

Chapter 4 Toolpaths for CO2 Body

Drill Holes - Wheel Cutouts (Pocket/Parallel) - Cut Body (Parallel/Blend)

A. Machine Type and Stock Setup.

Step 1. Click Machine Type Menu > Mill > MPTECHNO.MMD.

Step 2. If necessary, display Operations Manager. Use **Alt-O**.

Step 3. Expand **Properties** (click the +) in the Toolpaths Manager, **Fig. 1**.

Step 4. Click **Stock Setup** in the Toolpaths Manager, **Fig. 1**.

Step 5. Click **All Entities** button in the Stock Setup, **Fig. 2**.

Step 6. Click OK  in the Machine Group Properties, **Fig. 2**.

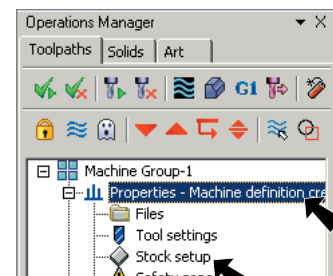


Fig. 1

B. Set WCS to LEFT CUT.

Step 1. Click **WCS** in the Status Bar at the bottom of the screen and **View Manager**.

Step 2. Click the **LEFT CUT** view from the list of views in the View Manager, **Fig. 3**.

Step 3. Click the Set All button  and click OK , **Fig. 3**.

Step 4. Change to the Isometric View, use . Check the origin. Use **F9** to show and hide axes.

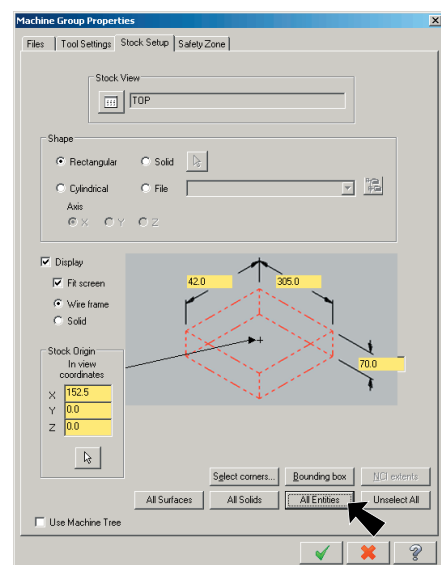


Fig. 2

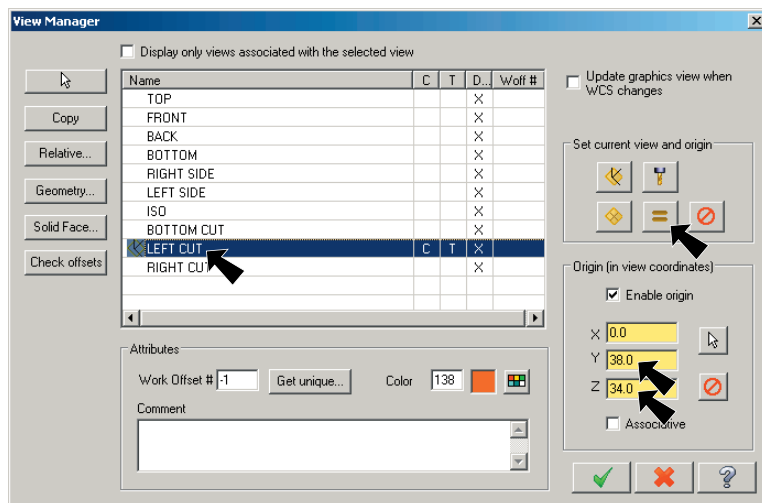


Fig. 3

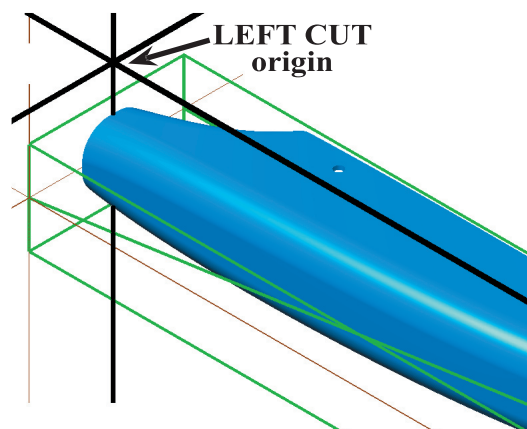


Fig. 4

C. FBM Drill Toolpath.

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

Step 2. Select **Hole Detection** from the tree control and set **Limit search to plane** to **LEFT CUT**, Fig. 5.

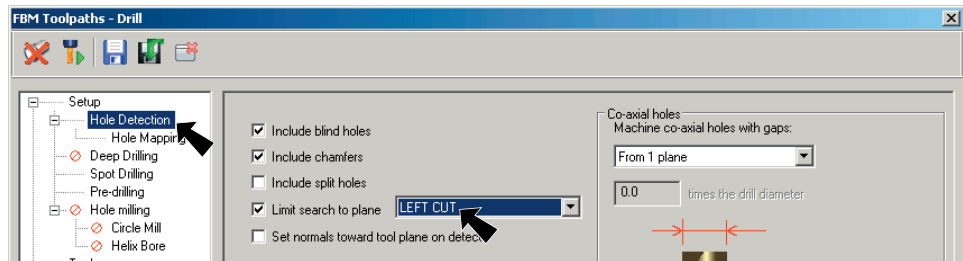


Fig. 5

Step 3. Select **Deep Drilling** from the tree control and check **Deep drilling** check box, Fig. 6.

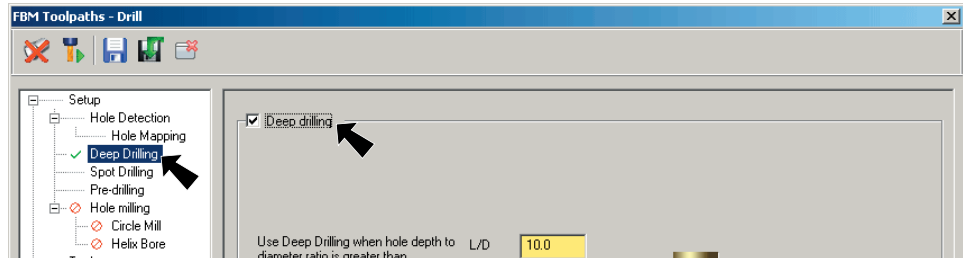


Fig. 6

Step 4. Select **Spot Drilling** from the tree control and uncheck **Spot Drilling** check box, Fig. 7.

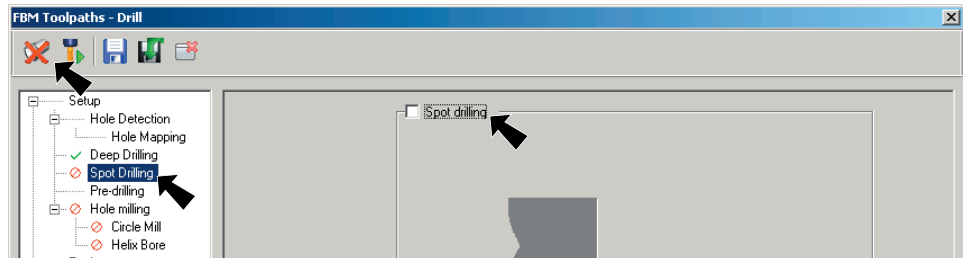


Fig. 7

Step 5. Click **Detect** button  at the top of the dialog box to find the holes, Fig. 7.

Step 6. Click the body solid, Fig. 8.

Step 7. Review the holes listed, Fig. 9 and click OK .

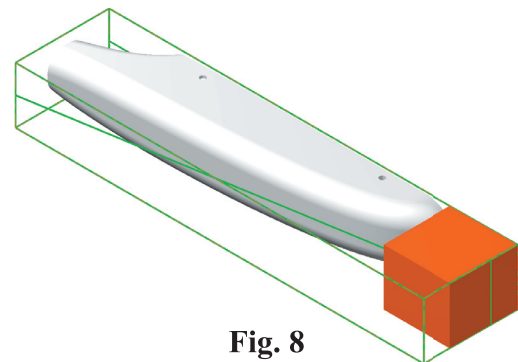


Fig. 8

Step 8. Click OK  in the NC name dialog, Fig. 10.

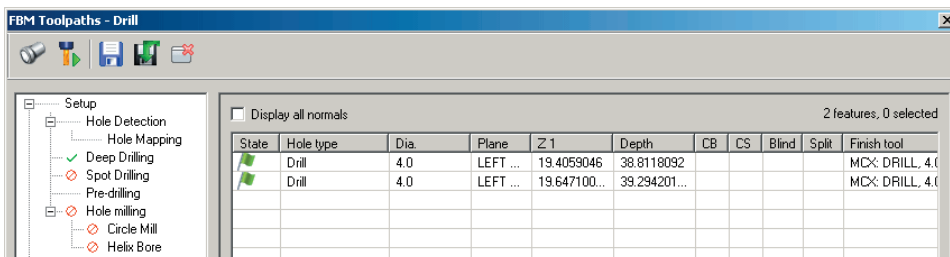


Fig. 9

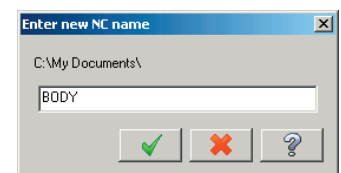


Fig. 10

D. Backplot Toolpath.

Step 1. Click **Backplot**  in Toolpaths Manager, **Fig. 11**.

Step 2. Turn on (depressed) **Display tool** , **Display holder**  and **Display rapid moves**  in the Backplot dialog box, **Fig. 12**.

Step 3. Adjust the speed to **75%** in the Backplot VCR bar, **Fig. 13**.

Step 4. Click **Play**  in the Backplot VCR bar, **Fig. 13**.

Step 5. Click **OK**  to close Backplot.

Step 6. Save your drawing. Use **Alt-F S**.

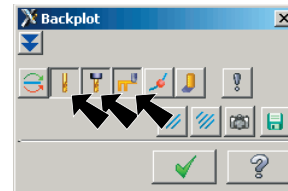


Fig. 12

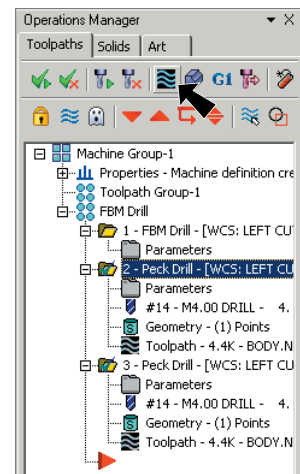


Fig. 11



Fig. 13

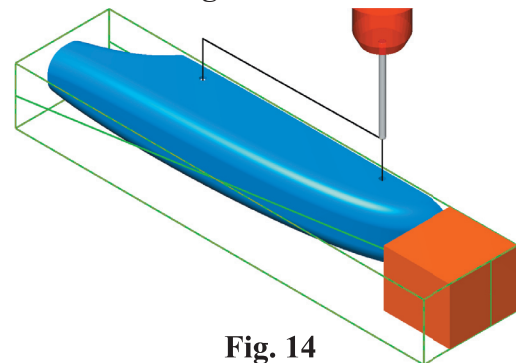


Fig. 14

E. Set-up Toolpath Groups.

Step 1. Use **Alt-T** to turn off toolpath display.

Step 2. Insert a new **Toolpath group**. To insert group, **right click Machine Group 1** at the very top and click **Groups > New Toolpath group** from the menu, **Fig. 15**.

Step 3. Rename Toolpath Group 2 to **BOTTOM WHEEL CUTOUTS**, **Fig. 16**.

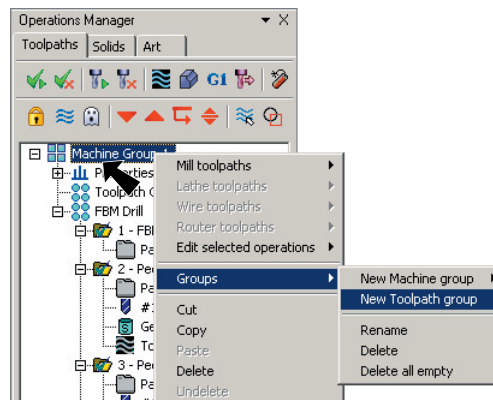


Fig. 15

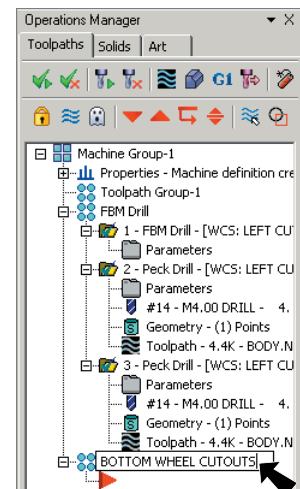


Fig. 16

F. Set WCS to BOTTOM CUT.

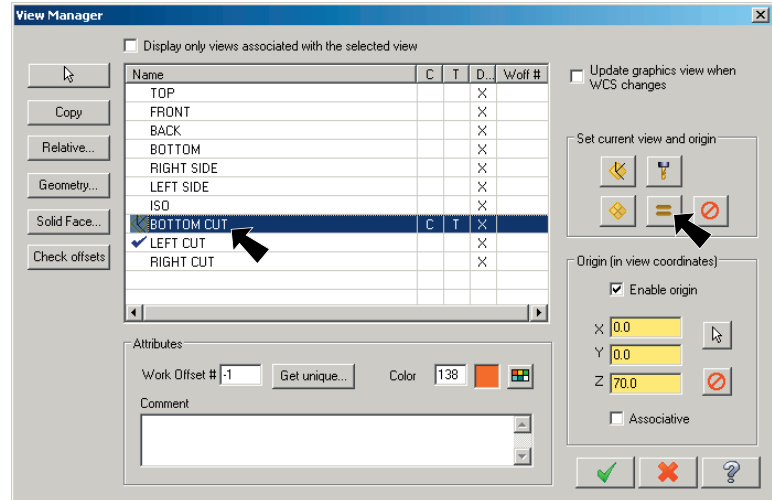
Step 1. Click **WCS** in the Status Bar at the bottom of the screen and **View Manager**.

Step 2. Click the **BOTTOM CUT** view from the list of views in the View Manager, **Fig. 17**.

Step 3. Click the Set All button



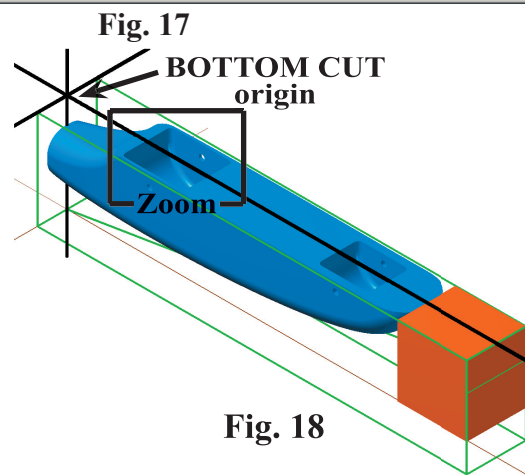
, **Fig. 17** and click OK



Step 4. Change to the Isometric View.



Step 5. Check origin. Use **F9** to show and hide axes.



G. Rear Wheel Cutout Rough Pocket Toolpath.

Step 1. Zoom-in on the rear wheel cutout. Use **F1** and make a zoom window, **Fig. 18**.

Step 2. Click Toolpaths Menu > Surface Rough > **Pocket**.

Step 3. Click **Activate solid selection**



button in

the Solids selection ribbon bar and click **Select face** and unselect others, **Fig. 19**.



Fig. 19

Step 4. Click all the surfaces inside the wheel cutout. The edges will highlight when selected, **Fig. 20**. Use **Alt key and Down arrow key** to rotate view to select all surfaces, **Fig. 21**.

Step 5. **Press ENTER** to accept solid selection and press **ENTER again** to accept Drive surfaces.

Step 6. Click **Containment Select** button, **Fig. 22**.

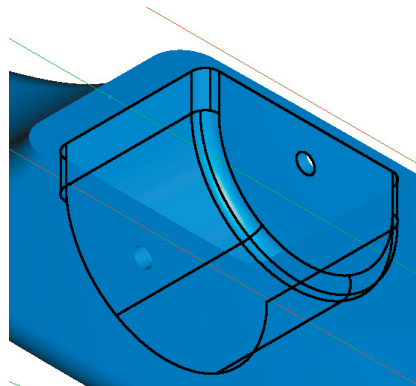


Fig. 20

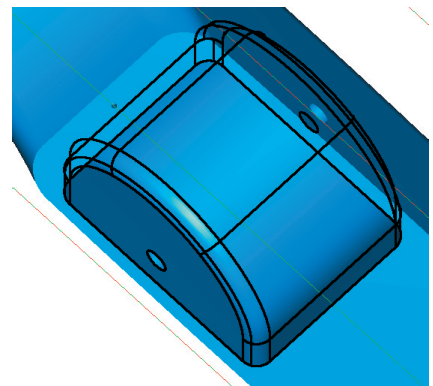


Fig. 21

Step 7. Click the **Solids** button  in the Chaining dialog box, **Fig. 23**.

Step 8. **Turn off** Face button  and keep **Loop** button  on (depressed) in the Chaining dialog box, **Fig. 23**.

Step 9. Click an edge of the wheel cutout, **Fig. 24**. The edges of the bottom body face and the wheel cutout should be selected. If the wrong edges are selected, click **Other face** in Pick Reference Face dialog box, **Fig. 25**. Click the OK  in the Pick Reference Face dialog box.

Step 10. Click the OK  in the Chaining dialog box.

Step 11. Click the OK button  in the Toolpath/surface selection dialog box.

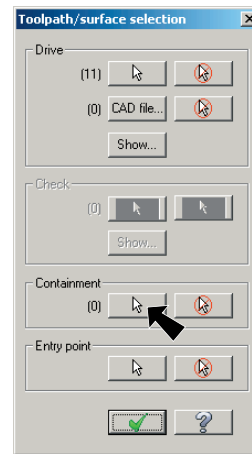


Fig. 22

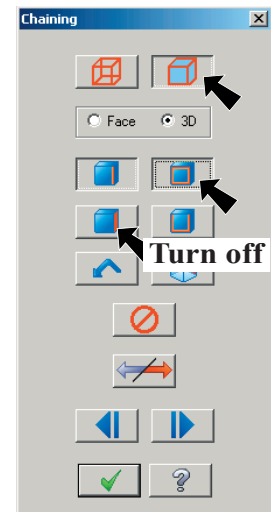


Fig. 23

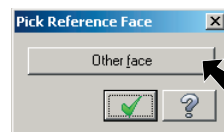


Fig. 25

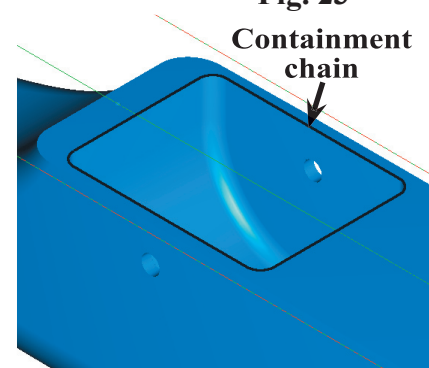


Fig. 24

H. Set Tool and Params.

Step 1. Click **Select library tool** button, **Fig. 26**.

Step 2. Click the **Filter** button, **Fig. 27**.

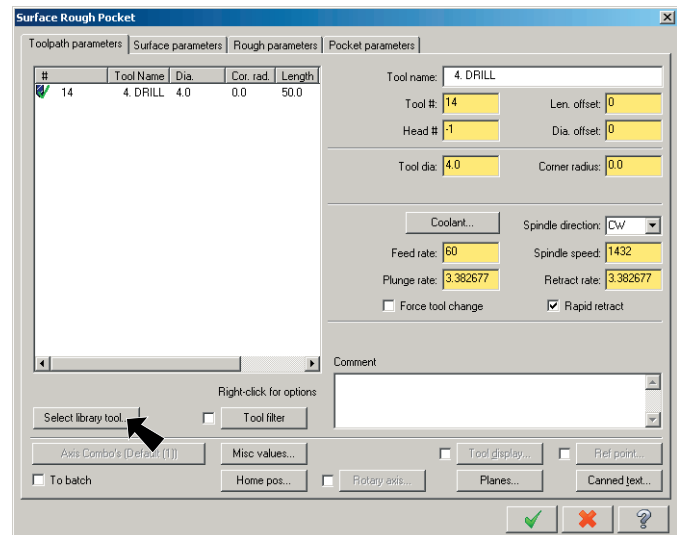


Fig. 26

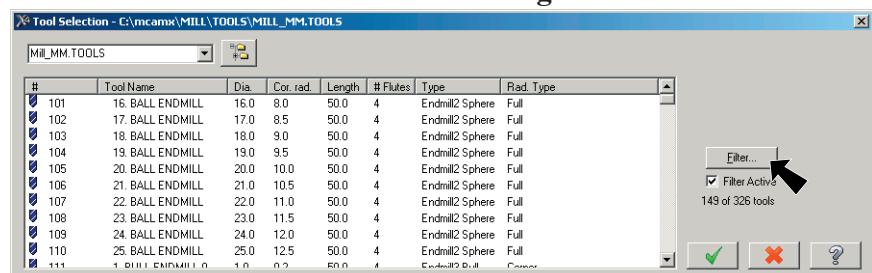


Fig. 27

Step 3. Click **None** button under **Tool Types**, **Fig. 28**.

Step 4. Click **Endmill2 Sphere** button (second button top row), **Fig. 28** and click OK.

Step 5. Click **240 Endmill2 Sphere 6mm**, **Fig. 29** and click OK.

Step 6. Set **Feed rate: 120** **Fig. 30**.

Step 7. Set **Plunge Rate: 60**

Step 8. Click the **Surface parameters** tab at the top of the dialog box, **Fig. 30**.

Step 9. Uncheck **Clearance**, **Fig. 31**.

Step 10. Uncheck **Retract**, **Fig. 31**.

Step 11. Set **Feed plane: 0** and click **Absolute**.

Step 12. Set **Stock to leave on drive: 1**

Step 13. Click the **Rough parameters** tab at the top of the dialog box, **Fig. 31**.

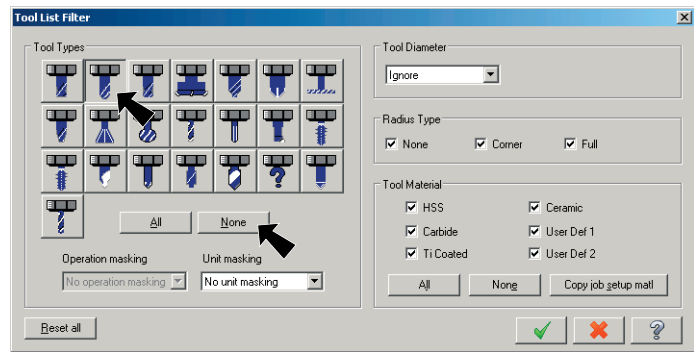


Fig. 28

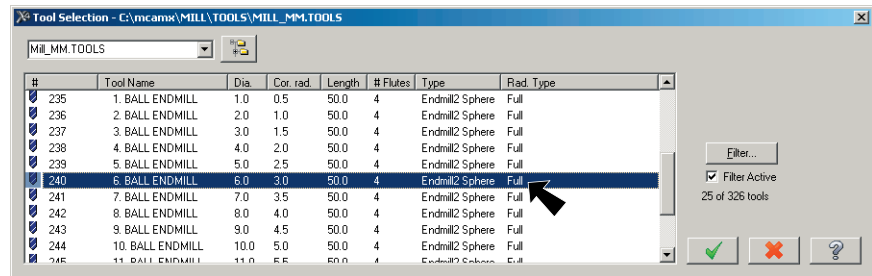


Fig. 29

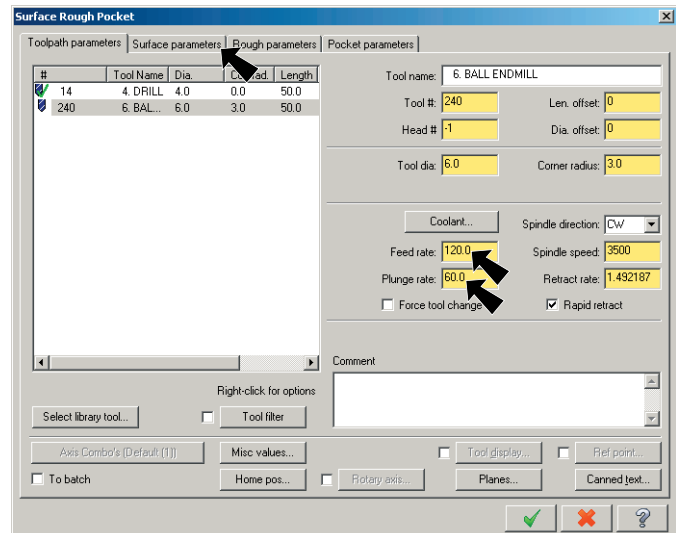


Fig. 30

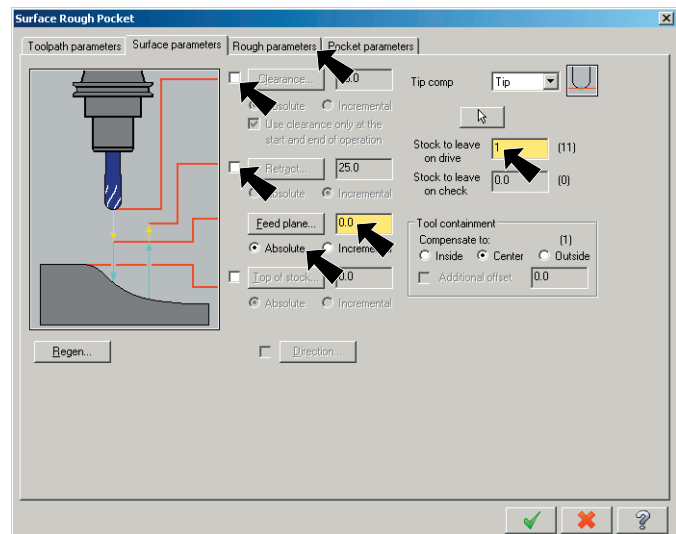


Fig. 31

Step 14. Set **Maximum stepdown: 4** Fig. 32

Step 15. Click the **Total tolerance button**,
Fig. 32.

Step 16. Set the 3 sliders to: **Fig. 33**
Normal - NC program length
Good - Surface quality
Normal - Calculation time

Step 17. Click to place check in all Create Arcs checkboxes, **Fig. 33.**

Step 18. Click OK .

Step 19. Click **Cut depths** button. **Fig. 32**

Step 20. Set **Adjustment to top cut 6** and click OK
 **Fig. 34**

Step 21. Click the **Pocket parameters tab** at the top of the dialog box, **Fig. 35.**

Step 22. Set **Cutting method: Parallel Spiral** **Fig. 35**

Step 23. Set **Stepover percentage: 55**

Step 24. Uncheck: **Finish**

Step 25. Click OK .

Step 26. Click OK to warning of large amount of material.

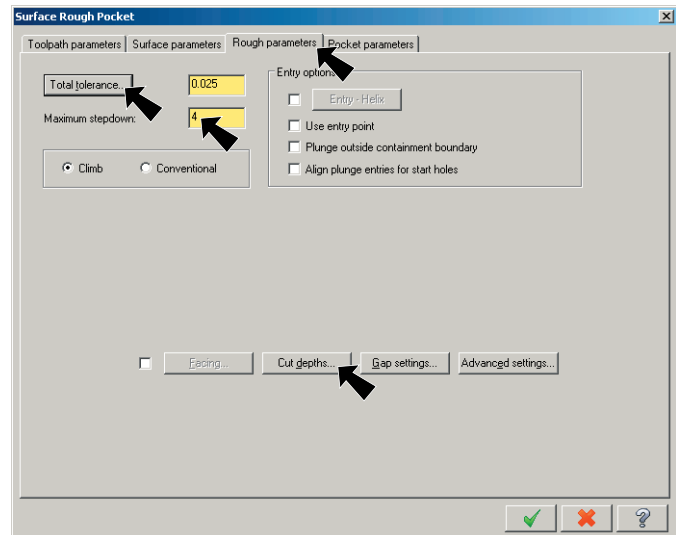


Fig. 32

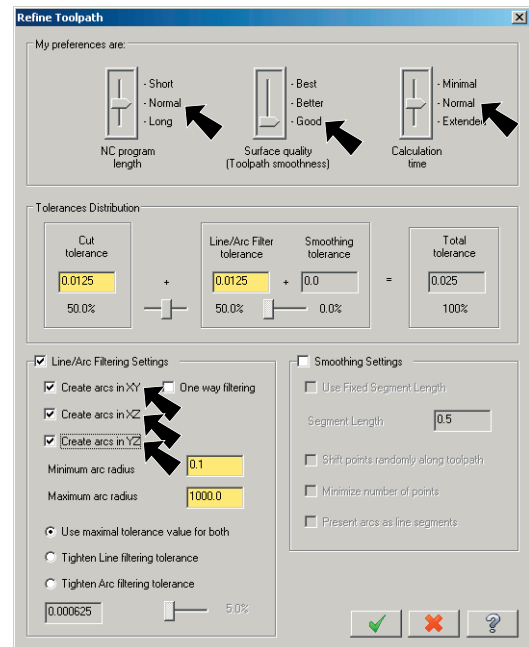


Fig. 33

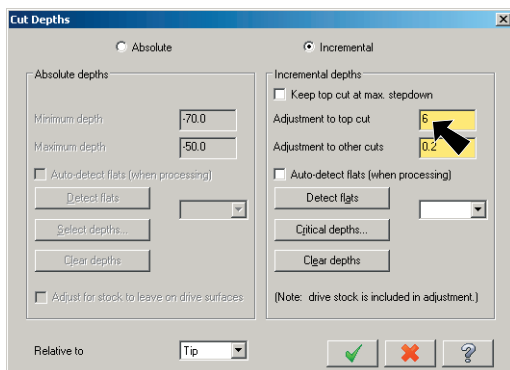


Fig. 34

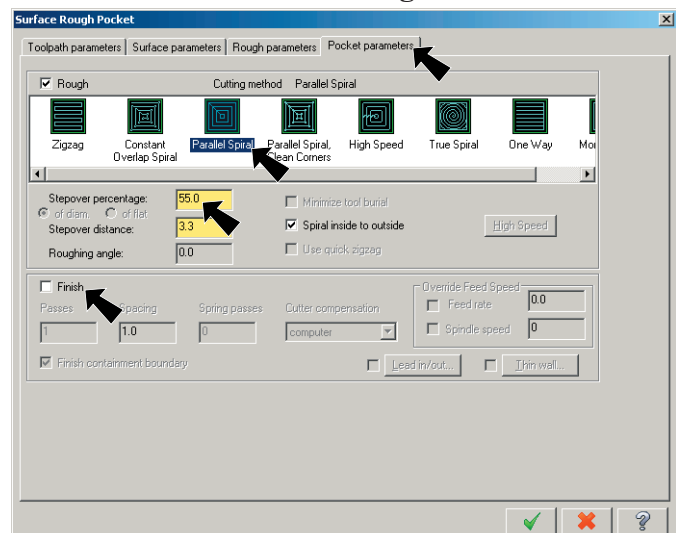


Fig. 35

I. Finish Parallel Toolpath.

Step 1. Use **Alt-T** to turn off toolpath display.

Step 2. Click Toolpaths Menu > Surface Finish > **Parallel**.

Step 3. Click **Activate solid selection**



Fig. 36

button  in the Solids selection ribbon bar and click **Select face**  and unselect others, Fig. 36.

Step 4. Click all the surfaces inside the wheel cutout. The edges will highlight when selected, Fig. 37. Use **Alt** key and **Down arrow** key to rotate view to select all surfaces, Fig. 38.

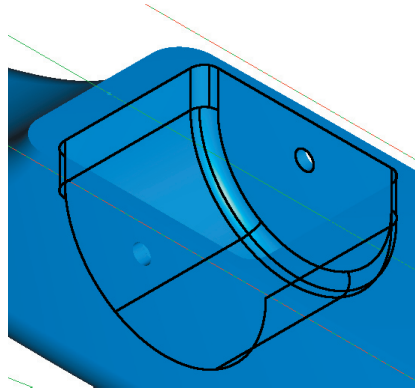


Fig. 37

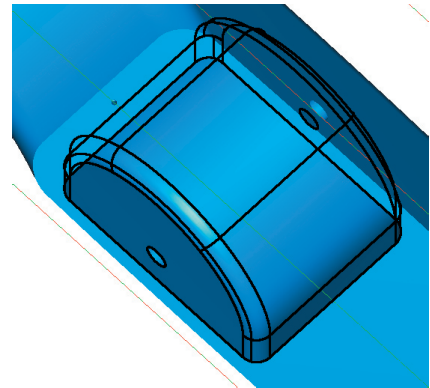


Fig. 38

Step 5. **Press ENTER** to accept solid selection and **press ENTER again** to accept Drive surfaces.

Step 6. Click **Containment Select** button, Fig. 39.

Step 7. Click the **Solids** button  in the Chaining dialog box, Fig. 40.

Step 8. **Turn off Face** button  and keep **Loop** button  on (depressed) in the Chaining dialog box, Fig. 40.

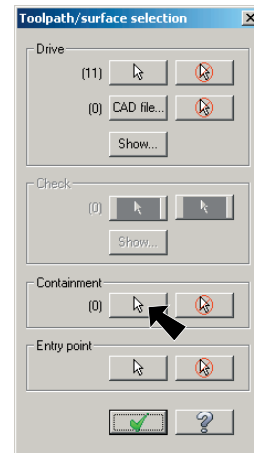


Fig. 39

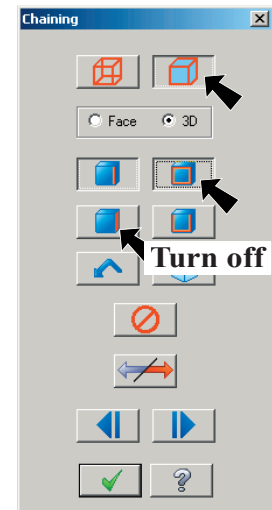


Fig. 40

Step 9. Click an edge of the wheel cutout, Fig. 41. The edges of the bottom body face and the wheel cutout should be selected. If the wrong edges are selected, click **Other face** in Pick Reference Face dialog box, Fig. 42. Click the OK button  in the Pick Reference Face dialog box.

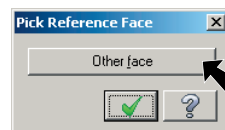


Fig. 42

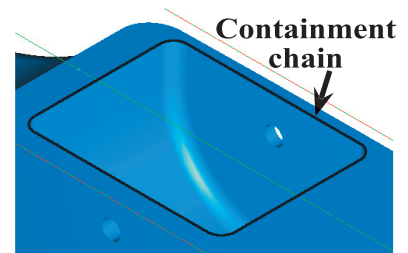


Fig. 41

Step 10. Click the OK button  in the Chaining dialog box.

Step 11. Click the OK button  in the Toolpath/surface selection dialog box.

J. Set Finish Parallel Params.

Step 1. Set **Feed Rate: 120** and **Plunge Rate: 60** Fig. 43.

Step 2. Click the **Surface Parameters** tab at the top of the dialog box, Fig. 43.

Step 3. Uncheck **Clearance**, Fig. 44.

Step 4. Uncheck **Retract**, Fig. 44.

Step 5. Set **Feed plane: 0** and click **Absolute**.

Step 6. Click the **Finish Parallel Parameters** tab at the top of the dialog box, Fig. 44.

Step 7. Set **Max Stepper: 1** Fig. 45

Step 8. Set **Machining angle: 0**

Step 9. Click **Gap settings** button. Fig. 45

Step 10. Under Motion, select **Follow surface(s)**, Fig. 46

Step 11. Check **Optimize cut order** and click OK , Fig. 46.

Step 12. Click **Advanced settings** button, Fig. 45.

Step 13. Select **Only between surfaces (solid faces)**, Fig. 47.

Step 14. Select **Skip hidden face test for solid bodies** and click OK  twice, Fig. 47.

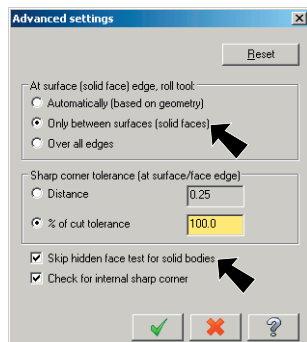


Fig. 47

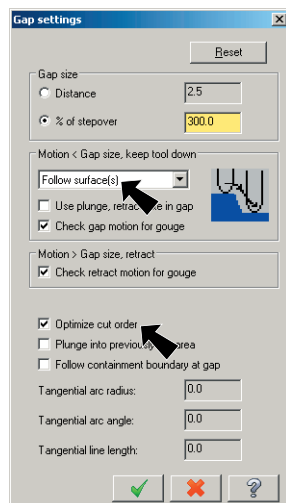


Fig. 46

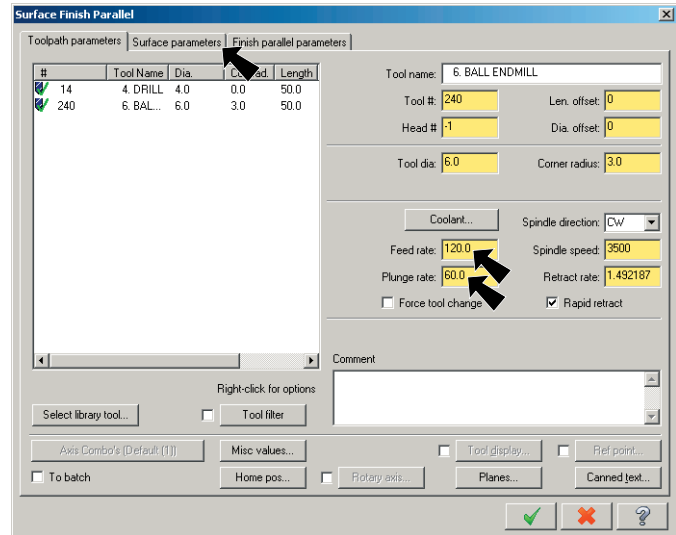


Fig. 43

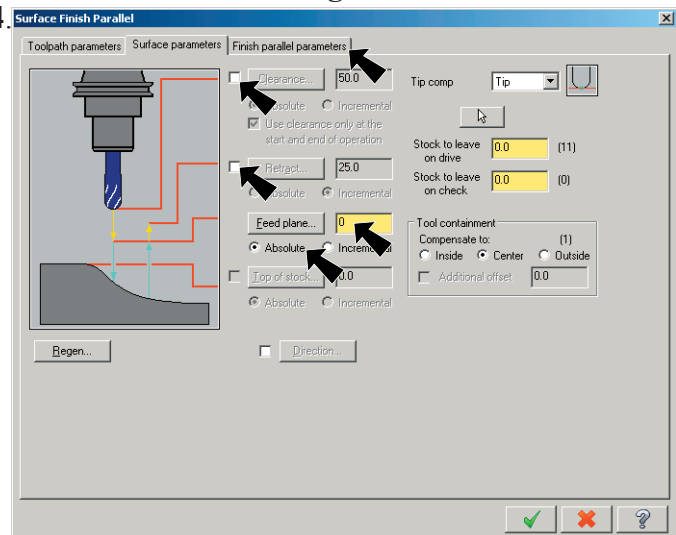


Fig. 44

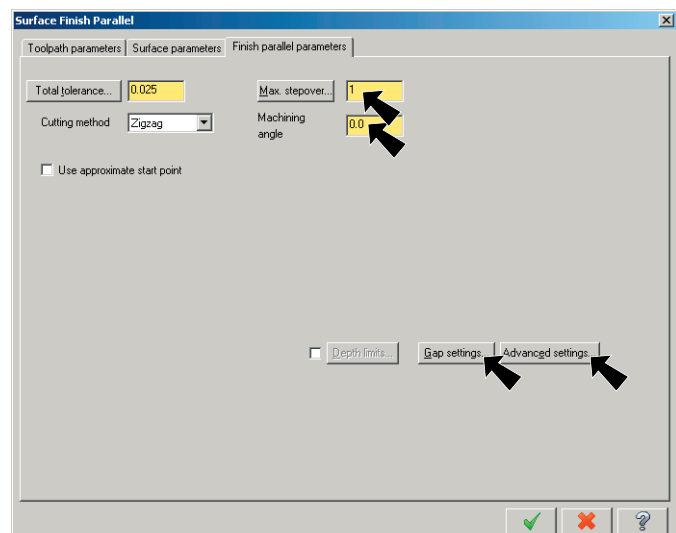


Fig. 45

K. Verify Wheel Cutout.

Step 1. Change to Isometric View. Use  or **Alt-7**.

Step 2. In the Toolpaths Manager, click the **BOTTOM WHEEL CUTOUTS Toolpath group** to select both cutout toolpaths, **Fig. 48**.

Step 3. Click **Verify**  in the Toolpaths Manager, **Fig. 49**.

Step 4. Click **Machine quickly**  in Verify dialog box, **Fig. 49**.

Step 5. Turn on (button depressed) **Simulate tool** .

Step 6. Click the **Play**  in the Verify dialog box to start the machining.

Step 7. Click OK  to close Verify dialog box.

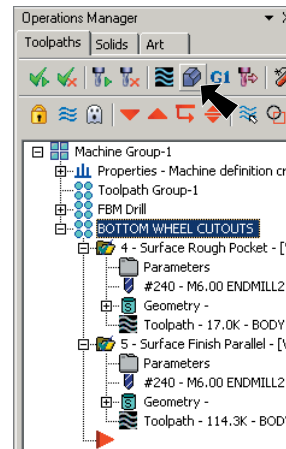


Fig. 48

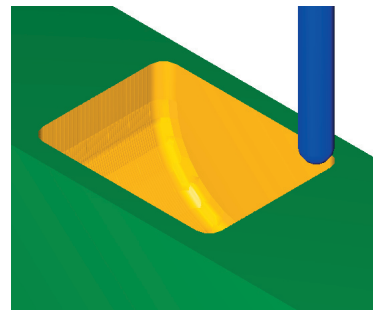


Fig. 50

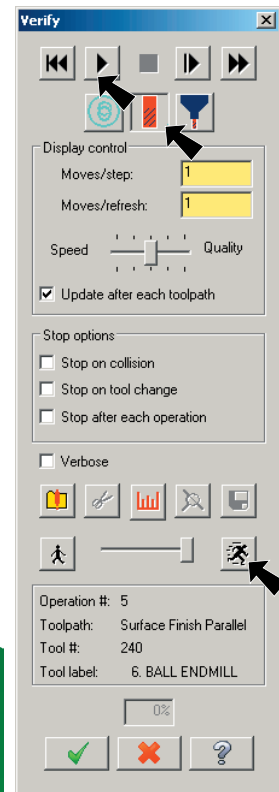


Fig. 49

L. Copy Wheel Cutout Toolpaths for Front Cutout.

Step 1. **Right click BOTTOM WHEEL CUTOUTS Toolpath group** in the Ops Manager and click **Copy** from the menu, **Fig. 51**.

Step 2. **Right click BOTTOM WHEEL CUTOUTS again** and click **Paste**.

M. Select Geometry for Front Wheel Cutout.

Step 1. Zoom-in on the front wheel cutout. Use **F1** and make a zoom window, **Fig. 53**.

Step 2. Expand (click +) **6 Surface Rough Pocket** and click **Geometry**, **Fig. 52**.

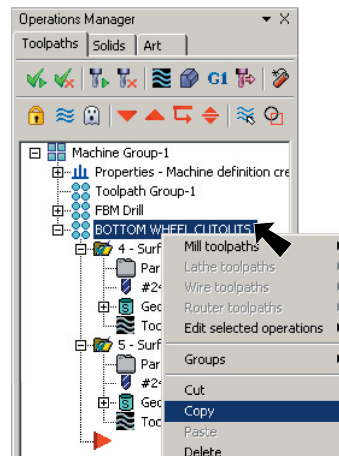


Fig. 51

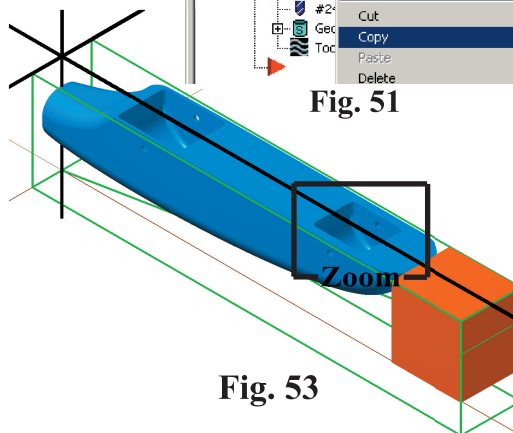


Fig. 53

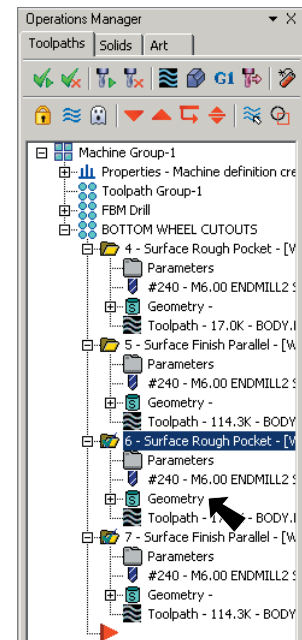


Fig. 52

Step 3. Click **Deselect All Drive** button, **Fig. 54**.

Step 4. Click **Select Drive** button, **Fig. 54**.

Step 5. Click **Activate solid selection** button  in the Solids selection ribbon bar and click **Select face** , **Fig. 55**.

Step 6. Click all the surfaces inside the front wheel cutout. The edges will highlight when selected, **Fig. 56**. Use **Alt key and arrow right key** to rotate view to select all surfaces, **Fig. 57**.

Step 7. **Press ENTER** to accept solid selection and press **ENTER again** to accept Drive surfaces.



Fig. 55

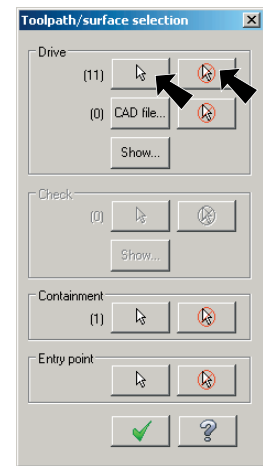


Fig. 54

Step 8. Click **Deselect Containment** button, **Fig. 58**.

Step 9. Click **Containment Select** button, **Fig. 58**.

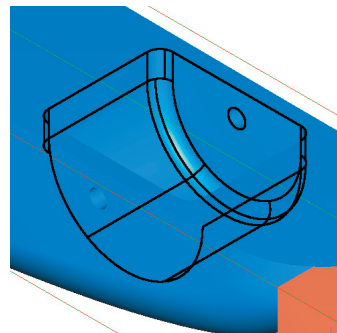


Fig. 56

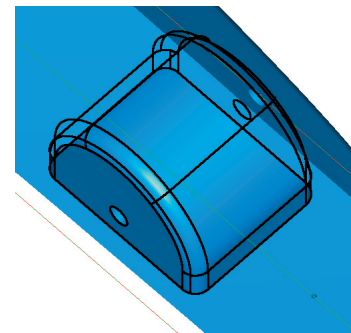


Fig. 57

Step 10. Click the **Solids** button  in the Chaining dialog box, **Fig. 59**.

Step 11. **Turn off Face**  button and keep **Loop** button  on in the Chaining dialog box, **Fig. 59**.

Step 12. Click an edge of the wheel cutout, **Fig. 60**. The edges of the bottom body face and the wheel cutout should be selected. If the wrong edges are selected, click **Other face** in Pick Reference Face dialog box, **Fig. 61**. Click the OK button  in the Pick Reference Face dialog box.

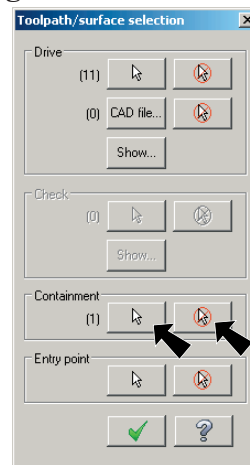


Fig. 58

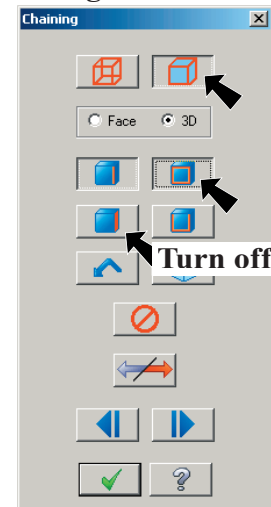


Fig. 59

Step 13. Click the OK button  in the Chaining dialog box.

Step 14. Click the OK button  in the Toolpath/surface selection dialog box.

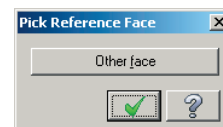


Fig. 61

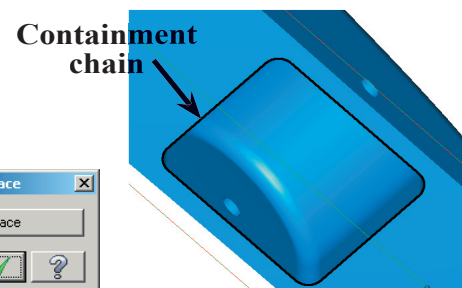


Fig. 60

Step 15. In the Toolpaths Manager, expand **7 Surface Finish Parallel** and click **Geometry**, **Fig. 62**.

Step 16. **Repeat the previous Steps 3 -14** to select Drive faces and Containment chain.

Step 17. In the Ops Manager, click **Regenerate all dirty operations**, **Fig. 62**.

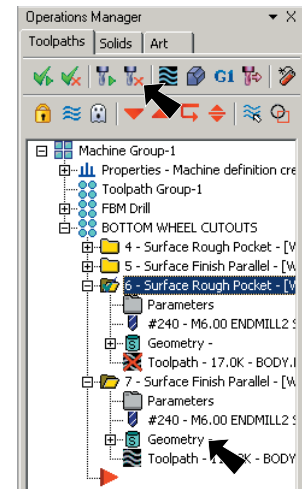


Fig. 62

N. Display Left Cut Level.

Step 1. Change to Isometric View. Use  or **Alt-7**.

Step 2. Display Level Manager. Use **Alt-Z**.

Step 3. In the Visible column, click to place a X in **LEFT CUT** surface level to make Level visible. Click OK, **Fig. 63**.

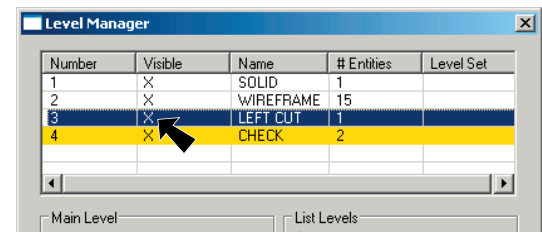


Fig. 63

O. Set WCS to LEFT CUT.

Step 1. Click **WCS** in the Status Bar at the bottom of the screen and **View Manager**.

Step 2. Click the **LEFT CUT** view from the list of views in the View Manager, **Fig. 64**.

Step 3. Click the Set All  button, **Fig. 64** and click OK.



Step 4. Change to the Isometric View



Step 5. Check the origin. Use **F9** to show and hide axes.

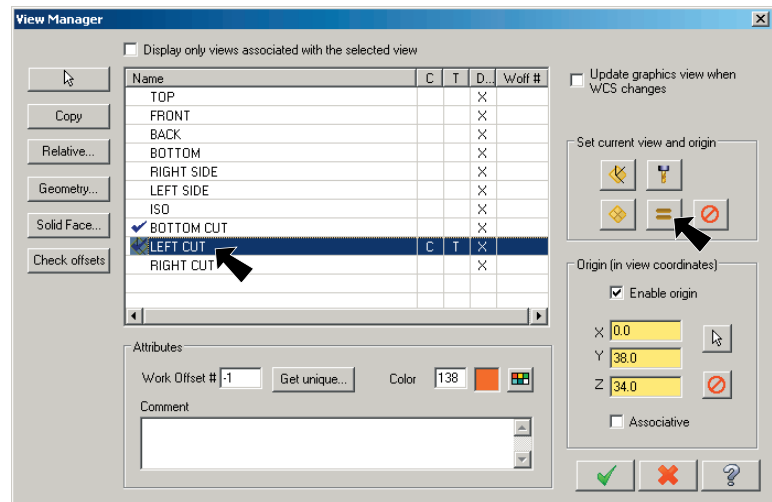


Fig. 64

P. LEFT CUT Body Rough Parallel Toolpath.

Step 1. Insert another **Toolpath group**. To insert group, **right click Machine Group 1** at the very top of the Ops Manager and click **Groups > New Toolpath group**, Fig. 65.

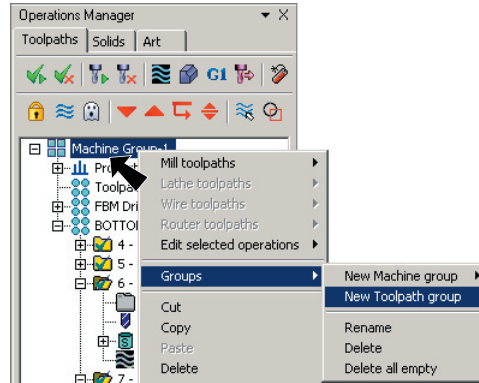


Fig. 65

Step 2. Rename the new Toolpath Group to **LEFT CUT**, Fig. 66.

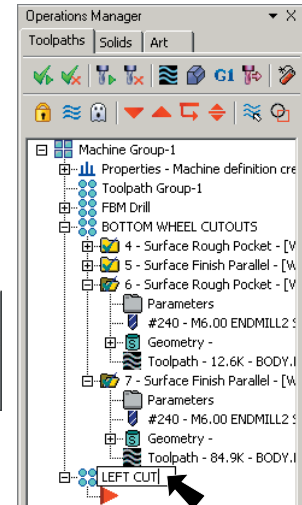


Fig. 66

Step 3. Click Toolpaths Menu > Surface Rough > **Parallel**.

Step 4. Click Boss and OK , Fig. 67.

Step 5. Click the **left cut surface**, Fig. 68.

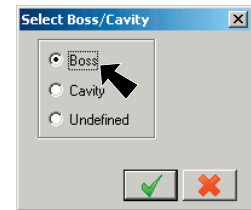


Fig. 67

Step 6. Click **Activate solid selection** button  in the Solids selection ribbon bar and click **Select body**  and unselect others, Fig. 69.

Step 7. Click the body solid, Fig. 68. The solid edges will highlight when selected.

Step 8. **Press ENTER** to accept solid selection and press **ENTER again** to accept Drive surfaces.

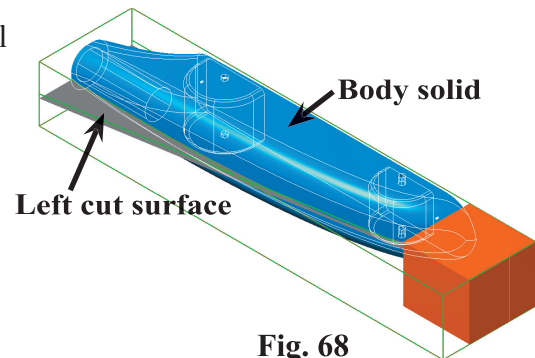


Fig. 68

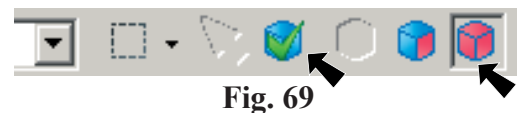


Fig. 69

Step 9. Click **Check Select** button, **Fig. 70**.

Step 10. Click **Activate solid selection** button  in the Solids selection ribbon bar and click **Select body** , **Fig. 72**.

Step 11. Click check block, **Fig. 73**.

Step 12. **Press ENTER** to accept solid selection and **press ENTER again** to accept Check surfaces.

Step 13. Click **Containment Select** button, **Fig. 70**.

Step 14. Click the **Wireframe** button  in the Chaining dialog box, **Fig. 71**.

Step 15. Click the **C-plane** in the Chaining dialog box, **Fig. 71**.

Step 16. Click the **Chain** button  in the Chaining dialog box, **Fig. 71**.

Step 17. Click a line of the side rectangle bounding box. The left side rectangle should be selected, **Fig. 73**. Click the OK button  in the Chaining dialog box.

Step 18. Click the OK button  in the Toolpath/surface selection dialog box.

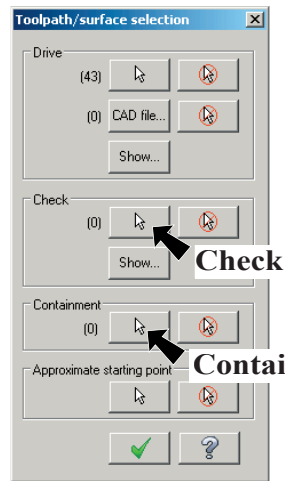


Fig. 70

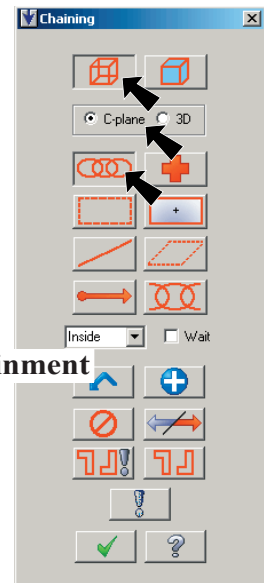


Fig. 71



Fig. 72

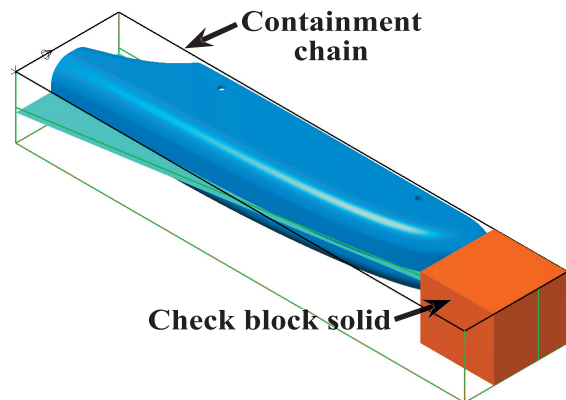


Fig. 73

Q. Set Tool and Params.

Step 1. Set **Feed rate: 120** **Fig. 74**.

Step 2. Set **Plunge Rate: 60**

Step 3. Click the **Surface parameters** tab at the top of the dialog box, **Fig. 74**.

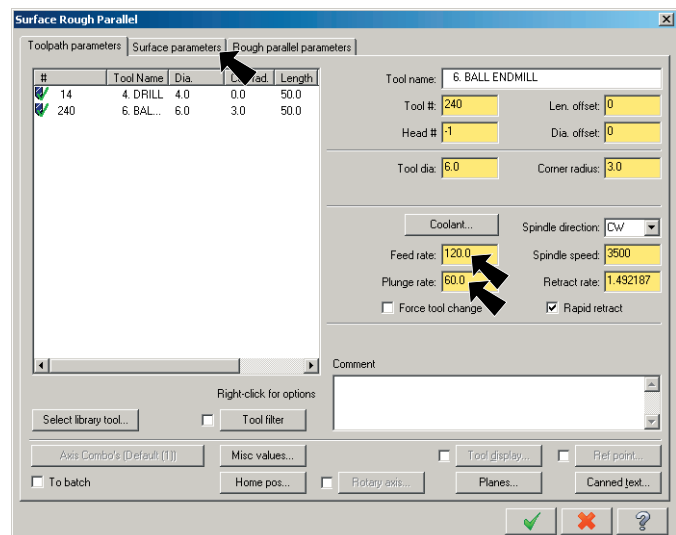


Fig. 74

Step 4. Uncheck **Retract**, **Fig. 75**.

Step 5. Set **Feed plane: 0** and click **Absolute**.

Step 6. Set **Stock to leave on drive: 1**

Step 7. Set **Stock to leave on check: .5**

Step 8. Click the **Rough parameters** tab at the top of the dialog box, **Fig. 75**.

Step 9. Set **Max Stepover: 4** **Fig. 76**

Step 10. Set Cutting method: **Zigzag**

Step 11. Set **Maximum stepdown: 5**

Step 12. Check **Allow multiple plunges along cut**.

Step 13. Check **Allow negative Z motion along surface**.

Step 14. Check **Allow positive Z motion along surface**.

Step 15. Click the **Total tolerance** button, **Fig. 76**.

Step 16. Set the 3 sliders to: **Fig. 77**
Normal - NC program length
Good - Surface quality
Normal - Calculation time

Step 17. Click to place check in all Create Arcs checkboxes.

Step 18. Click OK .

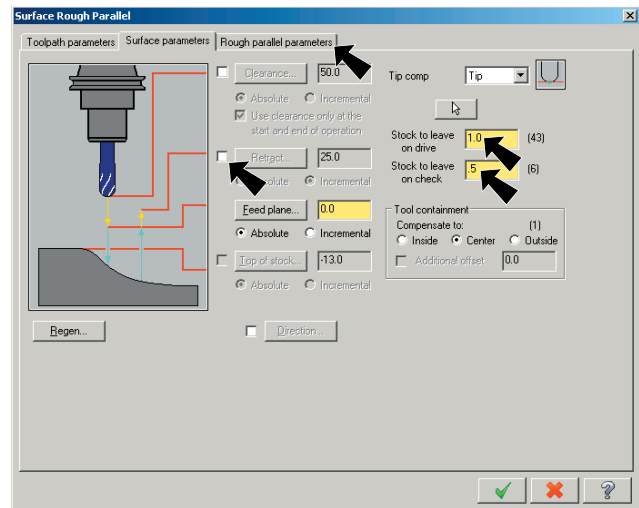


Fig. 75

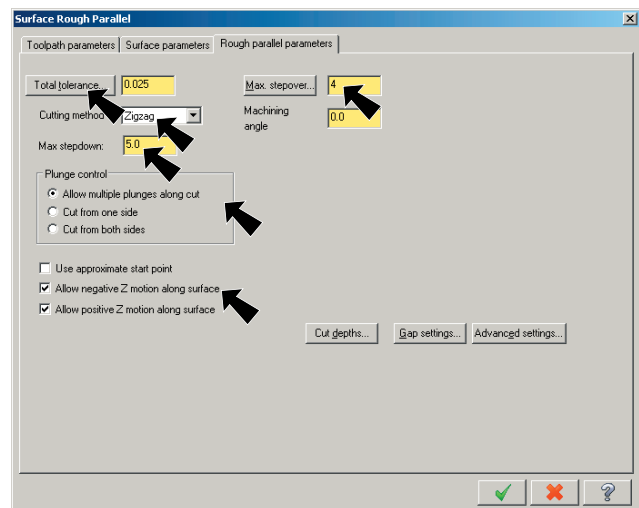


Fig. 76

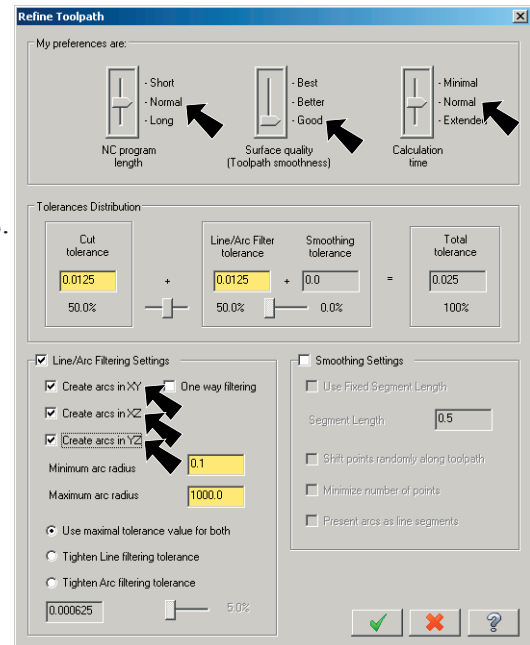


Fig. 77

Step 19. Click **Cut depths** button, **Fig. 78**.

Step 20. Set **Adjustment to top cut 6** and click OK  **Fig. 79**

Step 21. Click **Gap settings** button. **Fig. 78**

Step 22. Under Motion, select **Follow surfaces**, **Fig. 80**.

Step 23. Check **Optimize cut order** and click OK  **Fig. 80**.

Step 24. Click **Advanced settings** button, **Fig. 78**.

Step 25. Select **Only between surface(s)**, **Fig. 81**.

Step 26. Check **Skip hidden face test for solid bodies**, **Fig. 81** and click OK .

Step 27. Click OK .

R. Finish Blend Toolpath.

Step 1. Use **Alt-T** to turn off toolpath display.

Step 2. Click Toolpaths Menu > Surface Finish > **Blend**.

Step 3. Click the **Left cut surface**, **Fig. 82**.

Step 4. Click **Activate solid selection** button  in the Solids selection ribbon bar and click **Select body**  and unselect others, **Fig. 83**.

Step 5. Click the **body solid**, **Fig. 82**. The solid edges will highlight when selected.

Step 6. **Press ENTER twice** to accept surface and solid selection as drives surfaces.

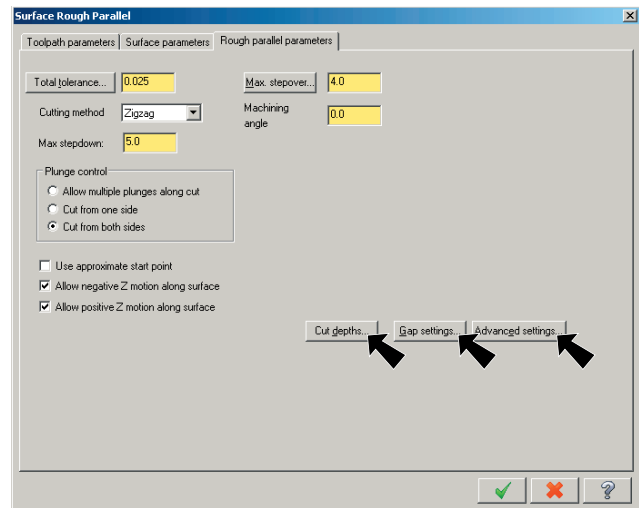


Fig. 78

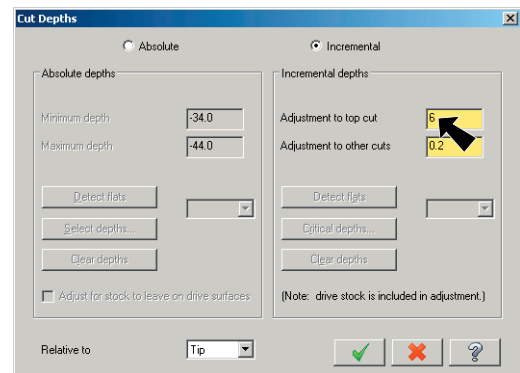


Fig. 79

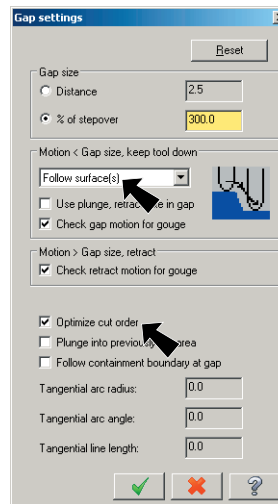


Fig. 80

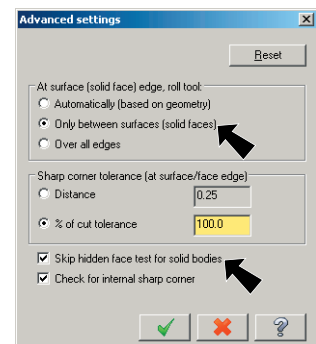


Fig. 81



Fig. 83

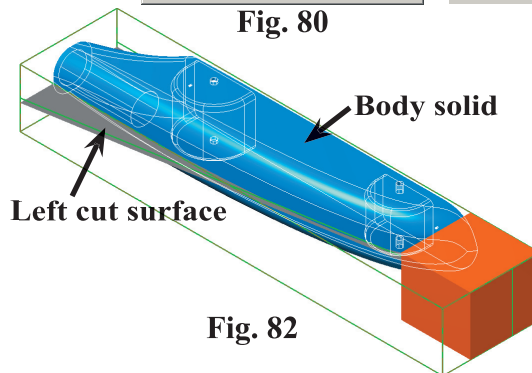


Fig. 82

Step 7. Click **Check Select** button, **Fig. 84**.

Step 8. Click **Activate solid selection** button  in the Solids selection ribbon bar and click **Select body** , **Fig. 85**.

Step 9. Click **check block solid**, **Fig. 86**.

Step 10. **Press ENTER twice** to accept solid selection as check surfaces.

Step 11. Click **Blend Select** button, **Fig. 84**.

Step 12. Click the **Single** button  in the Chaining dialog box, **Fig. 87**.

Step 13. Click **Chain 1**, bottom left line on the bounding box and **Chain 2**, top left line on the bounding box, **Fig. 86**. If the chaining directions arrows are not pointing in the same direction - click **Reverse** .

Step 14. Click **OK**  in the Chaining dialog box, **Fig. 87**.

Step 15. Click the **OK** button  in the Toolpath/surface selection dialog box.

Step 16. Set **Feed Rate: 120** **Fig. 88**.

Step 17. Set **Plunge Rate: 60** **Fig. 88**.

Step 18. Click the **Surface parameters** tab at the top of the dialog box.

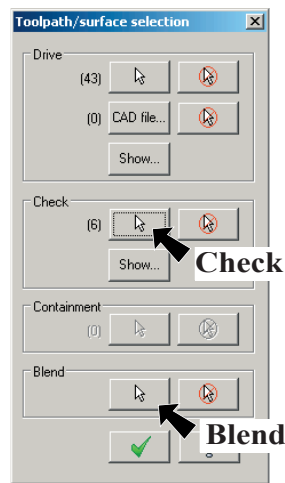


Fig. 84



Fig. 85

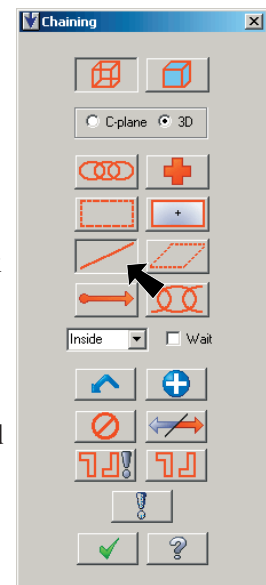


Fig. 87

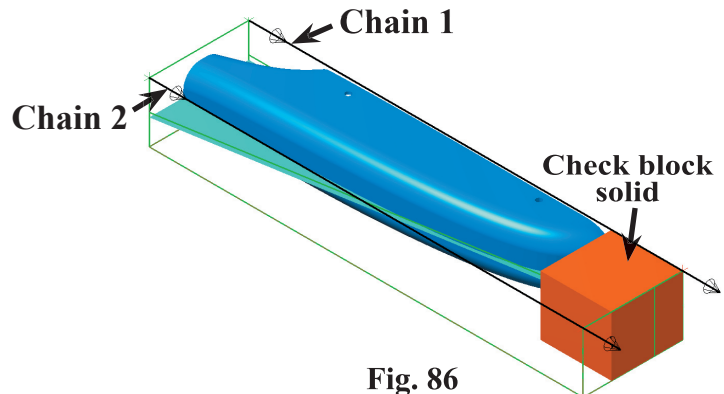


Fig. 86

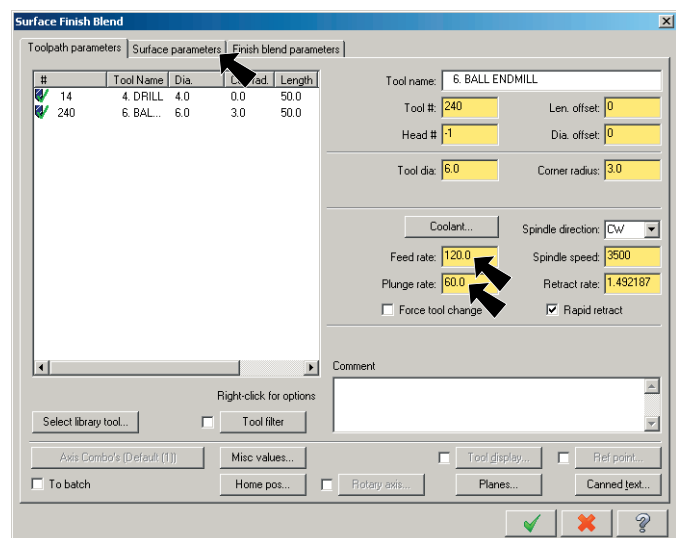


Fig. 88

Step 19. **Uncheck Clearance**, Fig. 89.

Step 20. **Uncheck Retract**.

Step 21. Set **Feed plane: 0** and click **Absolute**.

Step 22. Set **Stock to leave on check: .2**

Step 23. Click the **Finish blend parameters** tab at the top of the dialog box, Fig. 89.

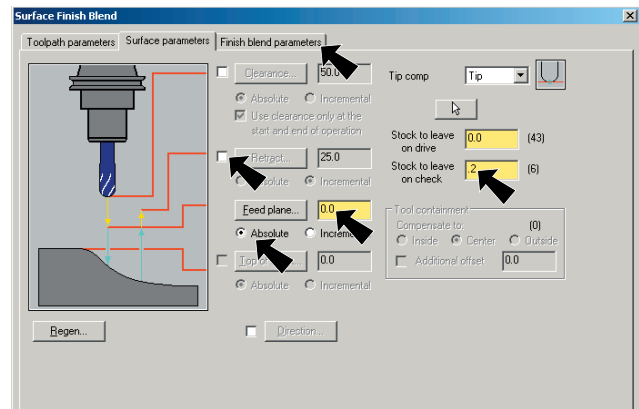


Fig. 89

Step 24. Set **Maximum Stepover: 1** Fig. 90.

Step 25. Click the **Total tolerance** button.

Step 26. Set the 3 sliders to: Fig. 91
Normal - NC program length
Good - Surface quality
Normal - Calculation time

Step 27. Check to place check in all Create Arcs checkboxes, Fig. 91.

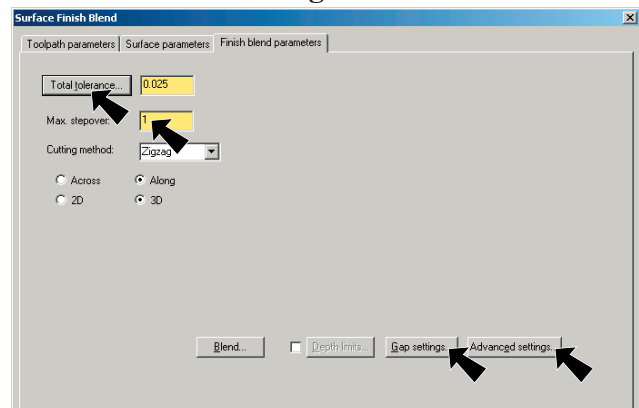


Fig. 90

Step 28. Click OK .

Step 29. Click **Gap settings** button, Fig. 90.

Step 30. Under Motion, select **Follow surface(s)**, Fig. 92.

Step 31. Check **Optimize cut order** and click OK .

Step 32. Click **Advanced settings** button, Fig. 90.

Step 33. Select **Only between surfaces**, Fig. 93.

Step 34. Check **Skip hidden face test for solid bodies** and click OK .

Step 35. Click OK .

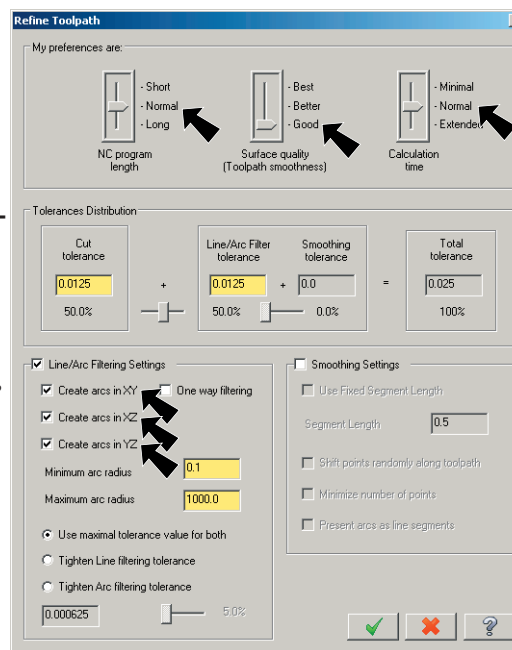


Fig. 91

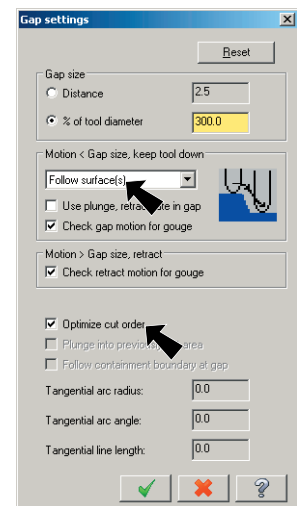


Fig. 92

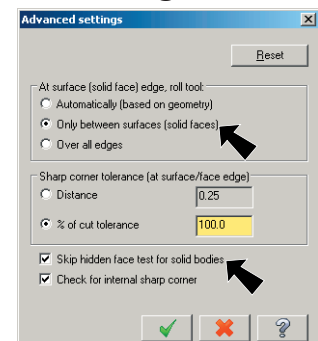


Fig. 93

S. Verify Left Cut.

Step 1. In the Toolpaths Manager, click the **LEFT CUT Toolpath group** to select both toolpaths, **Fig. 94**.

Step 2. Click **Verify**  in the Toolpaths Manager, **Fig. 94**.

Step 3. Click **Machine** quickly  in Verify dialog box, **Fig. 95**.

Step 4. Turn on (button depressed) **Simulate tool** .

Step 5. Click the **Play**  in the Verify dialog box to start the machining.

Step 6. Click **OK**  to close Verify dialog box.

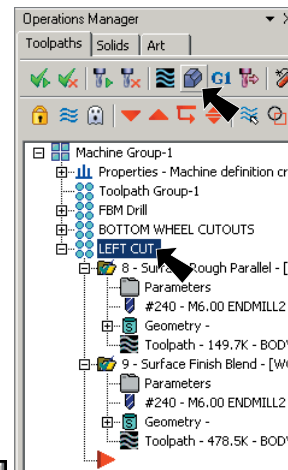


Fig. 94



Fig. 96

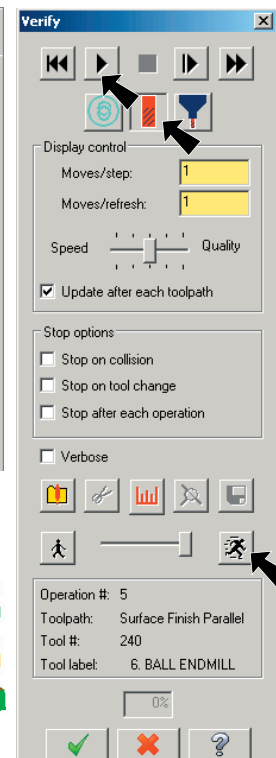


Fig. 95

T. Change to RIGHT CUT WCS.

Step 1. Click **WCS** in the Status Bar at the bottom of the screen and **View Manager**.

Step 2. Click the **RIGHT CUT** view from the list of views in the View Manager, **Fig. 97**.

Step 3. Click the **Set All**  button, **Fig. 97** and click **OK** .

Step 4. Change to the Isometric View. Use .

Step 5. Check the origin. Use **F9** to show and hide axes.

Step 6. Save your drawing. Use **Alt-F S**.

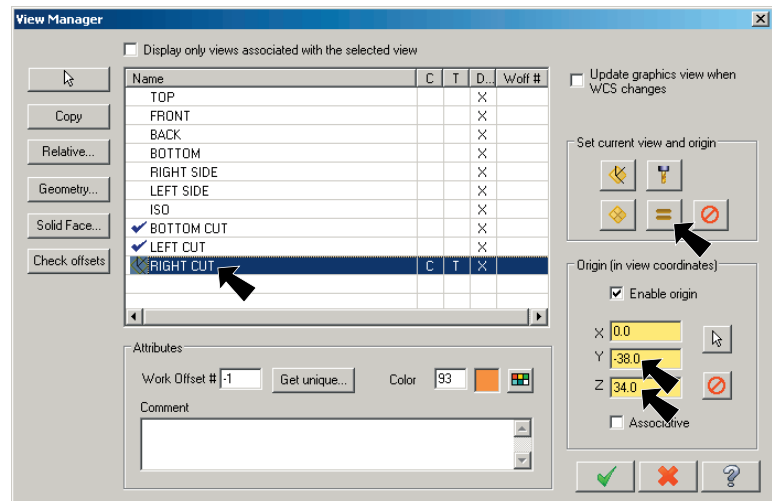


Fig. 97

U. Mirror LEFT CUT to RIGHT CUT Body Toolpaths.

Step 1. Insert another **Toolpath group**. To insert group, **right click Machine Group 1** at the very top of the Ops Manager and click **Groups > New Toolpath group**, **Fig. 98**.

Step 2. Rename the new Toolpath Group to **RIGHT CUT**, **Fig. 99**.

Step 3. Click Toolpaths Menu > Transform.

Step 4. Under Type, select **Mirror**, **Fig. 100**.

Step 5. Under Method, select **Tool plane** and click OK to message.

Step 6. Under Source operations select **LEFT CUT** toolpath group.

Step 7. Click the **Mirror** tab at the top of the dialog box, **Fig. 100**.

Step 8. Under Mirror method, select **X-axis**, **Fig. 101**.

Step 9. Select the Mirror view **Select entity** button , **Fig. 101**.

Step 10. Select **TOP** in the View Selection dialog box, **Fig. 102** and click OK .

Step 11. Click OK  in the Transform Operation Params dialog box.

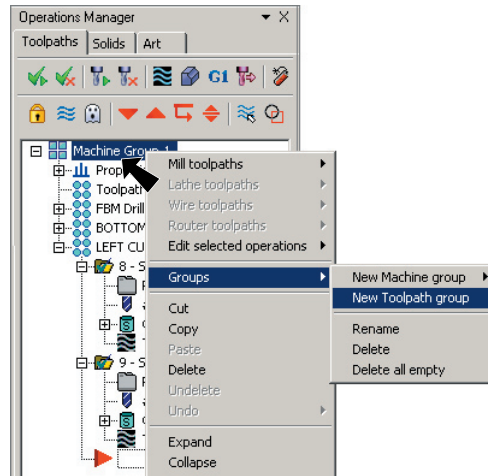


Fig. 98

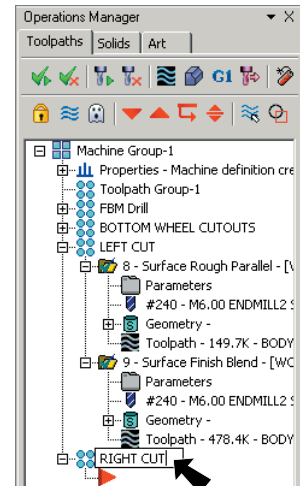


Fig. 99

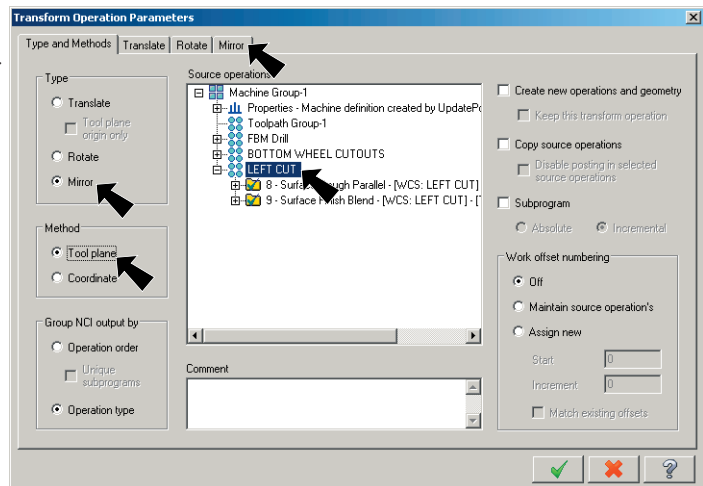


Fig. 100

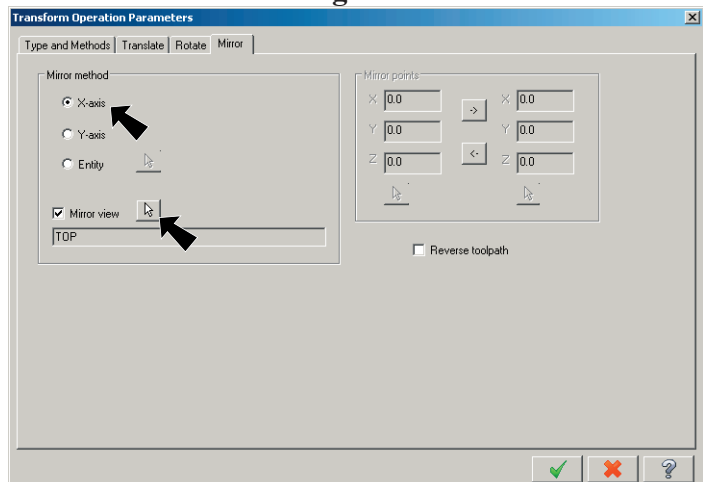


Fig. 101

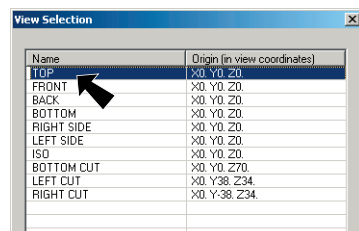


Fig. 102

V. Verify RIGHT CUT.

Step 1. In the Toolpaths Manager, **RIGHT CUT Toolpath group** to select both mirrored toolpaths, **Fig. 103**.

Step 2. Click **Verify**  in the Toolpaths Manager, **Fig. 104**.

Step 3. Click the **Play**  in the Verify dialog box to start the machining.

Step 4. Click **OK**  to close Verify dialog box.

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

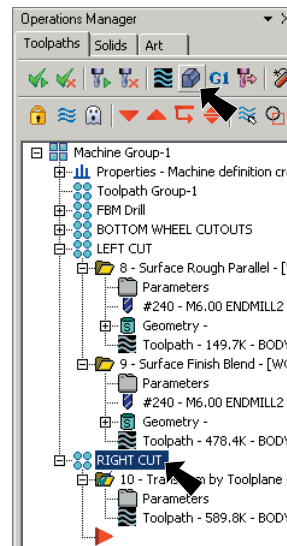


Fig. 103

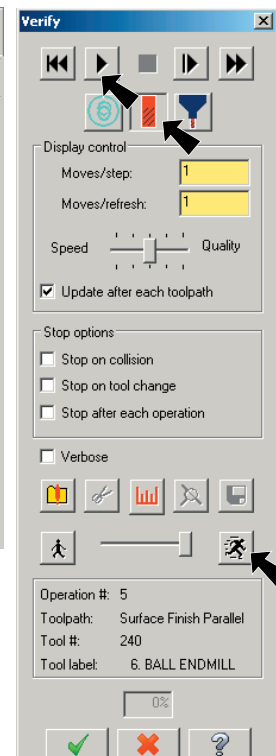


Fig. 104

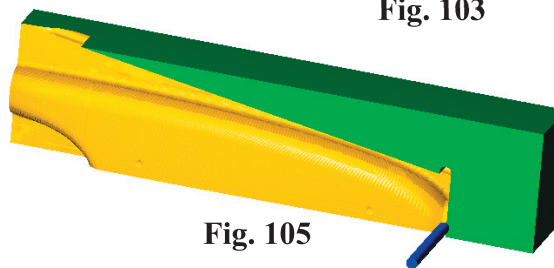


Fig. 105