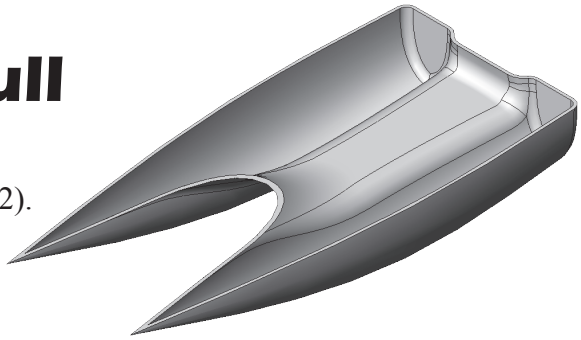
Chapter 20

Boat
Cat Hull



A. Save as "CAT".

Step 1. Open your **HULL MID PLANE** file (Chapter 2).

Step 2. Click File Menu > Save As.

Step 3. Key-in **CAT** for the filename and press ENTER.

B. Delete Loft1 and Sketch3 on Mid Plane.

Step 1. Click **Loft1** in the Feature Manager, **Fig. 1**.

Step 2. Press Delete key on keyboard.

Step 3. Delete **Sketch3 (on Mid Plane)**, click Sketch3 in the Feature Manager, press Delete key on keyboard and Yes to confirm delete, **Fig. 2**.

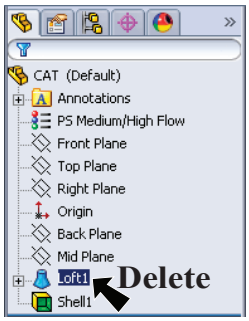


Fig. 1

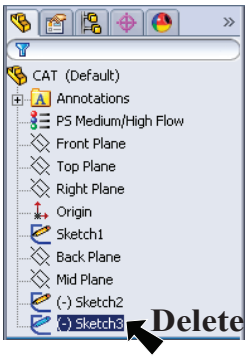


Fig. 2

C. Change Back Plane Sketch.

Step 1. Click **Sketch2** on Back Plane in the drawing and click **Edit Sketch** in the menu, **Fig. 3**.

Step 2. Click **Normal To** on the Standard Views toolbar. (**Ctrl-8**)

Step 3. **Delete all lines except top horizontal line and centerline**, **Fig. 4**. To delete, click the lines and press Delete key.

Step 4. Click **top endpoint** of the centerline, **Fig. 5**.

Step 5. Click **Make Fixed** from Content menu, **Fig. 5**.

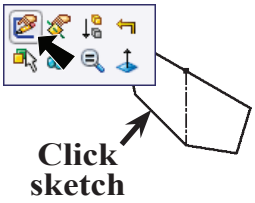


Fig. 3

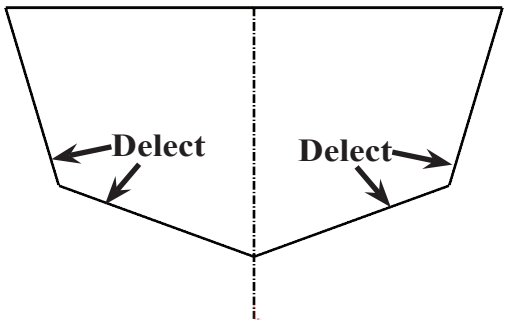


Fig. 4

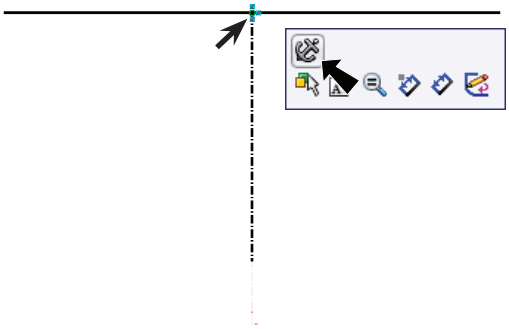


Fig. 5

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Step 6. Grab bottom endpoint of centerline and pull down to the Origin , **Fig. 6**.

Step 7. Click **Smart Dimension**

(S) on the Sketch toolbar.

Step 8. Dimension horizontal line **1.3**, **Fig. 6**.

Step 9. **Right click drawing and click Select** from menu to unselect Smart Dimension tool.

Step 10. Click centerline to select it, **Fig. 6**.

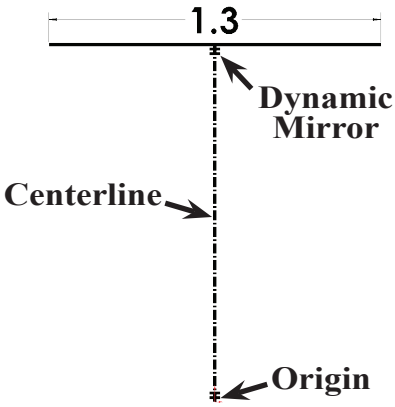


Fig. 6

Step 11. Click **Dynamic Mirror**

on the Sketch toolbar or Tools Menu > Sketch Tools > Dynamic Mirror, **Fig. 6**. Symmetry symbols appear at both ends of the centerline. Geometry drawn on one side of mirror centerline will mirror onto the other side.

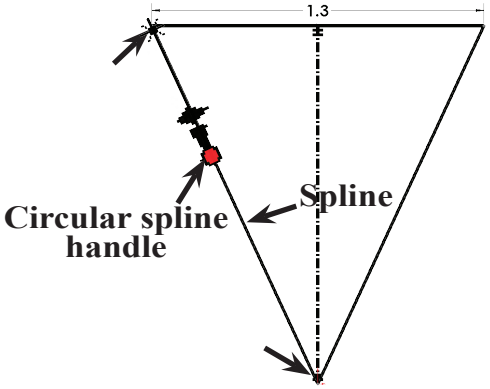


Fig. 7

Step 12. Click **Spline** **(S)** on the Sketch toolbar.

Step 13. Draw **spline between top left endpoint of horizontal** and **bottom endpoint of centerline, Fig. 7**. Press Escape to end spline.

Step 14. Click a spline to select it, **Fig. 7**.

Step 15. Grab the circular spline handle (small gray dot) at endpoint, **Fig. 7** and pull up to adjust spline and display the control polygon handles , **Fig. 8**.

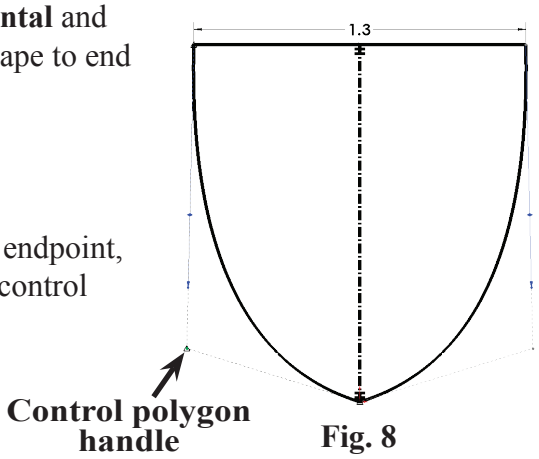


Fig. 8

Step 15. Click **Exit Sketch**

on the Sketch toolbar.

Step 16. Save. Use **Ctrl-S**.

D. Copy Sketch2 to Mid Plane (back sketch to mid plane).

Step 1. Click **Isometric** on the Standard Views toolbar. (**Ctrl-7**).

Step 2. Click **Sketch2** (sketch in Back Plane) in the Feature Manager, **Fig. 9**.

Step 3. Click Edit Menu > Copy (**Ctrl-C**).

Step 4. Click **Mid Plane** in the Feature Manager, **Fig. 10**.

Step 5. Click Edit Menu > Paste (**Ctrl-V**).

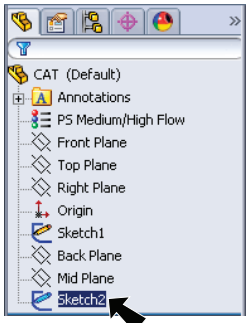


Fig. 9

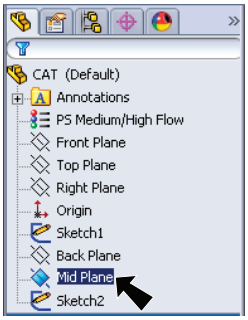


Fig. 10

E. Scale Sketch2 on Back Plane.

Step 1. Click **Sketch2** on Back Plane in the drawing and click **Edit Sketch** in the menu, **Fig. 11**.

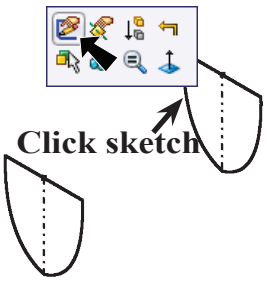


Fig. 11

Step 2. Click **Normal To** on the Standard Views toolbar. (**Ctrl-8**)

Step 3. **Delete 1.3 dimension**, **Fig. 12**. Click dimension and press Delete key.

Step 4. **Drag selection around sketch** to select all entities (line and splines), **Fig. 12**. To drag selection, click above and to left of sketch and drag down and to right to drag around all.

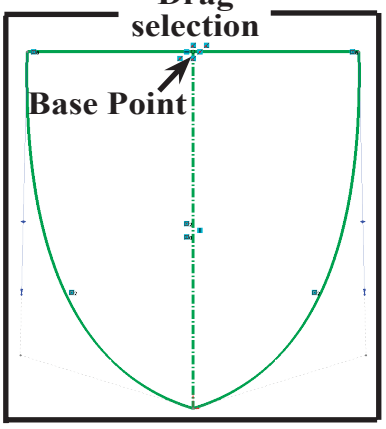


Fig. 12

Step 5. Click **Scale Entities** on the Sketch toolbar.

Step 6. In the Scale Property Manager set:
under Scale about, **Fig. 13**

click in Base Point
selection box
in the sketch click top endpoint of centerline Fig. 12

Scale Factor **.85**

click OK .

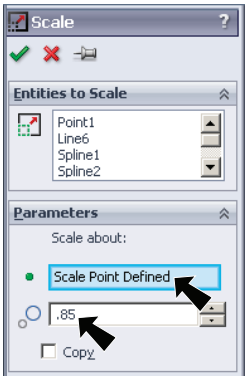


Fig. 13

Step 7. Click **Exit Sketch** on the Sketch toolbar.

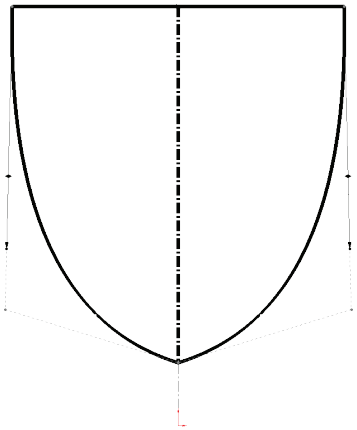
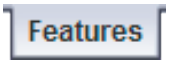
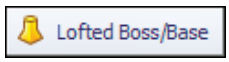


Fig. 14

F. Loft Boss/Base.

Step 1. Click **Isometric** on the Standard Views toolbar. (**Ctrl-7**)

Step 2. Click **Features**  on the Command Manager toolbar.

Step 3. Click **Lofted Boss/Base**  on the Features toolbar.

Step 4. In the Loft Property Manager:

under **Profiles**

click the same position on the three sketches, **Fig. 16**

Sketch Point1

Sketch3

Sketch2

click **Right** on the Standard Views toolbar

expand Start/End Constraints and set, **Fig. 15**

Start constraint:
Normal to Profile
Start Tangent Length: 1.2

click OK .

Step 5. Save. Use **Ctrl-S**.

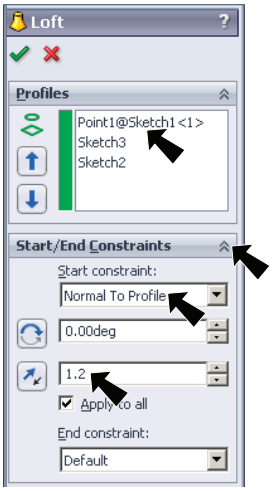


Fig. 15

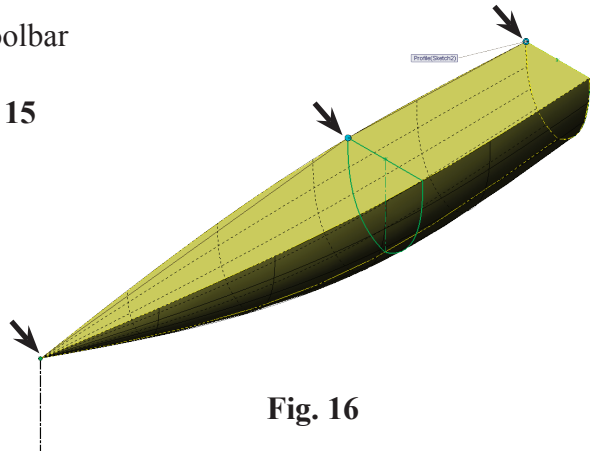


Fig. 16

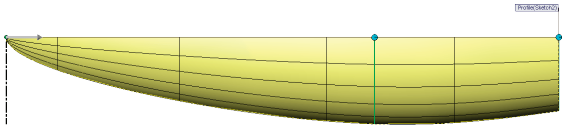


Fig. 17

G. Create Plane.

Step 1. Click **Isometric** on the Standard Views toolbar. **(Ctrl-7)**

Step 2. Click **Right Plane** in the Feature Manager, **Fig. 18**.

Step 3. **Ctrl drag** Right Plane in drawing area towards right of hull and release, **Fig. 19**. To Ctrl drag, hold down Ctrl and drag Plane to right.

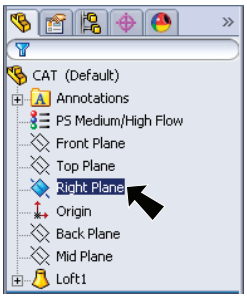


Fig. 18

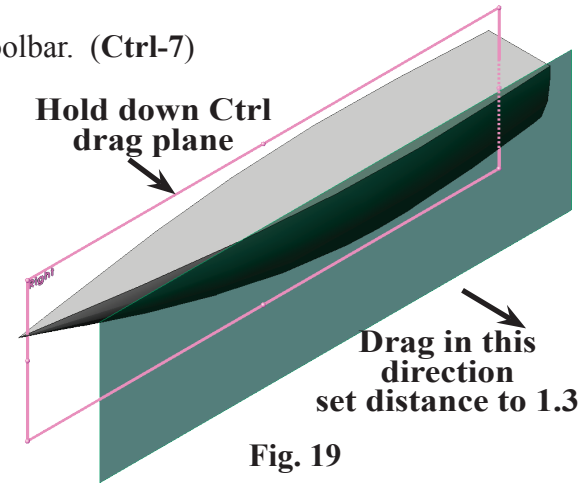


Fig. 19

Step 4. Key-in **1.3 for Distance** in the Property Manager, **Fig. 20** and click OK .

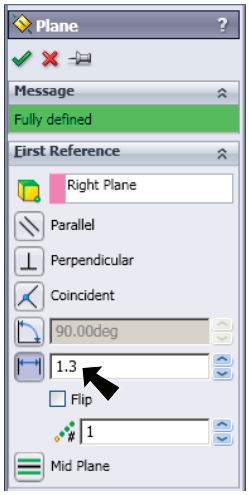


Fig. 20

H. Rename to CENTER PLANE.

Step 1. Click new Plane you just created in the Feature Manager, **Fig. 21**

Step 2. Press **F2** key on keyboard, change Plane name to **CENTER PLANE** and press ENTER, **Fig. 21**.

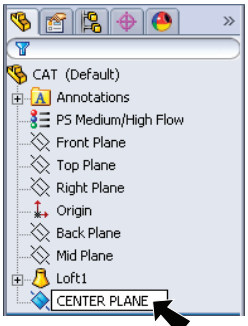


Fig. 21

I. Mirror Hull.

Step 1. Click **Mirror** Mirror on the Features toolbar.

Step 2. In the Mirror Property Manager,
under Mirror Face/Plane, **Fig. 22**
click **CENTER PLANE** in drawing, **Fig. 23**

expand Bodies to Mirror
click hull in drawing

under Options
uncheck Merge solids
select **Full preview**
click OK , **Fig. 24**.

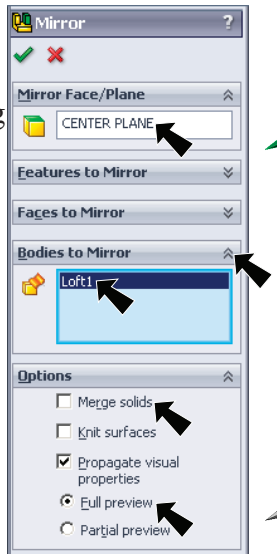


Fig. 22

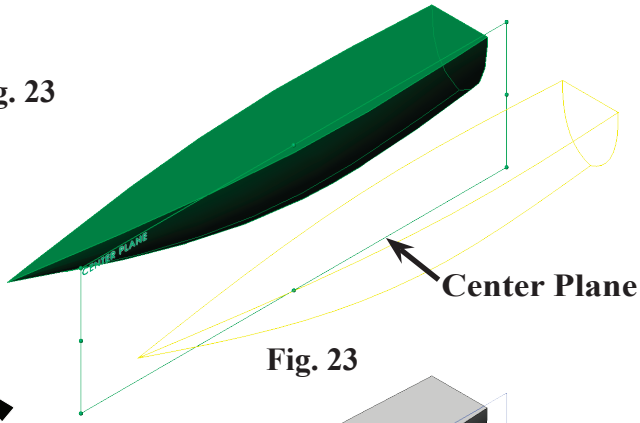


Fig. 23

Step 3. Save. Use **Ctrl-S**.

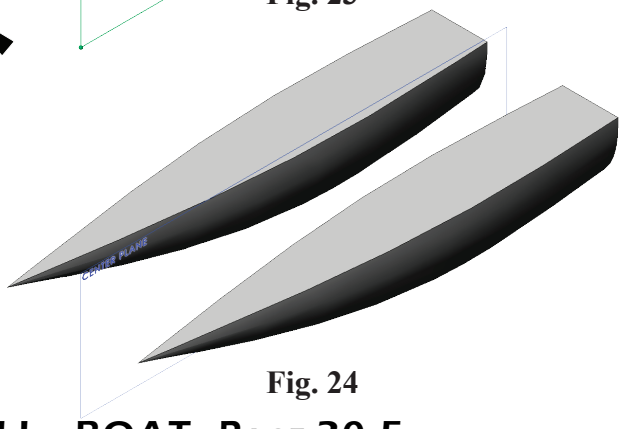


Fig. 24

J. Sketch for Trap.

Step 1. Click **Right Plane** in the Feature Manager and click **Sketch** from the Content toolbar, **Fig. 25**.

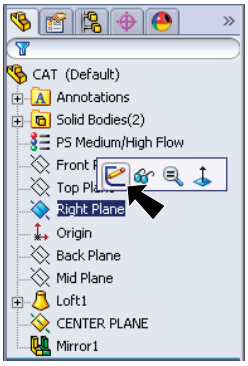


Fig. 25

Step 2. Click **Normal To** on the Standard Views toolbar. **(Ctrl-8)**

Step 3. Click **Line** **(L)** on the Sketch toolbar.

Step 4. Draw three lines as show in **Fig. 26**. Keep vertical line in rear away from rear edge of hull.

Fig. 26

Step 5. Click **Smart Dimension** on the Sketch toolbar.

Step 6. Dimension as shown in **Fig. 27**. Dimension the **.2 first**.

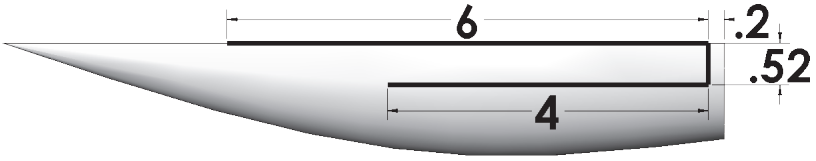


Fig. 27

Step 7. Click **Spline** **(S)** on the Sketch toolbar.

Step 8. Draw **two point** spline between front endpoints of horizontal lines, **Fig. 28**. **Press Escape to end the spline**.

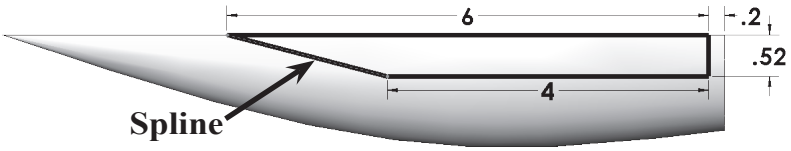


Fig. 28

Step 9. **Ctrl click bottom horizontal line and spline** to select both. Release Ctrl key and click **Make Tangent** on the Content menu, **Fig. 29**.

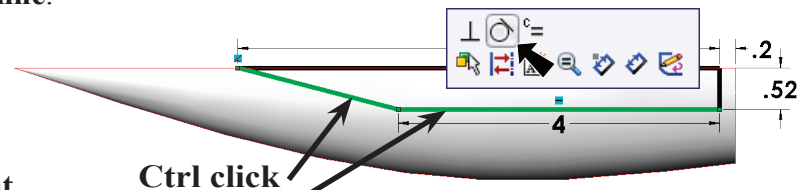


Fig. 29

Step 10. Click **Sketch Fillet** **(S)** on the Sketch toolbar.

Step 11. In the Property Manager set:

Radius to **.4**, **Fig. 30**

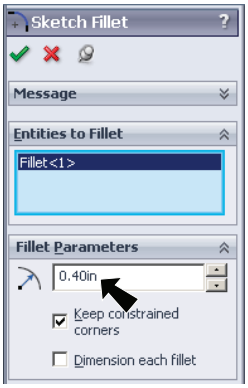


Fig. 30

click **bottom rear corner**, **Fig. 31**

click OK **twice**.

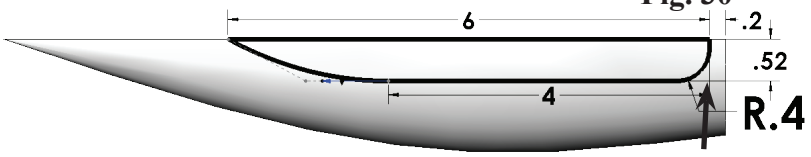


Fig. 31

Step 12. Click **Exit Sketch**

on the Sketch toolbar.

Step 13. Save. Use **Ctrl-S**.

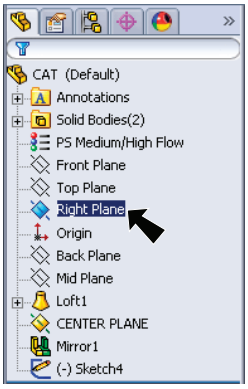


Fig. 32

K. Create Plane at 2nd Hull.

Step 1. Click **Isometric** on the Standard Views toolbar. (**Ctrl-7**)

Step 2. Click **Right Plane** in the Feature Manager, **Fig. 32**.

Step 3. **Ctrl drag** Right Plane in drawing area towards right hull and release, **Fig. 33**. To Ctrl drag, hold down Ctrl and drag Plane to right.

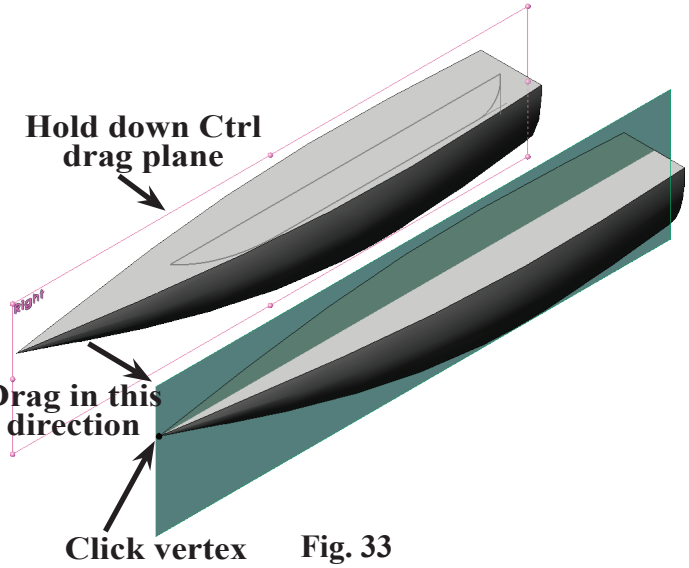


Fig. 33

Step 4. Click front tip of second hull (vertex), **Fig. 33** and **Fig. 34**. Click OK .

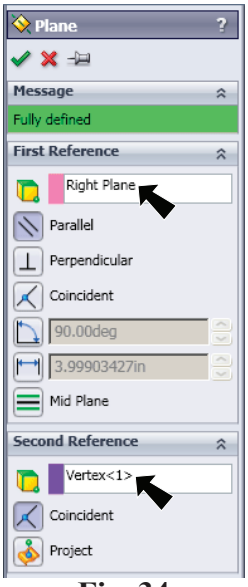


Fig. 34

L. Copy Sketch into Plane 2.

Step 1. Click **Sketch4** in the Feature Manager and copy, **Fig. 35**. Use **Ctrl-C** to copy sketch.

Step 2. Click **Plane2** in the Feature Manager and paste sketch, **Fig. 36**. Use **Ctrl-V** to paste sketch, **Fig. 37**.

Step 3. Hide Plane2. To hide, click **Plane2** in drawing and **Hide** from the menu, **Fig. 37**.

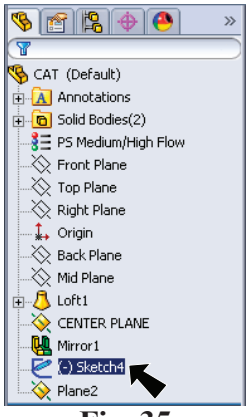


Fig. 35

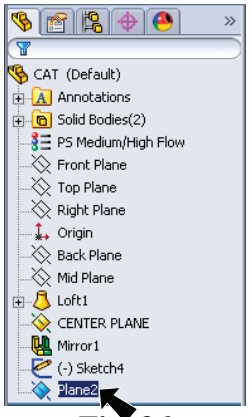


Fig. 36

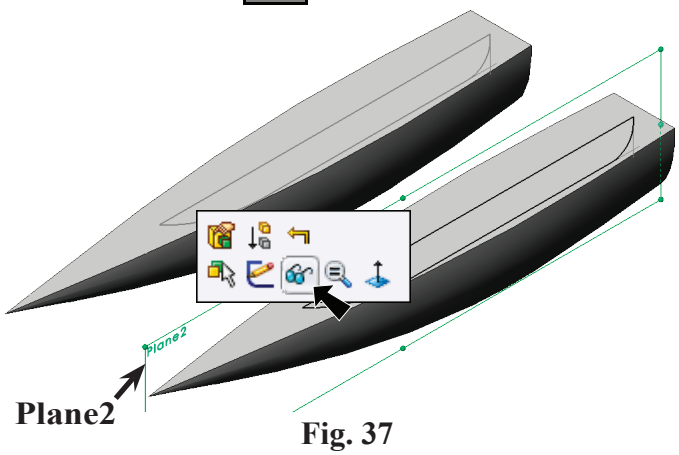


Fig. 37

M. Create Sketch for Loft Guide Curve.

Step 1. Click **top face of hull** and click **Sketch** on the Content menu, **Fig. 38**.

Step 2. Click **Normal To** on the Standard Views toolbar. (**Ctrl-8**)

Step 3. Click **Centerline** in the **Line flyout** on the Sketch toolbar.

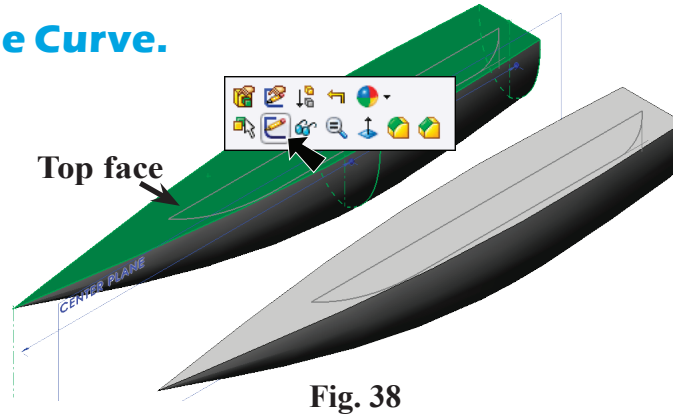


Fig. 38

Step 4. Draw a centerline at Center Plane, **Fig. 39**.

Step 5. **Right click drawing and click Select** from menu to unselect Centerline Tool.

Step 6. Click centerline to select it, **Fig. 39**.

Step 7. Click **Dynamic Mirror**

on the Sketch toolbar or Tools Menu > Sketch Tools > Dynamic Mirror, **Fig. 39**. Symmetry symbols appear at both ends of the centerline. Geometry drawn on one side of mirror centerline will mirror onto the other side.

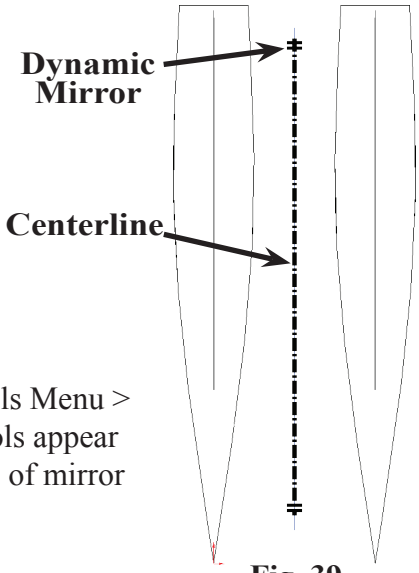


Fig. 39

Step 8. Click **Line** (**L**) on the Sketch toolbar.

Step 9. Draw **horizontal line from front end of Sketch4 to edge of hull**, **Fig. 40**.

Step 5. **Right click drawing and click Select** from menu to unselect Line Tool.

Step 11. Fix left endpoint of line. To Fix, click left endpoint and click **Make Fixed** on the Content menu, **Fig. 41**.

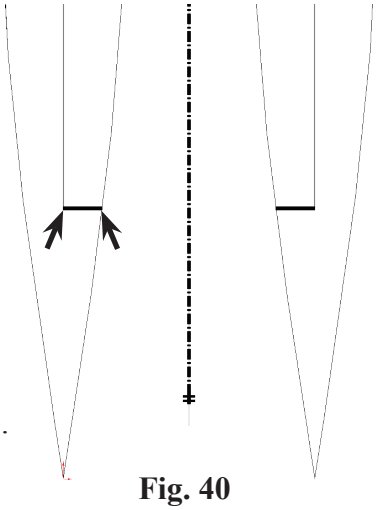


Fig. 40

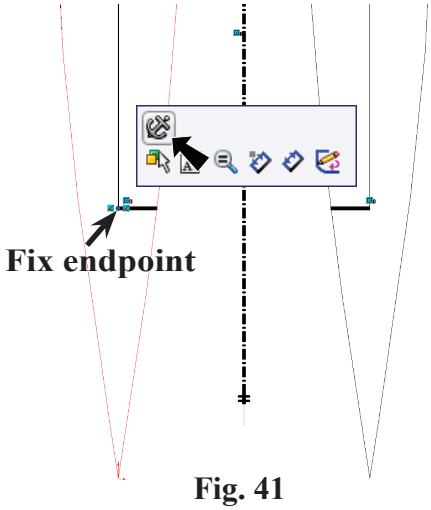


Fig. 41

Step 12. Click **Spline** (**S**) on the Sketch toolbar.

Step 13. Draw **two point** spline between end of line and centerline, **Fig. 42**. **Press Escape to end the spline**.

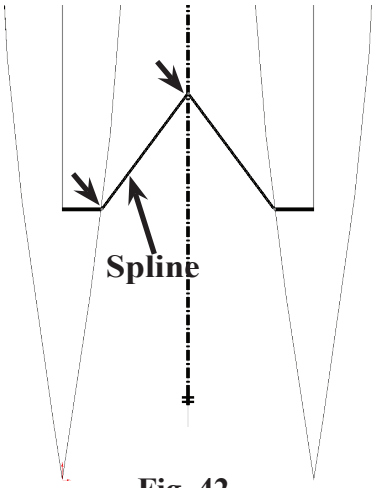


Fig. 42

Step 14. **Ctrl click both spline** to select both. Release Ctrl key and click **Make Tangent** on the Content menu, **Fig. 43**.

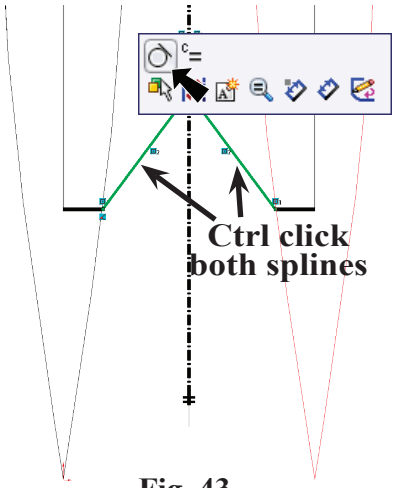


Fig. 43

Step 15. Click **Smart Dimension** (**S**) on the Sketch toolbar.

Step 16. Dimension **1.4** as shown in **Fig. 44**.

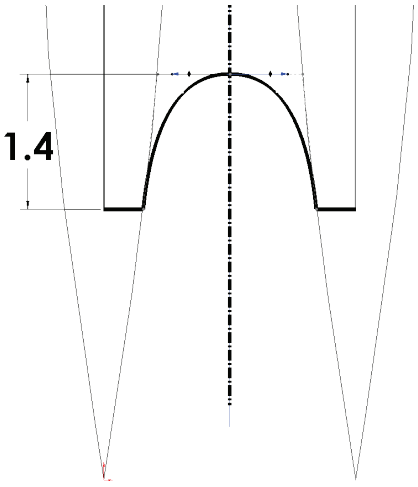


Fig. 44

Step 17. **Right click drawing and click Select** from menu to unselect Smart Dimension tool.

Step 18. Click the **top left Control polygon handle** of spline, **Fig. 45**.

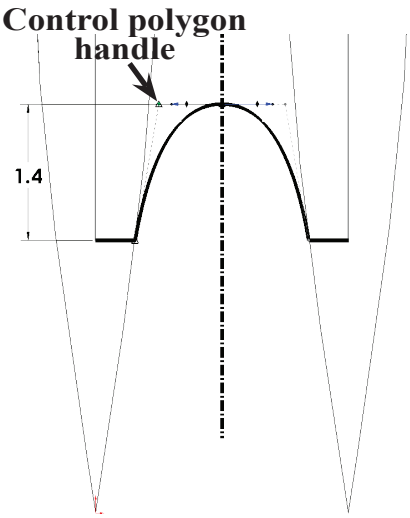


Fig. 45

Step 19. In the Spline Polygon Property Manger set:

X to **.65** **Fig. 46**

click OK .

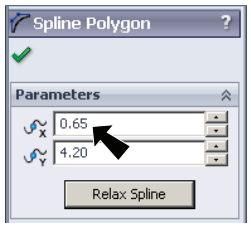


Fig. 46

Step 20. Click **Exit Sketch** on the Sketch toolbar.

Step 21. Save. Use **Ctrl-S**.

N. Hide Center Plane.

Step 1. Click **Isometric** on the Standard Views toolbar. (**Ctrl-7**)

Step 2. Hide Center Plane. To hide, click **Center Plane** in drawing and **Hide** from the Content menu, **Fig. 47**.

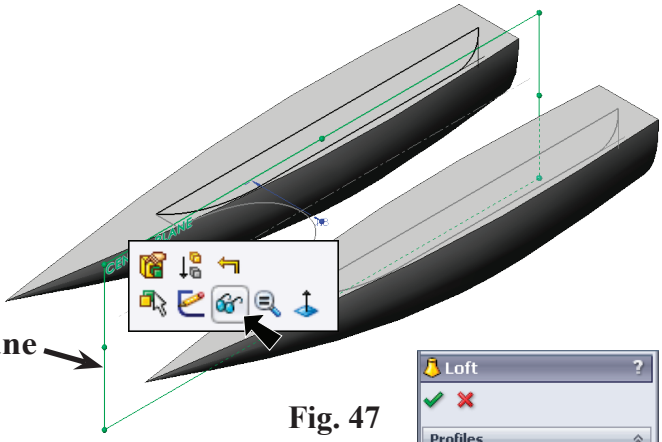


Fig. 47

O. Loft Boss/Base.

Step 1. Click **Features** Features on the Command Manager toolbar.

Step 2. Click **Lofted Boss/Base** Lofted Boss/Base on the Features toolbar.

Step 3. In the Loft Property Manager:

under **Profiles**, **Fig. 48**

click same position on each sketch, **Fig. 49**

Sketch4

Sketch5

under **Guide Curves**

click in **Guide Curves box, Fig. 48**

click **Sketch6 Guide Curve Sketch**, **Fig. 49**

set **Guide curves influence, Fig. 48**

To Next Sharp

click OK .

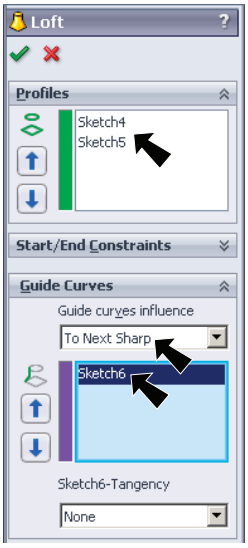


Fig. 48

Step 4. Save. Use **Ctrl-S**.

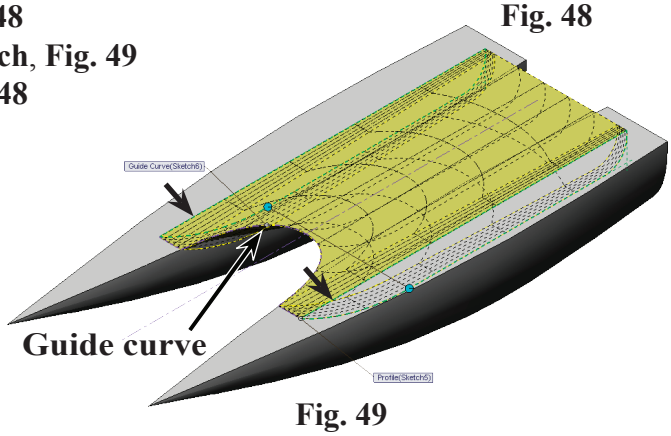


Fig. 49

P. Fillet Edges.

Step 1. Rotate view to view bottom and rear of hull as shown in **Fig. 51**. Hold down middle mouse button (wheel) and drag.

Step 2. Click **Fillet**

on the Features toolbar.

Step 3. In the Fillet Property Manager set:

FilletXpert, **Fig. 50**.

Radius to **.2**

Full preview

click the **four edges** at rear of hull, **Fig. 51**.

click Apply

Radius to **.3**

click the **2 edges under the base**, **Fig. 53**

click Apply

click OK .

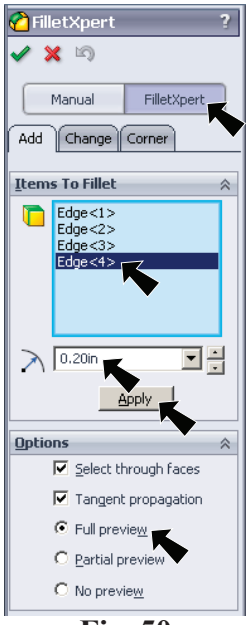


Fig. 50

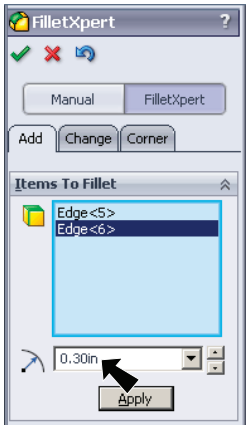


Fig. 52

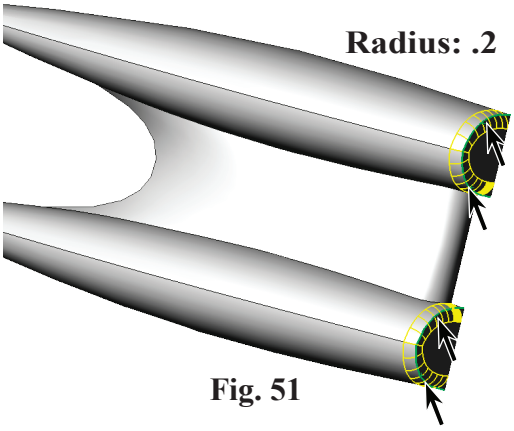


Fig. 51

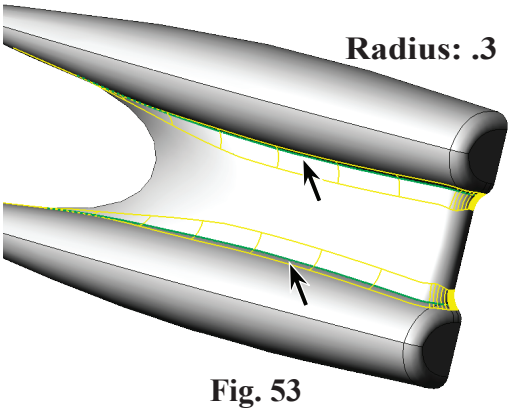


Fig. 53

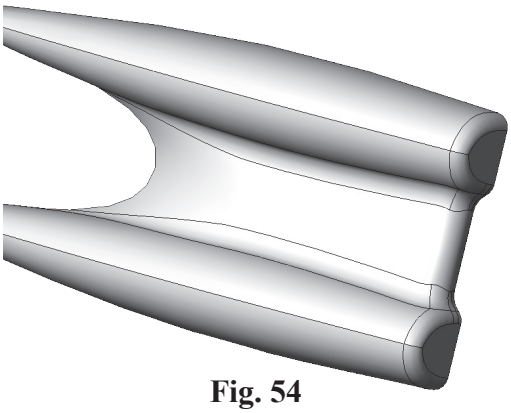


Fig. 54

Q. Shell.

Step 1. Click **Isometric** on the Standard Views toolbar. (**Ctrl-7**)

Step 2. Click the **top face** of hull, **Fig. 55**.

Step 3. Click **Shell** on the Features toolbar.

Step 4. In the Shell Property Manager set:

Thickness **.06 Fig. 56**
check **Show preview**

click OK .

Step 5. Save. Use **Ctrl-S**.

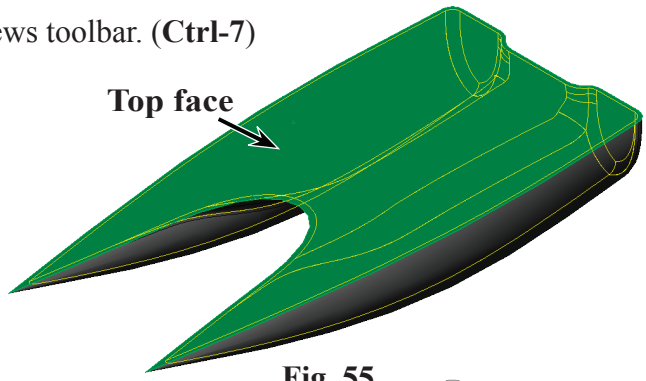


Fig. 55

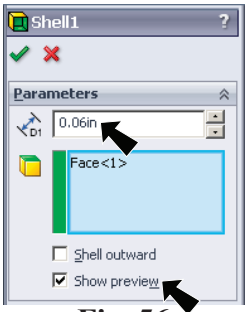


Fig. 56

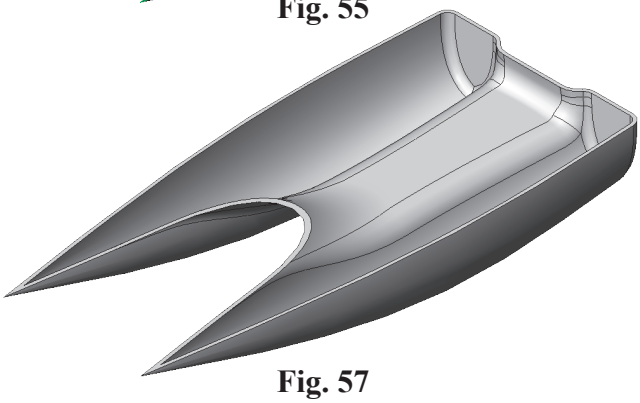


Fig. 57