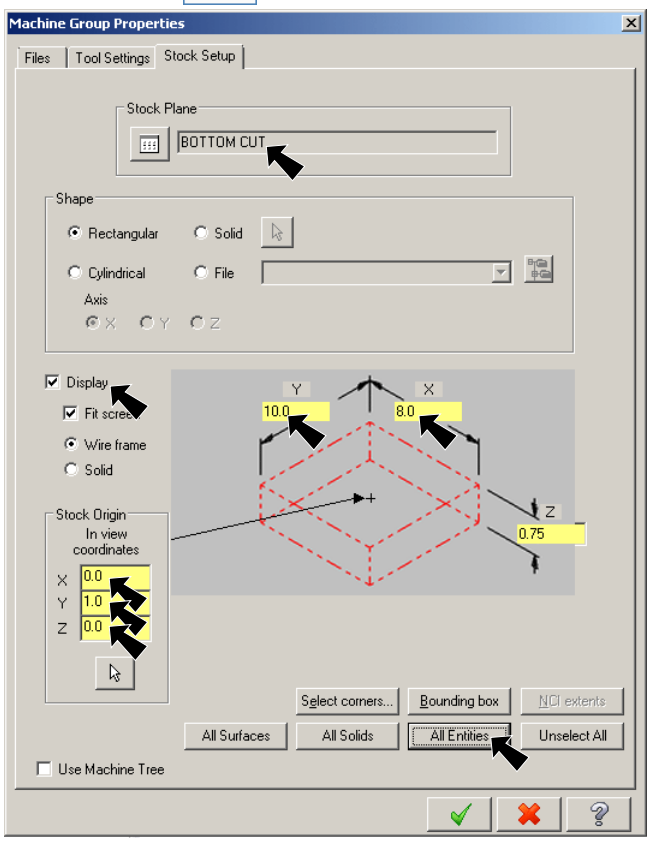


Fig. 39

Step 9. Click OK in the Machine Group Properties.

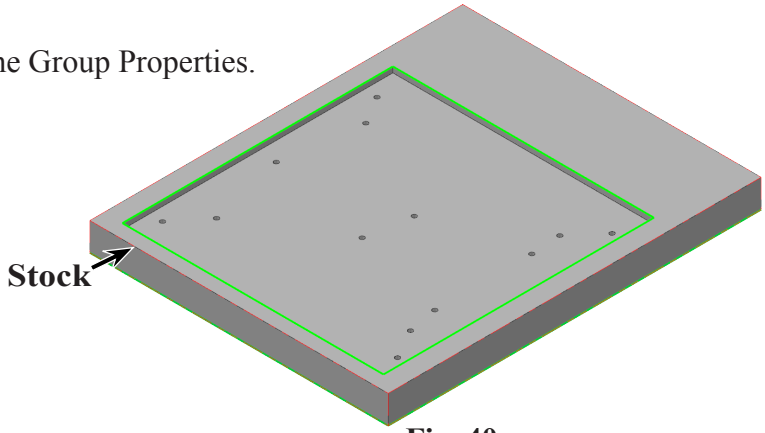
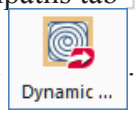


Fig. 40

L. Dynamic Mill Toolpath.

Step 1. On the Toolpaths tab TOOLPATHS in the 2D group click **Dynamic Mill** 

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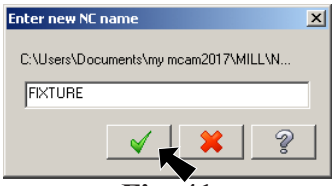

Fig. 41

Step 2. Click OK in the NC name dialog, **Fig. 41**.

Step 3. Select **Machining regions** button in Chain Options dialog box, **Fig. 42**.

Step 4. Select **Chain** in Chaining dialog box, **Fig. 43**.

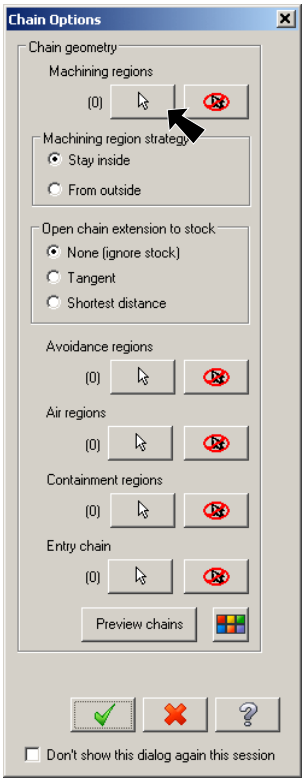

Fig. 42

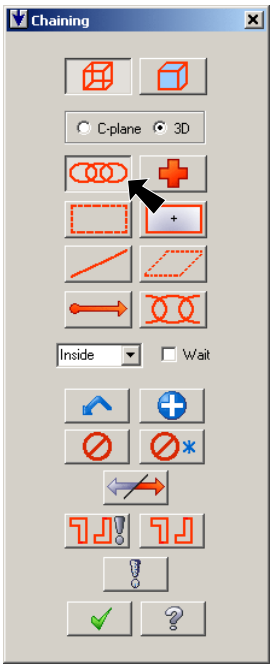

Fig. 43

Step 5. Click a **line of rectangle** to Chain the rectangle and click OK in Chain dialog box, **Fig 44**.

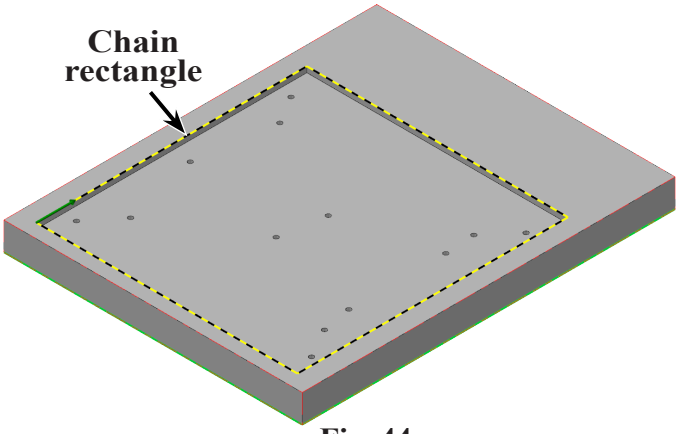

Fig. 44

Step 6. Click OK in Chain Options box, **Fig 45**.

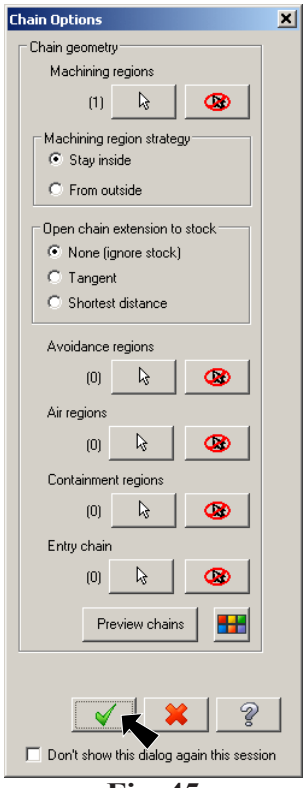

Fig. 45

Step 7. Select **Toolpath Type** from the tree control and confirm:

Dynamic Mill toolpath

Machining regions 1 Fig. 46.

Step 8. Select **Tool** from tree control and: click **Select library tool Fig. 47**.

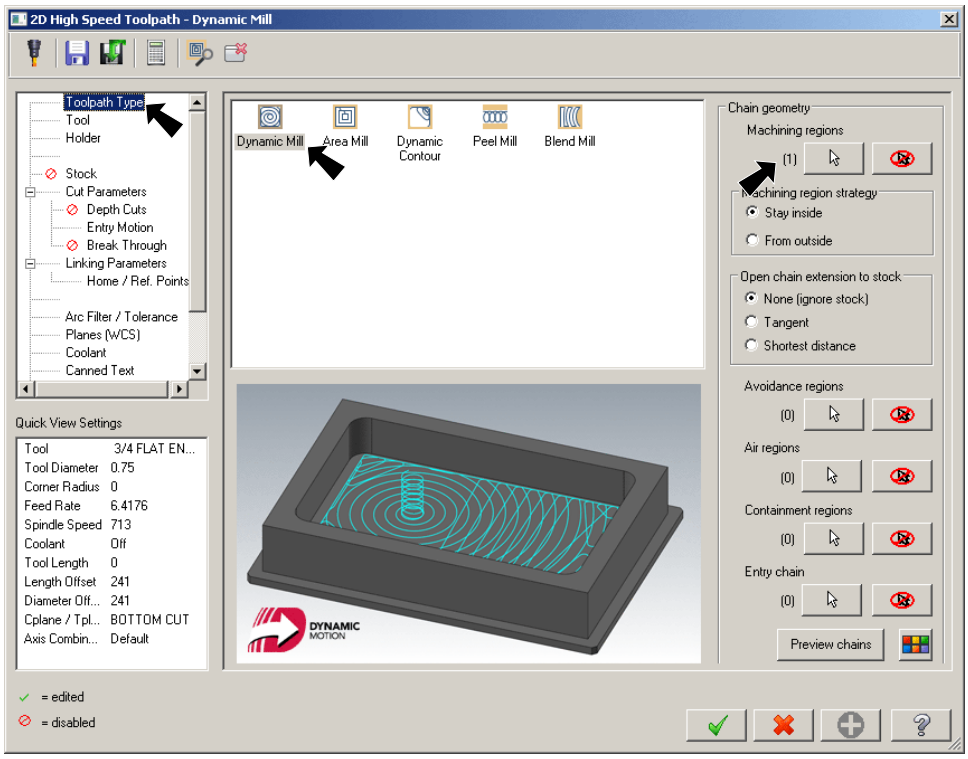

Fig. 46

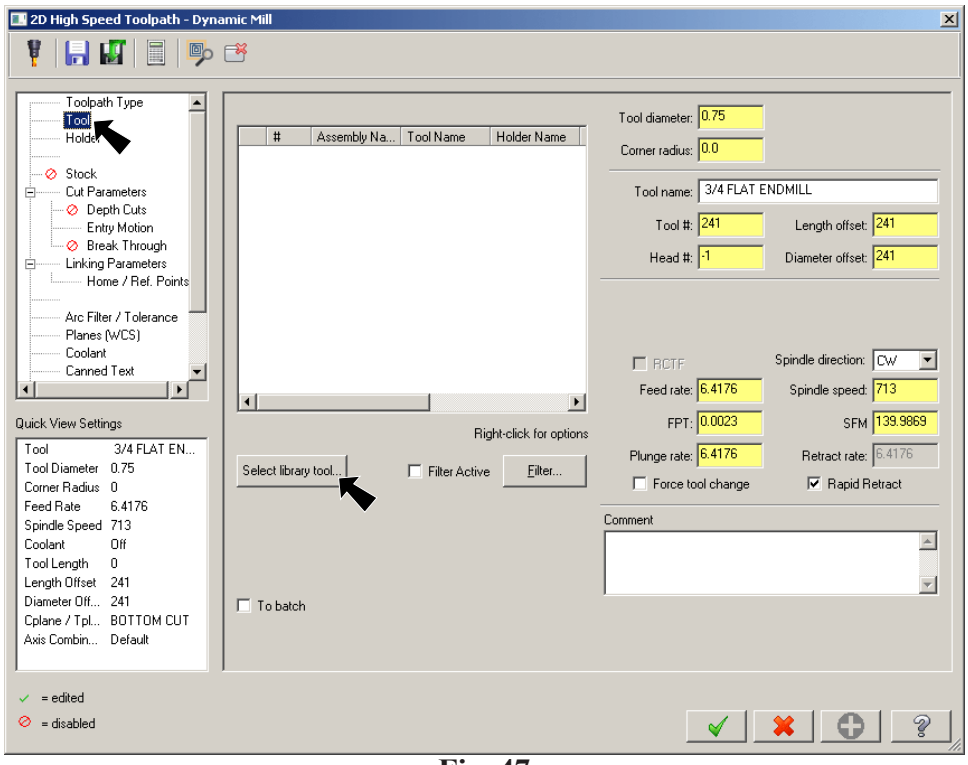

Fig. 47

Step 9. Click **Filter** button **Fig. 48**.

Step 10. Click **None** button under **Tool Types** **Fig. 49**.

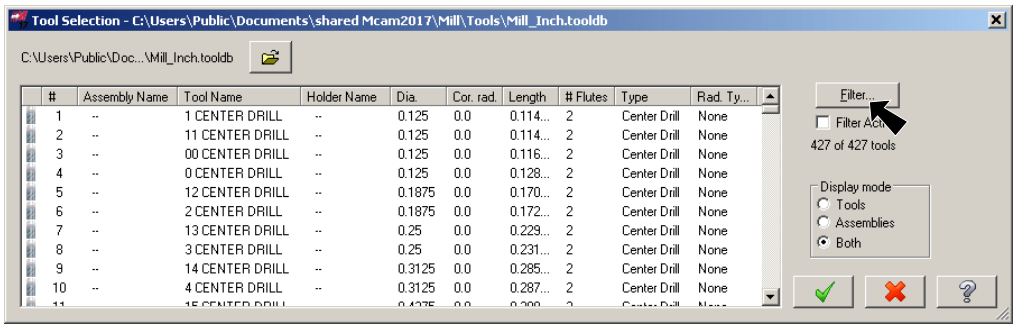

Fig. 48

Step 11. Click **Endmill1 Flat** button (first button top row) and click OK **Fig. 49**.

Step 12. Click **285 1/4 FLAT ENDMILL** and click OK, **Fig. 50**.

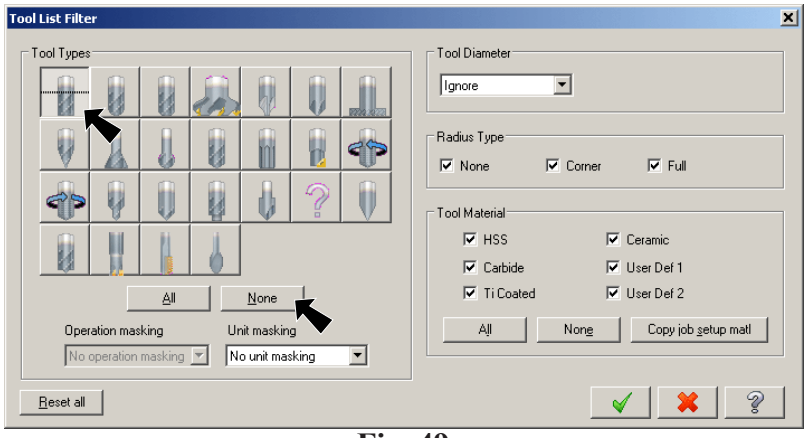

Fig. 49

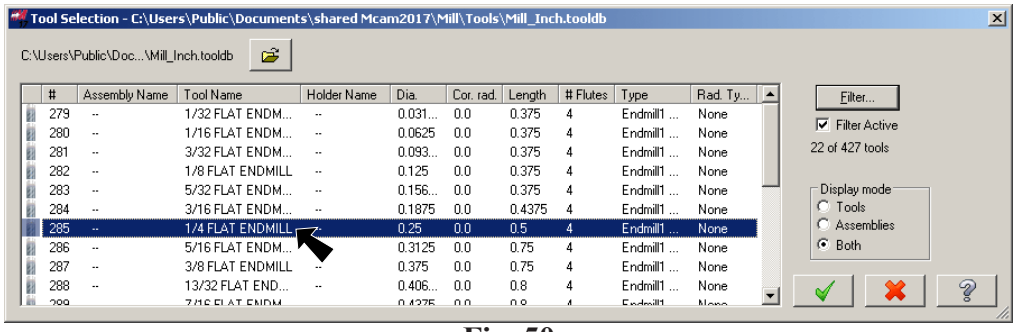

Fig. 50

Step 13. Back in **Tool** page set:

Feed rate 40
Plunge rate 20
Fig. 51.

Step 14. Select **Cut Parameters** from tree control and set:

Cutting method Climb

Stepover 45%

Stock to leave on walls and floors 0
Fig. 52.

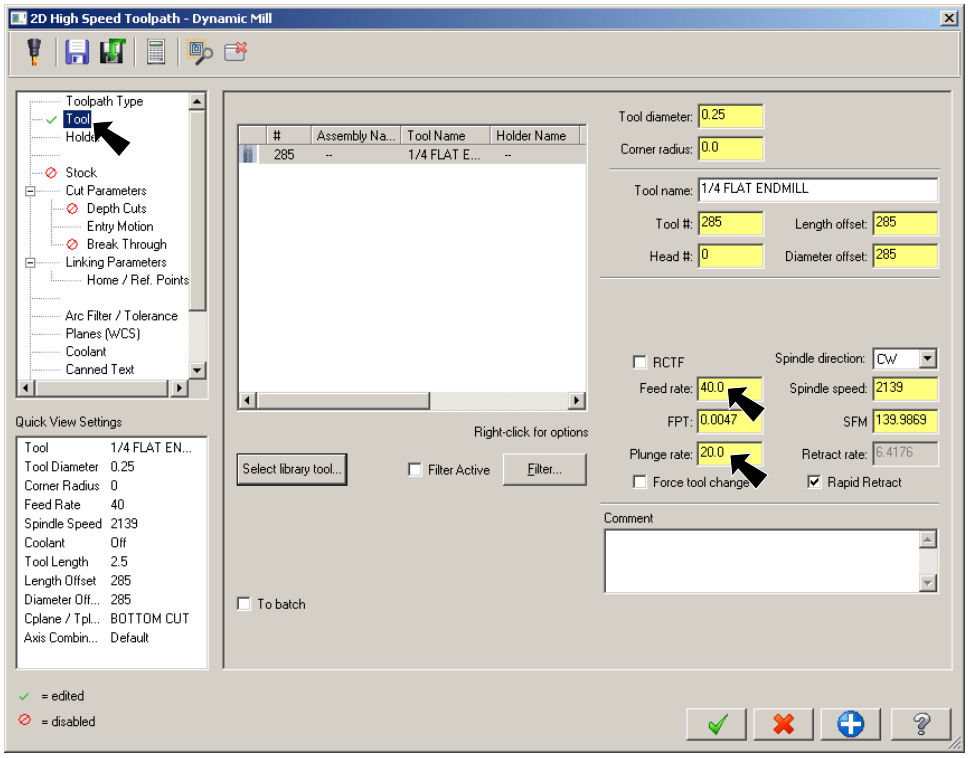

Fig. 51

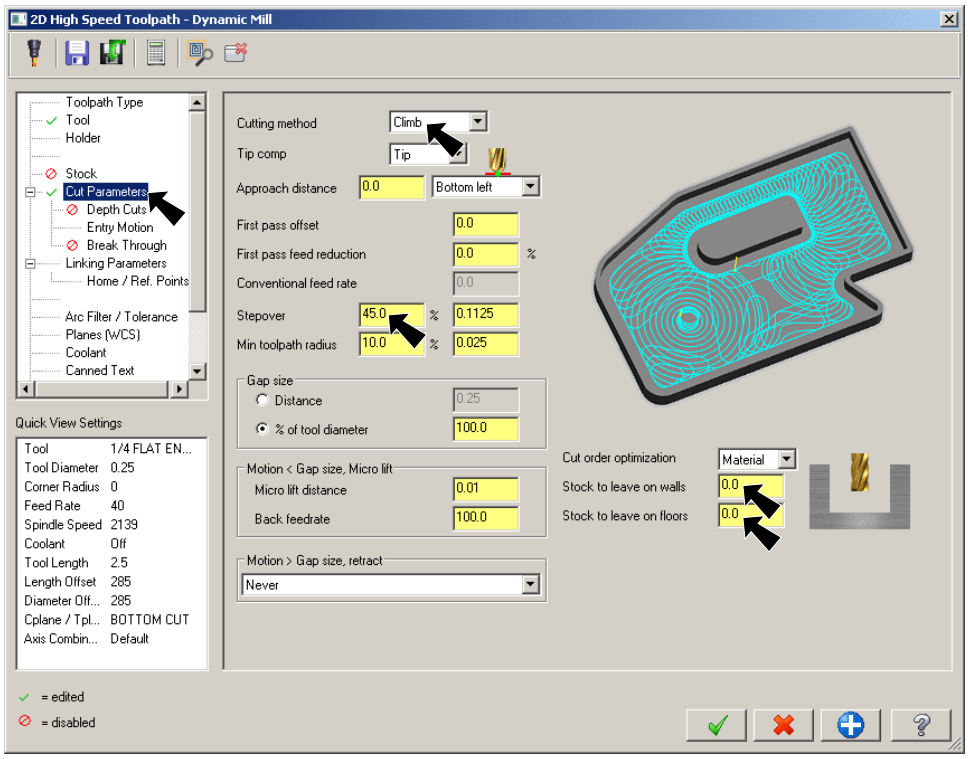

Fig. 52

Step 15. Select **Entry Motion** from tree control and set:

Plunge angle 10
Fig. 53.

Step 16. Select **Linking Parameters** from tree control and set:

Clearance 1

Depth -.15
Fig. 54.

Step 17. Click OK  in Dynamic Mill dialog box.

Step 18. Allow Mastercam to calculate the toolpath.

Step 19. Save  (**Ctrl-S**).

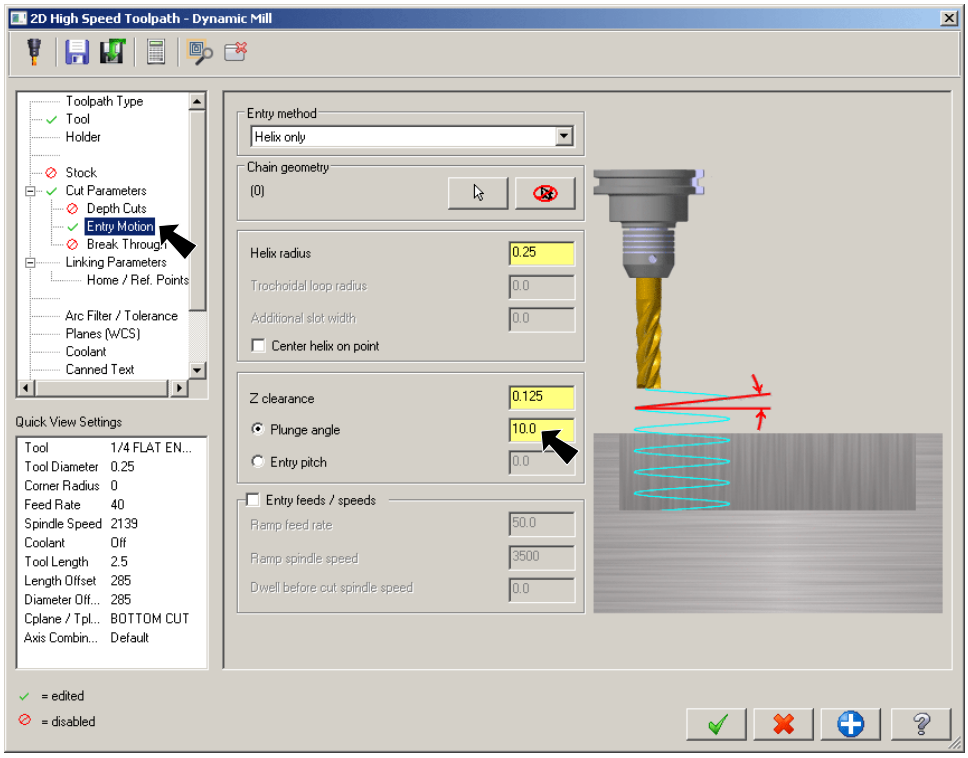

Fig. 53

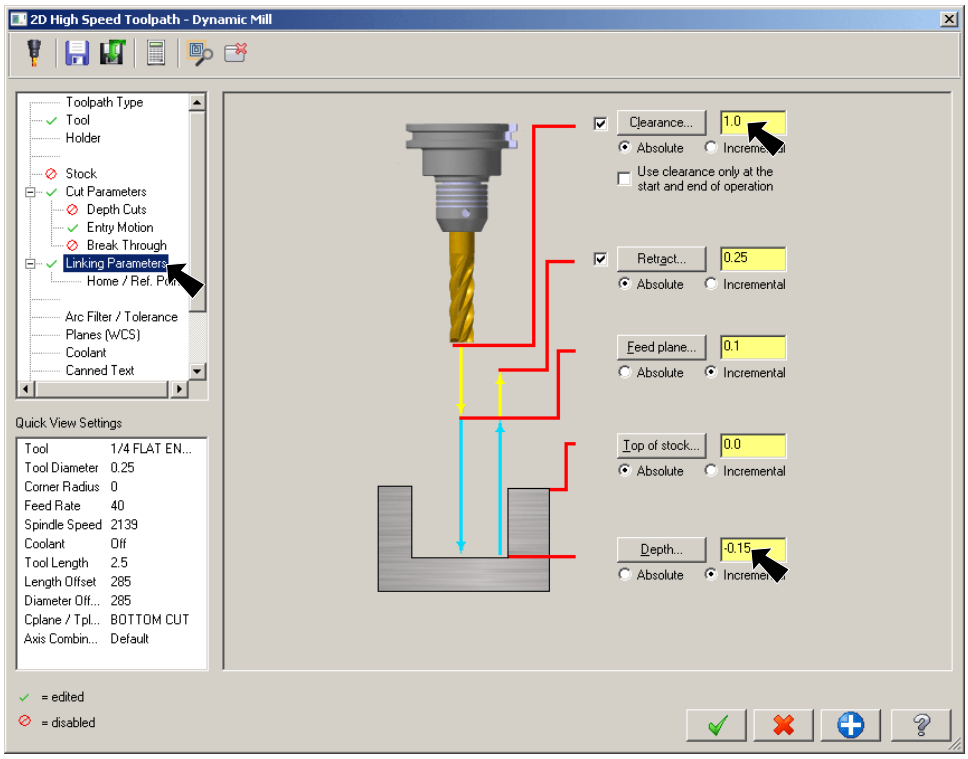

Fig. 54

M. Verify Dynamic Mill Toolpath.

Step 1. Click **Verify** in the Toolpaths Manager, **Fig. 55**.

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. 56**.

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

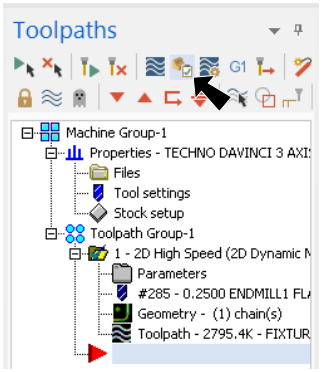

Fig. 55

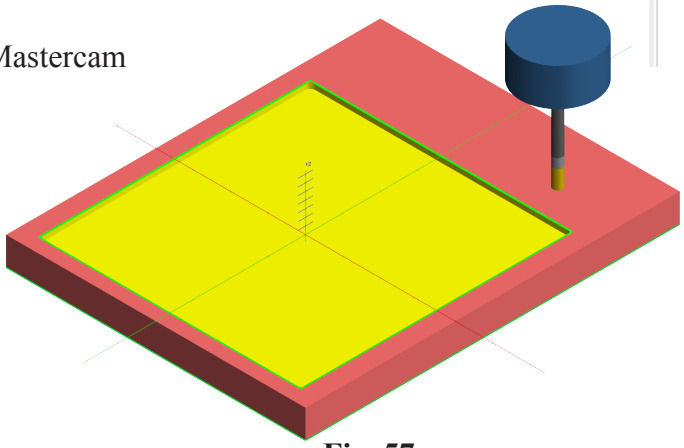

Fig. 57

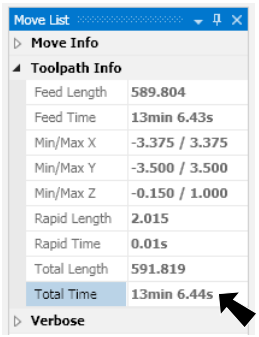

Fig. 56

N. Switch to TOP CUT WCS.

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

Step 2. In the Planes Manger (**Alt-L**) set:
under Name, **Fig. 58**
Click **TOP CUT**
Click **Set All** .

Step 3. Change to the Isometric View. **Right click** in the graphics window and click Isometric (WCS) (**Alt-7**).

Step 4. Save (**Ctrl-S**).

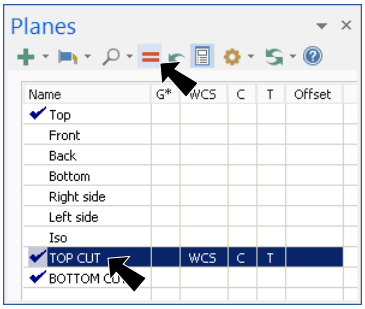

Fig. 58

O. FBM Drill Toolpath.

Step 1. On the Toolpaths tab TOOLPATHS in the 2D group click **Expand gallery** button and click **FBM Drill** FBM Drill, **Fig. 59**.

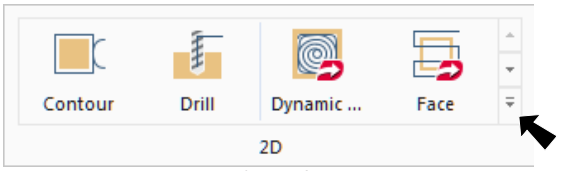

Fig. 59

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

Confirm: Limit search to plane **Top** **Fig. 60**.

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

Uncheck **Spot Drilling** check box **Fig. 61**.

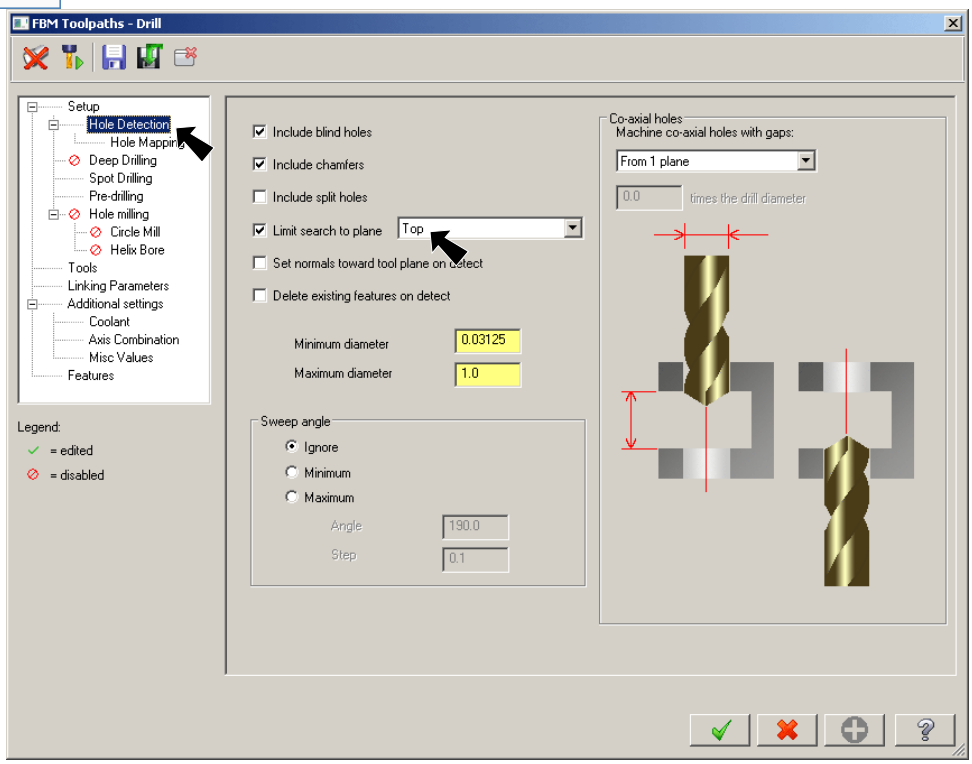

Fig. 60

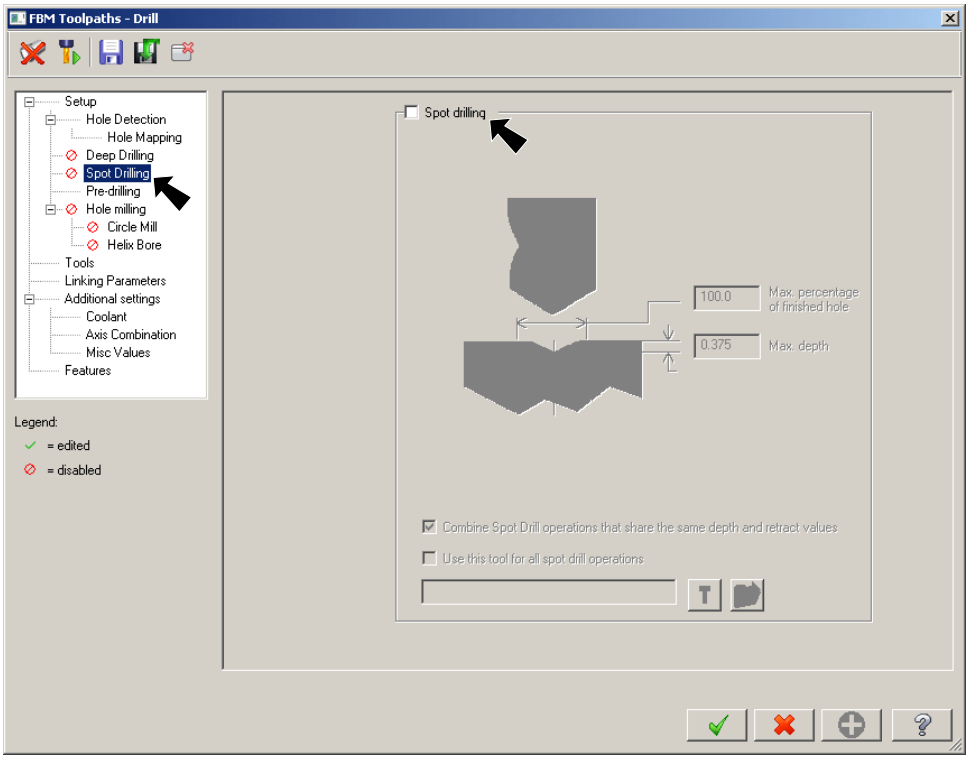

Fig. 61

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

Uncheck **Pre-drilling** check box
Fig. 62.

Step 5. Click **Detect** button  at the top of the dialog box to detect the holes **Fig. 62**.

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

Click OK 
Fig. 63.

Step 7. Save  (**Ctrl-S**).

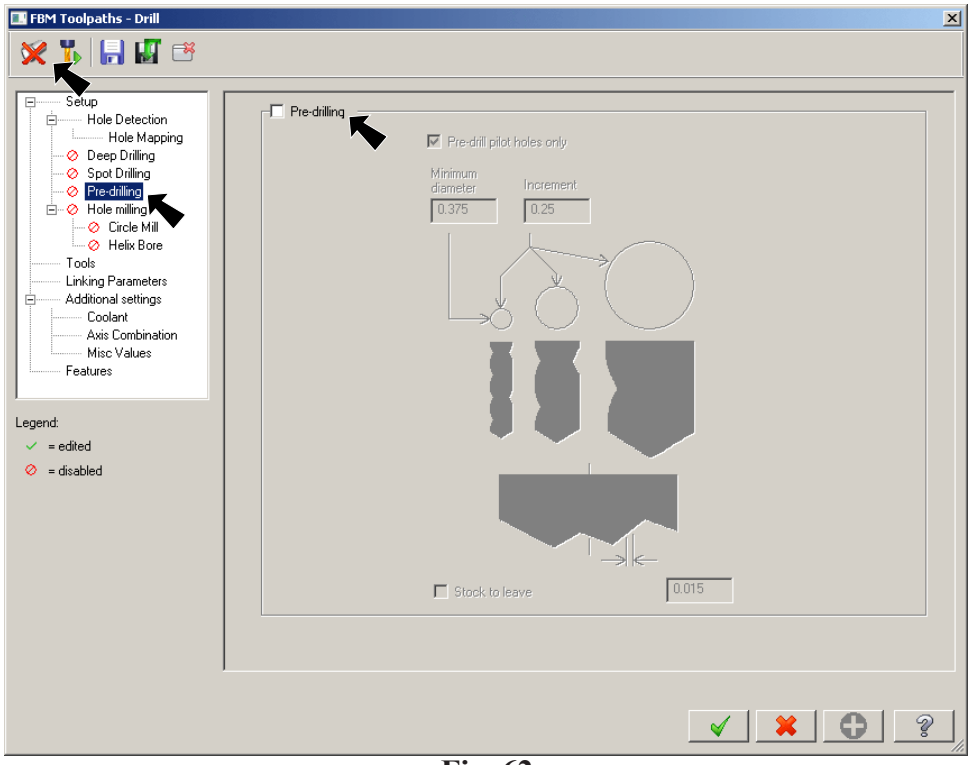

Fig. 62

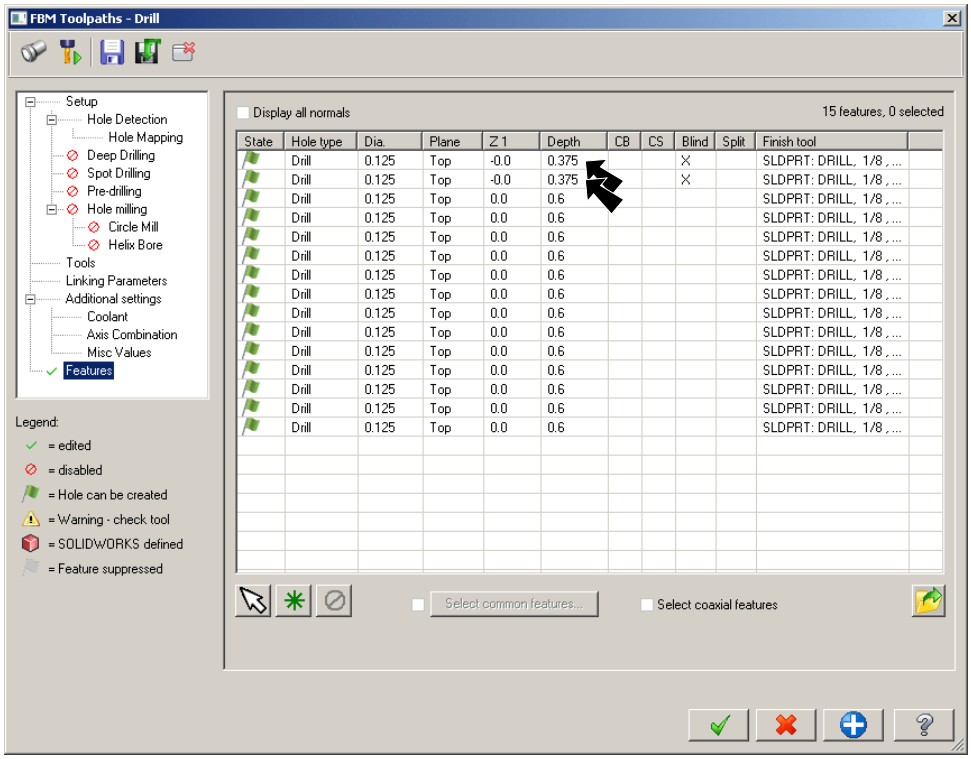

Fig. 63

P. Backplot.

Step 1. Use **Ctrl-T** to toggle **Translucency**.

Step 2. In Toolpaths Manager click **FBM Drill** to select toolpath group, **Fig. 64**.

Step 3. Click **Backplot** in Toolpaths Manager, **Fig. 64**.

Step 4. Turn on (button depressed) **Display tool** and **Display rapid moves**, **Fig. 65**.

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

Step 6. Click OK to close Backplot.

Step 7. Use **Ctrl-T** to toggle **Translucency**.

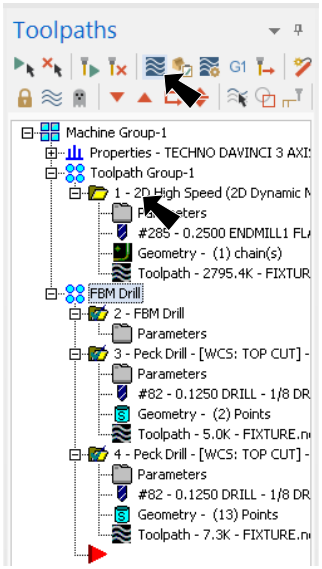

Fig. 64

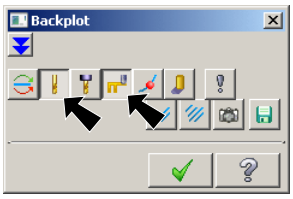

Fig. 65

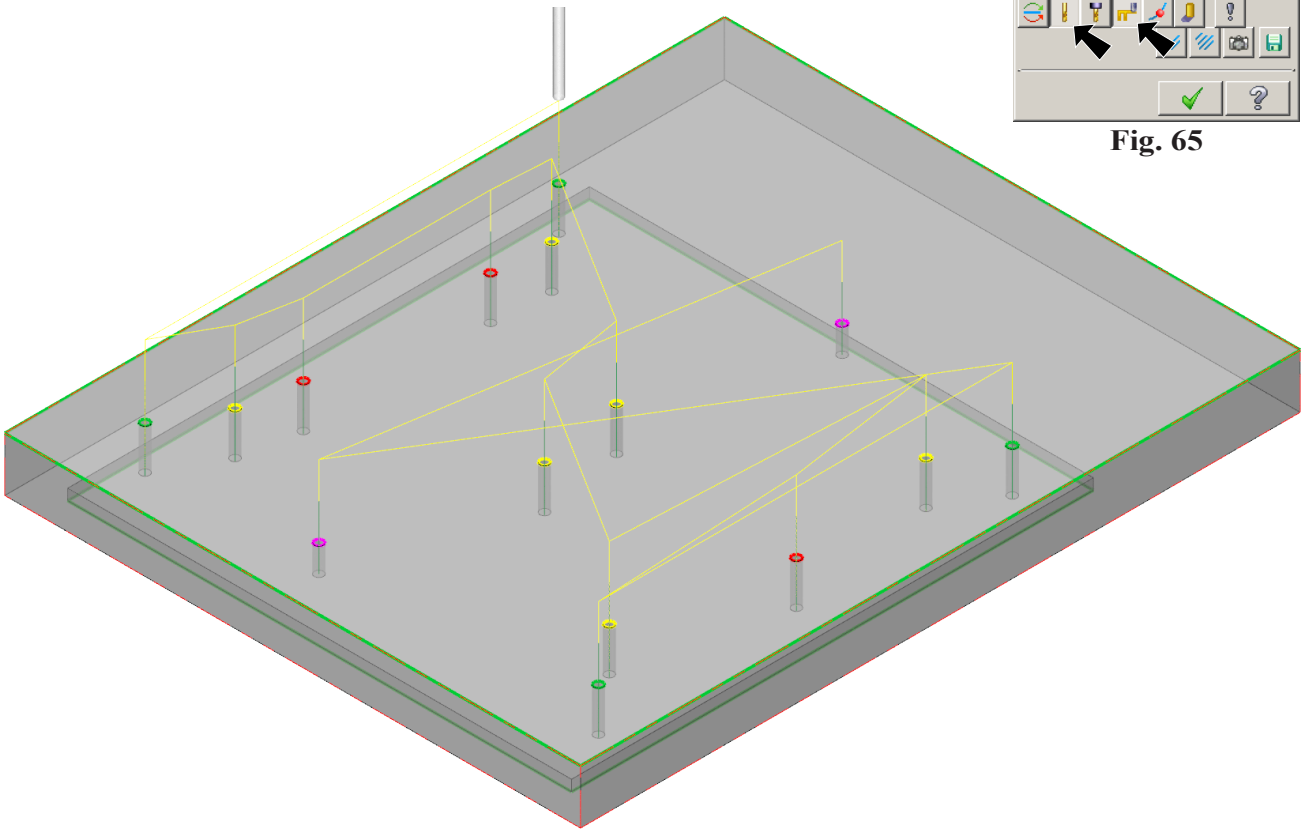

Fig. 66