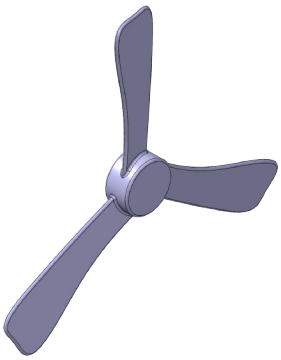
Propeller Solid



A. Change and Name Level.

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

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

Step 3. In the Levels Manager:
Key-in **3** in the Number field, **Fig. 1**
Press **Tab** key to move to the Name Field and key-in **PROPELLER GEOMETRY**.

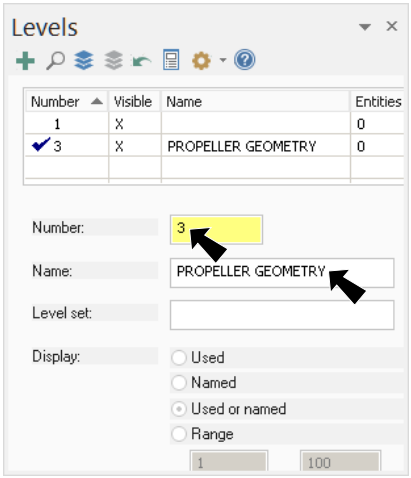


Fig. 1

B. Create Circle.

Step 1. Change to Right View. **Right click** in the graphics window and click Right (**Alt-5**).

Step 2. On the Wireframe tab WIREFRAME click **Circle Center Point** Circle Center Point.

Step 3. In the Circle Center Point function panel:
under Size, **Fig. 2**
Diameter .5 and press ENTER
Press **O key** on keyboard to select AutoCursor **Origin** override
Click OK.

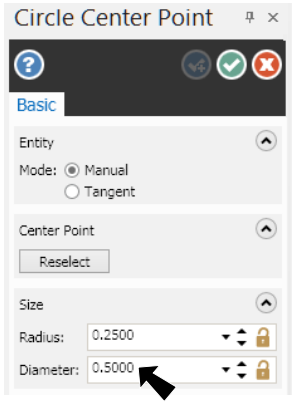


Fig. 2

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

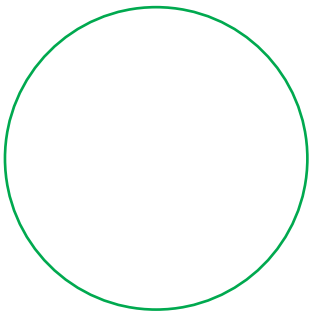


Fig. 3

C. Save As "PROPELLER"

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

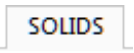
Step 2. Key-in **PROPELLER** for the filename and press ENTER.

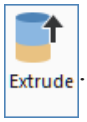
D. Extrude Hub Solid.

Step 1. Change to the Isometric View. **Right click** in the graphics window and click 

(**Alt-7**).

Step 2. **Right click** in the graphics window and on the Mini Toolbar click **Solid Color**  drop down arrow, then click **light purple**, **Fig. 4**.

Step 3. On the Solids tab 

click **Extrude** 

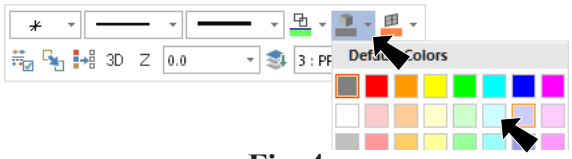


Fig. 4

Step 4. Click Chain  in Chaining dialog box, **Fig. 5**.

Step 5. Click **circle** to chain, **Fig. 6**.

Step 6. Click OK  in Chaining dialog box.

Step 7. In the Solid Extrude function panel:
under Operation, **Fig. 7**
select **Create body**
under Distance
Distance .25 and press ENTER
The direction arrow should **point to rear**, **Fig. 8**. If arrow points in wrong direction, click Reverse All  , **Fig. 7**.
Click OK  .

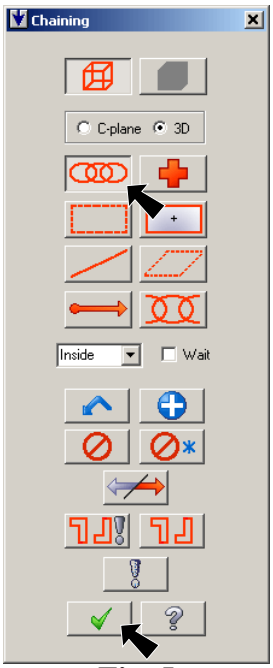


Fig. 5

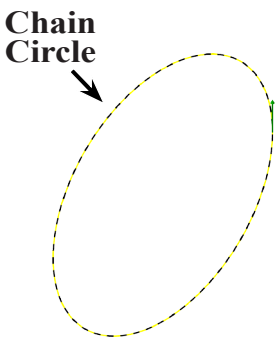


Fig. 6

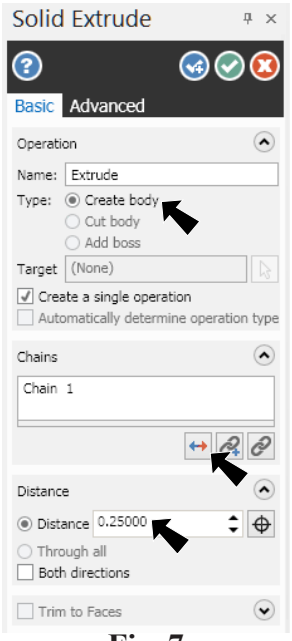


Fig. 7

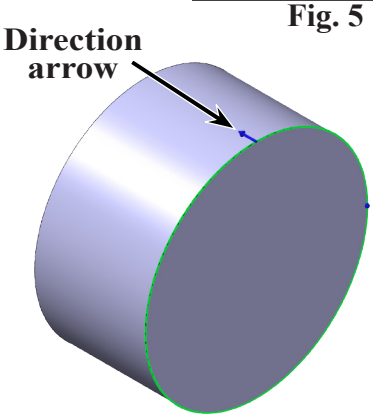


Fig. 8

E. Set Grid and Snap .1.

Step 1. Change to Right View. **Right click** in the graphics window and click Right (**Alt-5**).

Step 2. Change the Z depth to **-.08**. **Right click** in the graphics window and on the Mini Toolbar set **Z depth -.08** and press ENTER, **Fig. 9**.

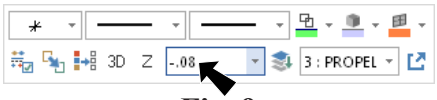


Fig. 9

Step 3. On the View tab VIEW click **Show Grid** Show Grid and **Snap to Grid** Snap to Grid.

Step 4. Click the **Dialog Box Launcher** **(Alt-G)**, **Fig. 10**.

Step 5. In the Grid Settings dialog box:
under Spacing, **Fig. 11**
X and Y Spacing .1
Click OK.

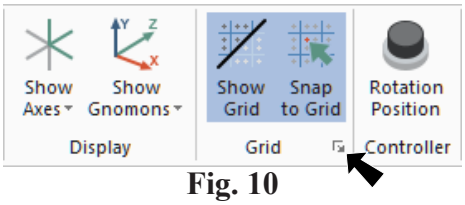


Fig. 10

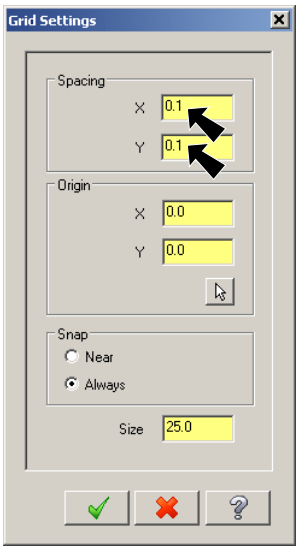


Fig. 11

F. Sketch Blade Spline.

Step 1. Turn off shading, use **Alt-S**.

Step 2. On the Wireframe tab WIREFRAME click **Spline Manual** Spline Manual.

Step 3. In the Spline function panel:

Press **spacebar** to activate Fast Point
Key-in coordinates in **Fig. 12**
Press ENTER after each coordinate
Press ENTER to end spline.

Or use grid to determine location of spline.
Use **Page Down** key to zoom out
Click OK.

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

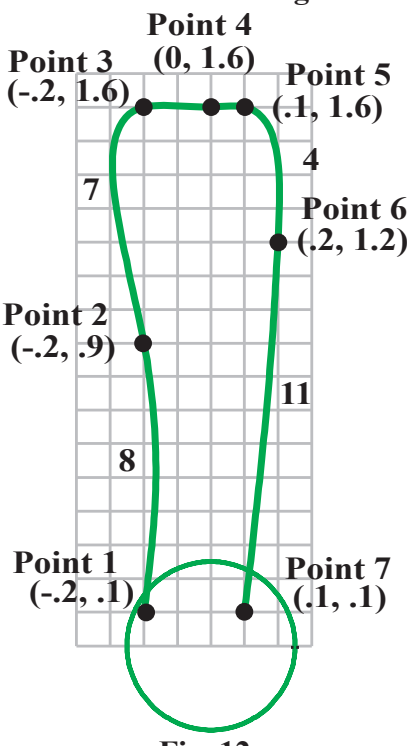


Fig. 12

G. Create Line Across Bottom Of Blade Spline.

Step 1. On the Wireframe tab WIREFRAME click **Line Endpoints** Line Endpoints.

Step 2. Sketch line across endpoints of spline, **Fig. 13**.
Click OK.

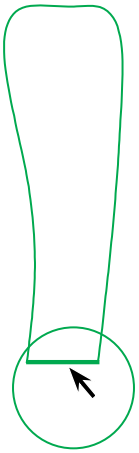


Fig. 13

H. Rotate Blade.

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

Step 2. **Fit** (**Alt-F1**).

Step 3. On the Transform tab TRANSFORM click **Rotate** Rotate.

Step 4. **Shift click spline** to chain **blade entities** and click End Selection End Selection (ENTER), **Fig. 14**.

Step 5. In the Rotate dialog box:
Select **Move** **Fig. 15**
Number of Steps # **1**
Click **Define Center Point**
Click **bottom left endpoint of spline** for point to rotate about, **Fig. 16**
Rotation Angle **10** and press ENTER
Click OK.

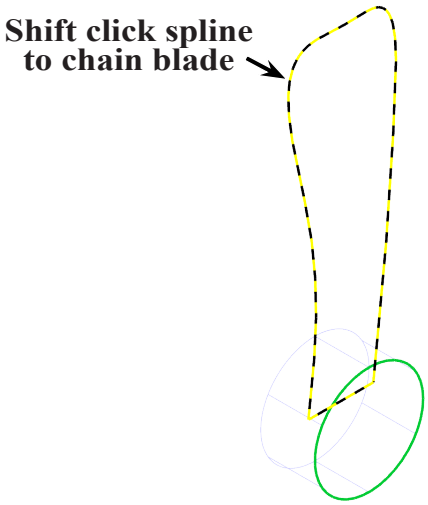


Fig. 14

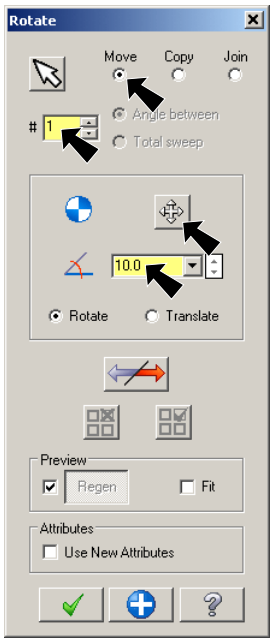


Fig. 15

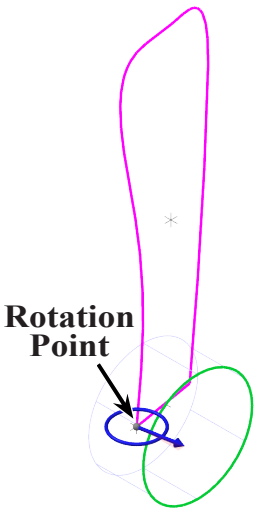


Fig. 16

I. Rotate/Copy Blade.

Step 1. Change CPlane to **Right Side**. Click **CPLANE** in Status bar at bottom of the graphics window and click **Right side** from the menu, **Fig 17**.

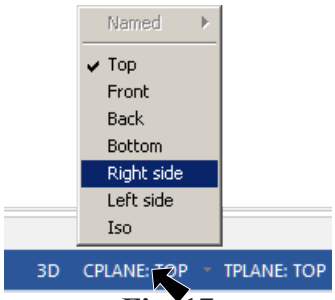


Fig. 17

Step 2. On the Transform tab TRANSFORM click **Rotate** Rotate.

Step 3. **Shift click** spline to chain blade entities and click End Selection End Selection (ENTER), **Fig. 18**.

Step 4. In the Rotate dialog box:

Select **Copy** **Fig. 19**

Number of Steps **2**

Rotation Angle **120** and press ENTER

Click OK.

Step 5. **Right click** the graphics window and click **Clear Colors**.

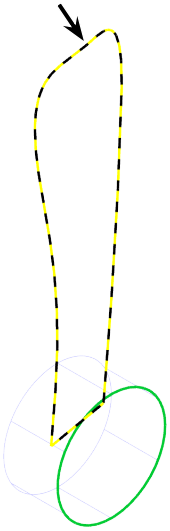


Fig. 18

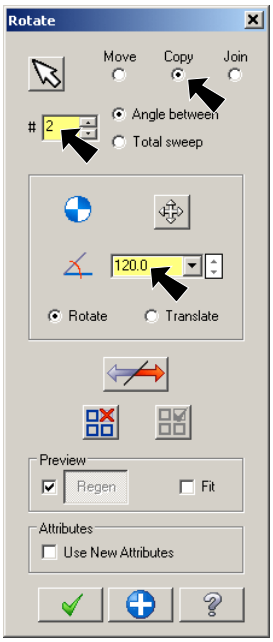


Fig. 19

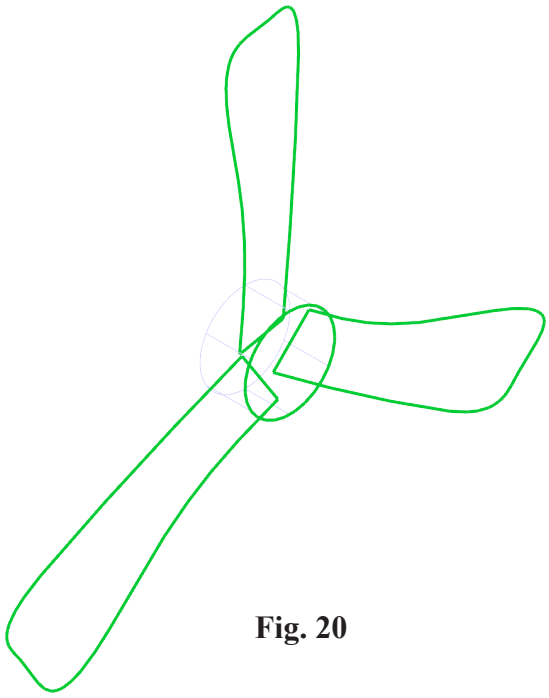
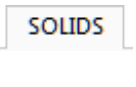
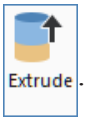


Fig. 20

G. Extrude Blade Solid.

Step 1. Turn on shading, use **Alt-S**.

Step 2. On the Solids tab 

click **Extrude** 

.

Step 3. Click Chain  in Chaining dialog box.

Step 4. Click **each spline** to chain, **Fig. 21**.

Step 5. Click OK  in Chaining dialog box.

Step 6. In the Solid Extrude function panel:
under Operation, **Fig. 22**
select **Add boss**
under Distance
Distance .04
The direction arrow should **point to rear**, **Fig. 23**. If arrow points in wrong direction, click Reverse All  , **Fig. 22**.
Click OK  .

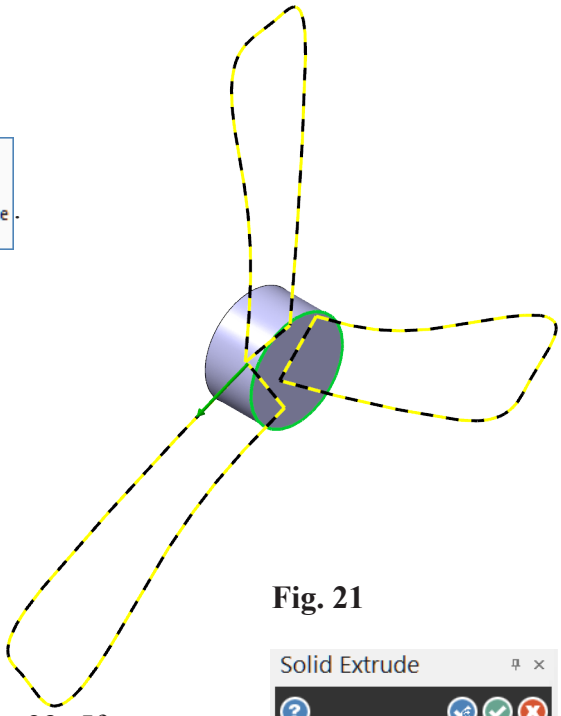


Fig. 21

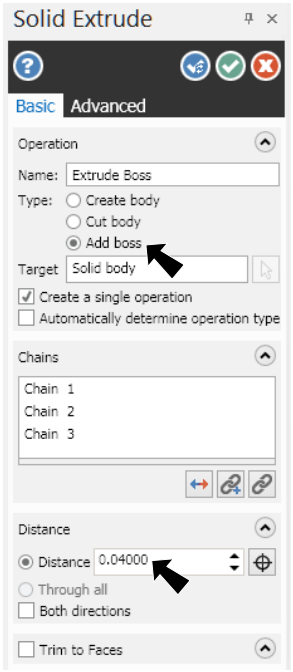


Fig. 22

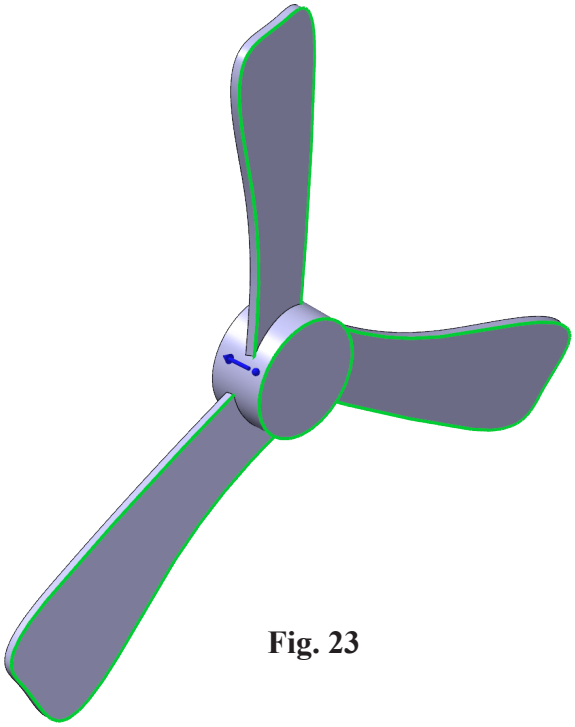


Fig. 23

K. Fillet Blade Solid.

Step 1. On the Solids tab SOLIDS click **Constant Fillet** Constant Fillet.

Step 2. In the Solid Selection dialog box, select **Solid** and unselect others, **Fig. 24**.

Step 3. Click **solid**, **Fig. 25**.

Step 4. Click OK in Solid Selection dialog box.

Step 5. In the Constant Radius Fillet function panel:
under Distance, **Fig. 26**
Distance .02
Click OK.

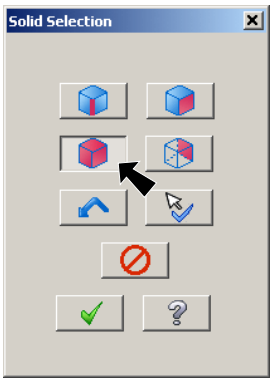


Fig. 24

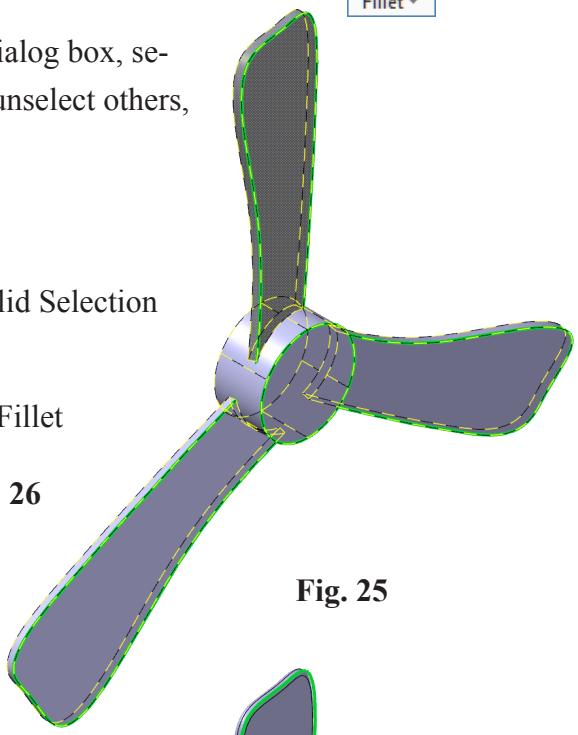


Fig. 25

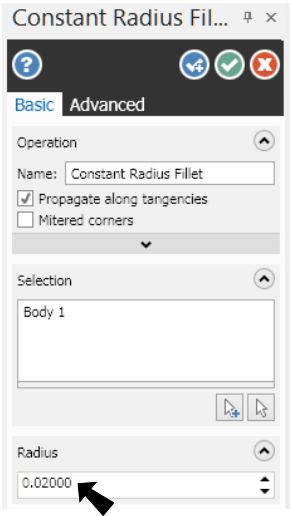


Fig. 26

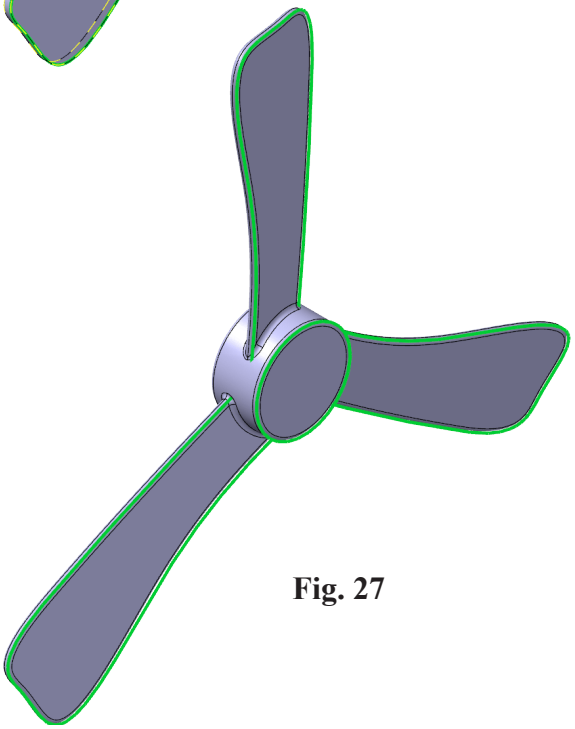


Fig. 27

L. Move Solids To New Level.

Step 1. **Right click** in the graphics window and on the Mini Toolbar click **Change level** , **Fig. 28**.

Fig. 28

Step 2. Click **solid** and click End Selection (ENTER), **Fig. 29**.

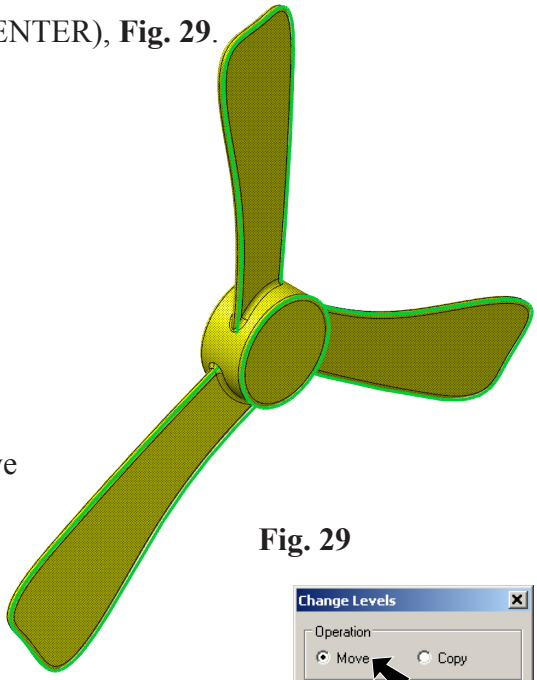


Fig. 29

Step 3. In the Change Levels dialog box:
under Operation, **Fig. 30**
select **Move**
under Level Number
Uncheck **Use Main Level**
Key-in **4** for Level Number
Click OK .

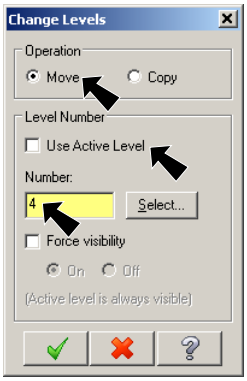


Fig. 30

Step 4. In the Levels Manager (**Alt-Z**), **Fig. 31**
Click 4 in Number column to make Level active

Click to remove X in Visible column of **PROPELLER GEOMETRY** level to hide level

In Level 4 Name Field key-in **PROPELLER SOLID**.

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

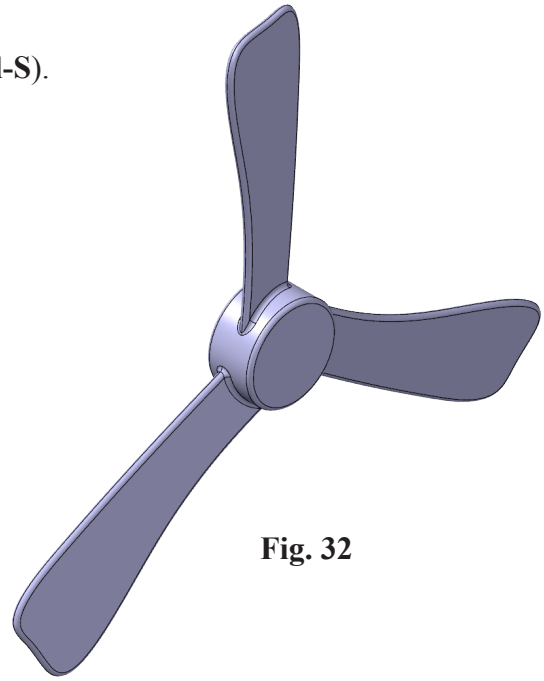


Fig. 32

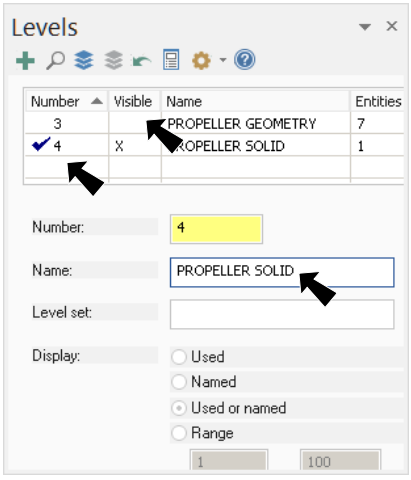


Fig. 31