CO2 Rail Car E
Blank

A. New Metric Document.

Step 1. Confirm new document and **units are mm**, **Fig. 1**.

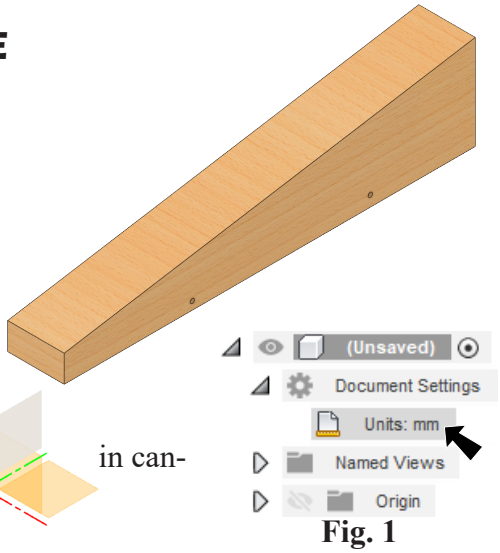


Fig. 1

B. Body.

Step 1. On the Solid tab SOLID click **Create Sketch**  in the Sketch area of toolbar and click **Right plane** in canvas, **Fig. 2**.

Step 2. Click **Line**  **(L)** on the toolbar.

Step 3. Starting at the Origin  sketch the lines in **Fig. 2**. Keep the side lines vertical and the bottom line horizontal.

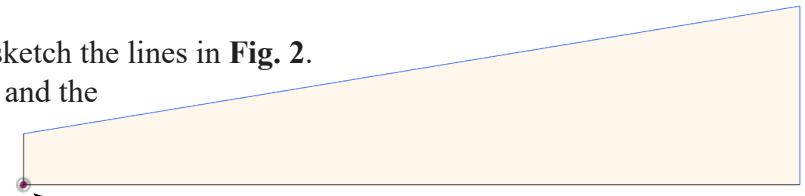


Fig. 2

Step 4. Click **Dimension**  **(D)** in the sketch area of toolbar.

Step 5. Add dimensions, **Fig. 3**. To dimension click the line then move the cursor out away from the line and click. Key-in the dimension and press ENTER.

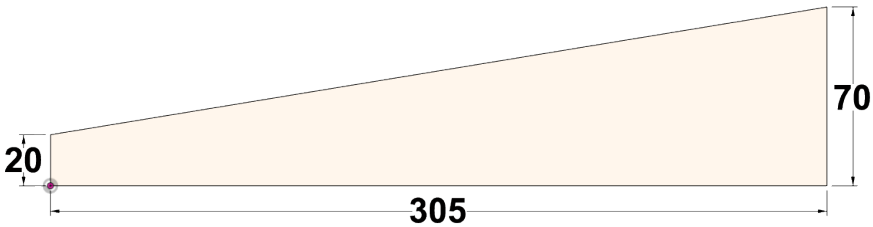


Fig. 3

Step 6. Click **Fit**  **(F6)** on the Navigation Bar at the bottom of the canvas.

Step 7. Click **Home**  (Isometric) on View Cube  at top right corner of the canvas.

Tip: Set zoom shortcuts to SOLIDWORKS. To set, click your name in top right corner of canvas and click Preferences, **Fig. 4**. On the General Tab, Pan, Zoom select SOLIDWORKS, **Fig. 5**.

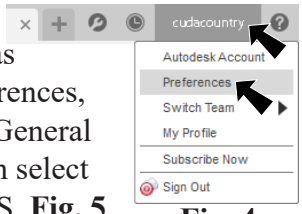


Fig. 4

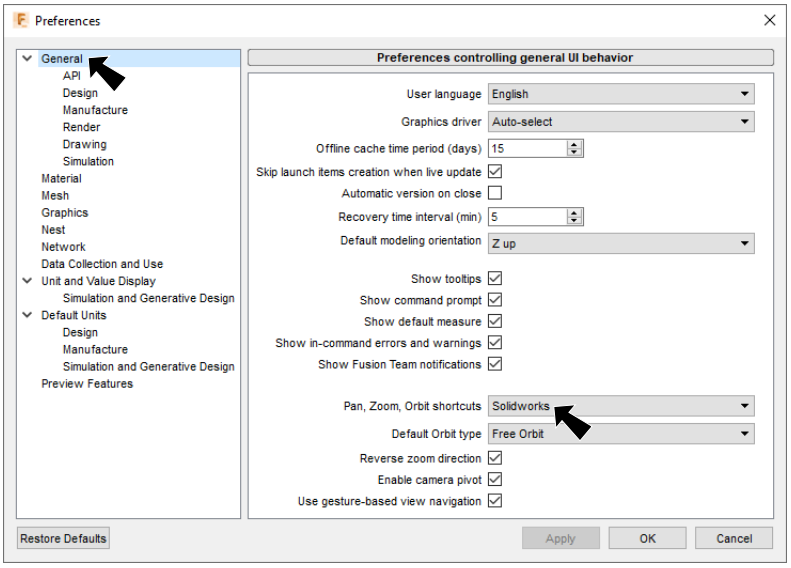


Fig. 5

12/19/19

Step 8. On the Solid tab SOLID click **Extrude** (E).

Step 9. In the Extrude panel set, **Fig. 6**
Start **Profile Plane**
Direction **Symmetric**
Measurement **Whole Length**
Distance **42**
click OK.

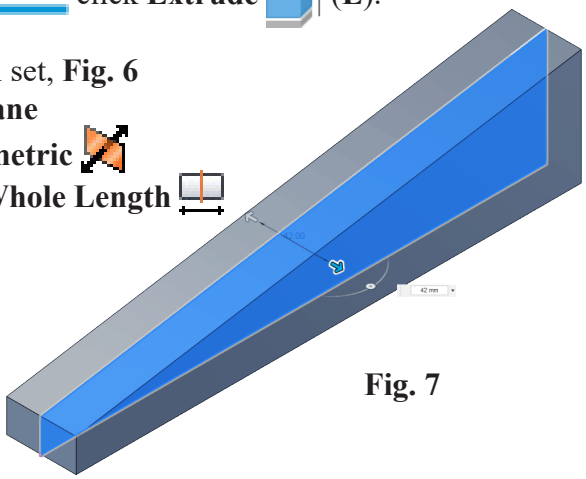


Fig. 7

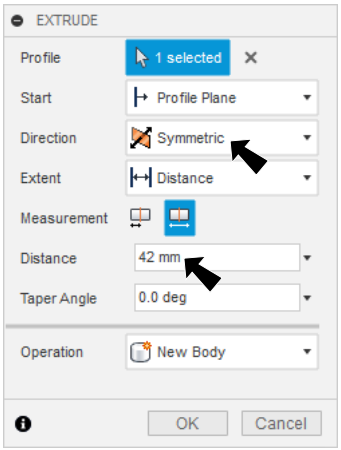


Fig. 6

C. Create Project, CO2 Folder and Save as "BLANK".

Step 1. Click Data Panel in top left corner of display.

Step 2. Click **New Project** button in the Data Panel, **Fig. 8**.

Step 3. For Project Name key-in **CO2 Cars** and press ENTER, **Fig. 9**. Double click the CO2 Cars Project Name to enter project.

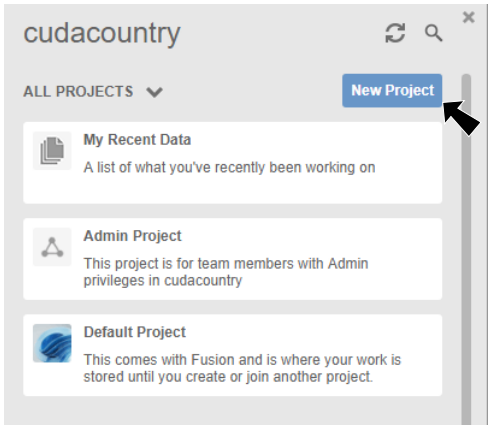


Fig. 8

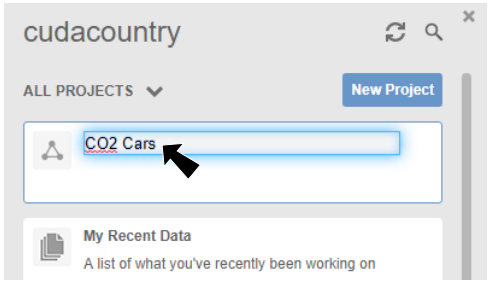


Fig. 9

Step 4. In the Application Bar (top right of panel) click File Menu > Save.

Step 5. Key-in **BLANK** for filename, **Fig. 10**.
Confirm Location is CO2 Cars.
Click Save.

Step 6. Click **Close Data Panel**.

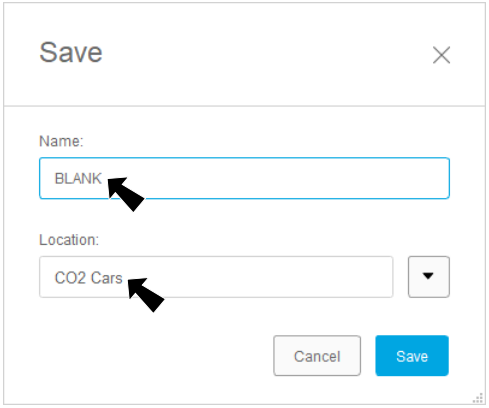
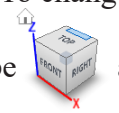


Fig. 10

D. Cartridge Hole.

Step 1. Change to **Back View**. To change to Back View, click top rear corner of View Cube  and then Back  .

Step 2. On the Solid tab  click **Hole**  **(H)** in the Create area of toolbar, **Fig. 11**.

Step 3. In the Hole panel set, **Fig. 11**

Face **click rear face of body**, **Fig. 12**

Reference 1 click **vertical axis at Origin**, **Fig. 13**

Reference 2 click **bottom edge of body**, **Fig. 14**

Key-in **34**, **Fig. 15**

Drill Point select **Flat** 

Fig. 11

Depth **52**

Diameter **20**

click OK.

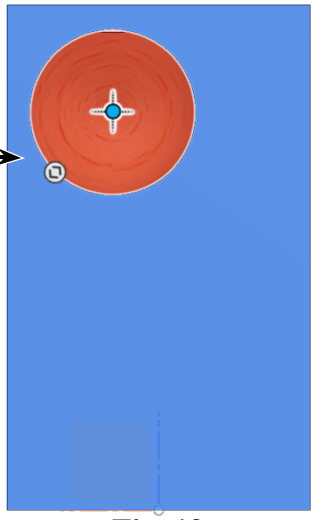


Fig. 12

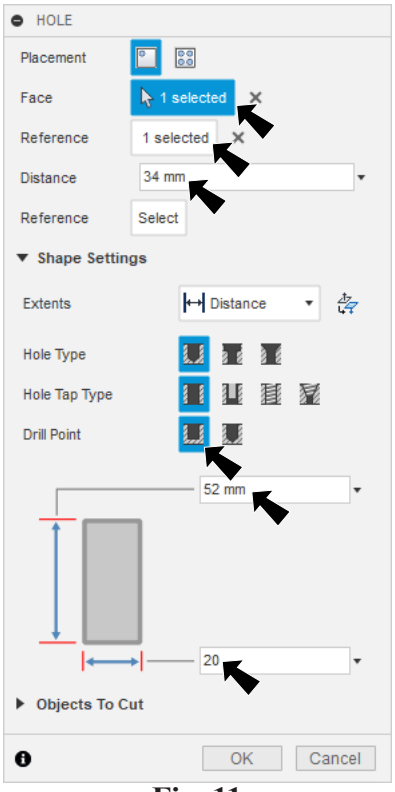


Fig. 11

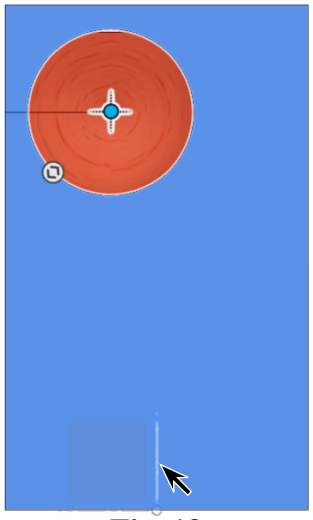


Fig. 13

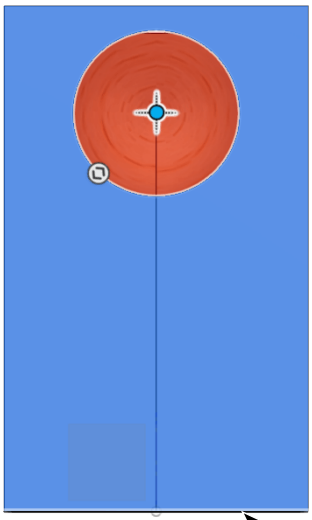


Fig. 14

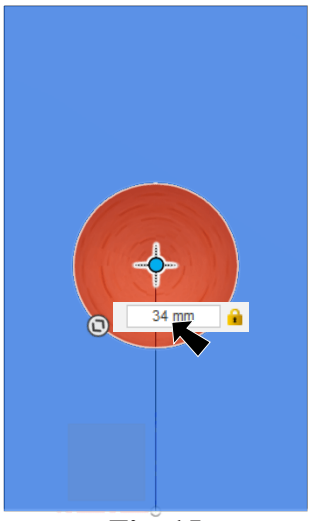


Fig. 15

Step 4. Click **Home**  (Iso-metric) on View Cube  .

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

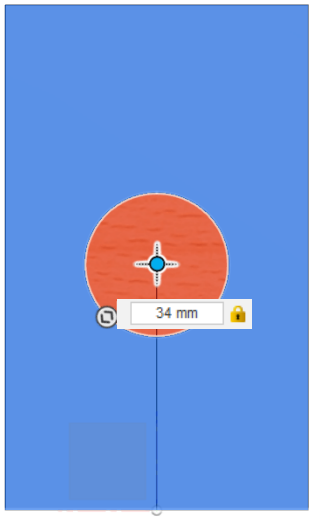


Fig. 16

E. Axle Holes.

Step 1. On the Solid tab SOLID click **Create Sketch** in the sketch area of toolbar and click **Right plane** in canvas, **Fig. 17**.

Step 2. Click **Fit** **(F6)** on the Navigation Bar at the bottom of the canvas.

Step 3. Click **Center Diameter Circle** **(C)** in the Create area of toolbar.

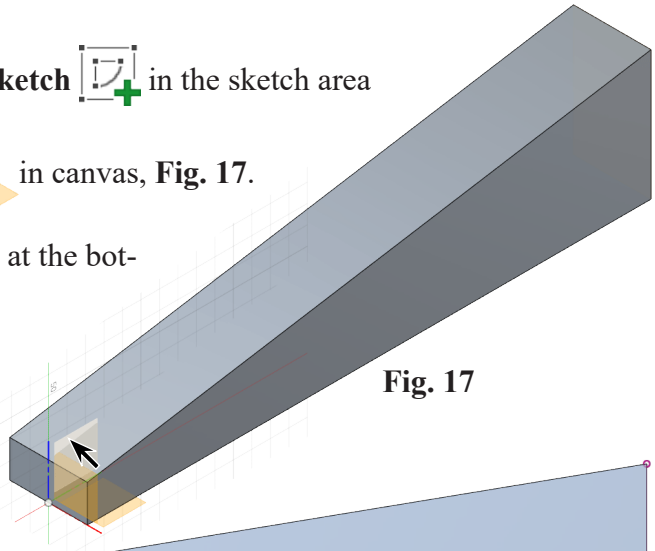


Fig. 17

Step 4. Sketch **two circles** for axle holes, **Fig. 18**.

Step 5. Click **Dimension** **(D)** on the toolbar.

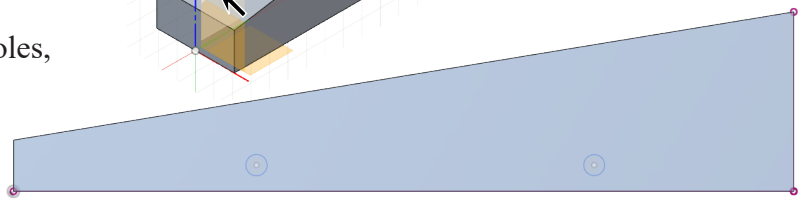


Fig. 18

Step 6. Add dimensions, **Fig. 19**.

Step 7. Click **Home** on View Cube .

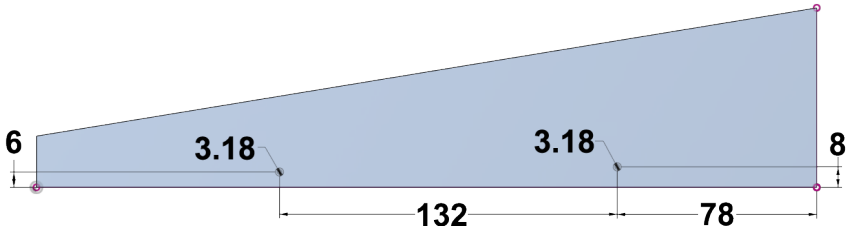


Fig. 19

Step 8. On the Solid tab SOLID click **Extrude** **(E)**.

Step 9. In the Extrude panel set, **Fig. 20**

Profile **click, hold on both circles and select Profile, Fig. 21**

Direction **Symmetric**

Measurement **Whole Length**

Distance **42**

Operation **Cut**

click OK.

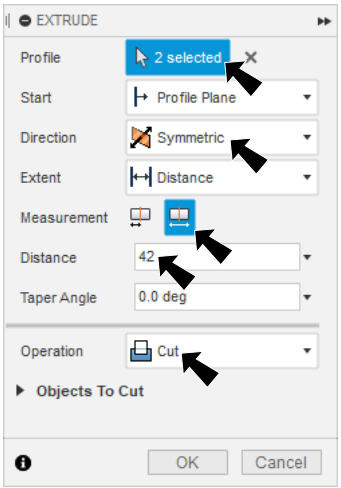


Fig. 20

Step 10. Save. Use **Ctrl-S**.

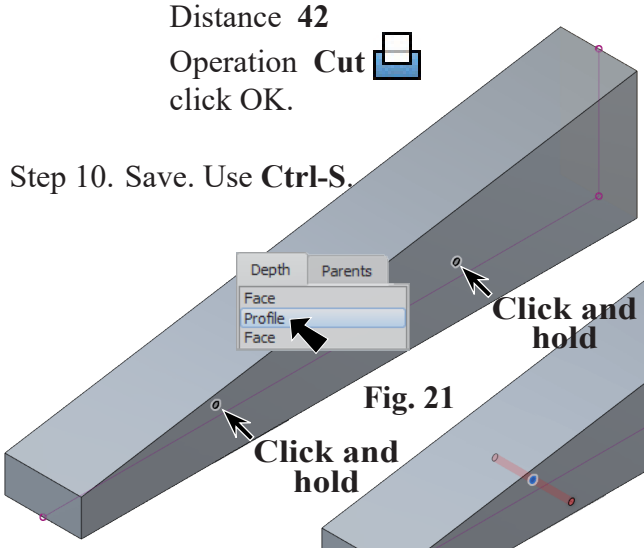


Fig. 21

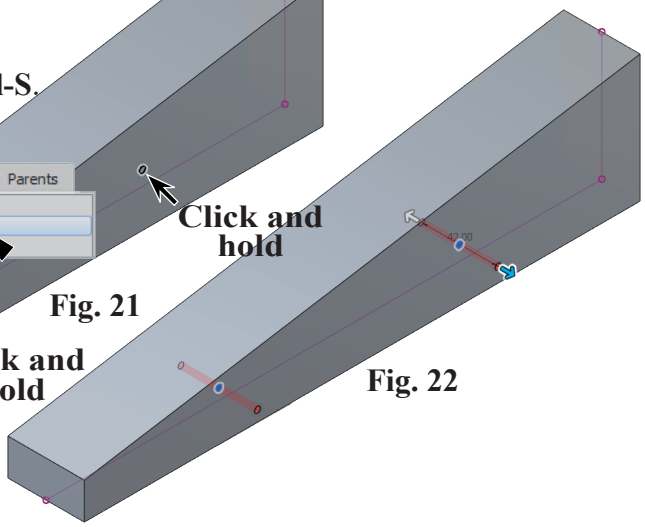


Fig. 22

F. Create Balsa Physical Material.

Step 1. Download the **polished balsa.jpg** file from cudacountry.net.

Step 2. On the Solid tab SOLID click Modify Menu > Physical Material.

Step 3. In the Physical Material Panel:
under Library, **Fig. 23**.
expand **Wood**
scroll down to **Softwood Lumber** and drag Softwood onto the body in canvas, **Fig. 24**.

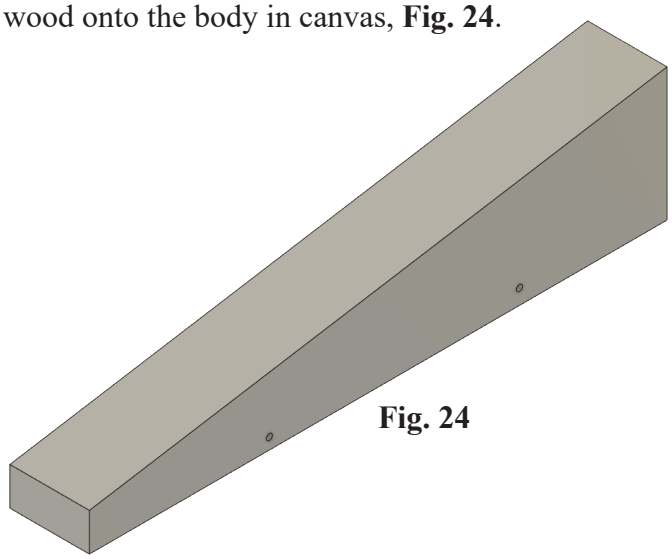


Fig. 24

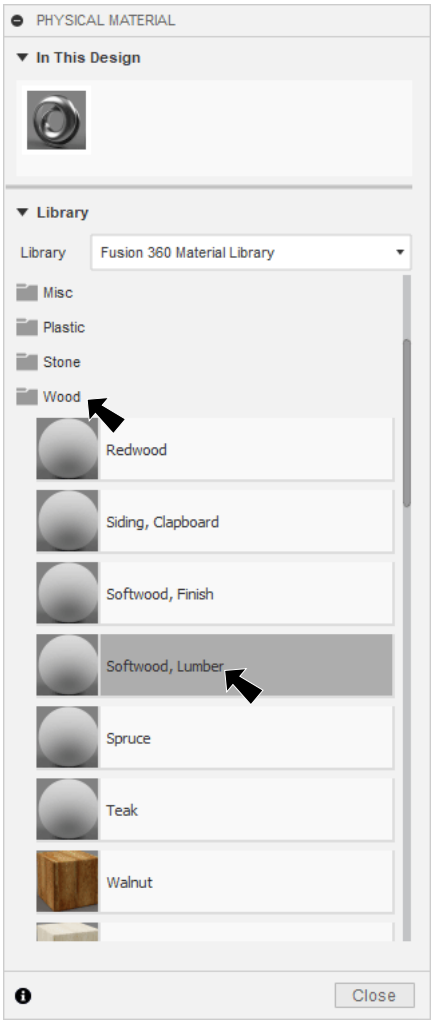


Fig. 23

Step 4. In the Physical Material Panel:
under In This Design, **Fig. 25**.
right click the Softwood swatch click **Edit**.

Step 5. In the Appearance Properties panel:
key-in **Balsa** for name, **Fig. 26**.
click **Advanced** button.

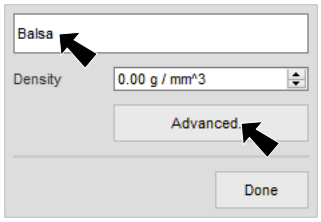


Fig. 26

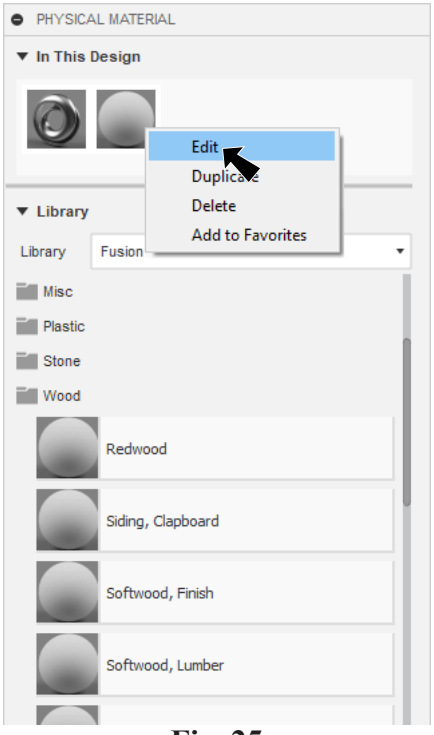


Fig. 25

Step 6. In the Material Editor set:
on Identity tab, **Fig. 27**.
Description key-in
Ochroma Lagopus

Step 7. In the Material Editor:
click Appearance tab, **Fig. 28**.
click **Color drop down arrow** and select **Image**.

Navigate to your Download folder and select **polished balsa.jpg** file.

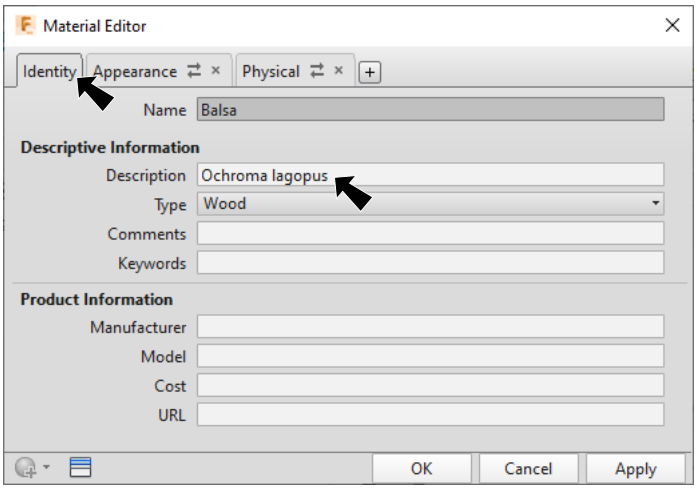


Fig. 27

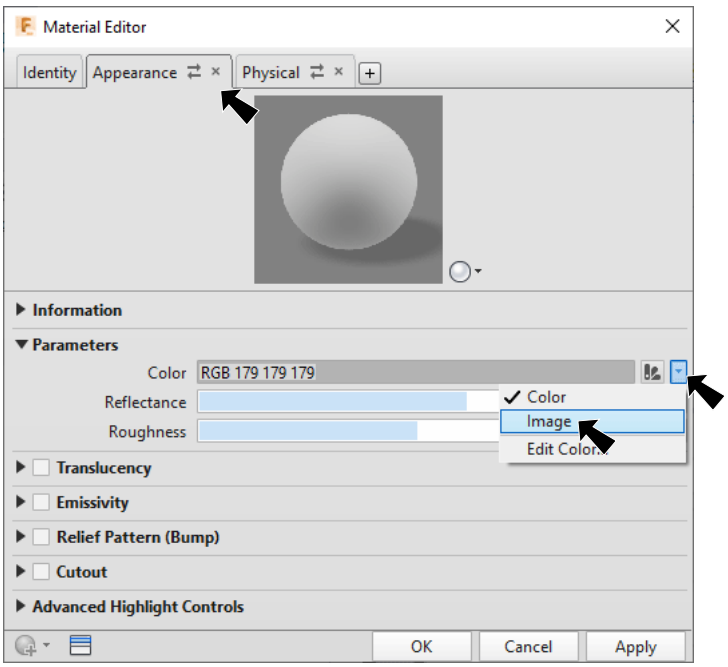


Fig. 28

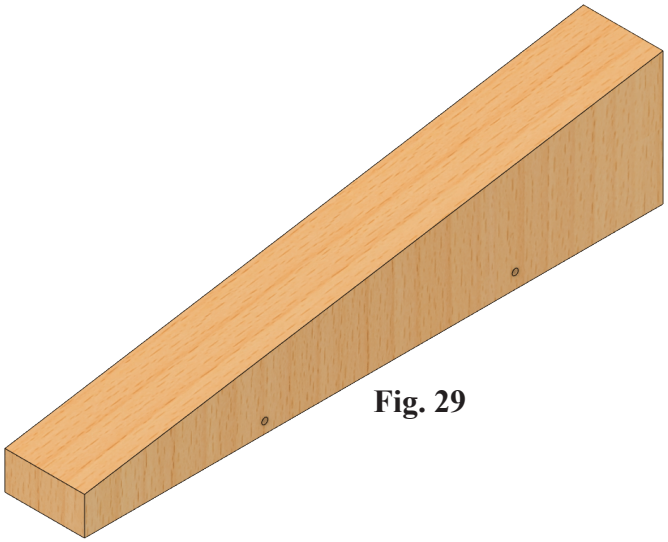


Fig. 29

Step 8. In the Material Editor:
under Parameter, **Fig. 30**.
double click the **image**.

Step 9. In the Texture Editor:
under Position, **Fig. 31**.
Rotation 90
under Scale
Width/Height 200
click **Done.**

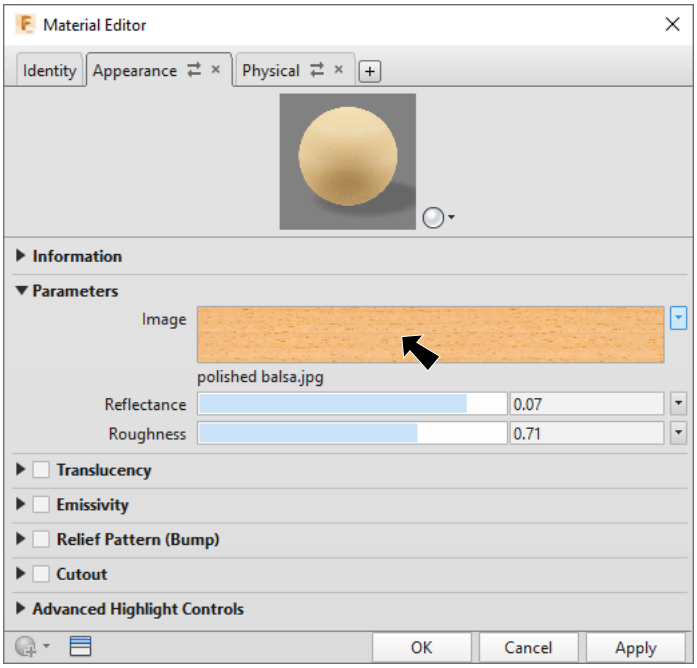


Fig. 30

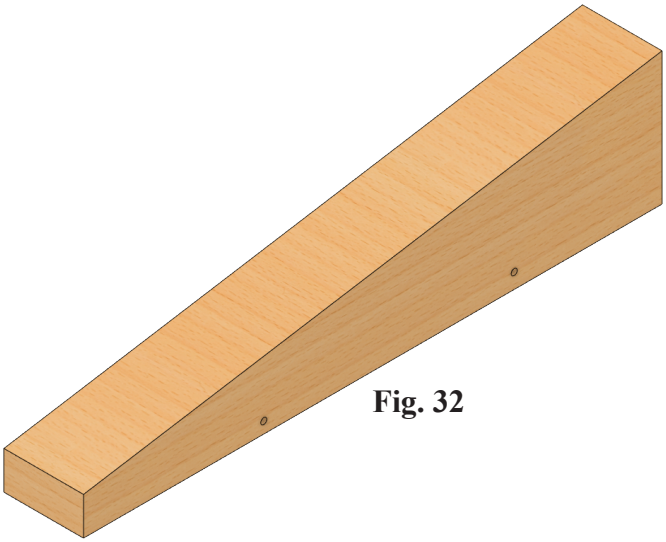


Fig. 32

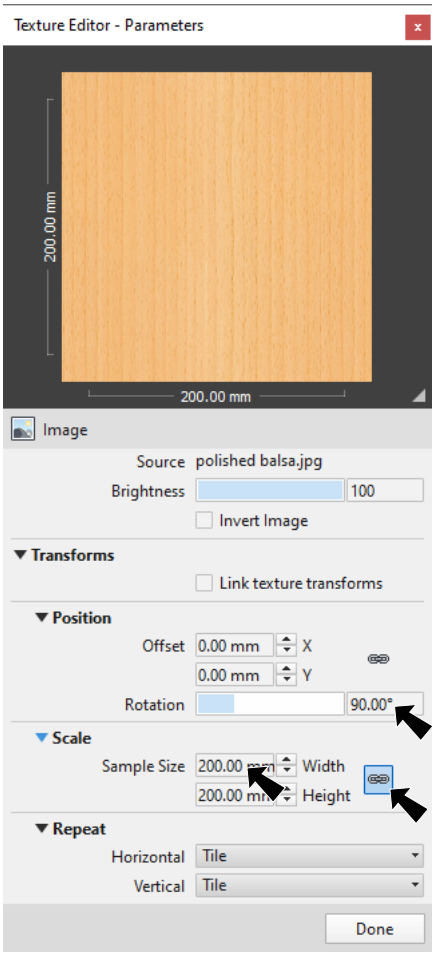


Fig. 31

Step 10. In the Material Editor:
click Physical tab, **Fig. 33**.
under Information
Name Balsa

Description Ochroma Lagopus

Subclass Softwood

under Mechanical
Density .160

under Strength
Compression Parallel to Grain 7

Compression Perpendicular to Grain 1
click **OK**.

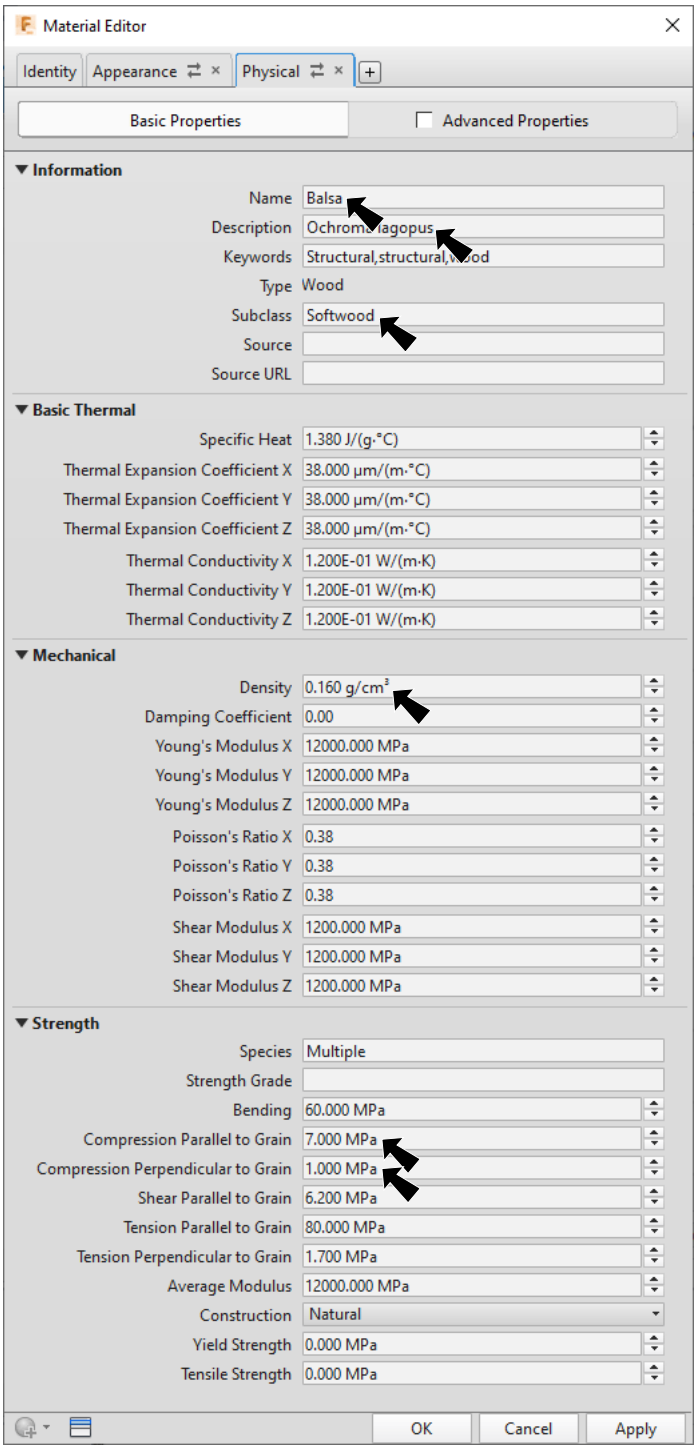


Fig. 33

Step 11. Back In the Physical Material Panel:
under In This Design, **Fig. 34**.
right click the Balsa swatch click **Add to Favorites**.

under Library, **Fig. 35**.
change to **Favorites** and confirm Balsa.

Step 12. Expand **Bodies** in the Browser and **right click Body1**, then click **Remove Appearance Override**, **Fig. 36**.

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

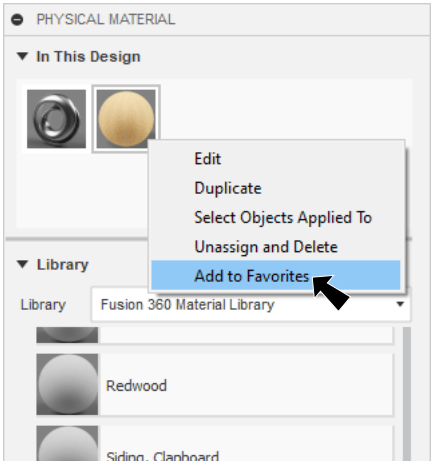


Fig. 34

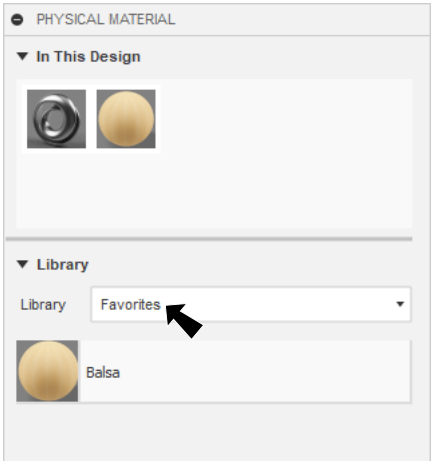


Fig. 35

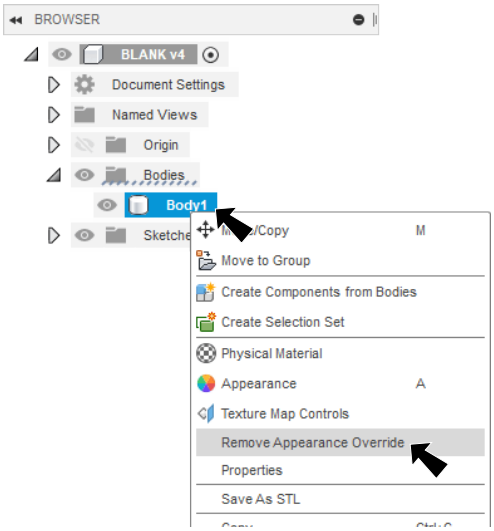


Fig. 36