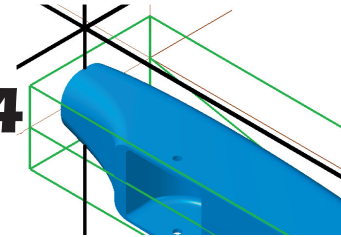


Chapter 3

CO2 Car

SolidWorks to Mastercam X4 2008



A. Open File in Mastercam X4.

- Step 1. If necessary, save your **body** file in SolidWorks.
- Step 2. In Mastercam X4, click File Menu > Open.
- Step 3. In the Open dialog box set **Files of type** to **SolidWorks Files**, select your BODY file and click **Options**, **Fig. 1**.
- Step 4. In the SolidWorks File Params dialog box, uncheck **Edge curves** and click OK , **Fig. 2**. Click OK in Open dialog box.
- Step 5. Change to the Isometric View. Use  or **Alt-7**.

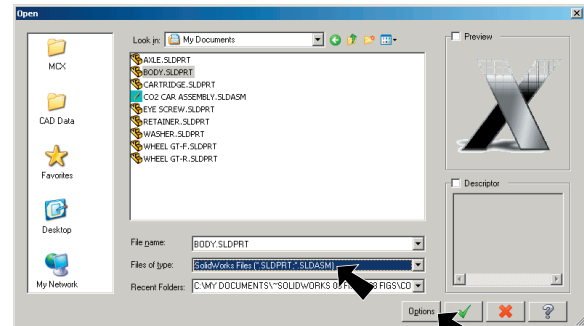


Fig. 1

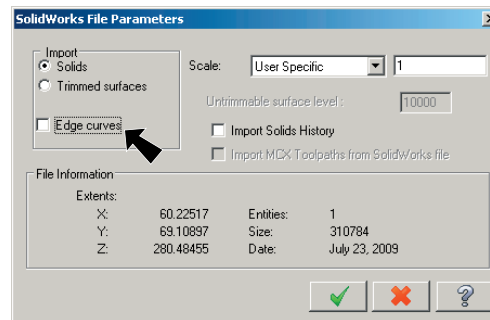


Fig. 2



Fig. 3

B. If Necessary, Convert Units to Metric.

- Step 1. Click Settings Menu > Configuration.
- Step 2. Click **Start/Exit** in the list of configuration topics on the left, **Fig. 4**.
- Step 3. Set **Startup setting Configuration** to **TECHED METRIC (Metric)**, **Fig. 4**.
- Step 4. Set **Current** to **TECHED METRIC (Metric)**, **Fig. 4** and click OK .
- Step 5. Click **Yes** to scale part to Metric, **Fig. 5**.
- Step 6. Click **Fit**  or use **Alt-F1**.

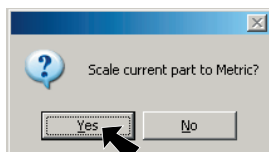


Fig. 5

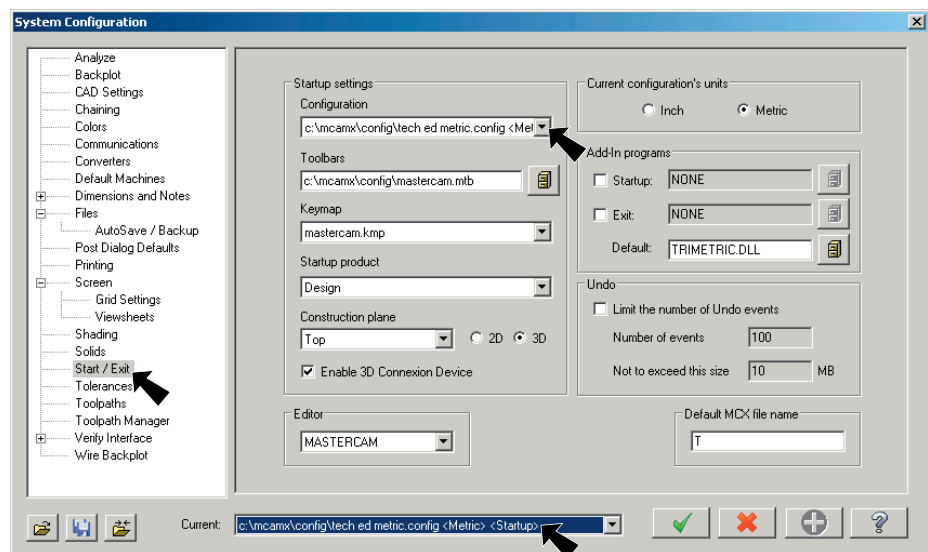


Fig. 4

C. Save Your File.

Step 1. Click File Menu > Save As.

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

D. Rotate Body Around Axes.

Step 1. Click the down arrow of the Set Planes button  in the toolbar and click **Top (WCS)**, Fig. 6.

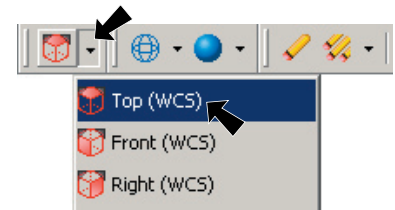


Fig. 6

Step 2. Click Xform Menu > Rotate.



Fig. 7

Step 3. Click the **All** button  in the General Selection ribbon bar, Fig. 7.

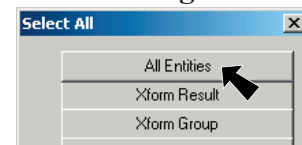


Fig. 8

Step 4. Click **All Entities** button Fig. 8.

Step 5. Press **ENTER** to except all entities.

Step 6. Set: **Move** 

1 for Number of Steps 

90 for Rotation Angle 

Click **Apply** , Fig. 9.

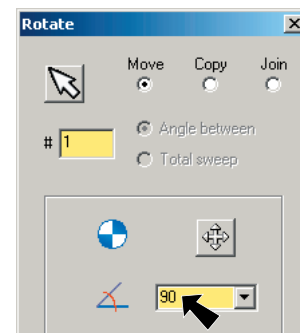


Fig. 9

Fig. 10

Step 7. Click the down arrow of the Set Planes button  in the toolbar and click **Front (WCS)**, Fig. 11.

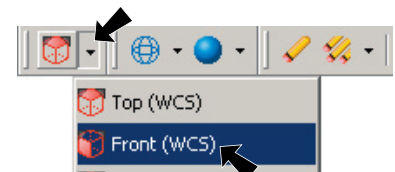


Fig. 11

Step 8. Click the **All** button  in the General Selection ribbon bar, Fig. 12.



Fig. 12

Step 9. Click **All Entities** button, Fig. 13.

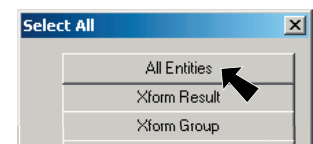


Fig. 13

Step 10. Press **ENTER** to except all entities.

Step 11. Set: **Move** 

-90 for Rotation Angle 

Fig. 14.

Negative -90

Step 12. Click **OK**  in the Rotate dialog box.

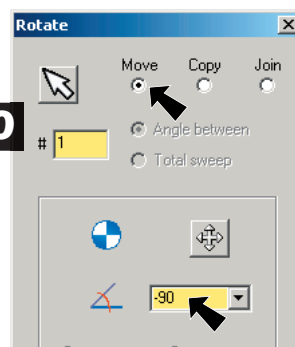


Fig. 14

Step 13. Click **Fit**  and save your drawing. Use **Alt-F S**.

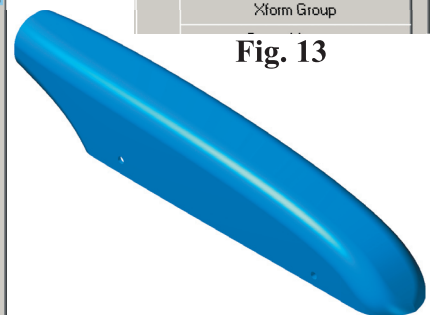


Fig. 15

E. Create Bounding Box.

Step 1. Draw the bounding box **tangerine**. Click the color swatch in the Status Bar at the bottom of the screen. Key-in **94** for **tangerine** color number and press ENTER.

Step 2. Click Create Menu > Bounding Box.

Step 3. Set: check **Lines Arcs** uncheck **Center Point**, Fig. 16

Click OK . The bounding box places a rectangle wire frame around the body, Fig. 17.

Step 4. Save your drawing. Use **Alt-F S**.

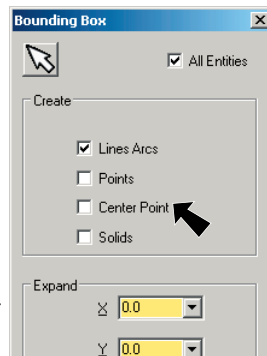


Fig. 16

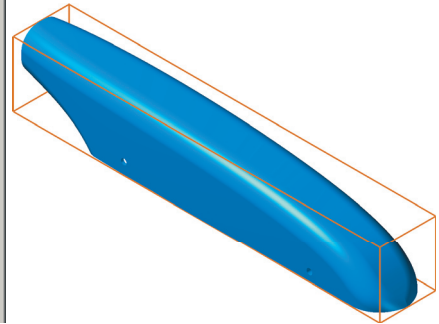


Fig. 17

F. Add Levels.

Step 1. Display Level Manager. Use **Alt-Z**.

Step 2. Press **Tab** key to move to the Name Field and key-in **SOLID**, Fig. 18.

Step 3. Press **Shift-Tab** key (hold down the Shift key and press Tab key) to move back to the Number Field and key-in **2**, Fig. 19.

Step 4. Press Tab key to move to the Name Field and key-in **WIREFRAME**, Fig. 19.

Step 5. Continue and create two more Levels as shown here and Fig. 20.

- 1 **SOLID**
- 2 **WIREFRAME**
- 3 **LEFT CUT**
- 4 **CHECK**

Step 6. Click the **2** in the Number column to make **Level 2 WIREFRAME** active and click OK . Fig. 20.

Step 7. Save your drawing. Use **Alt-F S**.

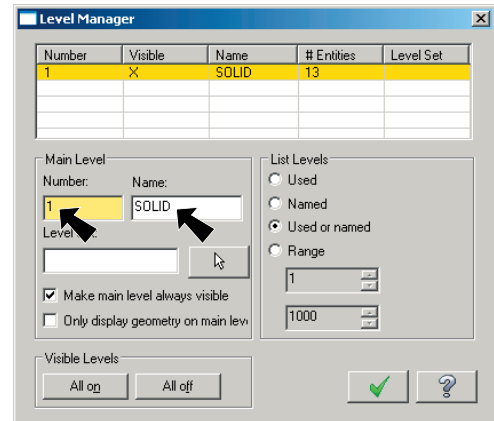


Fig. 18

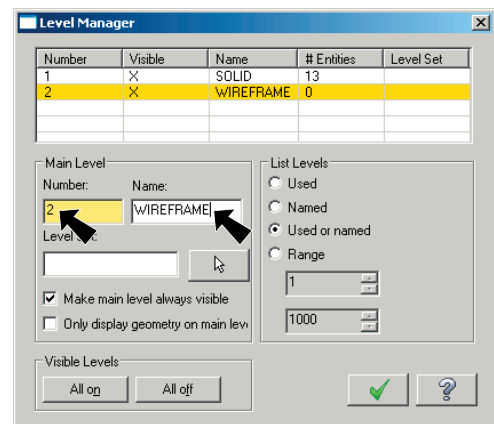


Fig. 19

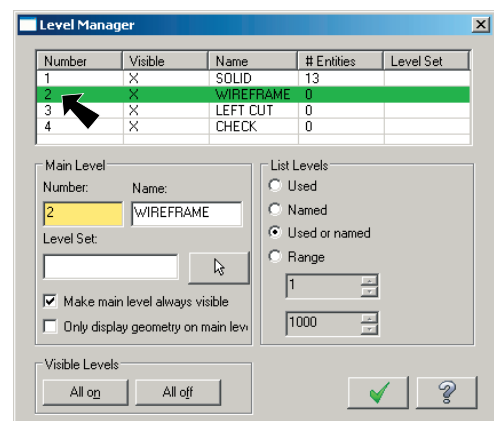


Fig. 20

G. Create Rectangular Shapes.

Step 1. Draw the **rectangular shape green**. Click the color swatch in the Status Bar at the bottom of the screen. Key-in **10** for **green** color number and press ENTER.

Step 2. Click the down arrow of the Set Planes button  in the toolbar and click **Top (WCS)**, Fig 21.

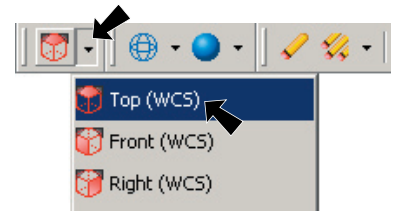


Fig. 21

Step 3. Click Create Menu > Rectangular Shapes.

Step 4. Set: **Base Point** 

305 for **Width** 

42 for **Height** 

Click the **Anchor point**  in the middle of the left side, Fig. 22

Click the down arrow in the Auto Cursor ribbon bar and click **Midpoint** , Fig. 23.

Click the **bottom back line** of the bounding box wireframe, Fig. 24.

Click OK  to close the dialog box, Fig. 22.

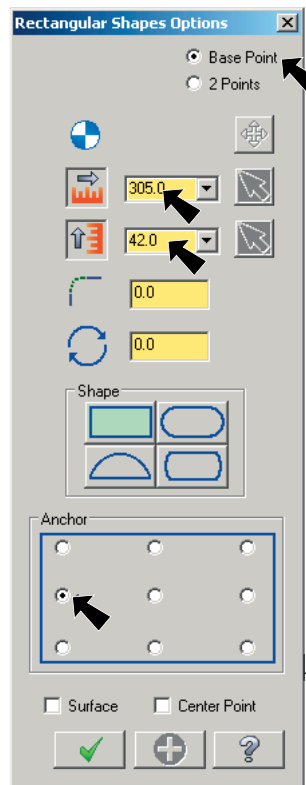


Fig. 22

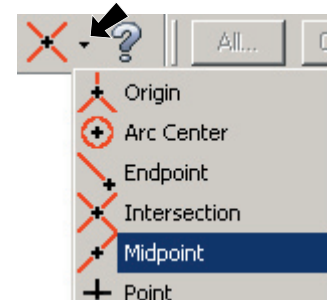


Fig. 23

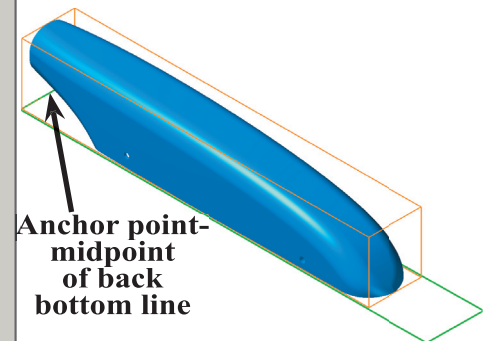


Fig. 24

Step 5. Click Fit  or use **Alt-F1** to fit.

H. Delete Orange Bounding Box.

Step 1. Click the All...  in the General Selection ribbon bar, Fig. 25.



Fig. 25

Step 2. Click **Color** button in the Select All dialog box, Fig. 26.

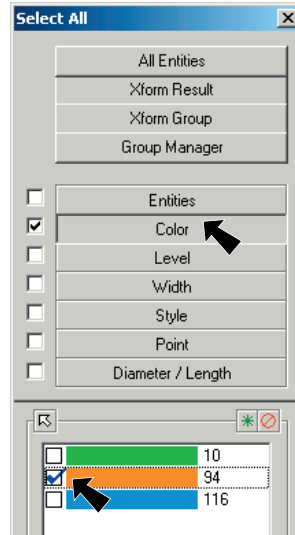


Fig. 26

Step 3. Click to place a **check** in **tangerine (94)** check box, Fig. 26.

Step 4. Click OK .

Step 5. Press **Delete** key on the keyboard.

Step 6. Click Repaint  or use F3 to redraw.

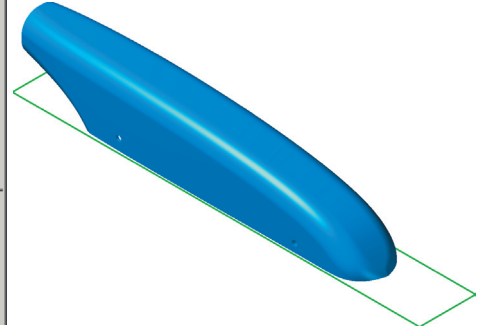


Fig. 27

I. Create 3D Wireframe.

Step 1. Click Xform Menu > Translate.

Step 2. Click the lines of the rectangle, Fig. 28.

Step 3. Press ENTER.

Step 4. Set: **Join** 
Z to 70 , Fig. 29.

Step 5. Click OK  to close the Translate dialog box, Fig. 30.

Step 6. **Right click** the drawing area and click Clear Colors  from the menu or use Alt-R C.

Step 7. Save your drawing.
Use Alt-F S.

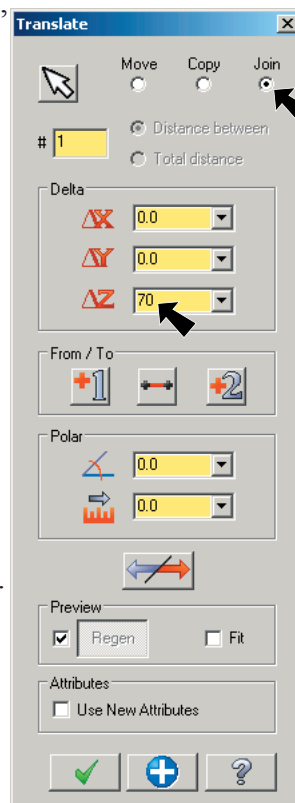


Fig. 29

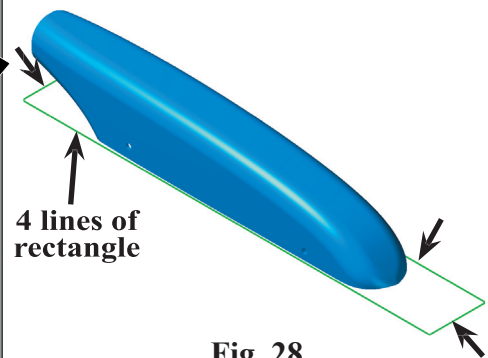


Fig. 28

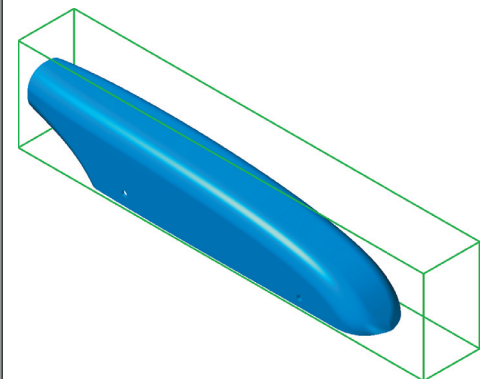


Fig. 30

J. Move to Origin.

Step 1. Display the origin. Use **F9** to show the axes, **Fig. 31**.

Step 2. Click Xform Menu > Move to Origin.

Step 3. Click the down arrow in the Auto Cursor ribbon bar and click Midpoint , **Fig. 32**.

Step 4. Click the **top back line**, **Fig. 33**.

Step 5. Click Fit  or use **Alt-F1** to fit.

Step 6. **Right click** the drawing area and click Clear Colors  from the menu or use **Alt-R C**.

Step 7. Check the new origin, **Fig. 34**.

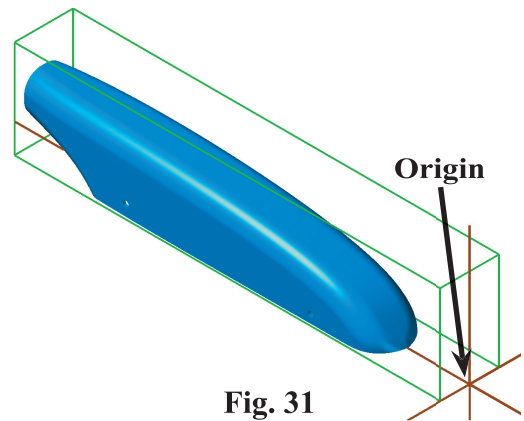


Fig. 31

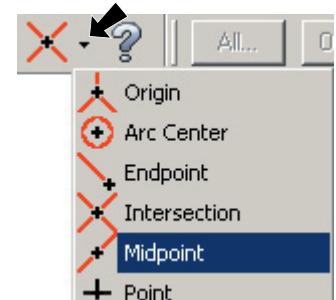


Fig. 32

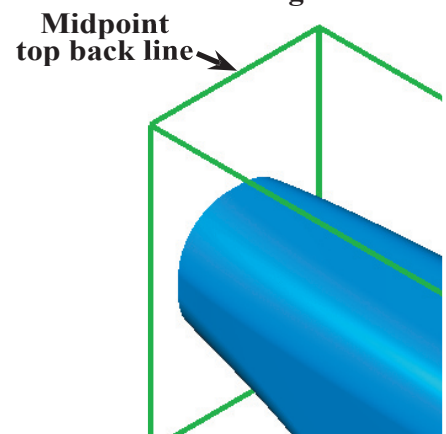


Fig. 33

K. Copy Line.

Step 1. Click the **bottom front line** of the wireframe, **Fig. 34**.

Step 2. Click Xform Menu > Translate.

Step 3. Set: Copy  **Z to 20** , **Fig. 35** and press **ENTER**.

Step 4. Click OK  to close the Translate dialog box.

Step 5. **Right click** the drawing area and click Clear Colors  from the menu or use **Alt-R C**.

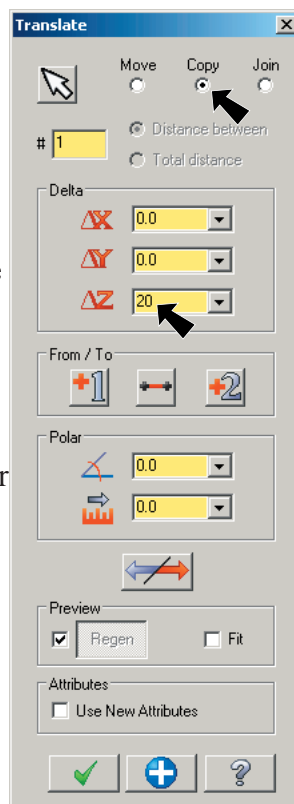


Fig. 35

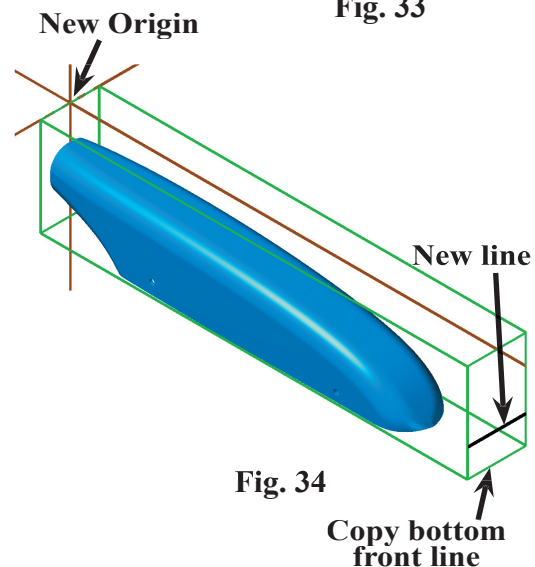


Fig. 34

L. Draw Lines for Mid Surface.

Step 1. Click Create Menu > Line > Endpoint.

Step 2. Click the down arrow in the Auto Cursor ribbon bar and click **Midpoint**  , Fig. 36.

Step 3. Draw the two lines as shown in Fig 37. Draw one line from **midpoint of the new line in front and the top back line of wireframe**. Keep the **Midpoint**  AutoCursor button on (depressed) to snap to midpoints and drawn second line.

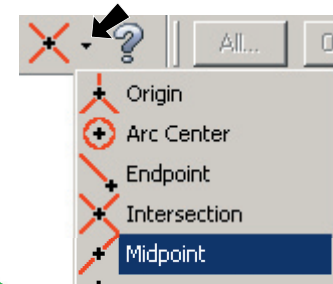


Fig. 36

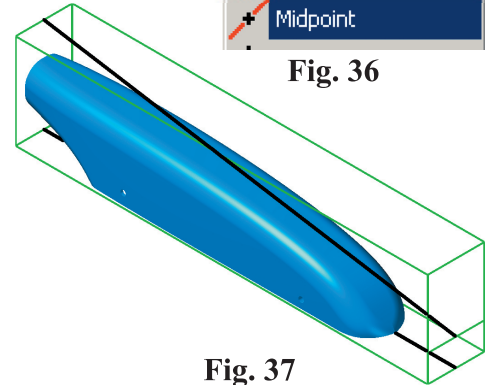


Fig. 37

M. Create Left Cut Surface Loft.

Step 1. Draw the Left Cut Surface **cyan**. Click the color swatch in the Status Bar at the bottom of the screen. Key-in **11** for **cyan** color number and press ENTER.

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

Step 3. Click the **3** in the Number column to make **Level 3 LEFT CUT** active and click OK



Fig. 38.

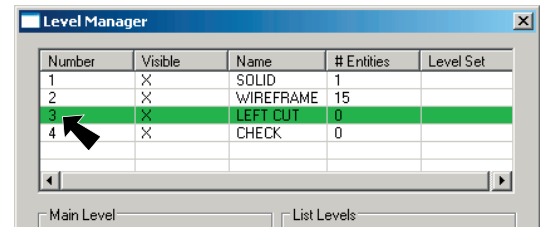
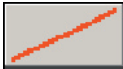


Fig. 38

Step 4. Click Create Menu > Surface > Ruled/Lofted.

Step 5. Click the Single button  in the Chaining dialog box, Fig. 39.

Step 6. Click Chain 1 and Chain 2, **the two lines that were just drawn**, Fig. 40. If the chaining directions arrows are not pointing in the same direction - click Reverse .

Step 7. Click OK  in the Chain dialog box, Fig. 39 and Fig. 41.

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

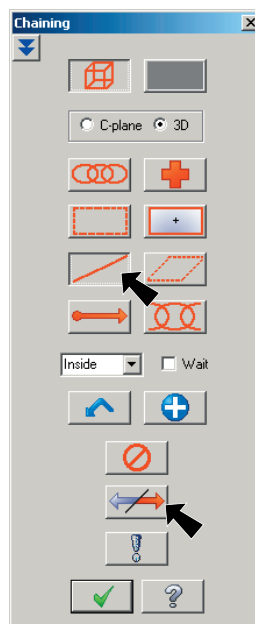


Fig. 39

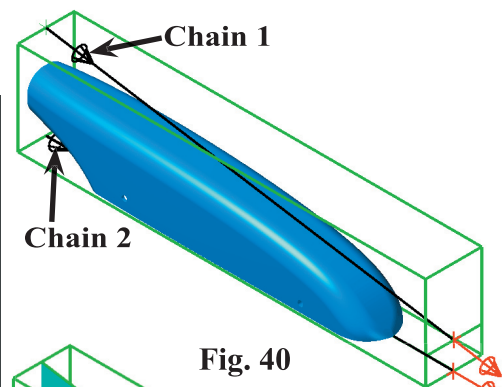


Fig. 40

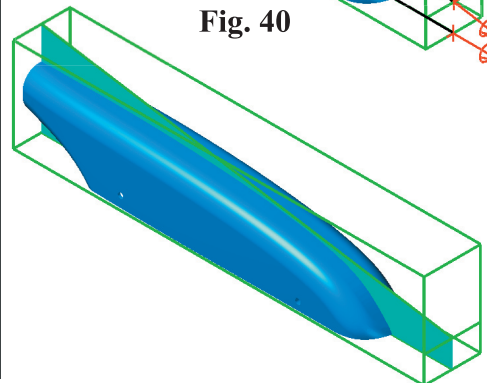


Fig. 41

N. Xform Move Surface.

Step 1. Click the **Left Cut surface** that was just created, **Fig. 42**.

Step 2. Click Xform Menu > Translate.

Step 3. Set: Move  **Negative -3**
Y to -3 , **Fig. 43**
and press ENTER.

Step 4. Click OK  to close the Translate dialog box, **Fig. 44**.

Step 5. **Right click** the drawing area and click Clear Colors from the menu.

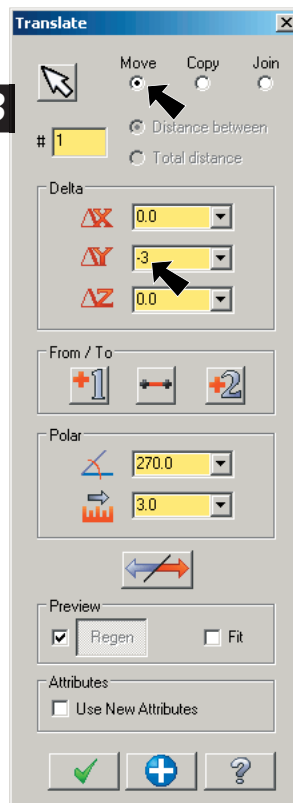


Fig. 43

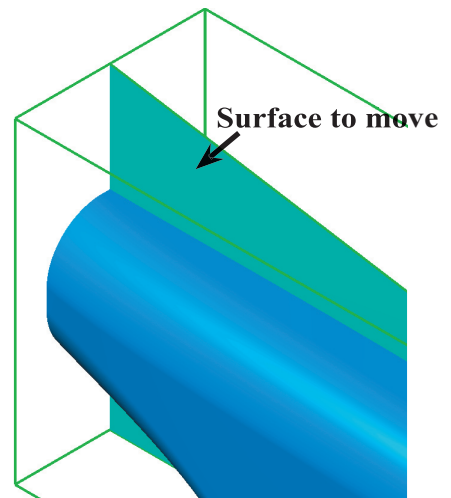


Fig. 42

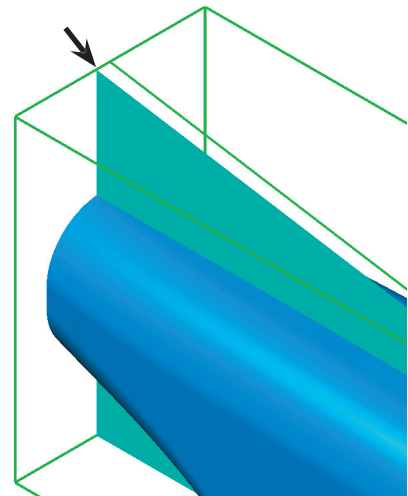


Fig. 44

O. Check Solid.

Step 1. Draw the check block **orange**. Click the color swatch in the Status Bar at the bottom of the screen. Key-in **138 for orange** color number and press ENTER.

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

Step 3. Click the **4** in the Number column to make **Level 4 CHECK** active, **Fig. 45**.

Step 4. **Turn off the LEFT CUT surface level.** The surface will be used later when the left cut toolpath is created. To turn off level, click the X in the Visible column to remove the X in **LEFT CUT**. Click OK  when done, **Fig. 45**.

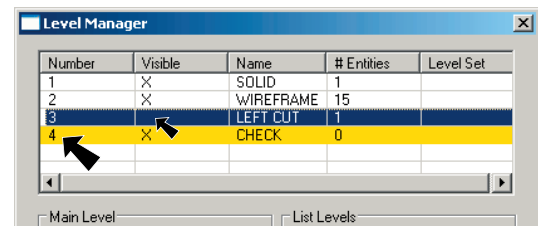


Fig. 45

Step 5. Click Create Menu > Primitives > Block.

Step 6. Click the Expand button .

Set: Solids 

Length 50 

Width 42 

Height 50 

Click the Anchor point  in the middle of the right side, Fig. 46

Set Axis to Z , Fig. 46

Click the down arrow in the Auto Cursor ribbon bar and click Midpoint , Fig. 47

Then, click the **bottom front line** of the bounding box wire-frame, Fig. 48

Click OK  in dialog box, Fig. 46 and Fig. 49.

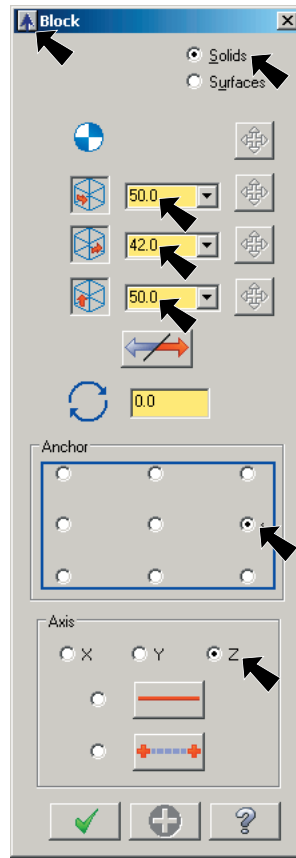


Fig. 46

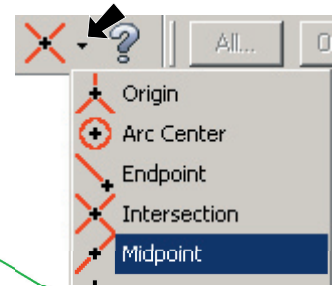


Fig. 47

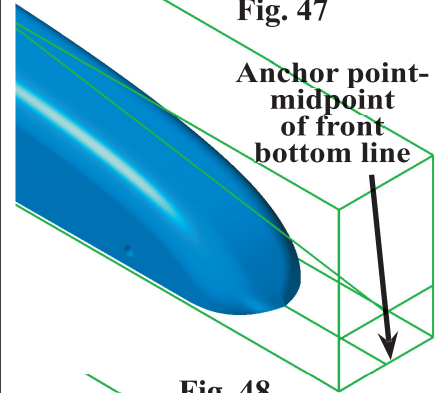


Fig. 48

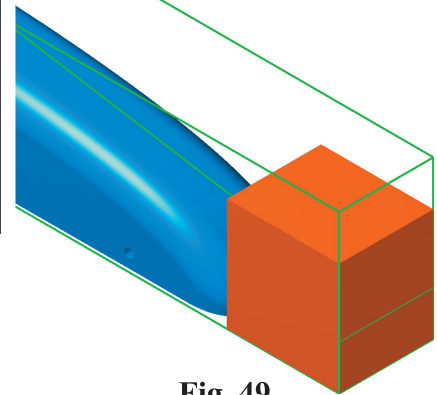


Fig. 49

Step 7. Save your drawing. Use Alt-F S.

P. Create WCS BOTTOM CUT.

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

Step 2. Click View Menu > Orient > Flip Y for Z, Fig. 50.

Step 3. Click Fit  or use Alt-F1 to fit.

Step 4. Click **WCS** in the Status Bar at the bottom of the screen and **View Manager** from the menu, Fig. 51.

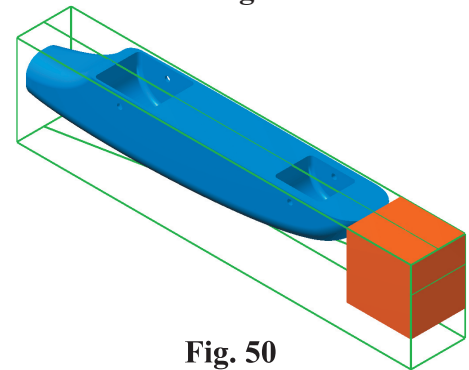


Fig. 50

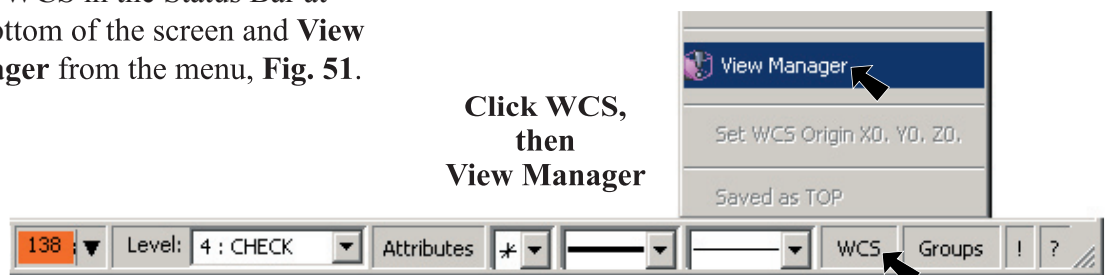


Fig. 51

Step 5. Click the **Solid Face** button in the View Manager dialog, **Fig. 52**.

Step 6. Click the bottom face of the check solid, **Fig. 53**.

Step 7. Set X axes to point to the front and Y axes to point right, **Fig. 53**. This should be View 1, **Fig. 54**. Click OK  in the Select view dialog box.

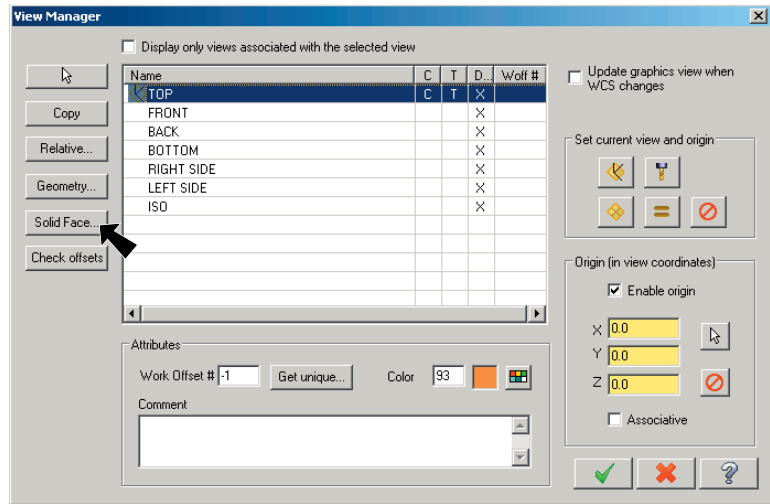


Fig. 52

Step 8. Key-in **BOTTOM CUT** for new view name in the New View dialog and click OK , **Fig. 55**.

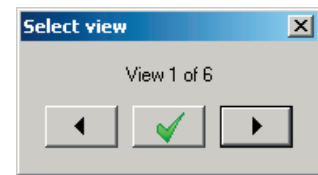


Fig. 54

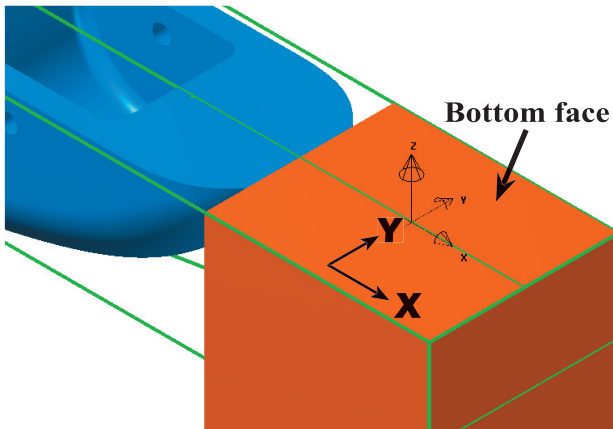


Fig. 53

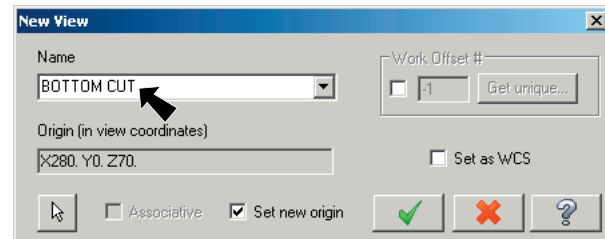


Fig. 55

Step 9. Set:
Origin X to 0
Origin Z to 70, Fig. 56.

Step 10. Click the **Set All** button , **Fig. 56**.

Step 11. Click OK , **Fig. 56**

Step 12. Check the origin. Use **F9** to show the axes, **Fig. 57**. Then, **F9** again to hide axes.

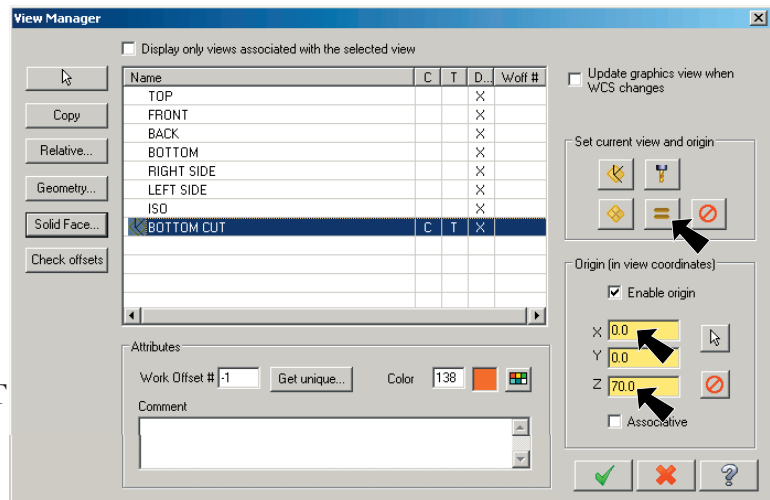


Fig. 56

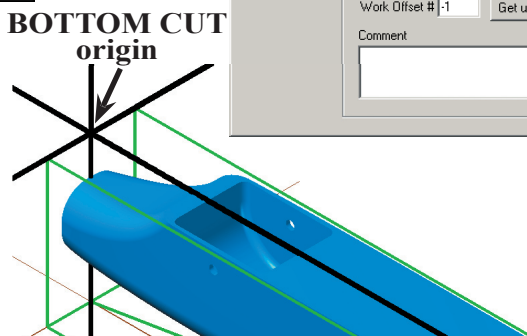


Fig. 57

Q. Create WCS LEFT CUT.

Step 1. Click **WCS** in the Status Bar at the bottom of the screen and **Top** from the menu. This changes WCS back to original state (Top), **Fig. 58**.

Step 2. Change to the Isometric View. Use  or **Alt-7**.

Step 3. Use the **Alt** and **left arrow** key on the keyboard to rotate view as shown in **Fig. 59**. To rotate with the arrow key, hold down the Alt key and press the left arrow key.

Step 4. Click **WCS** in the Status Bar at the bottom of the screen and **View Manager** from the menu, **Fig. 60**.

Step 5. Click the **Solid Face** button in the View Manager dialog, **Fig. 61**.

Step 6. Click the **side face** of the check solid, **Fig. 62**.

Step 7. Set X axes to point to the front and Y axes to point right, **Fig. 62**. This should be View 1, **Fig. 63**. Click OK  in the Select view dialog box.

Step 8. Key-in **LEFT CUT** for new view name in the New View dialog and click OK , **Fig. 64**.



Fig. 58

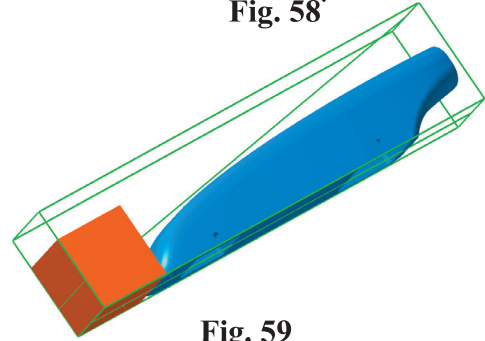


Fig. 59

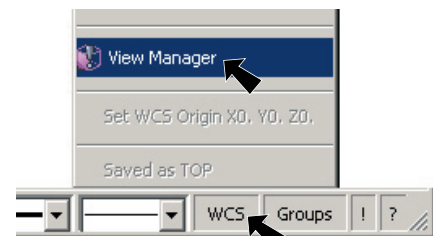


Fig. 60

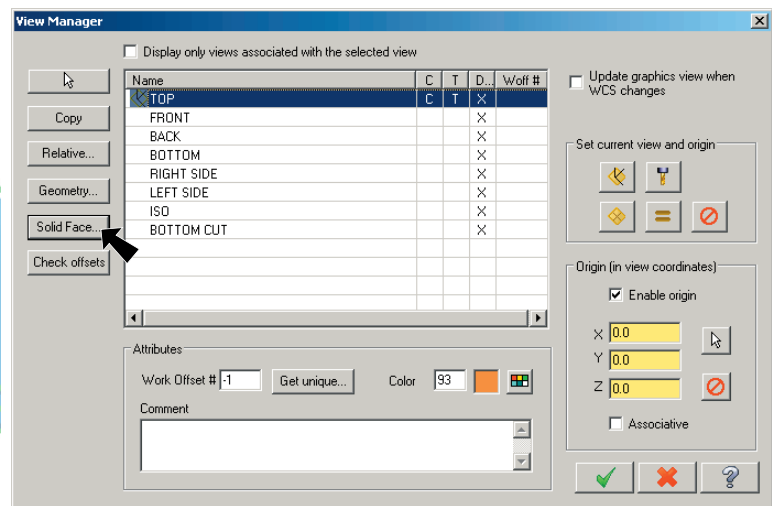


Fig. 61

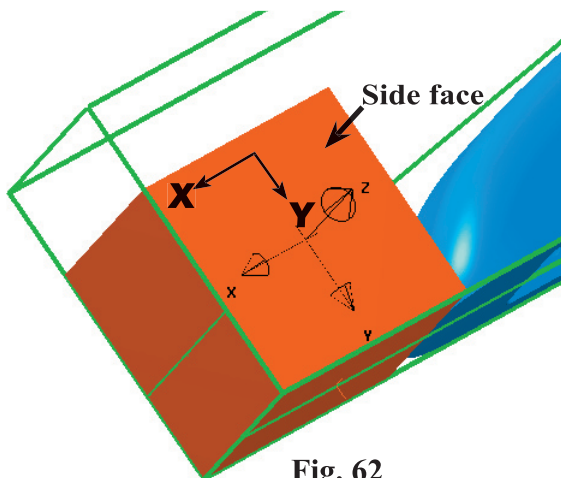


Fig. 62

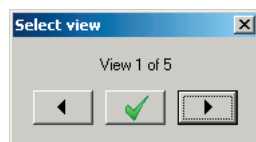


Fig. 63

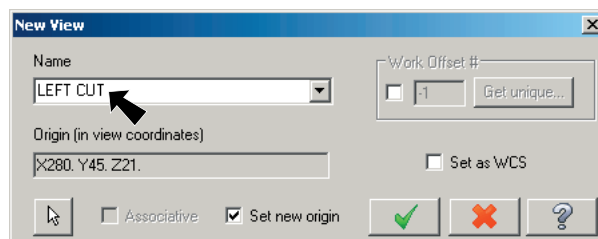


Fig. 64

Step 9. Set:

Origin X to 0
Origin Y to 38
Origin Z to 34, Fig. 65.

Step 10. Click the **Set All** button



, Fig. 65.

Step 11. Click OK



Step 12. Change to the Isometric

View. Use  or **Alt-7**,
Fig. 66.

Step 13. Save your drawing. Use **Alt-F S**.

R. Create WCS RIGHT Cut.

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

Step 2. Click the **FRONT** view from the list of named views in the View Manager dialog box, Fig. 67.

Step 3. Click the **Copy** button in the View Manager dialog box,
Fig. 67.

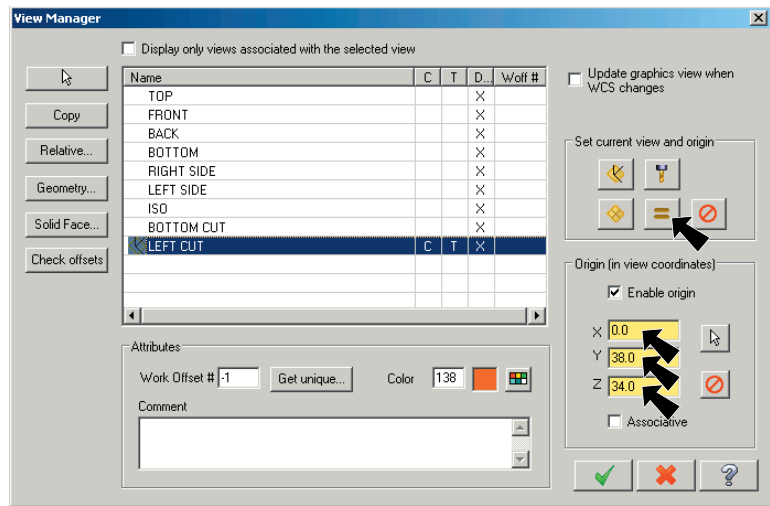


Fig. 65

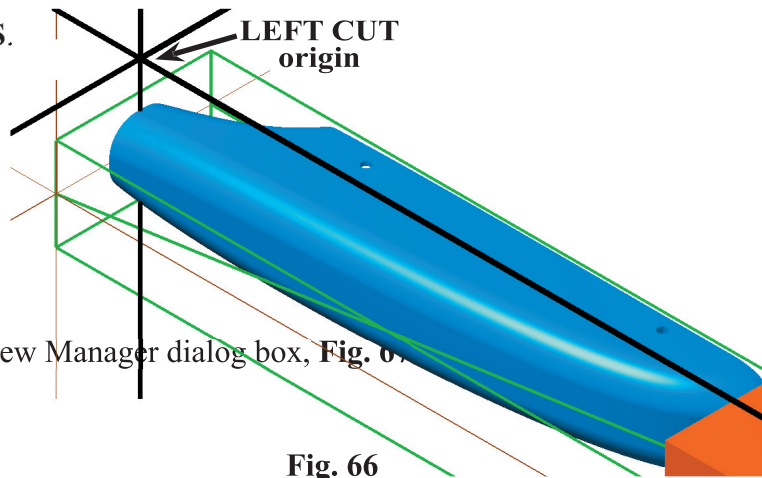


Fig. 66

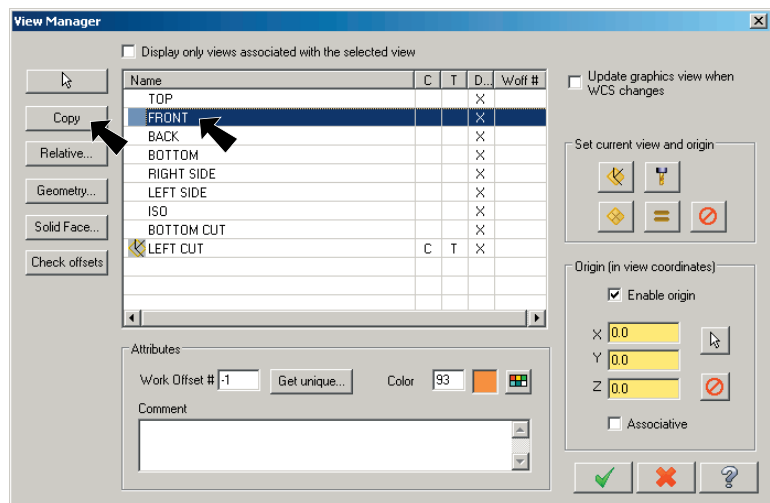


Fig. 67

Step 4. Rename COPY OF FRONT to **RIGHT CUT**. To rename, slowly click the view name and key-in the new name, **Fig. 68**.

Step 5. Set: **Negative -38**
Origin Y to -38
Origin Z to 34, Fig. 69.

Step 6. Click the **Set All** button



, **Fig. 69.**

Step 7. Click OK

Step 8. Change to the Isometric View. Use or **Alt-7, Fig. 70.**

Step 9. Save your drawing. Use **Alt-F S.**

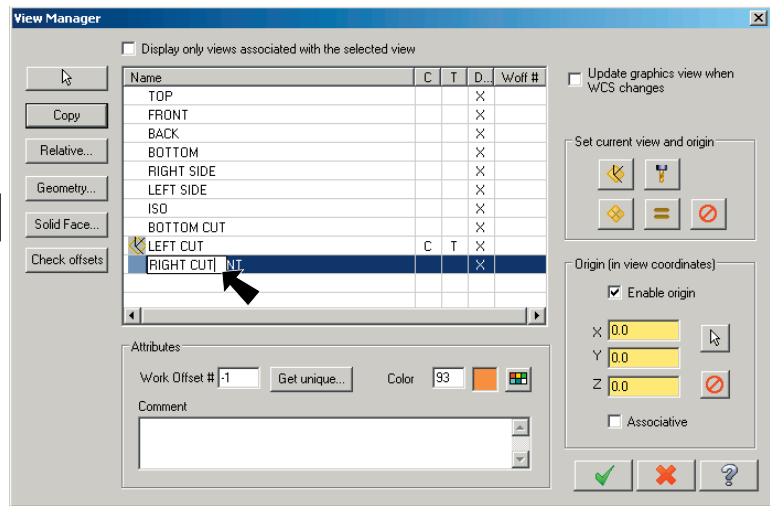


Fig. 68

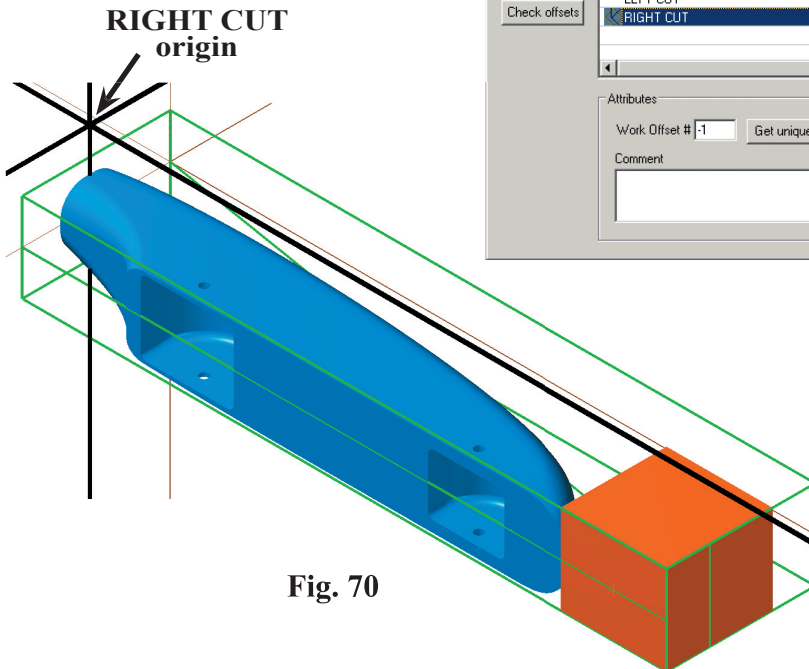


Fig. 70

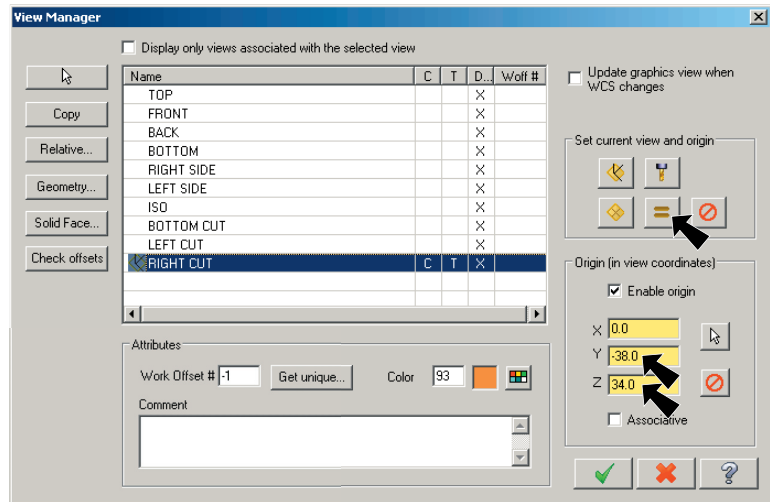


Fig. 69