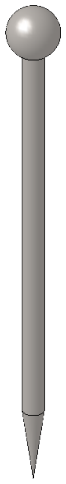
Chapter 13

Delta Dart
Pin



A. Revolve.

Step 1. Click File Menu > New, click **Part Metric** and OK.

Step 2. Click **Front Plane** in the Feature Manager and click **Sketch** on the context toolbar, **Fig. 1**.

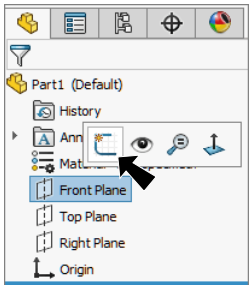


Fig. 1

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

Step 4. Sketch a **vertical line** up from the Origin. Auto-transition to Tangent Arc tool and sketch arc, **Fig. 2**.
To autotransition to arc, after sketching endpoint of line, move cursor away and back. The preview shows a tangent arc. Click to place the arc.
Autotransition back to Line tool and sketch vertical down and angled line back to Origin.
Tip: Toggle between line and arc without returning to the endpoint, use **A** key.

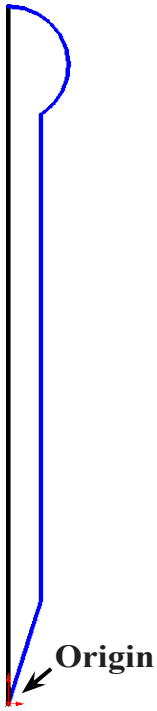


Fig. 2

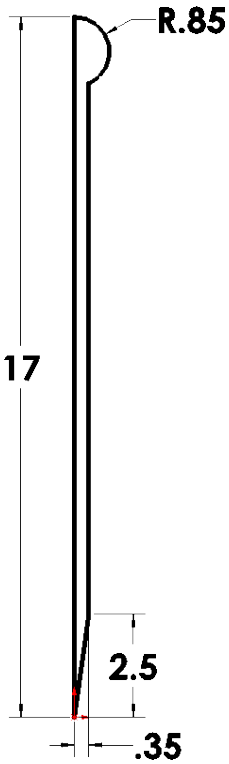


Fig. 3

Step 5. Click **Smart Dimension** (**S**) on the Sketch toolbar.

Step 6. Add dimensions, **Fig. 3**.

Step 7. Click **Features** on the Command Manager toolbar.

Step 8. Click **Revolved Boss/Base** on the Features toolbar.

Step 9. In the Revolve Property Manger set:

under Axis of Revolution click **vertical centerline**, **Fig. 5**

click OK .

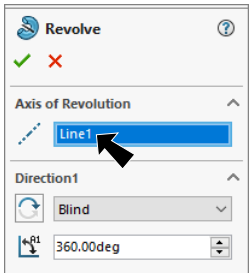


Fig. 4

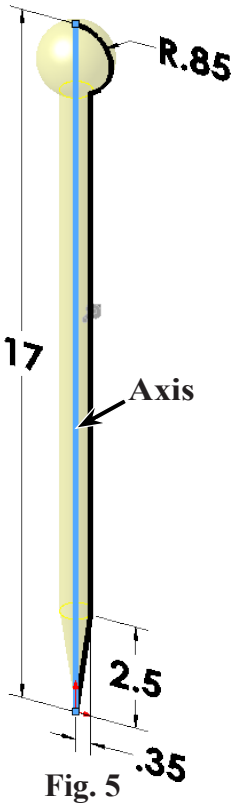


Fig. 5

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B. Material 304 Steel.

Step 1. **Right click Material** in the Feature Manager and click **Edit Material**, **Fig. 6**.

Step 2. Expand **Steel** in the material tree and select **AISI 304**. Click **Apply** and **Close**.

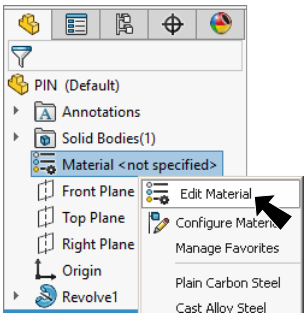


Fig. 6

C. Save as "PIN".

Step 1. Click File Menu > Save As.

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

D. Open Assembly File.

Step 1. Click File Menu > Open. Select your DELTA DART ASSEMBLY file and click OK.

Step 2. Click **FUSELAGE** in the Feature Manager and click **Open Part** on the context toolbar, **Fig. 7**.

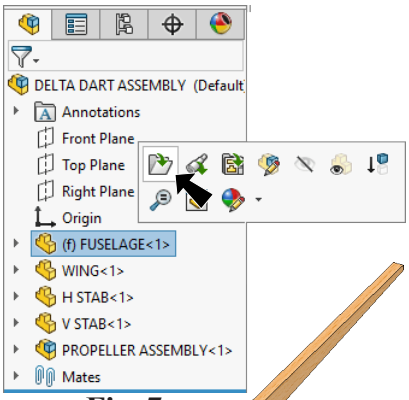


Fig. 7

E. Create Plane1 for Pin Hole.

Step 1. Click **Trimetric** on the Standard Views toolbar.

Step 2. Zoom in around **front of Fuselage**, **Fig. 8**.

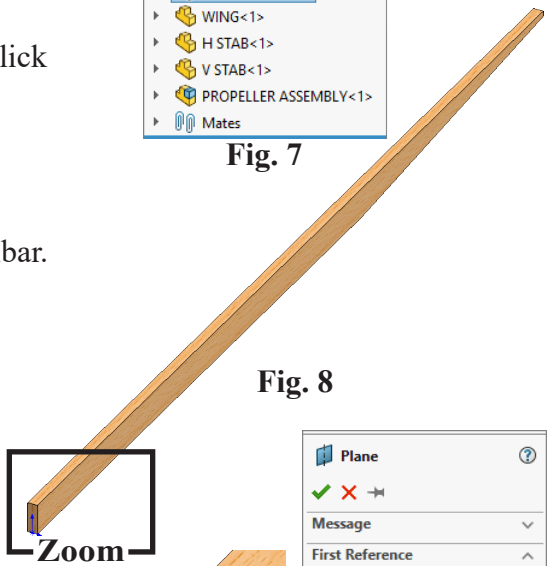


Fig. 8

Step 3. Click **Reference Geometry** on the Features toolbar and **Plane** from the menu.

Step 4. In the Plane Property Manager set:
under First Reference, **Fig. 9**
click **bottom front edge of Fuselage**, **Fig. 10**

under Second Reference
click **front face of Fuselage**
click **At angle**
Angle **45°**
uncheck **Flip**
click OK .

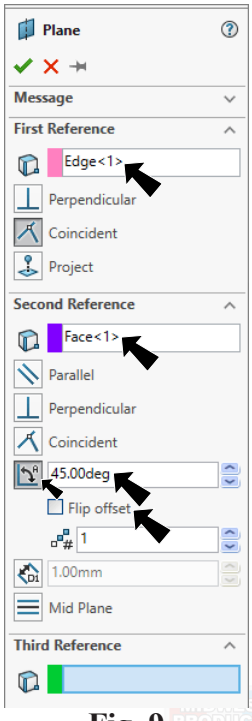


Fig. 9

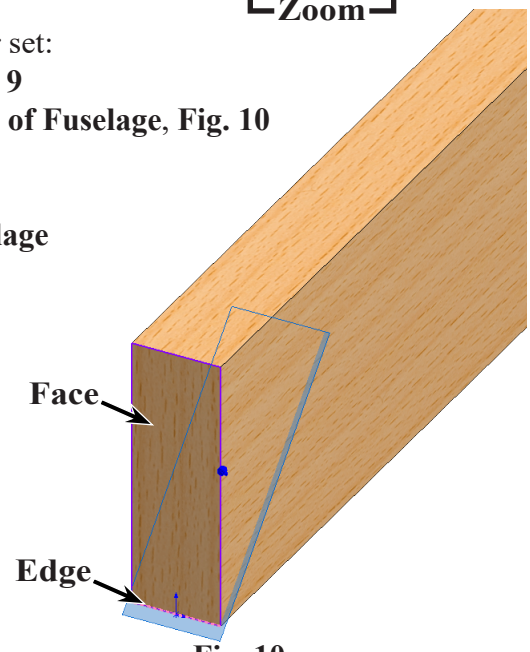


Fig. 10

F. Sketch Centerline for Pin Hole.

Step 1. Click **Bottom** on the Standard Views toolbar. (**Ctrl-6**)

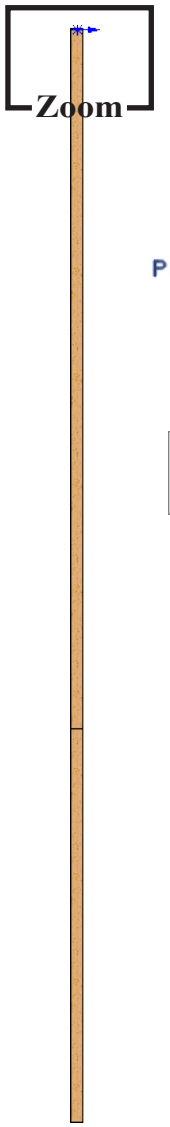


Fig. 11

Step 2. Zoom in on Origin , **Fig. 11**.

Step 3. Click the **bottom face** of Fuselage and click **Sketch** on the context toolbar, **Fig. 12**.

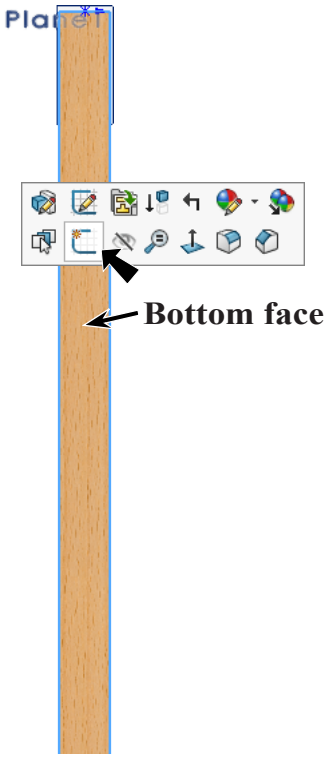


Fig. 12

Step 4. Click **Centerline** in the **Line flyout** on the Sketch toolbar.

Step 5. Sketch **vertical centerline** down from Origin , **Fig. 13**.

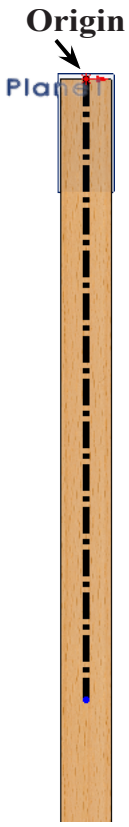


Fig. 13

Step 6. Click **Smart Dimension** (**S**) on the Sketch toolbar.

Step 7. Dimension centerline **180**, **Fig. 14**.

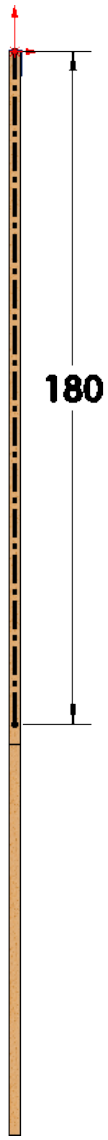
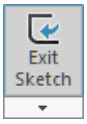


Fig. 14

Step 8. Click **Exit Sketch**  on the Sketch toolbar.

G. Sketch Pin Hole.

Step 1. Click **Plane1** in the Feature Manager and click **Sketch** on the context toolbar, **Fig. 15**.

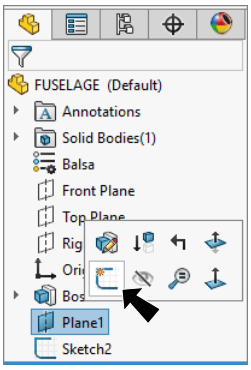


Fig. 15

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

Step 3. Zoom in on the **endpoint of centerline Sketch2**, **Fig. 16**.

Step 4. Click **Circle** **(S)** on the Sketch toolbar.

Step 5. Sketch **circle at endpoint of centerline** in Sketch2, **Fig. 17**.

Step 6. Click **Smart Dimension** **(S)** on the Sketch toolbar.

Step 7. Dimension circle diameter **.7**, **Fig. 17**.

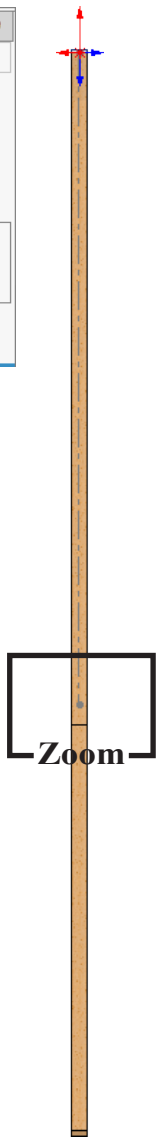


Fig. 16

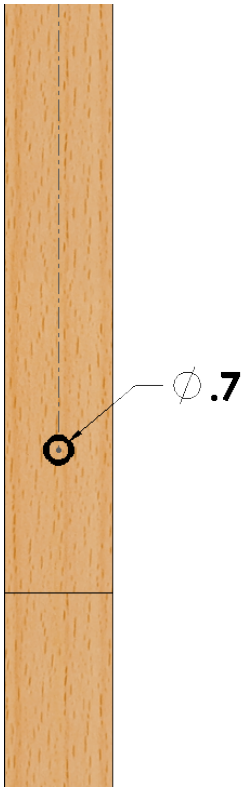


Fig. 17

H. Cut Pin Hole.

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

Step 2. Click **Extruded Cut** Extruded Cut on the Features toolbar.

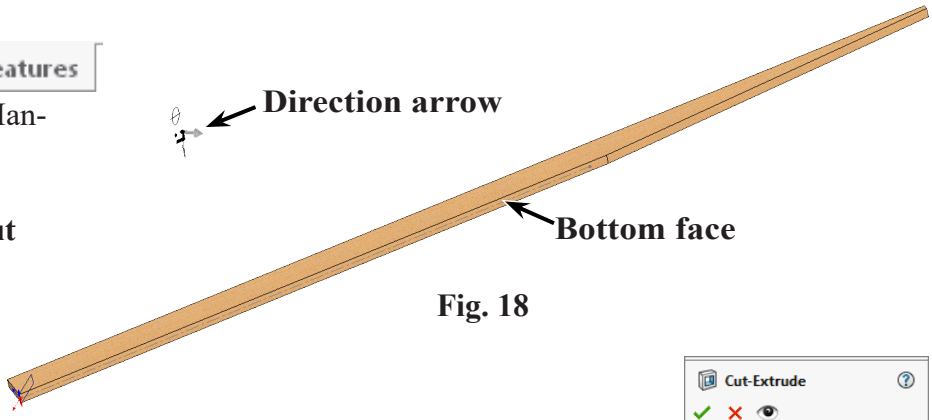


Fig. 18

Step 3. Click **Zoom to Fit** on the View toolbar.

Step 4. Rotate view to view **bottom face of Fuselage** and **Direction arrow** as shown in **Fig. 18**. Hold down middle mouse button (wheel) and drag.

Step 5. In the Cut-Extrude Property Manager set:

under From, **Fig. 19**

Start Condition **Surface/Face/Plane**

in Select Surface/Face/Plane box

click **bottom face of Fuselage** (not angled face), **Fig. 20**

under Direction 1

click **Reverse Direction**

Depth D1 **5**

The Direction arrow should point towards Fuselage.

Click OK .

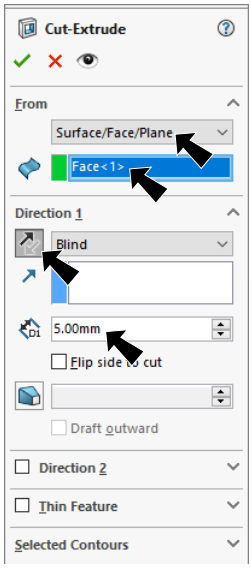


Fig. 19

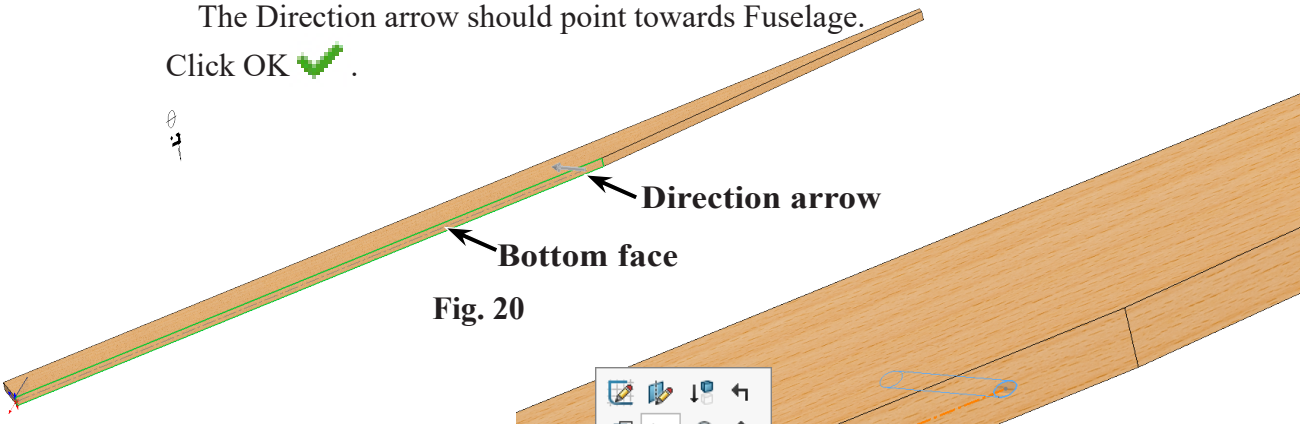


Fig. 20

Step 6. **Hide Sketch2**. To hide, click **Sketch2** in graphics area and click **Hide** on context toolbar, **Fig. 21**.

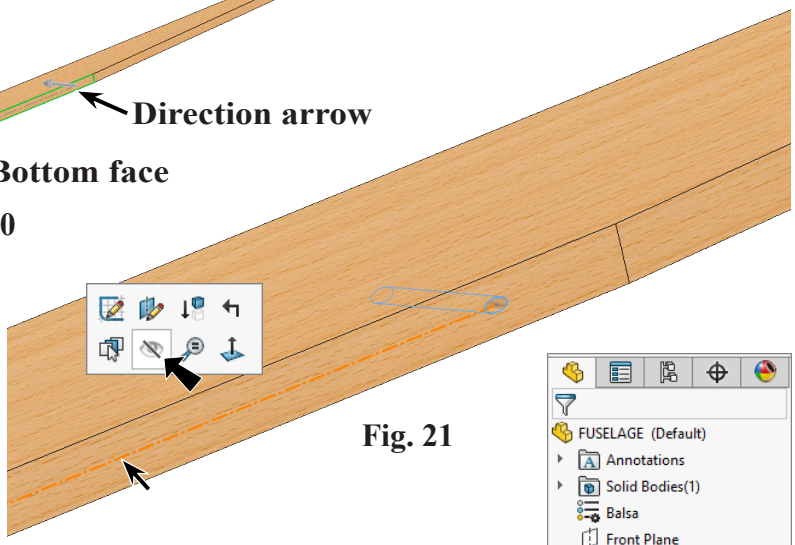


Fig. 21

Step 7. **Hide Plane1**. To hide, click **Plane1** in the Feature Manager and click **Hide** on context toolbar, **Fig. 22**.

Step 8. Save. Use **Ctrl-S**.

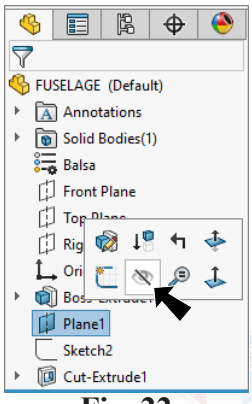
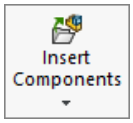


Fig. 22

I. Insert Pin into Assembly.

Step 1. Switch back to the ASSEMBLY file. Use **Ctrl-Tab**.

Step 2. Rotate view to view **bottom of Fuselage and Pin hole**, **Fig. 23**. Hold down middle mouse button (wheel) and drag.

Step 3. Click **Insert Components** 

on the Assembly toolbar.

Step 4. Open your **PIN** file and place Pin as positioned in **Fig. 23**.

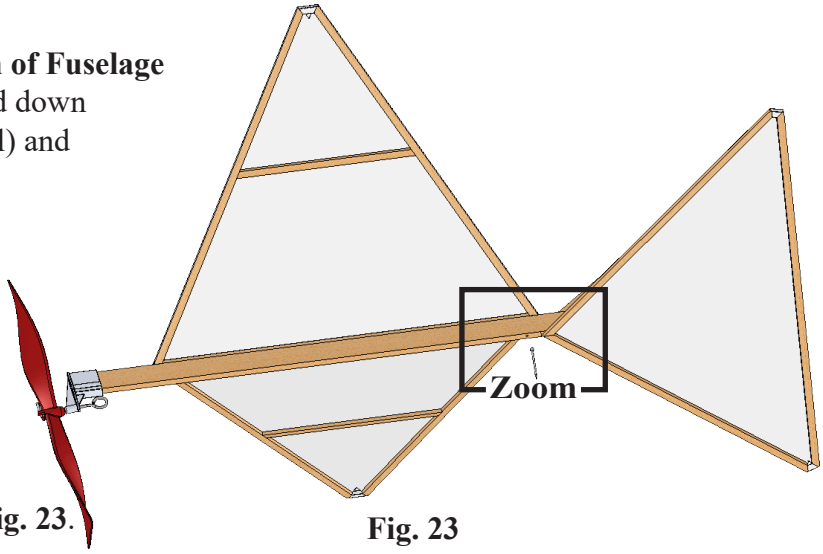


Fig. 23

J. Mate: Pin and Fuselage.

Step 1. Zoom in around **Pin and hole**, **Fig. 23**.

Step 2. Click **Mate**

on the Assembly toolbar.

Step 3. Click **cylindrical face of hole** and **cylindrical face of the Pin**, **Fig. 24**.

Step 4. Click **Flip Mate Alignment** in the Mate pop-up, **Fig. 25**. Pin should be aligned, **Fig. 26**.

Step 5. Click Add/Finish Mate in Mate pop-up toolbar to add a **Concentric** mate.

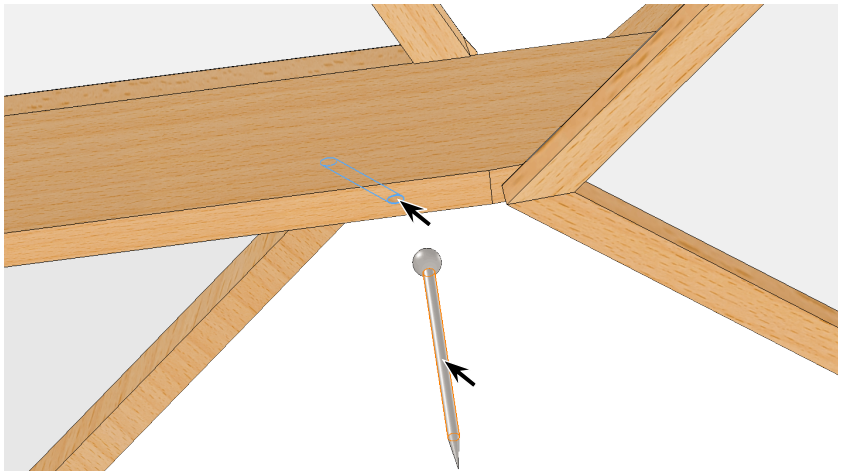


Fig. 24

Fig. 25

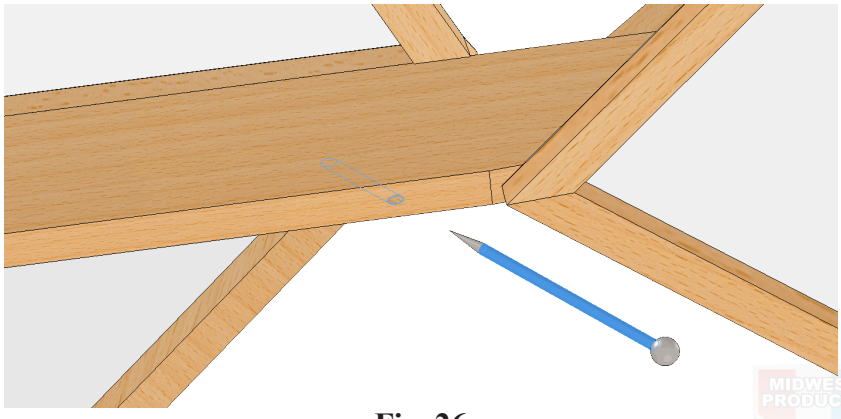


Fig. 26

Step 6. Click the **bottom face of Fuselage** and **vertex** at tip of Pin point, **Fig. 27**.

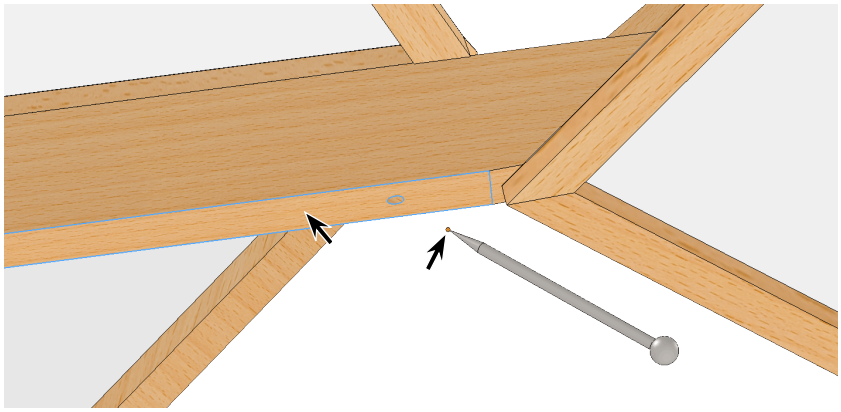


Fig. 27

Step 7. Click **Distance** in Mate pop-up, **Fig. 28**. Set **distance 7** and press ENTER. Click **Flip Dimension**. The Pin should be positioned in hole, **Fig. 29**. If positioned in opposite direction, click **Flip Dimension** in the Mate pop-up. Click Add/Finish Mate to add Distance mate.

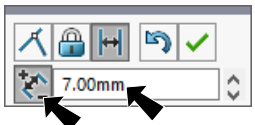


Fig. 28

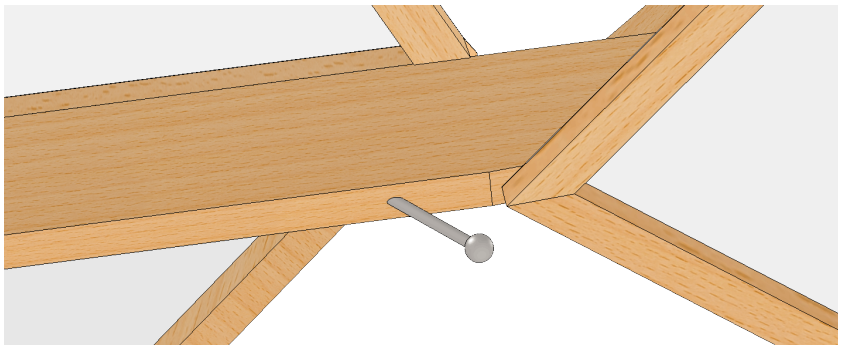


Fig. 29

Step 8. Click OK in the Property Manager.

Step 9. Save. Use **Ctrl-S**.

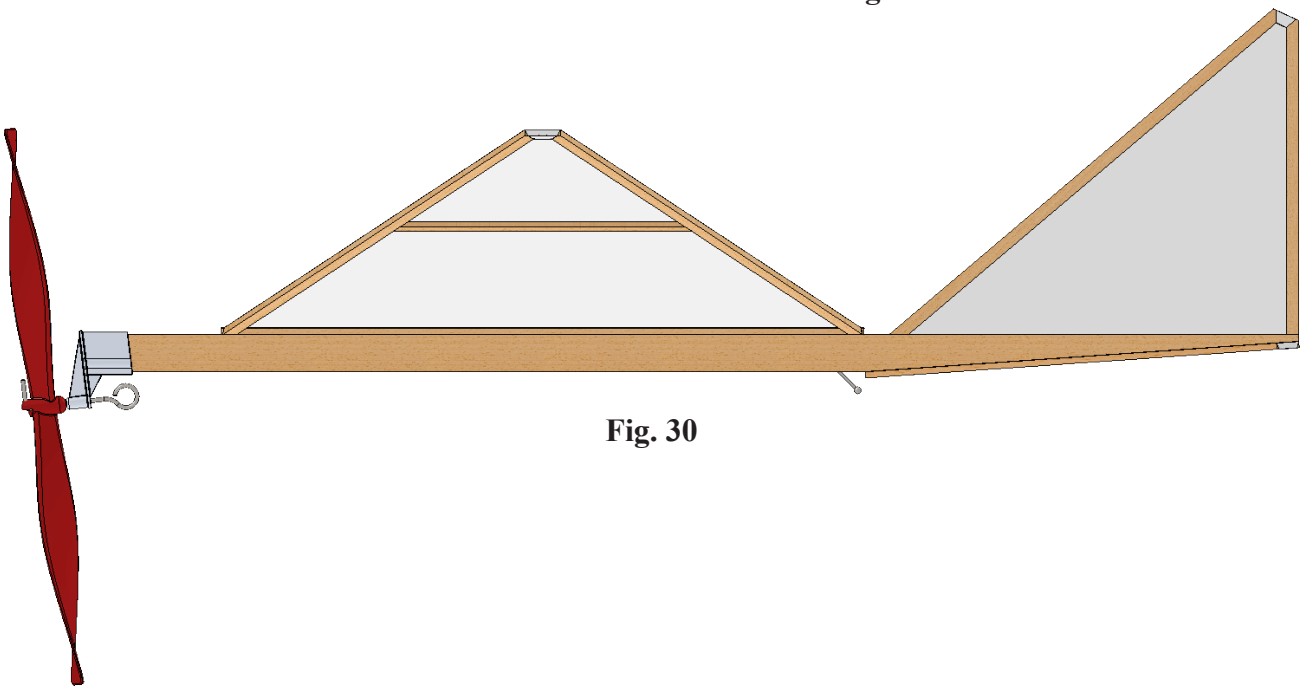


Fig. 30