SOLIDWORKS® 2026 Intermediate Skills

Expanding on Solids, Surfaces, Multibodies, Configurations, Drawings, Sheet Metal and Assemblies

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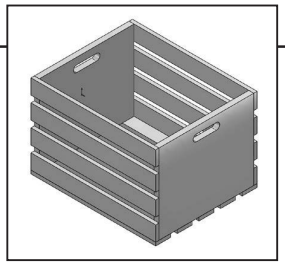
CHAPTER 3

Creating Multibody Parts



Creating Multibody Parts
Wooden Crate

Part documents can contain multiple solid bodies.
Multibody parts should not replace the use of assemblies.

A general rule to keep in mind is that one part, multibody or not, should represent one part number in a Bill of Materials. A multibody part consists of multiple solid bodies that are not dynamic. If dynamic motion among bodies is needed it should be done in an assembly instead. Tools such as Move Component, Dynamic Clearance, and Collision Detection are available only with assembly documents.

Multibody solids can be manipulated the same way you manipulate single solid bodies. For example, you can add and modify features, and change the names and colors of each solid body.

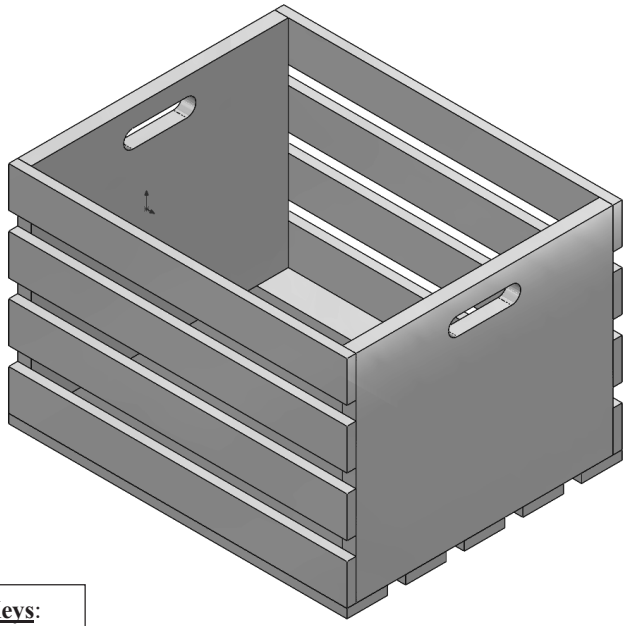
A folder named Solid Bodies  appears in the FeatureManager design tree when there are solid bodies in a single part document. The number of solid bodies in the part document is displayed in parentheses next to the Solid Bodies folder. The solid bodies can be organized and managed in the following ways:

* Group bodies into folders in the Solid Bodies folder
* Select commands to apply to all bodies within a folder
* List features that belong to each body

Multiple solid bodies can be created from a single feature with the following commands:

* Extrude boss and cut
* Surface cut
* Boss and cut thicken
* Revolve boss and cut (including thin features)
* Sweep boss and cut (including thin features)
* Cavity.

Creating Multibody Parts
Wooden Crate



View Orientation Hot Keys:

Ctrl + 1 = Front View
Ctrl + 2 = Back View
Ctrl + 3 = Left View
Ctrl + 4 = Right View
Ctrl + 5 = Top View
Ctrl + 6 = Bottom View
Ctrl + 7 = Isometric View
Ctrl + 8 = Normal To Selection

Dimensioning Standards: **ANSI**

Units: **INCHES** – 3 Decimals

Tools Needed:

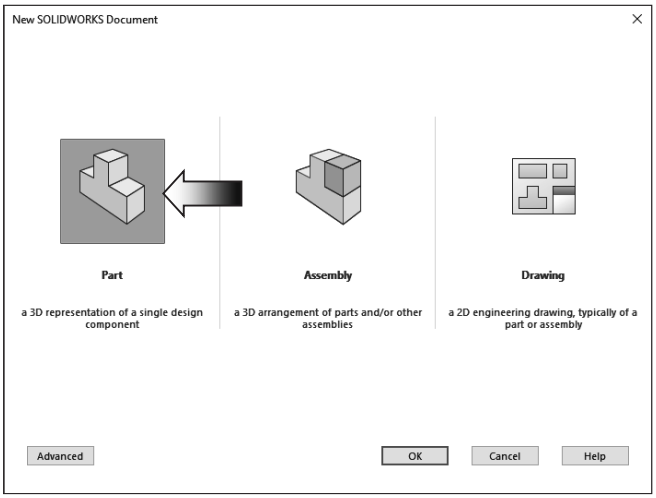
Insert Sketch	Center Rectangle	Extruded Boss/Base
Dimension	Add Relations	Linear Pattern
Move/Copy	Exploded View	Mirror

1. Starting a new part document:

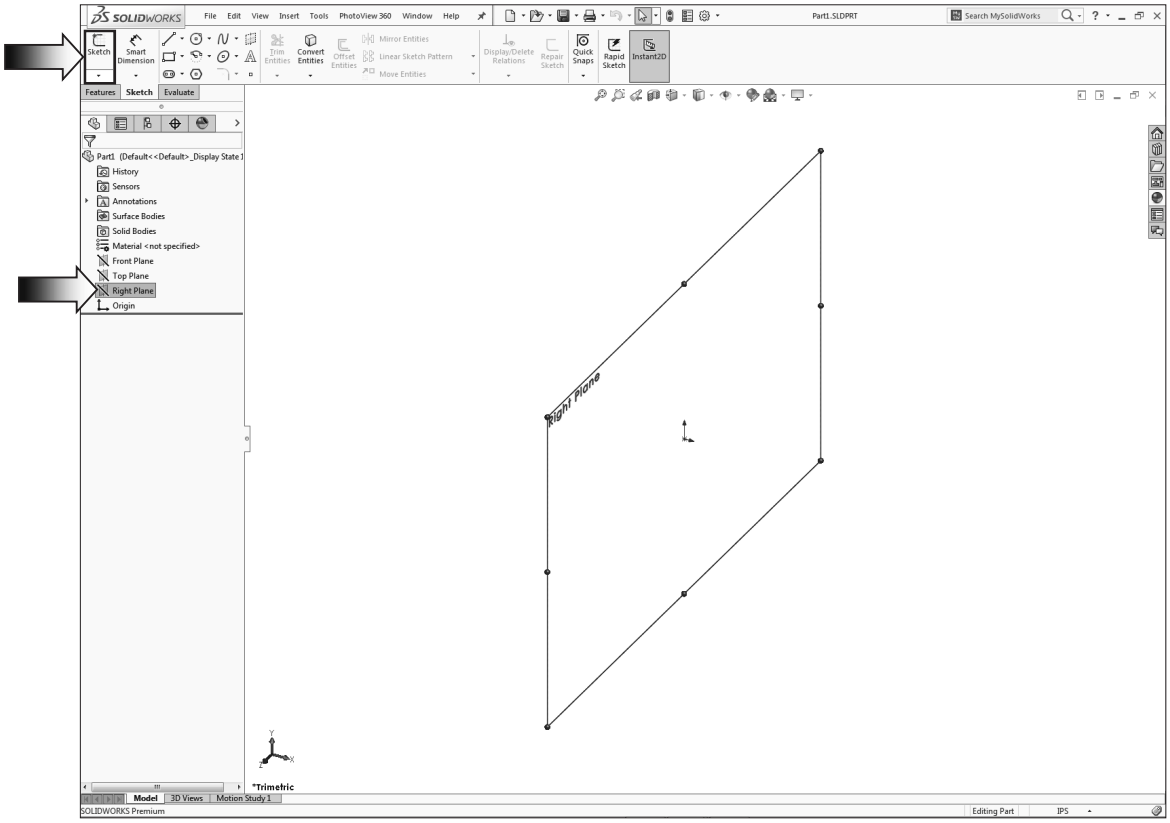
The Multibody-Parts topic is best learned by creating a new model from scratch. You will learn step-by-step, how each body gets created and how the bodies get organized and managed as the model is built.

Select **File / New / Part**.

Select the **Part** template and click **OK**.

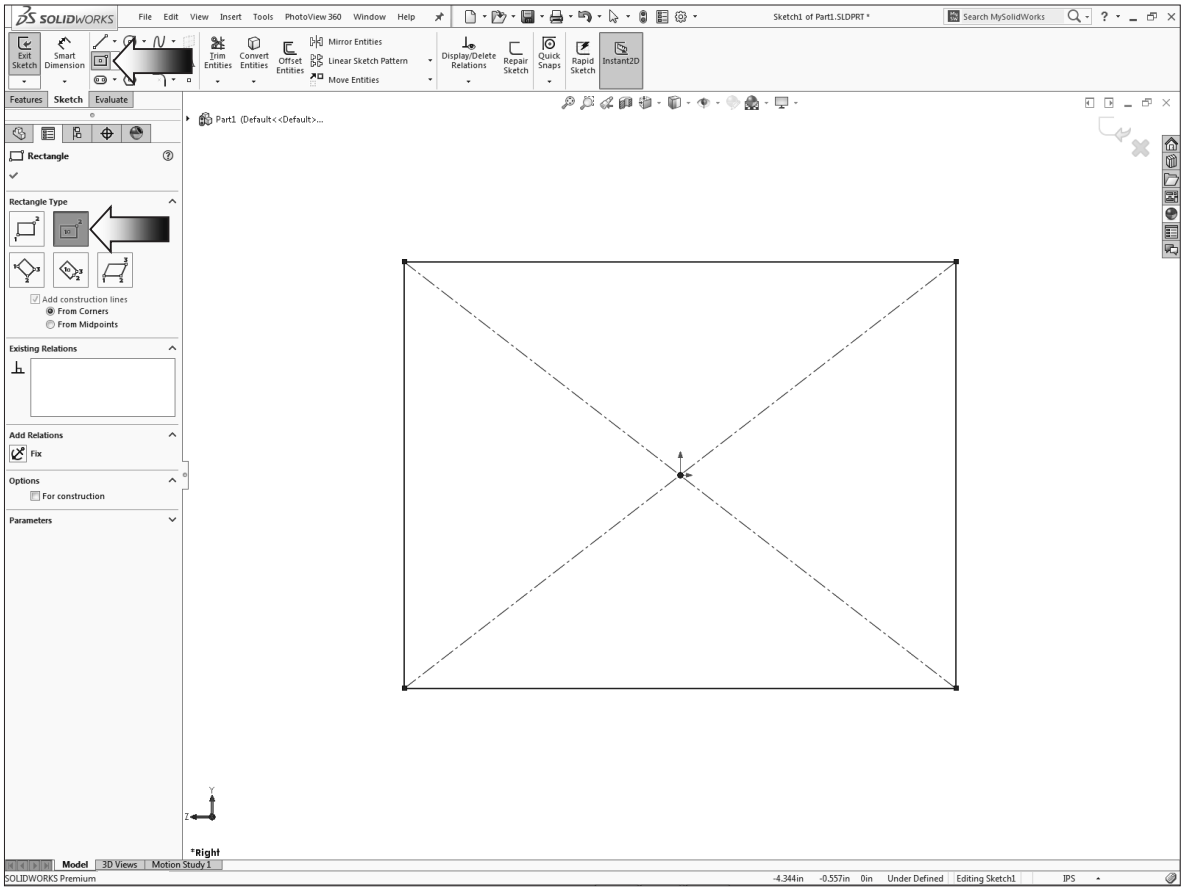


Select the Right plane from the FeatureManager tree (arrow) and open a **new sketch** by clicking on the **Sketch** icon (arrow).



2. Sketching the first body profile:

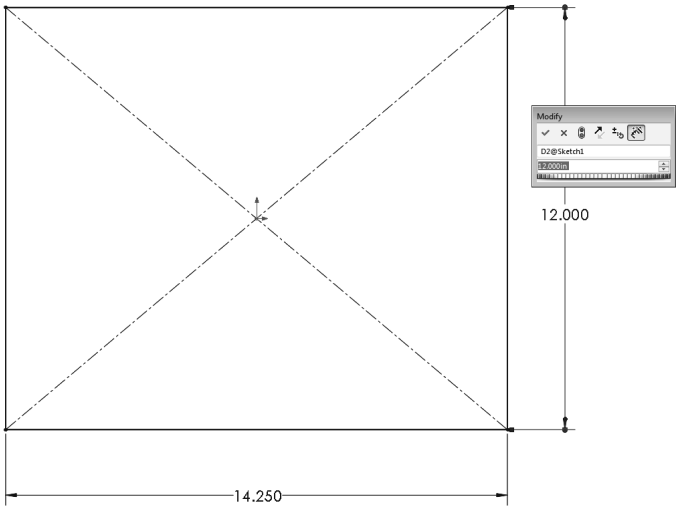
Select the **Center Rectangle** command (arrow) and sketch a rectangle that is centered on the origin.



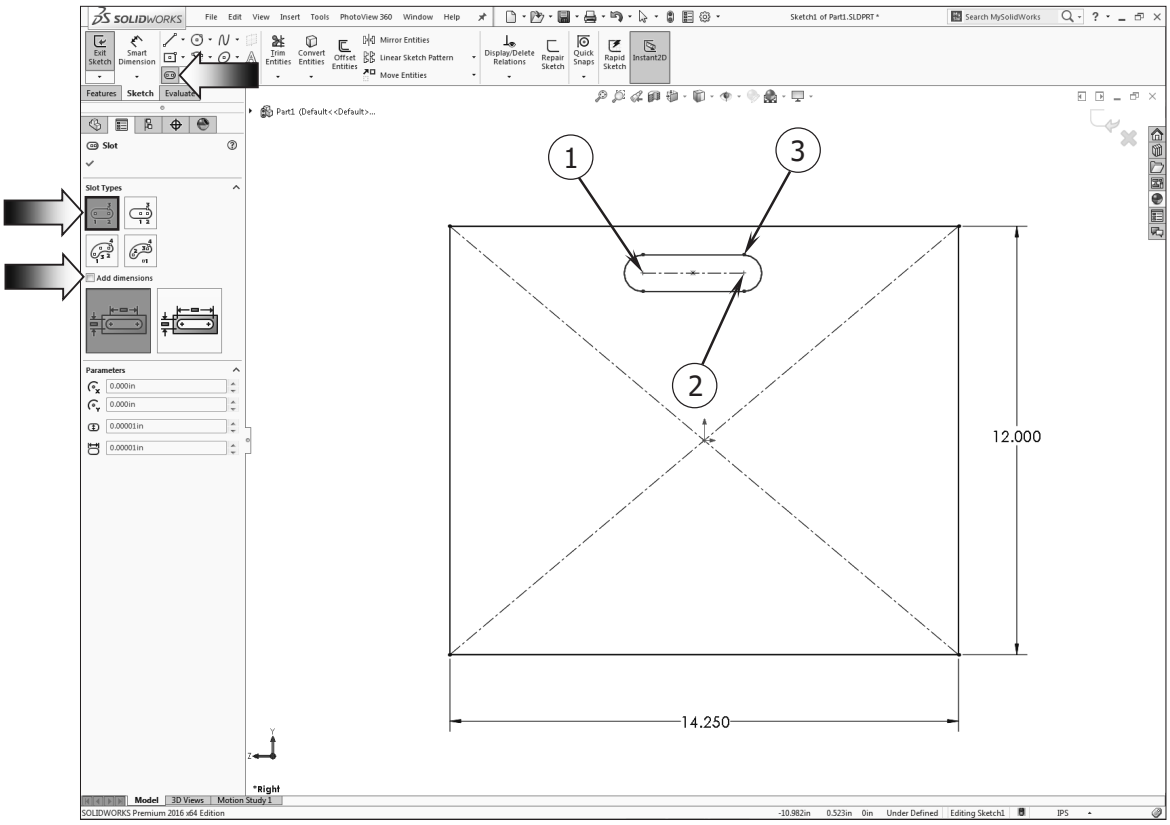
Add the vertical and the horizontal dimensions shown.

Vertical dim. = **12.000in**.
Horizontal dim. = **14.250in**.

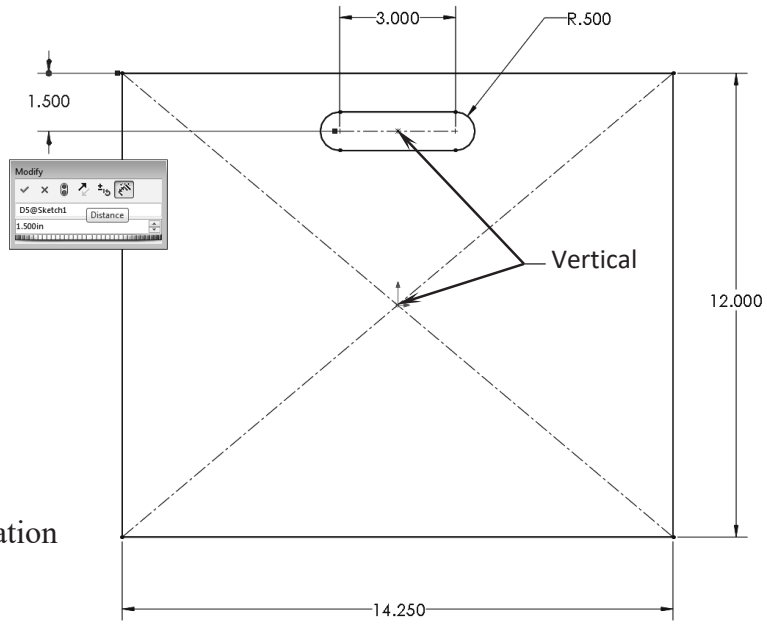
The sketch should become fully defined at this point.



Click the **Straight-Slot** command, clear the **Add Dimensions** checkbox (arrows).



Sketch the **Straight slot** by clicking the 3 points in the order indicated above.



Add the 3 dimensions shown in the image to position the slot.

Also add the vertical relation to fully define the slot.

3. Extruding the first body:

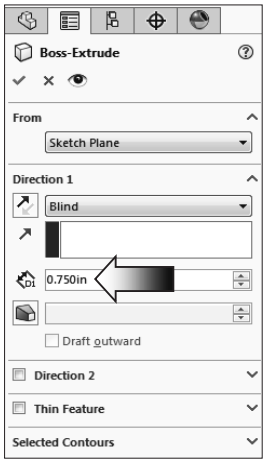
Switch to the **Features** tool tab.

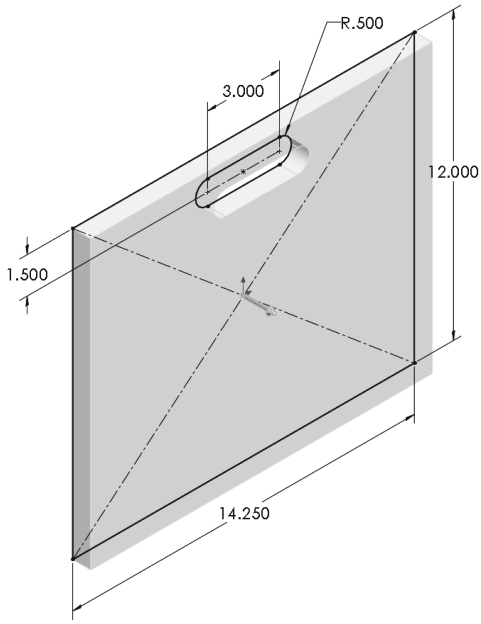
Click the **Extruded Boss-Base** command.

Use the default **Blind** extrude type.

Enter **.750in**. for extrude depth.

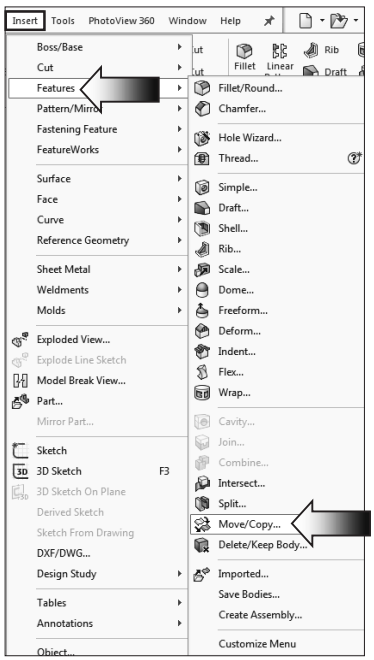
Click **OK**.

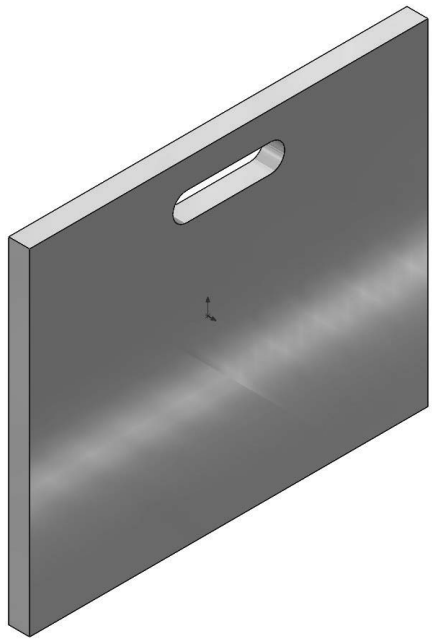




4. Copying the body:

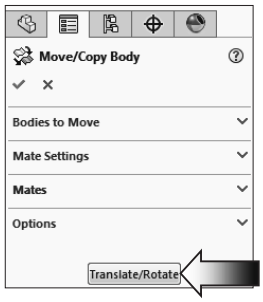
Since the second body is identical to the first one, it is quicker to make a copy than to recreate it. Select **Insert / Features / Move/Copy** (arrow).

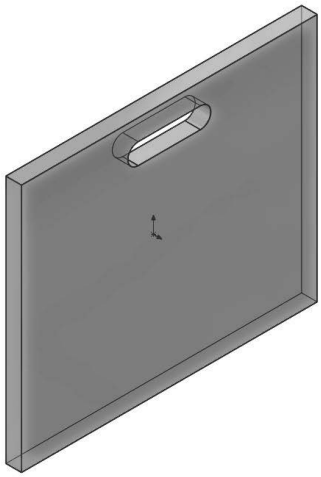


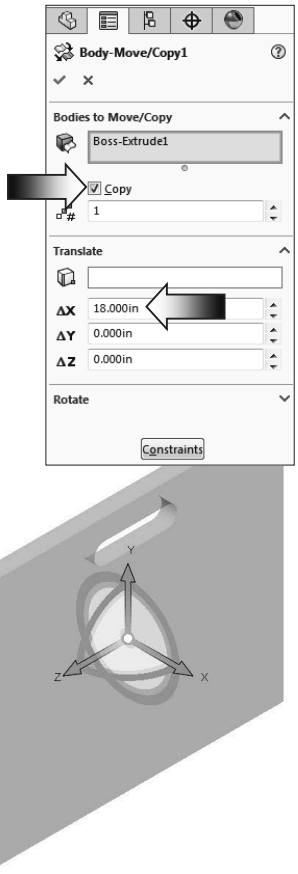


*<u>To add commands to a toolbar:</u> Select **Tools / Customize / Commands / Features** and drag/drop the **Move/Copy** command to your Features tool tab.*

Click the **Translate/Rotate** button at the bottom of the tree to switch from the Constraints mode to Move mode.







For Bodies to Move/Copy, select the **Boss-Extrude1** either from the graphics or from the FeatureManager tree.

Enable to **Copy** checkbox (arrow).

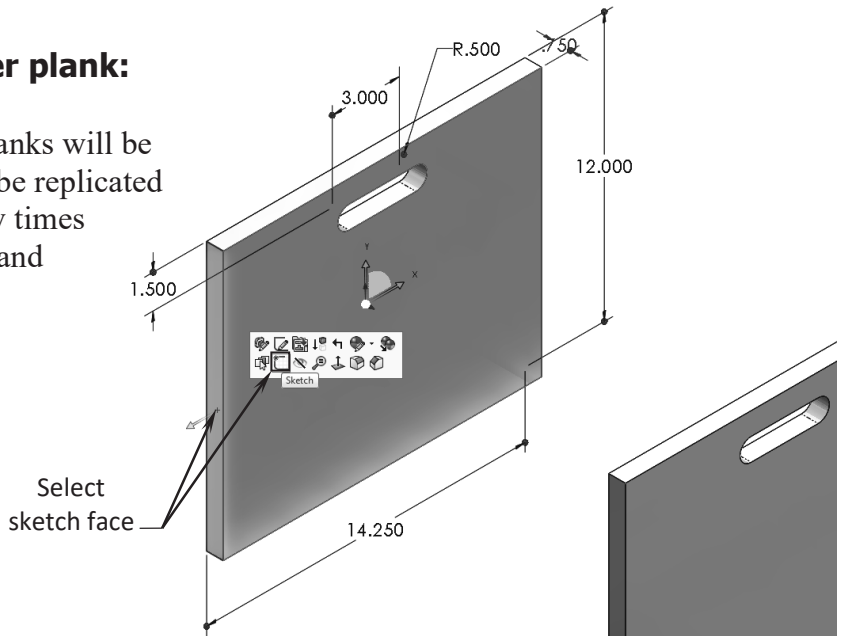
Enter **18.00in**. in the **Delta X** box.

Click **OK**.

5. Creating the upper plank:

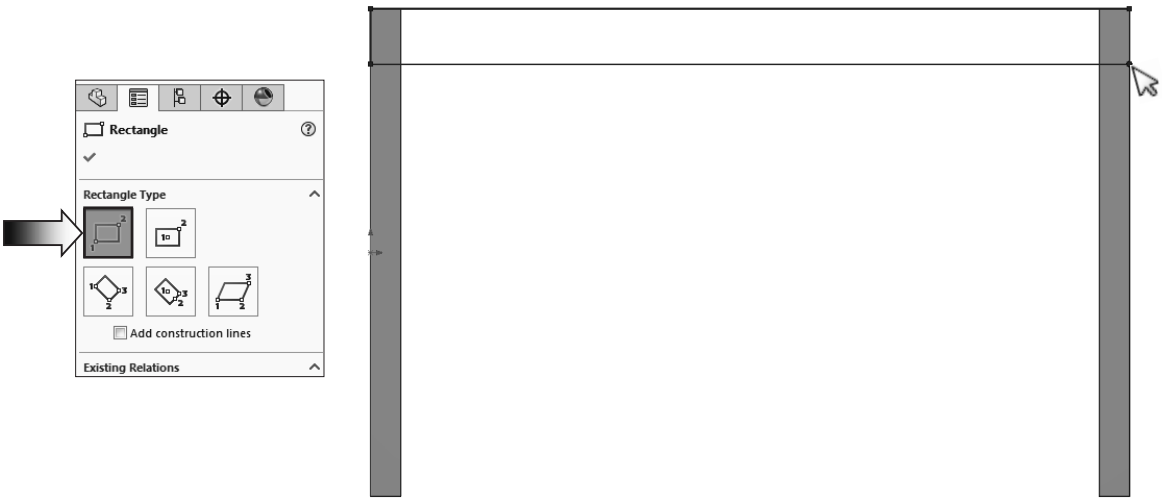
Only one of the planks will be made. It will then be replicated and mirrored a few times to create the front and rear planks.

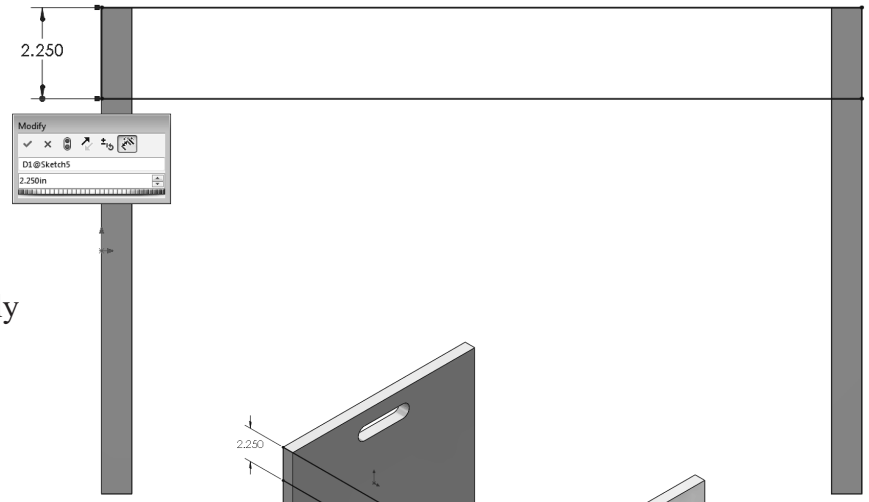
Select the <u>left side face</u> and open a **new sketch**.



Change to the **Front** orientation (Control+1).

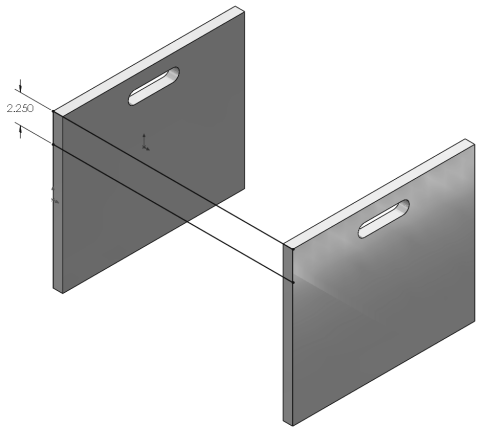
Sketch a **Corner Rectangle** from the upper left corner of the 1st body to the outer edge of the second body.





Add a vertical dimension of **2.250in**. to fully define the rectangle.

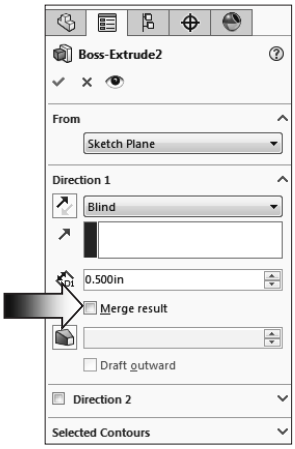
Change to the **Isometric** view (Control+7); it will help with seeing the extrude direction more clearly in the next step.

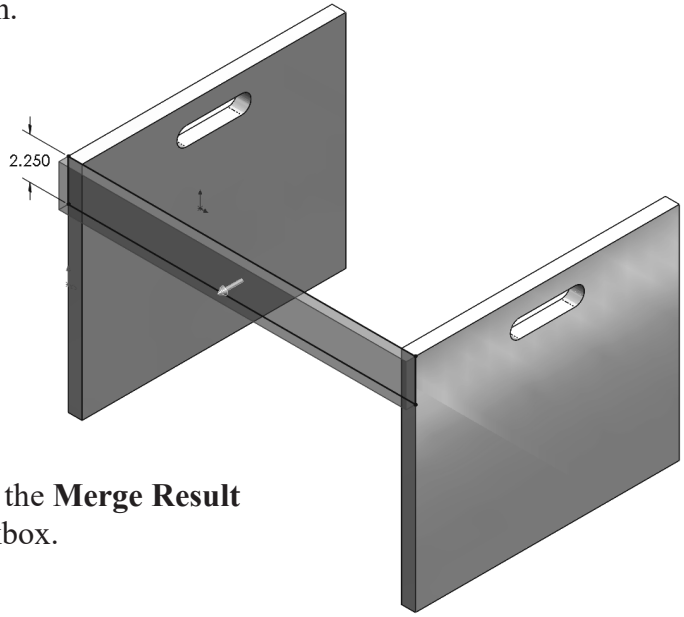


Switch to the **Features** tab and click **Extruded Boss/Base**.

Use the default **Blind** type, extrude away from the bodies.

Enter **.500in**. for extrude depth.





Clear the **Merge Result** checkbox.

Click **OK**.

6. Creating the first linear pattern:

Click the **Linear Pattern** command from the **Features** tab.

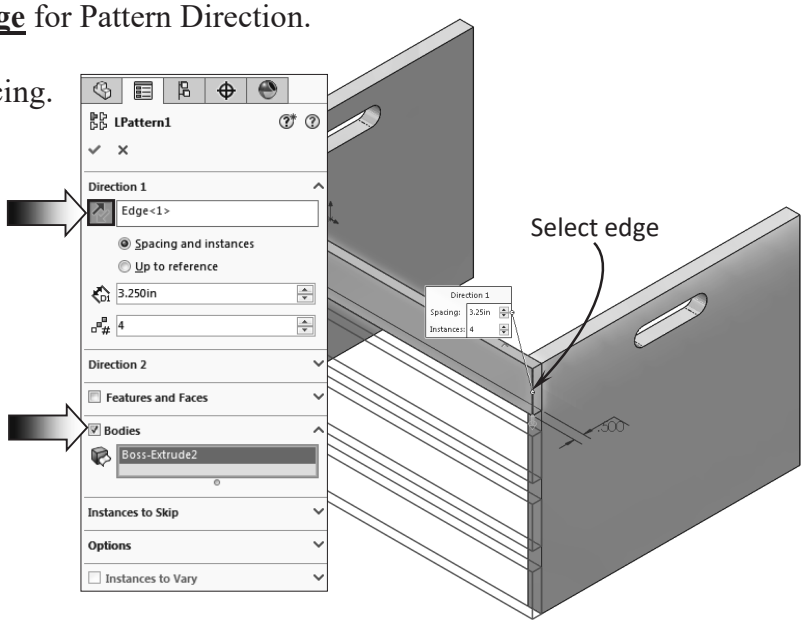
Select the vertical **edge** for Pattern Direction.

Enter **3.25in**. for spacing.

Enter **4** for Number of Instances.

Expand the **Bodies** section (arrow) and select the plank (**Boss-Extrude2**) for Bodies to Pattern.

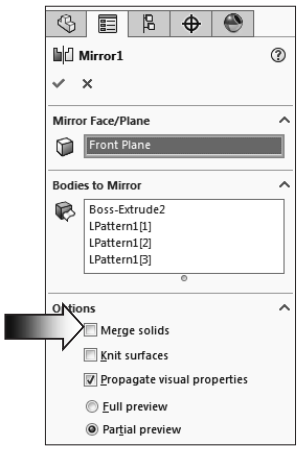
Click **OK**.

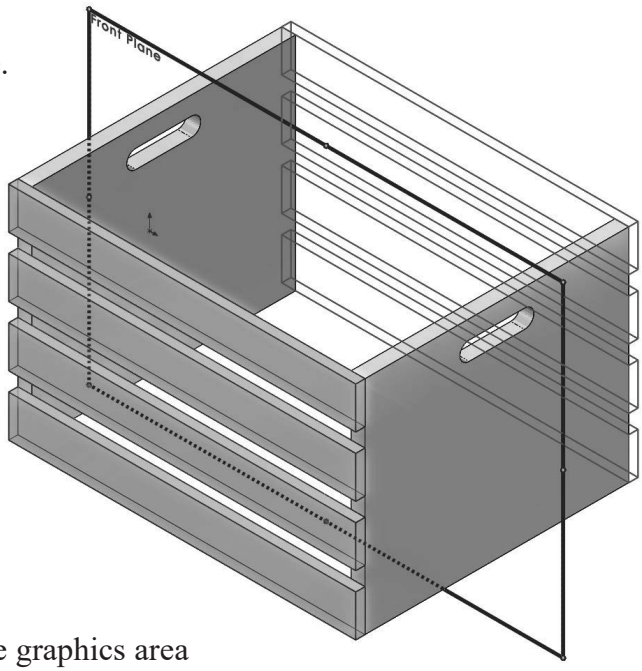


7. Mirroring the planks:

Click the **Mirror** command from the **Features** tab.

For Mirror Face/Plane, select the **Front** plane from the Feature tree.





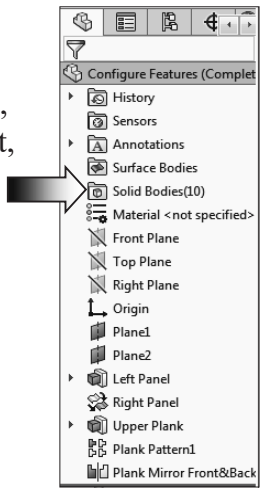
Select all **4 planks** either from the graphics area or from the Solid Bodies folder. Clear **Merge Solids**.

Click **OK**.

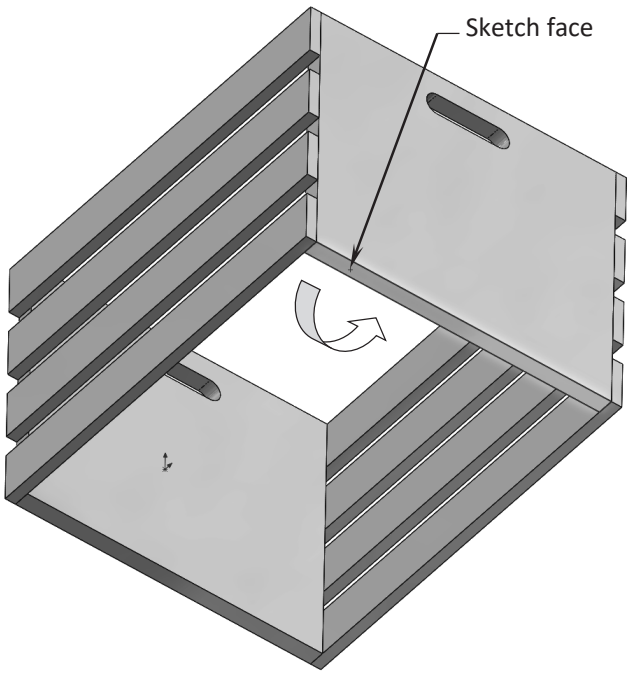
8. Creating the lower plank:

There should be a total of **10 Solid bodies** at this point.

(1 on the left, 1 on the right, 4 in the front and 4 in the back).

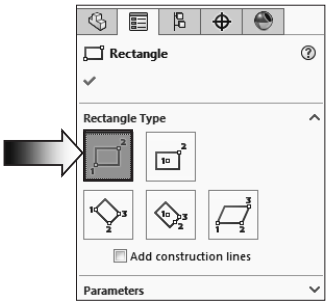


Open a **new sketch** on the bottom face of the right panel.

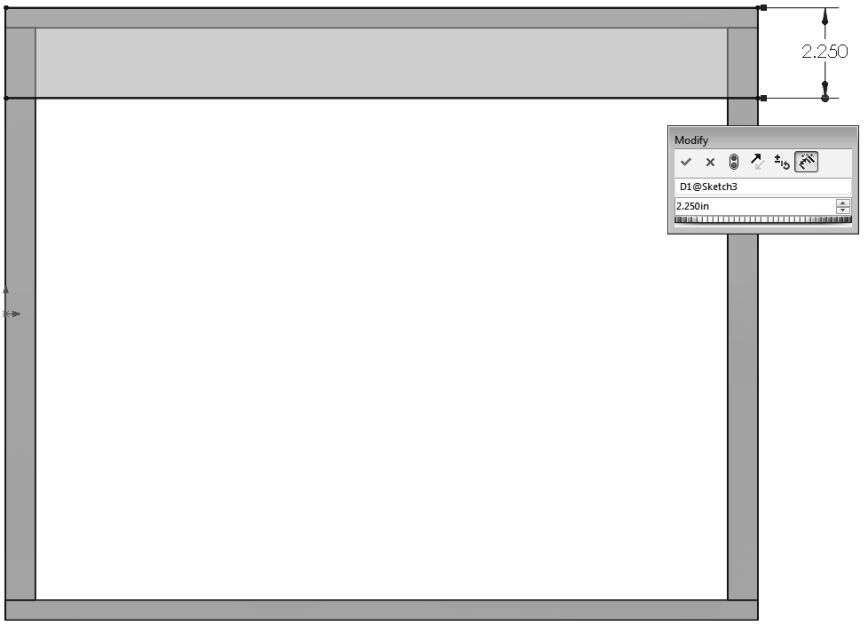


Change to the **Bottom** view orientation (Control+6).

Sketch a **Corner Rectangle** approximately as shown.



Add a vertical dimension of **2.250in**. to match the height of the other planks.

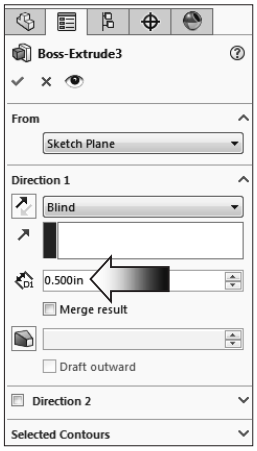


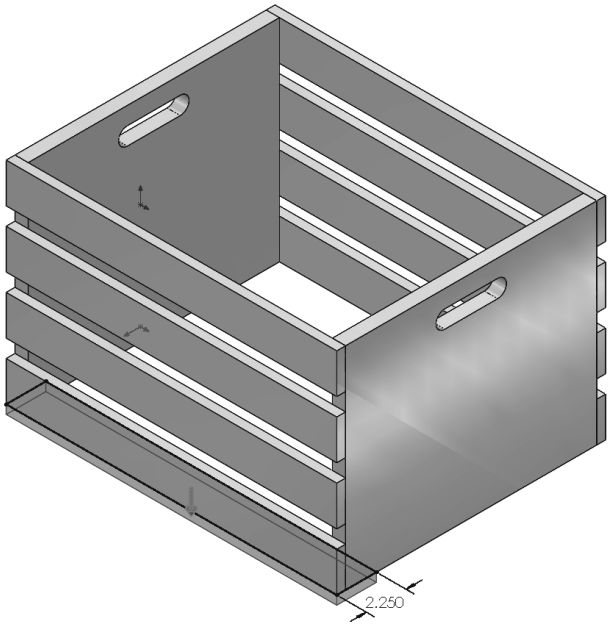
Change to the **Isometric** view (Control+7) before extruding the sketch. Switch to the **Features** tab and click **Extruded Boss/Base**.

Use the default **Blind** type and extrude away from the bodies.

Enter **.500in**. for extrude depth.

Click **OK**.





9. Creating the second linear pattern:

Click the **Linear Pattern** command from the **Features** tab.

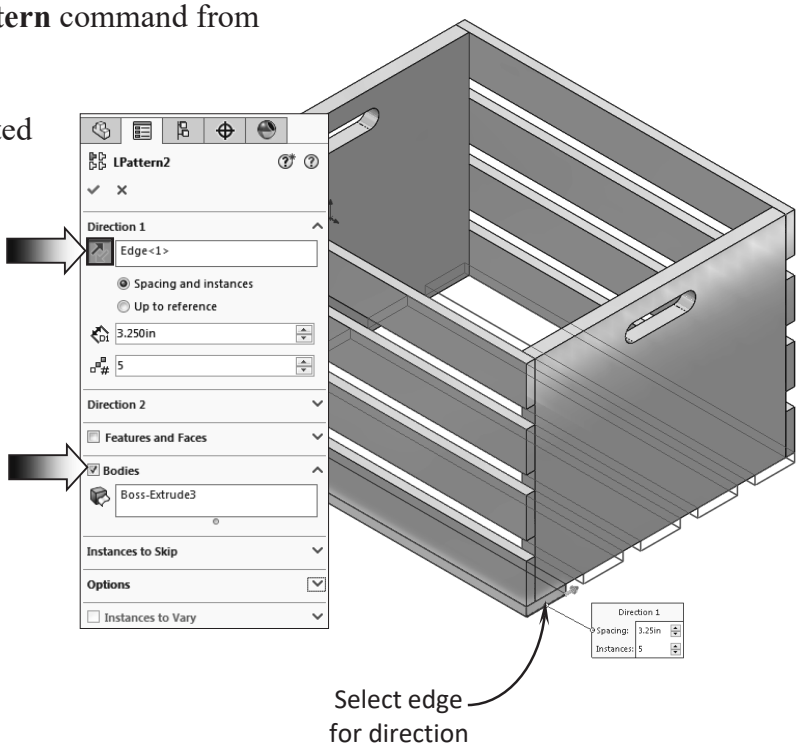
Select the **edge** as noted for Pattern Direction.

Enter **3.250in**. for Spacing.

Enter **5** for Number of Instances.

Expand the **Bodies** section (arrow) and select the bottom plank (**Boss-Extrude3**) for Bodies to Pattern.

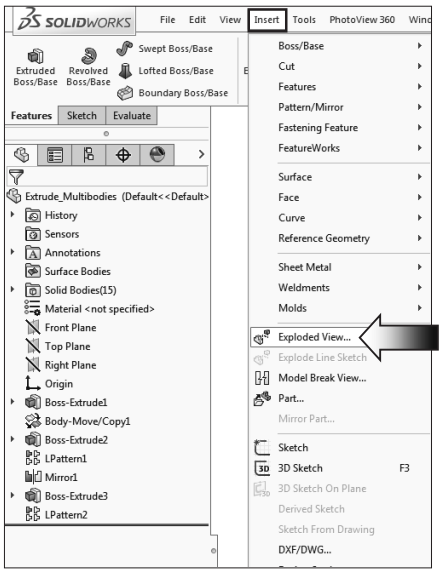
Click **OK**.

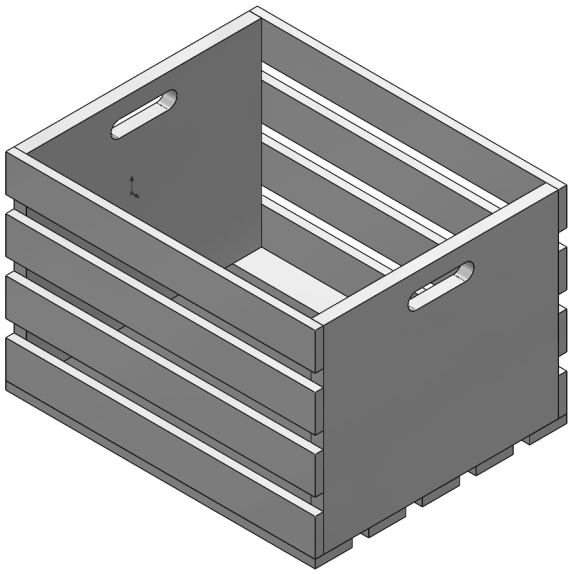


10. Creating an exploded view:

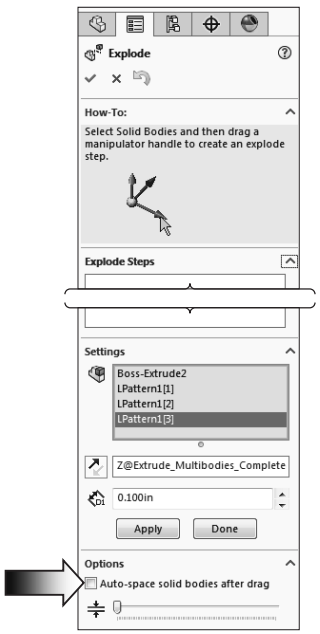
An exploded view is created by selecting and dragging a triad arm in the graphics area to show the solid bodies spread out, creating one or more explode steps.

Select **Insert / Exploded View**.



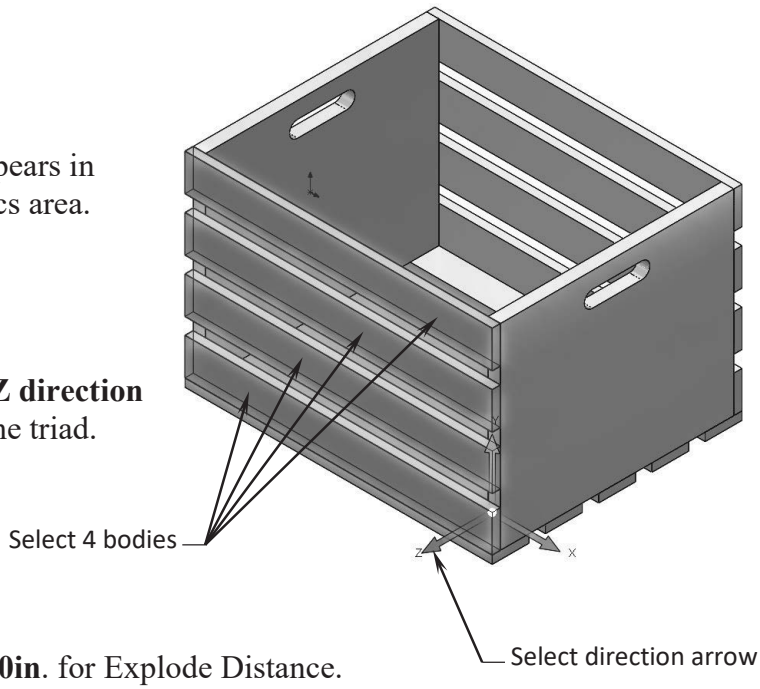


Select the **4 solid bodies** as indicated.



A triad appears in the graphics area.

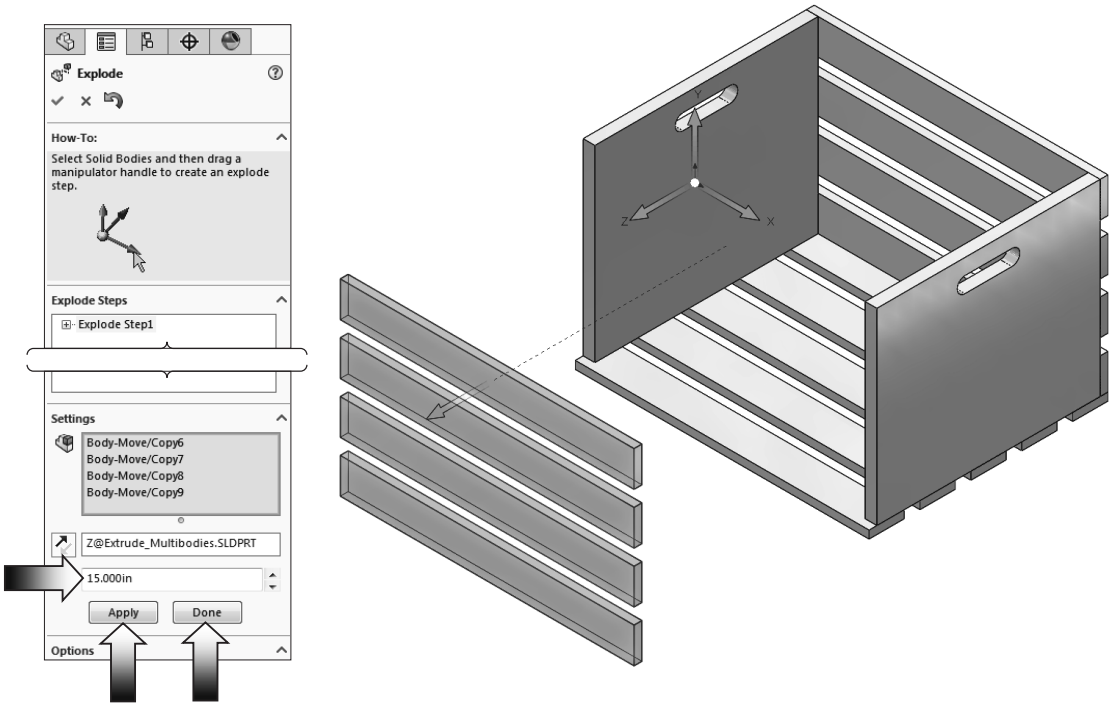
Click the **Z direction** arrow of the triad.



Enter **15.00in**. for Explode Distance.

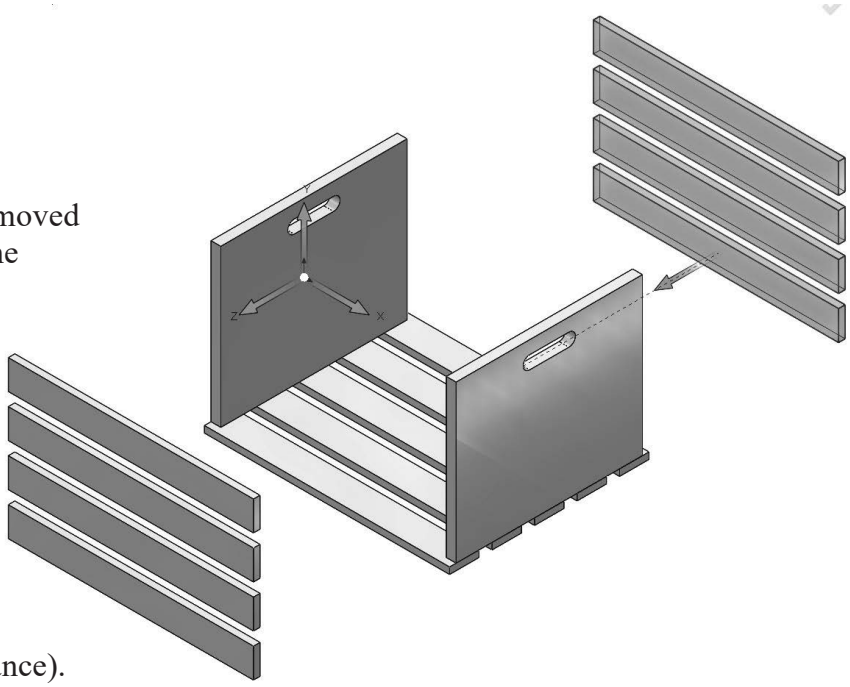
Clear the **Auto-Space** checkbox.

Click **Apply** to move the selected bodies.



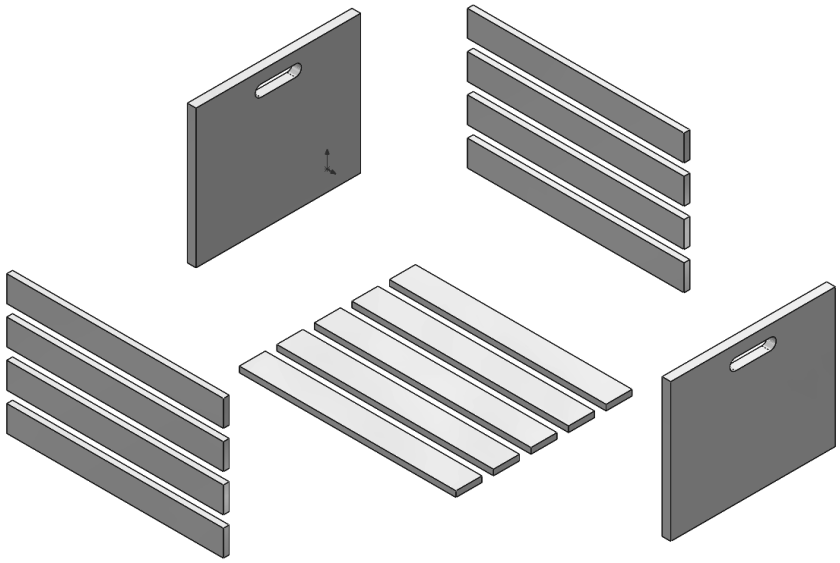
Click **Done**.

The 4 bodies are moved 15 inches along the Z direction.



Repeat the same step and move the other 4 bodies along the opposite direction (enter **-15.00in**. for distance).

Create 3 additional steps to explode the left panel, the right panel, and the bottom planks similar to the image shown here.



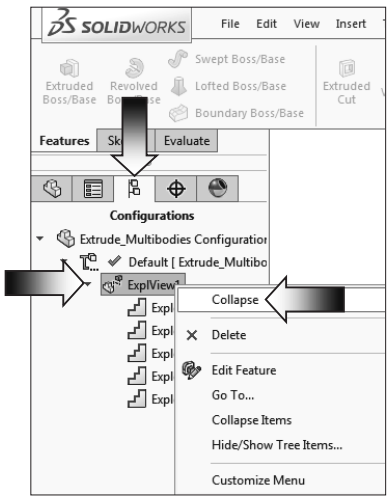
11. Collapsing the view:

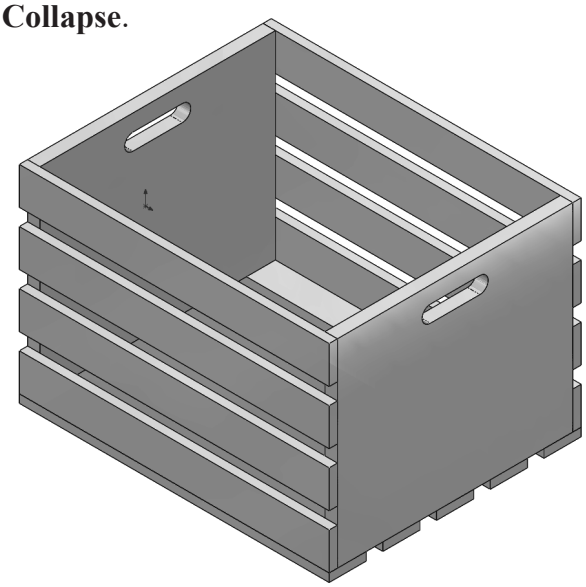
The exploded view can be collapsed, edited, or deleted.

Switch to the **ConfigurationManager** tree (arrow).

Expand the **Default** configuration.

Right-click on **ExplView1** and select **Collapse**.



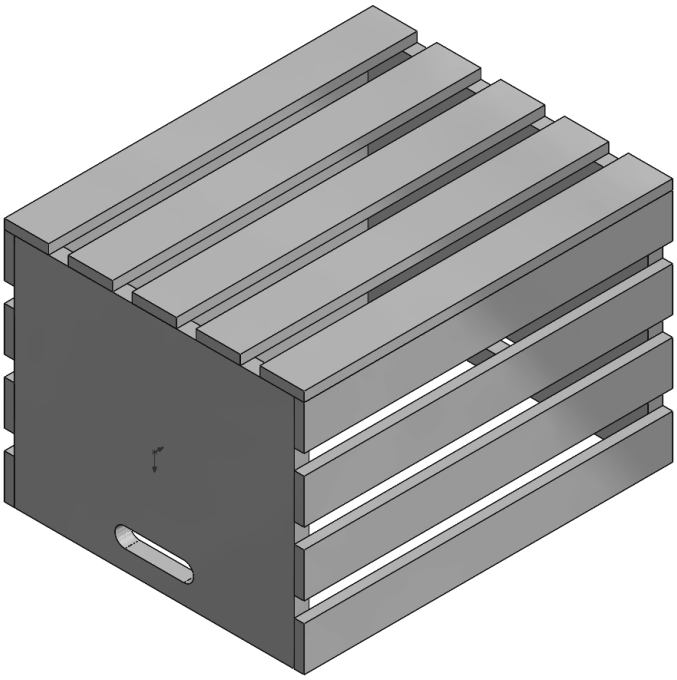


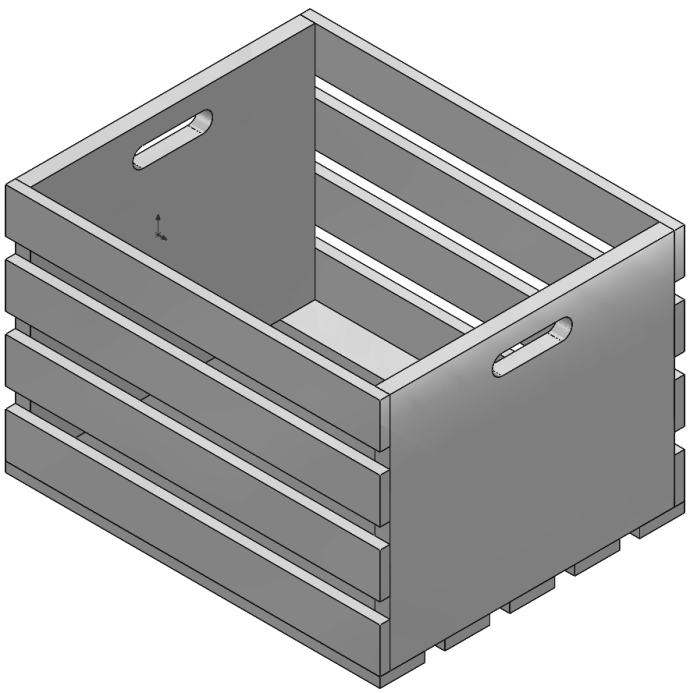
12. Saving your work:

Select **File / Save As**.

Enter **Multibody Parts** for the file name.

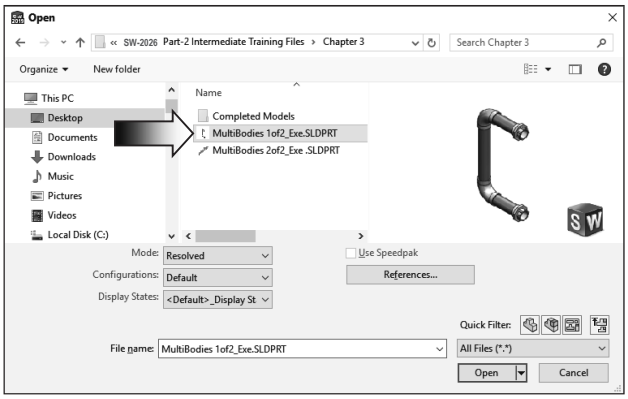
Click **Save**.





Exercise: Combining Multibody Parts

1. Opening a part document:



Click **File / Open**.

Browse to the Training Files folder and open the part document named: **Multibodies 1of 2_Exe**.

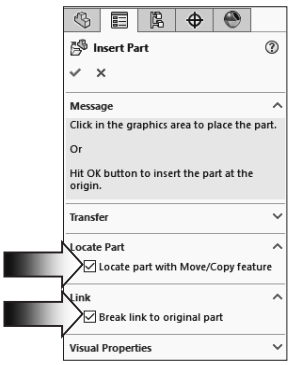
2. Inserting a solid body:

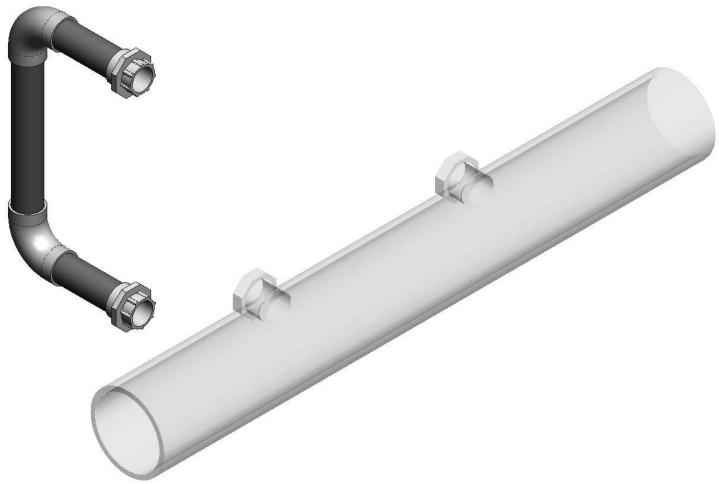
Using the pull-down menus, select **Insert / Part**.

Locate the Training Files folder, and select the document named: **MultiBodies 2of 2_Exe** and open it.

A preview of the selected part is attached to the mouse cursor; do not click OK. Enable the two check boxes: **Locate Part with Move / Copy Feature** and **Break Link to Original Part** (arrows).

Click **OK** to place the part on the **Origin**.





The **Locate part** dialog appears. We will use the Rotate options to reorient the large tube to the upright position.

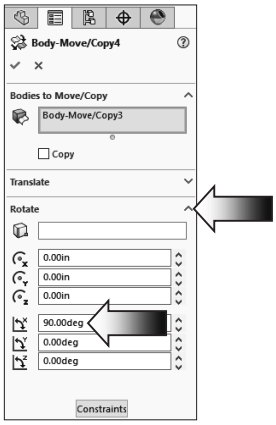
Click the **Translate/Rotate** button Translate/Rotate.

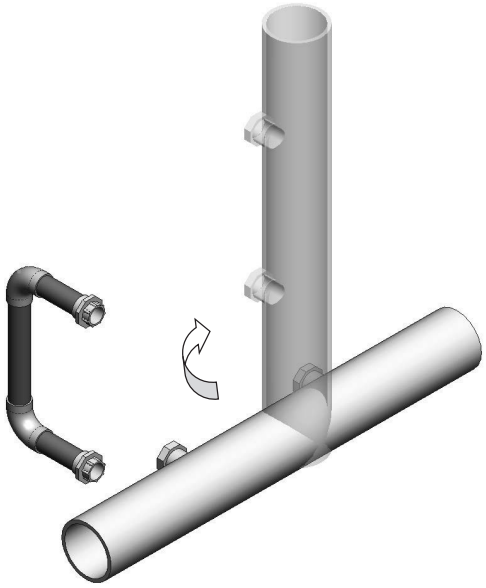
3. Rotating a solid body:

Click the **Rotate** tab (arrow) to activate its options.

Enter **90.00deg**. in the **X** direction.

Select the large tube and press **Enter** to rotate it to the vertical position.





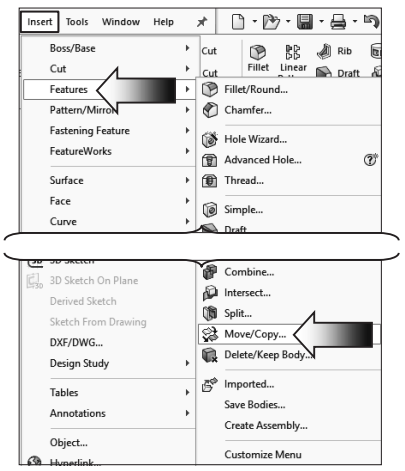
This is one of the few areas where the Reverse or Flip direction is not available; use either a 90° or -90° to rotate the body either to the left or to the right.

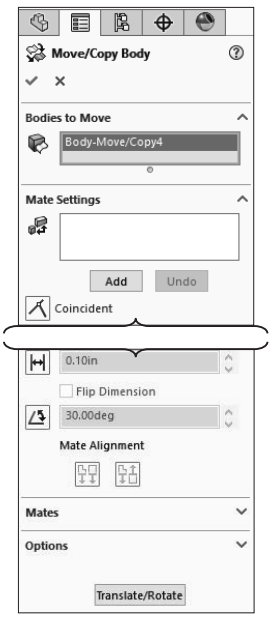
Click **OK** to exit the Locate Part mode.

4. Creating new mates:

Using the pull-down menus, select **Insert / Features / Move / Copy** (arrow).

Under the Bodies to Move section, select the large tube as noted.





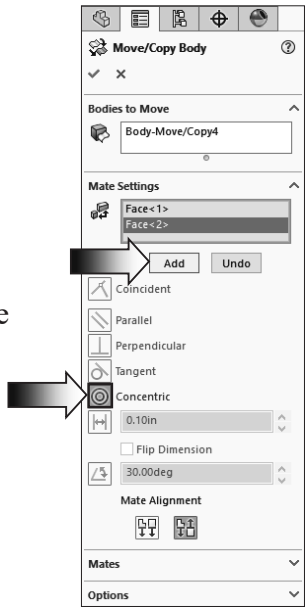
Click the **Constraints** button Constraints (at the lower left side of the tree) and click inside the **Mate Settings** section box to activate this option.

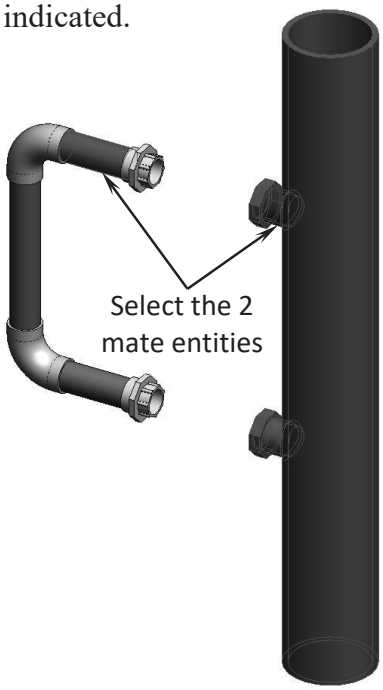
First, select the 2 cylindrical faces of the 2 bodies as indicated.

A **Concentric** mate is created and the large tube moves to the new position.

Click **Add** to accept the mate.

This mate is stored in the Mate section near the bottom of the dialog box. It can be edited or deleted if needed.

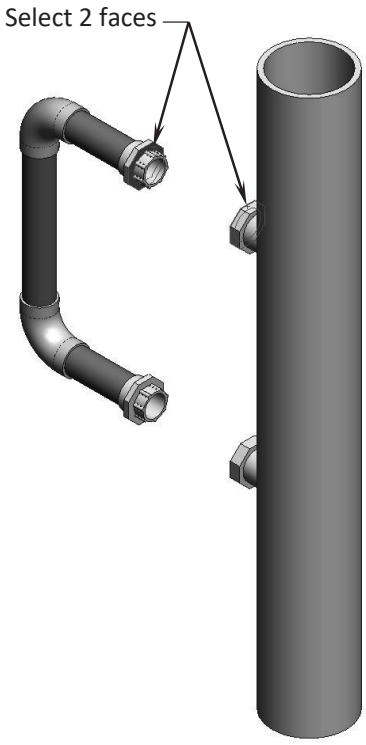


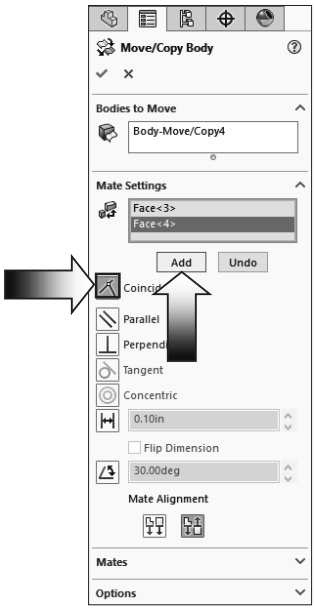


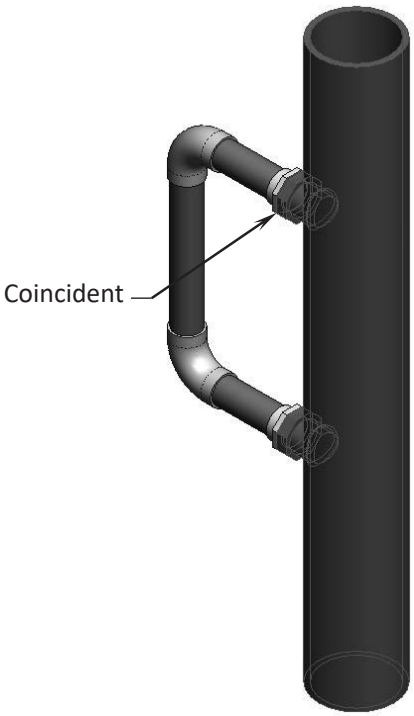
Next, select the 2 planar faces of the 2 bodies as noted below.

A **Coincident** mate is created. The large tube moves forward and touches the fixed body. Click **Add** to accept the mate.

Click **OK**.



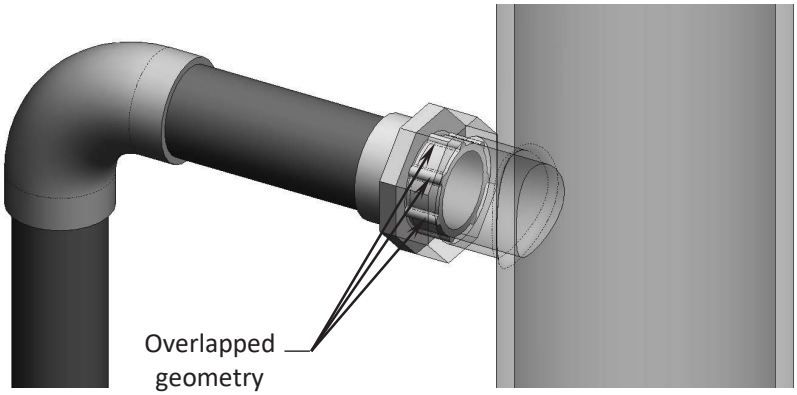


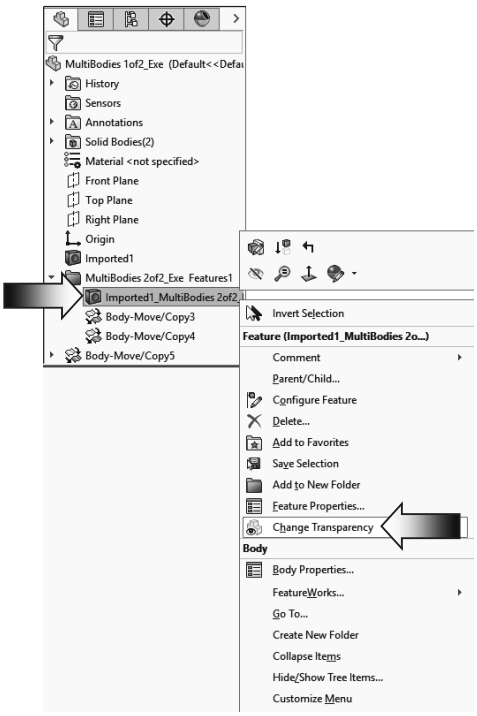


5. Checking the overlapped geometry:

After the two solid bodies are positioned, they cause some interferences. One of the easier ways to view the interference is to change the Body2 to transparent.

Expand the Multibodies folder to see its contents.

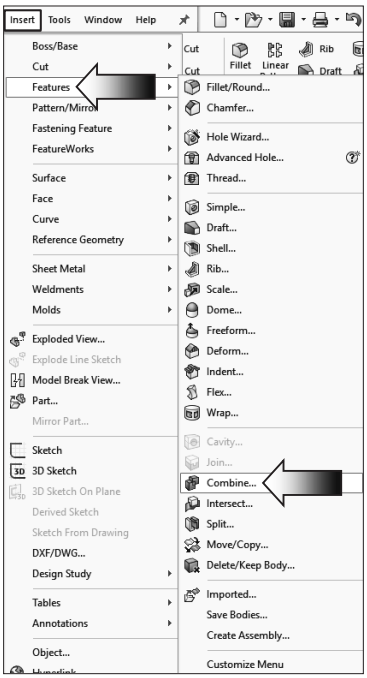




Right-click the **Body2** (the large tube) and select **Change Transparency** (arrow).

Examine the interferences between the 2 solid bodies in both areas. There are several options to remove the interferences; the method that we are going to use is **Combine-Add**.

6. Combining the solid bodies:



Using the drop-down menus once again; select: **Insert / Features / Combine**.

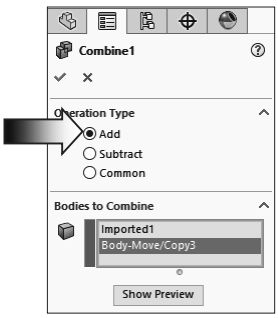
As mentioned earlier in this chapter, the Combine command offers three different options:

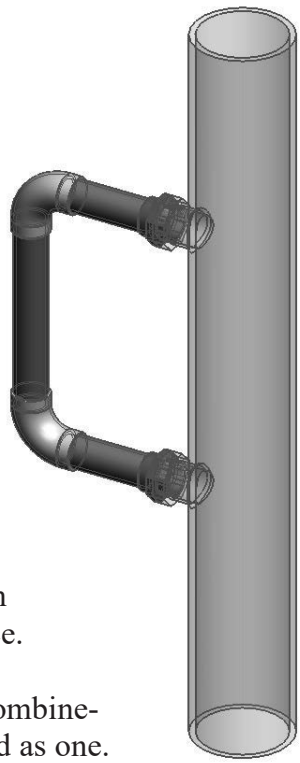
* **Add** = Combines multiple bodies into a single body.

* **Subtract** = Subtracts overlapping material from a selected main body.

* **Common** = Removes all material except that which overlaps.

Under the Operation Type, select the **Add** option (arrow).



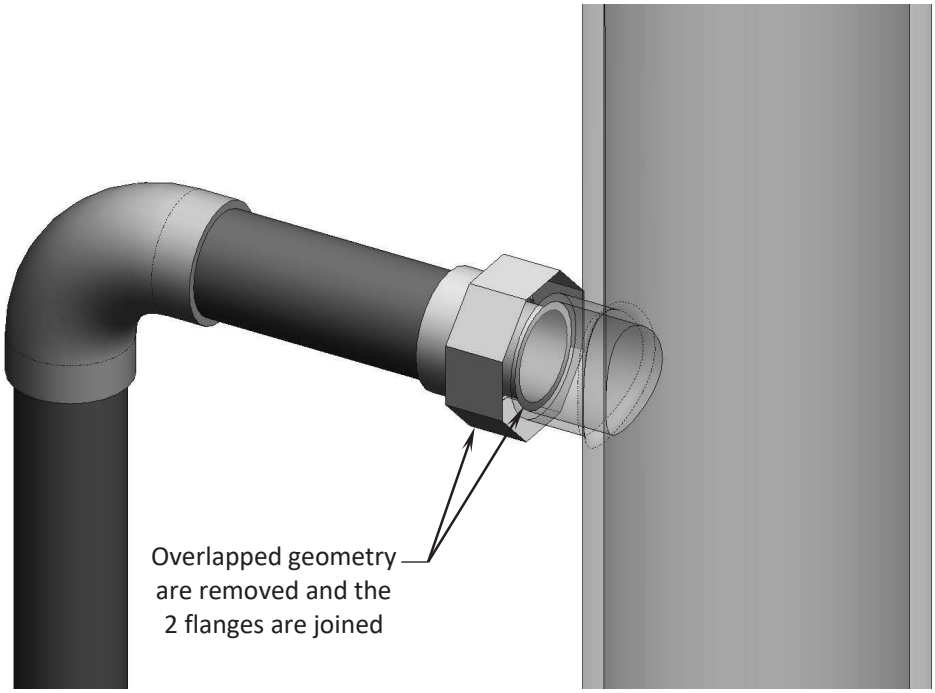


Select the **2 solid bodies** either from the graphics areas or from the FeatureManager tree.

Click the **Show Preview** button and zoom in one of the areas that has the interference.

The interferences are consumed by the Combine-Add operation and the 2 flanges are joined as one.

Examine the result of the Combine-Add against the image shown here.



7. Saving your work:

Click **File / Save As**.

Enter **Combining Mutibodies_Exe** for the name of the file.

Press **Save**. Close all documents.