PowerSHAPE 2016 R1

Tutorials Manual

Parameterised assembly

Acknowledgements

Patent Information

Emboss functionality is subject to patent number GB 2389764 and patent applications US 10/174524 and GB 2410351.

Morphing functionality is subject to patent application GB 2401213.

PowerSHAPE 2016 R1. Published on 13 July 2015

Contents

Parameterised Assembly for PowerSHAPE

Creating and editing solids

1.Create a solid from surfaces

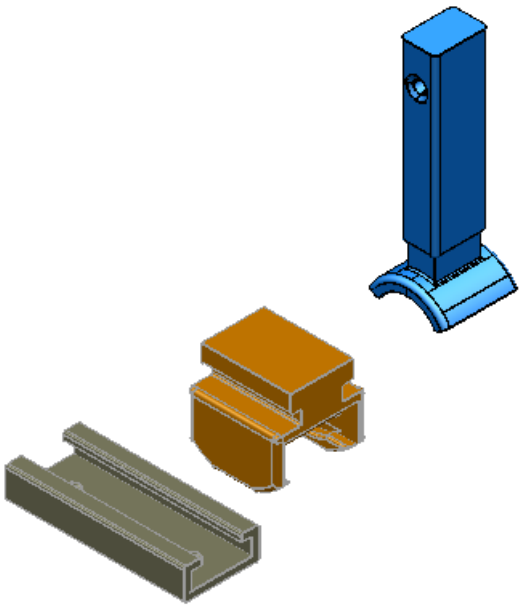
 If you do not have the licence required for the commands in this tutorial*, go to the next step in the tutorial and click **Import Data (Parameterised_assembly.psmodel)**.

The model will then be provided with the correct data and you will be able to complete the tutorial.

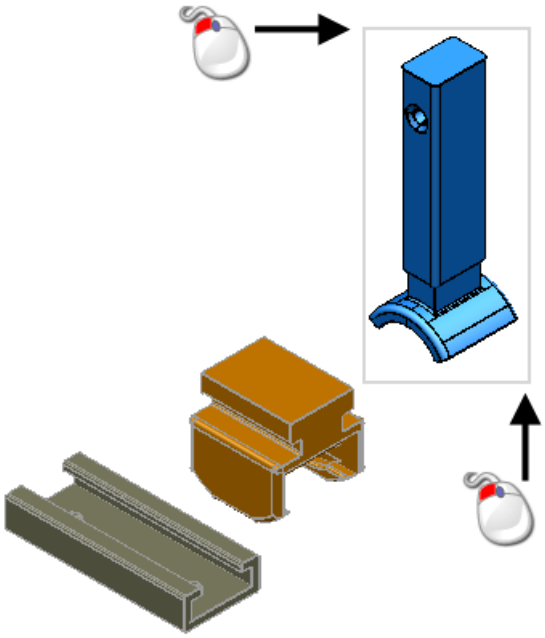
*In most cases selecting an icon will inform you that the necessary licence is missing. In some modules of PowerSHAPE the icon(s) may be missing entirely.

1 Click **Import Data**.

2 The following objects are displayed in the graphics area:

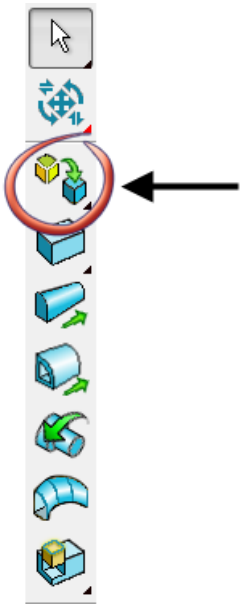


3 Click the left mouse button and drag a box, as shown below:

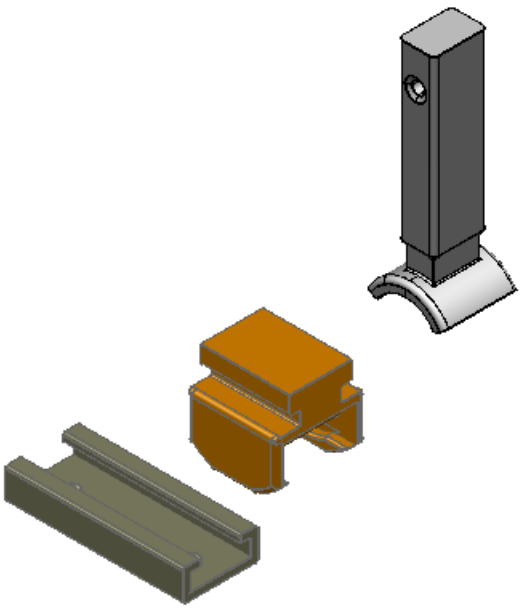


4 Click **Solid**  .

5 Click **Create solid from selected surfaces or meshes** .



6 Click anywhere in the graphics window to deselect the objects



2. Rename the solid

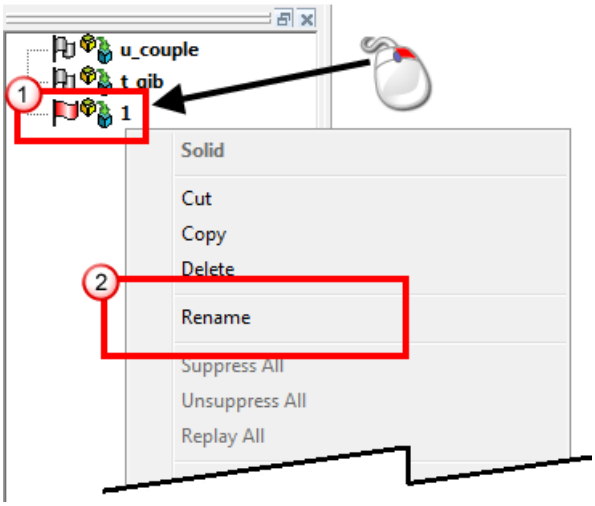
1 You are now going to give the solid object a specific name.

2 Click **Show the tree window** .

The Window Tree is displayed.

3 Do the following:

1. Click solid **1** using the right mouse button.
2. Click **Rename.**



4 Type **lifter_blade**, shown in the image below:

5 Press **Enter**.

Creating an assembly

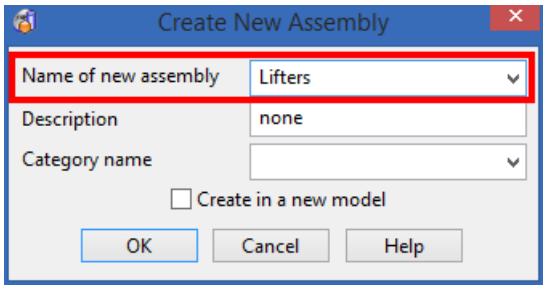
3. Add and register components

1 Click **Resize to Fit**  .

2 Click **Assembly**  .

3 Click **Create new empty assembly**  .

4 Type **Lifters** for the **Name of new assembly**.

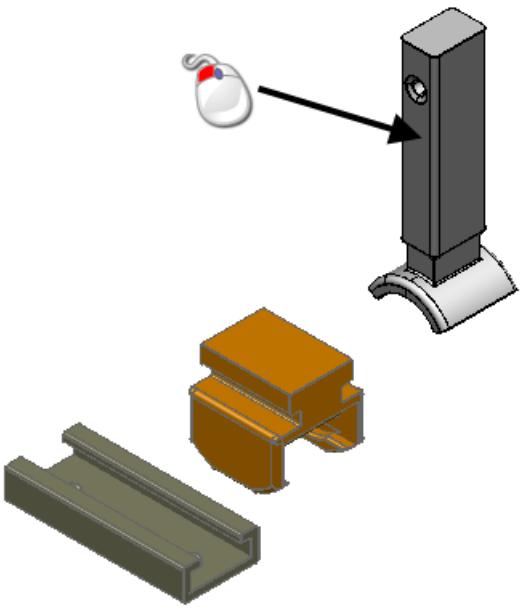


5 Click **OK**.

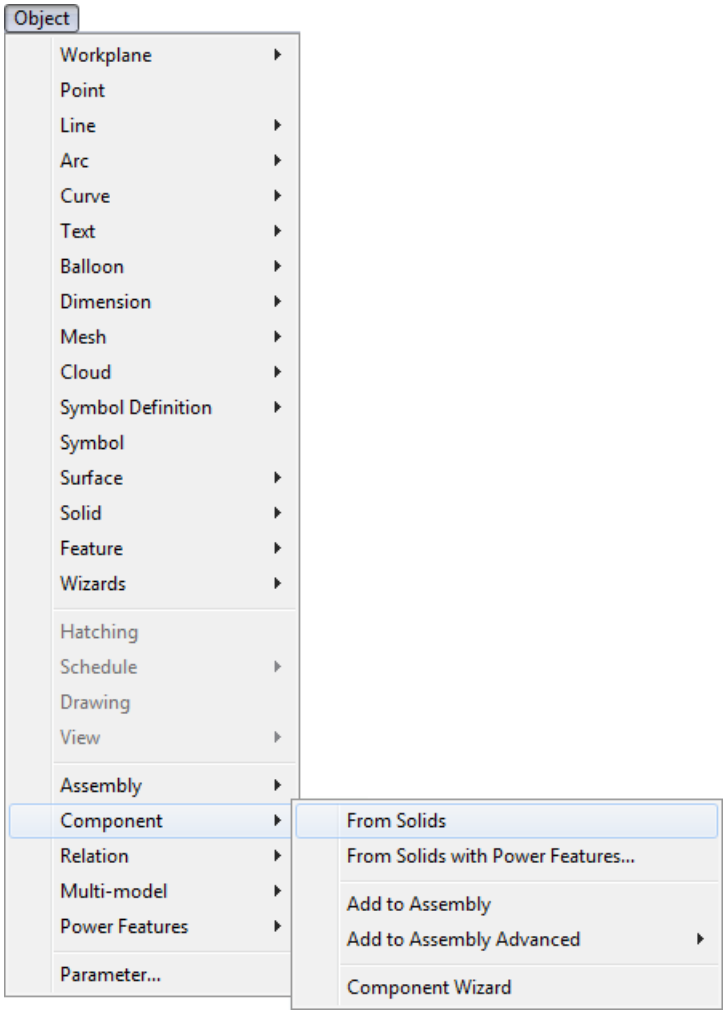
The feature tree displays the created lifters assembly.

4. Add components to an assembly method 1

1 Click on solid **lifter_blade**, as shown in the image below:



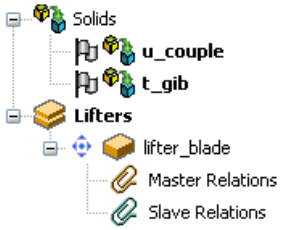
2 Click **Object > Component > From Solids** from the main menu.



The solid is now registered as a component.

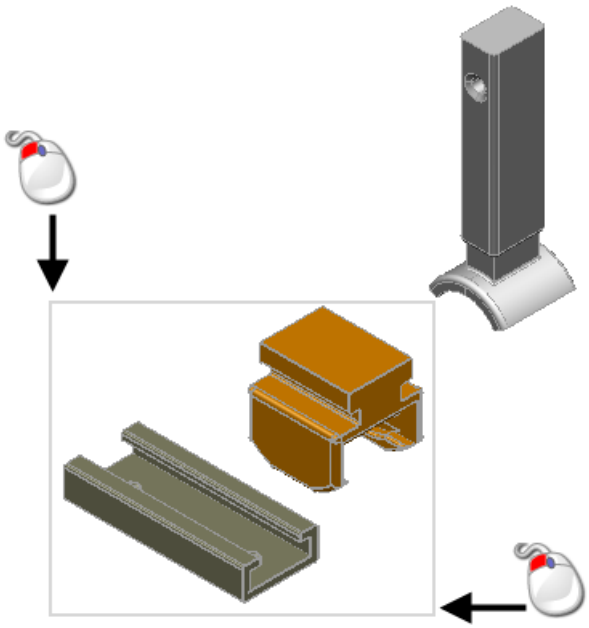
The solid appears in the tree window in the **lifters assembly** model.

Click ⊞ to expand the tree if necessary.



5. Add components to an assembly method 2

1 Click the left mouse button and drag a box, as shown below:

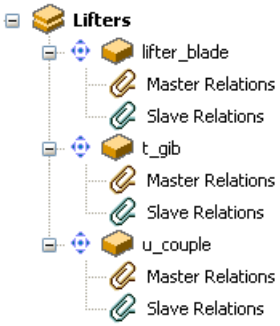


2 Click **Assembly**  .

3 Click **Create components from selected solids**  .

4 Click **Select**  .

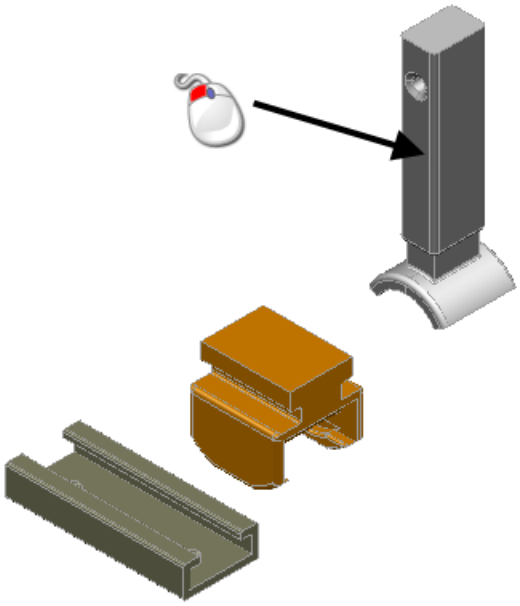
5 Click ⊞ to expand the **Lifters** assembly in the feature tree to see the created components.



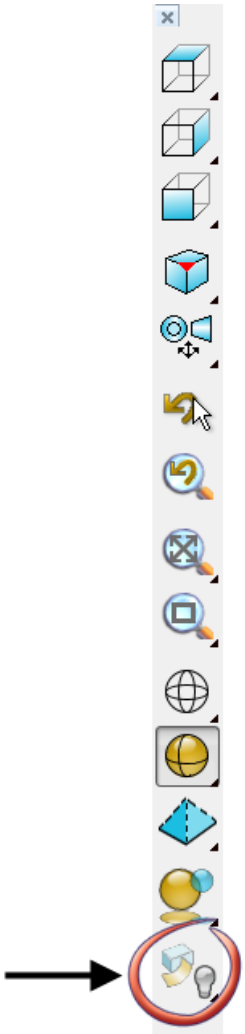
Creating relationships between components

6. Create the first relationship

1 Click on **lifter blade** to select it.

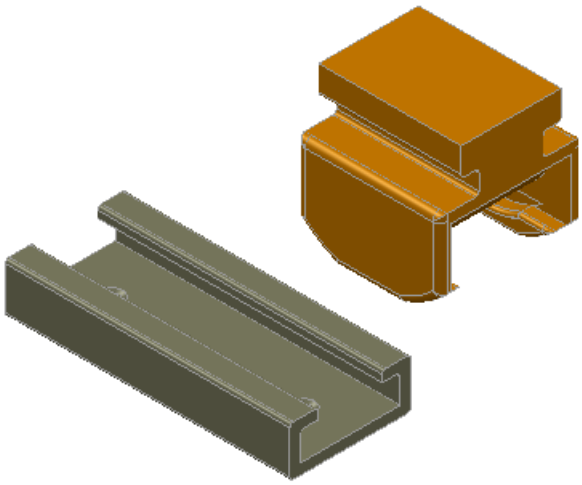


2 Click **Blank Selected**  .



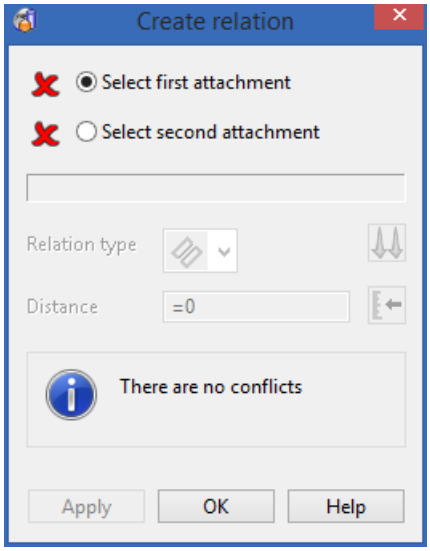
3 Click **Resize to Fit**  .

Your model should look like the one shown below:



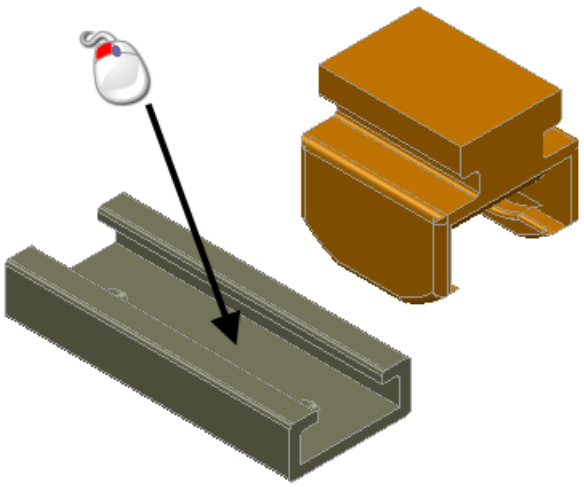
4 Click **Add relation using attachments**  .

The **Create relation** dialog is displayed.

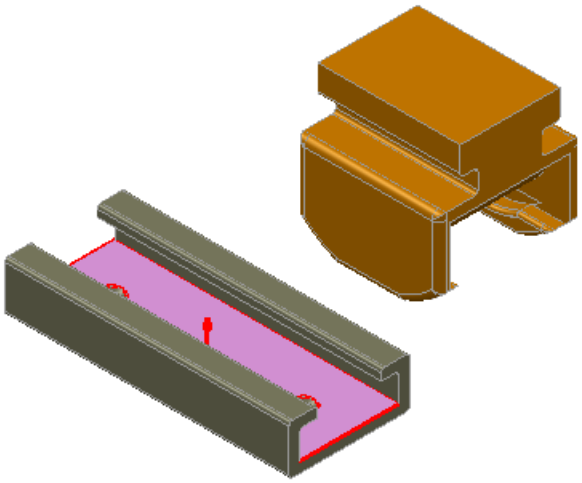


Select first attachment is selected on the **Create relation** dialog, waiting for the *first* attachment to be selected.

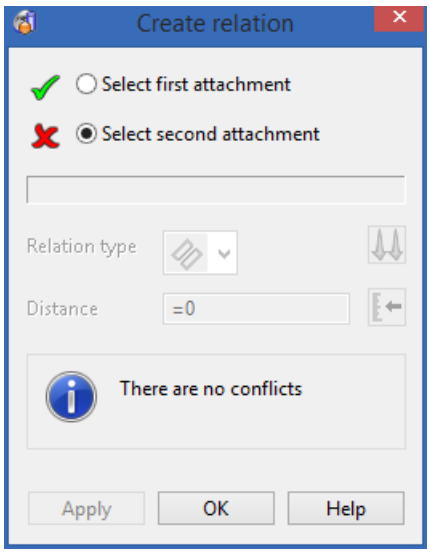
5 Click on **t_gib** component, shown in the image below.



The colour changes to show the plane attachment has been selected shown in the image below.

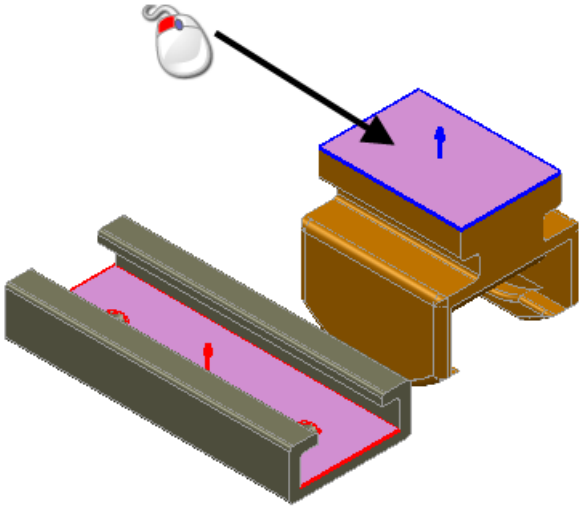


Select second attachment is selected on the **Create relation** dialog, waiting for the *second* attachment to be selected.



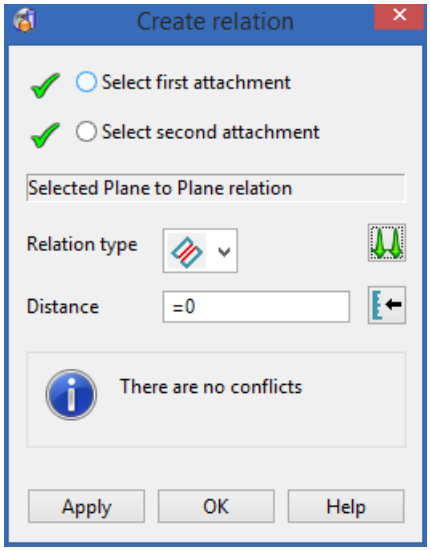
6 Click on **u_couple** component,

The colour changes to show the plane attachment has been selected shown in the image below.



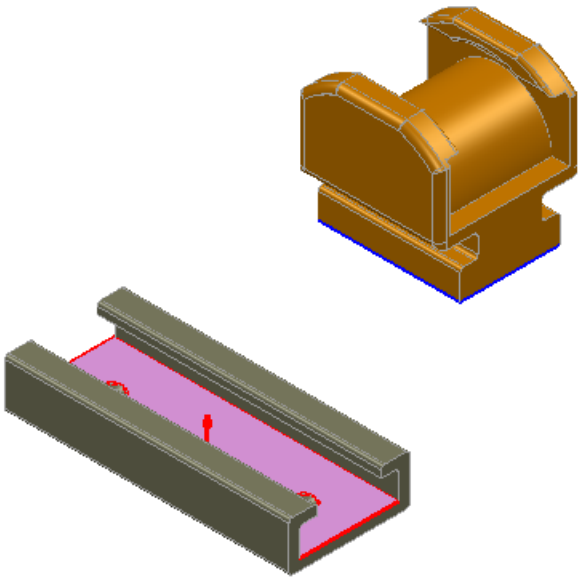
When the second attachment is selected the components align to show the chosen attachment.

7 Select the **Plane + Plane** relation type.



8 Click the **Align or Anti-Align** option until is displayed.

The component u_couple updates to reflect the alignment.

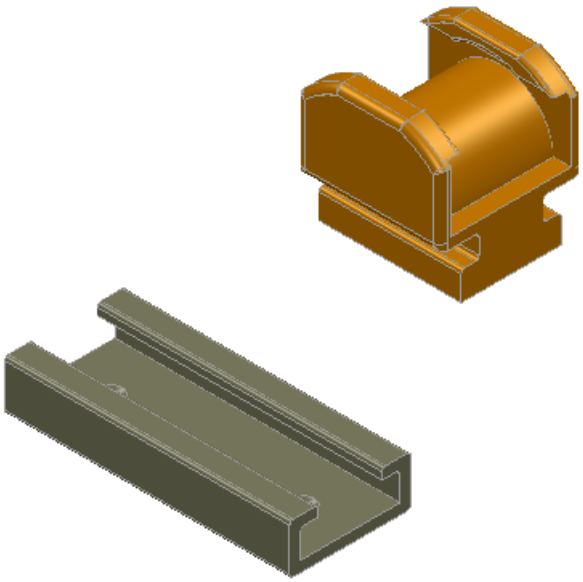


9 Click **Apply**.

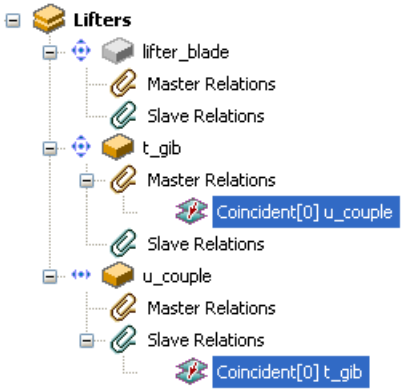
10 Click **OK**.

11 Click **Select**  .

12 Click anywhere in the graphics window to deselect the model.



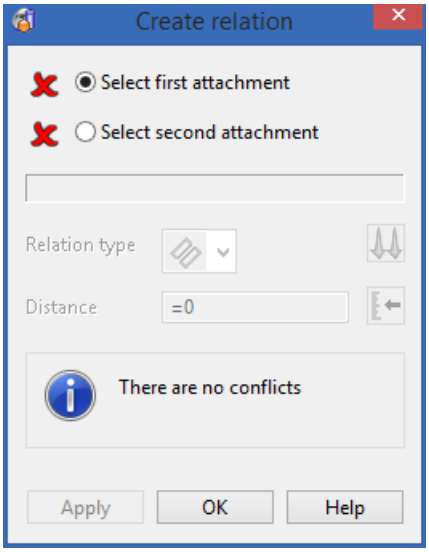
13 Click ⊞ to expand the solid tree to see the relation.



7. Create the second relationship

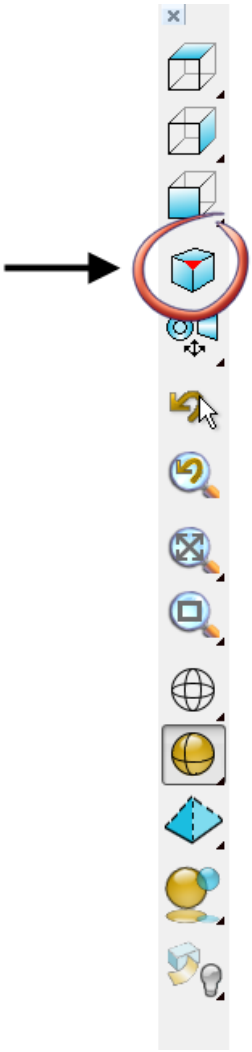
1 Click **Add relation using attachments**  .

The **Create relation** dialog is displayed.



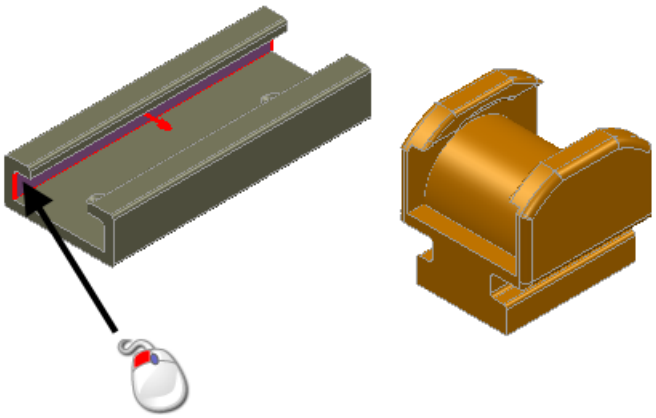
Select first attachment is selected on the **Create relation** dialog, waiting for the *first* attachment to be selected.

2 Click **View ISO1**  .

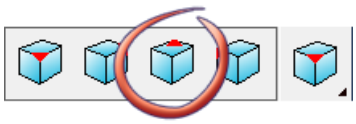


3 From the flyout, Click **View ISO4**  .

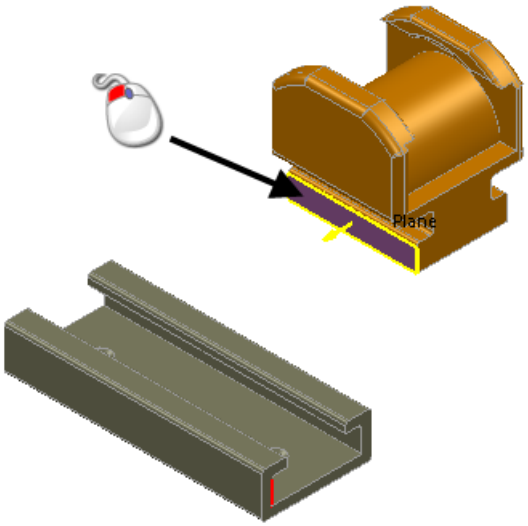
4 Select the first attachment when it is highlighted on **t_gib**, shown in the image below.



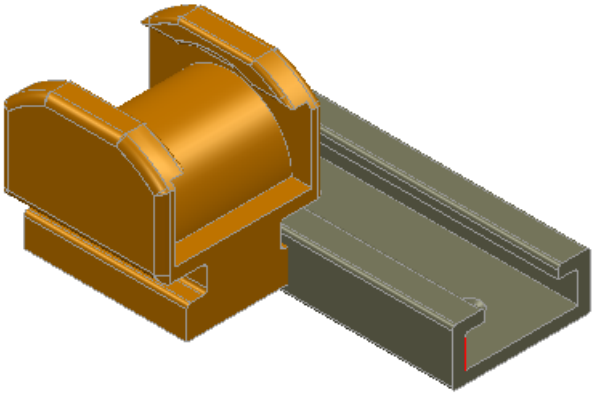
5 Click **View ISO3**  .



6 Select the second attachment when it is highlighted. on **u_couple**.

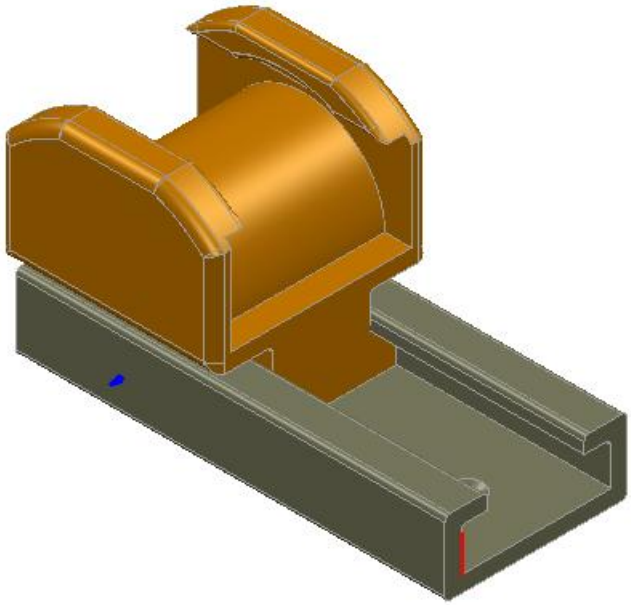


The components change positions and attach.



7 Click the **Align or Anti-Align** option until  is displayed.

Your model should look like the one shown below:

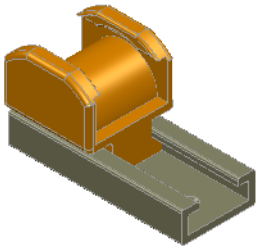


8 Click **Apply**.

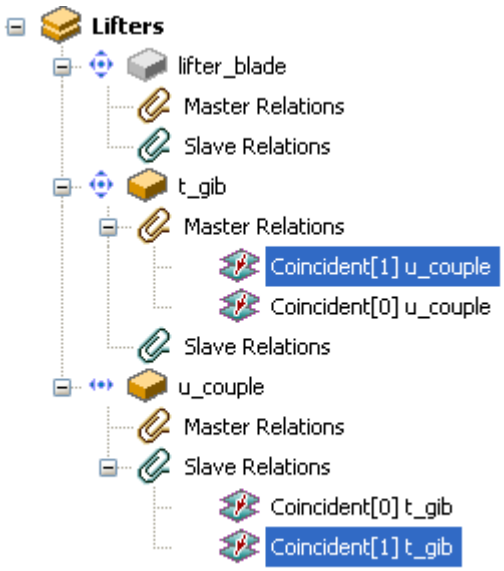
9 Click **OK**.

10 Click **Select**  .

11 Click anywhere in the graphics window to deselect the model.



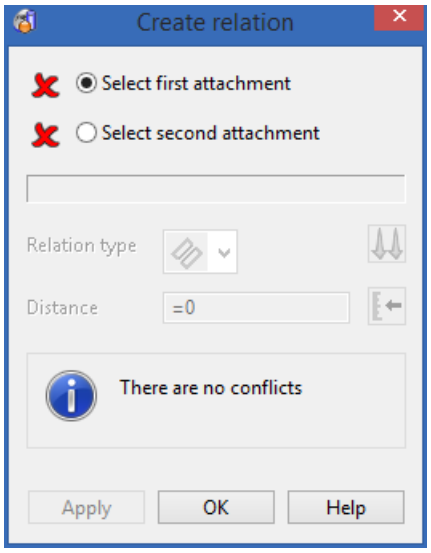
The solid tree should look like the tree below:



8. Create the third relationship

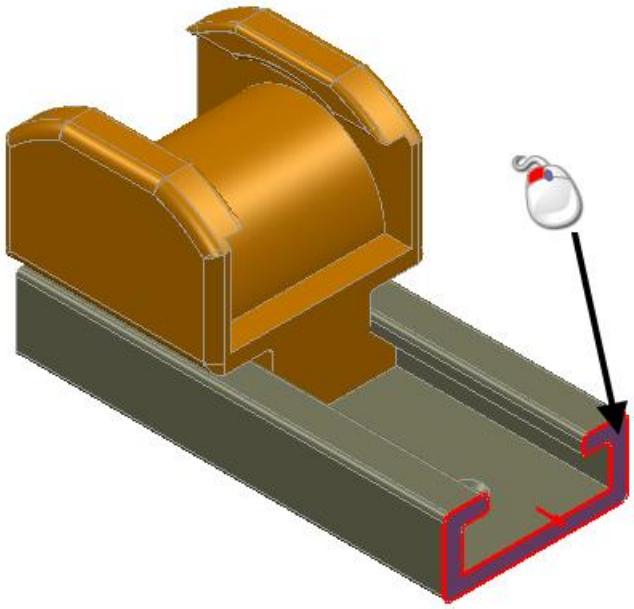
1 Click **Add relation using attachments**  .

The **Create relation** dialog is displayed.

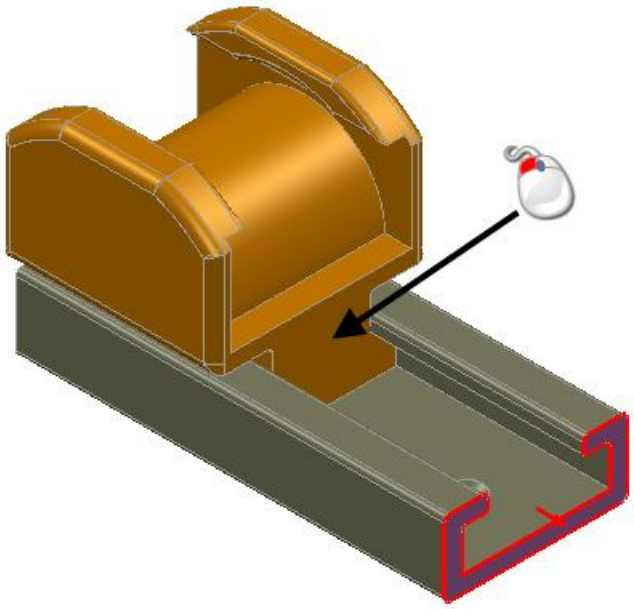


2 **Select first attachment** is selected on the **Create relation** dialog, waiting for the *first* attachment to be selected.

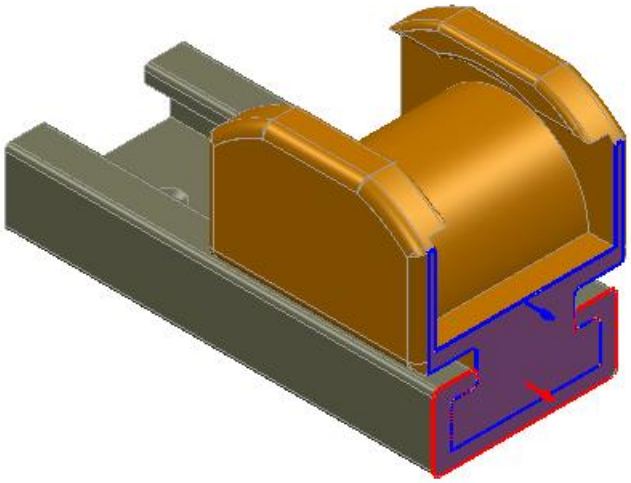
3 Select the face on the **t_gib** component, shown in the image below.



4 Select the face on the **u_couple** component shown in the image below.

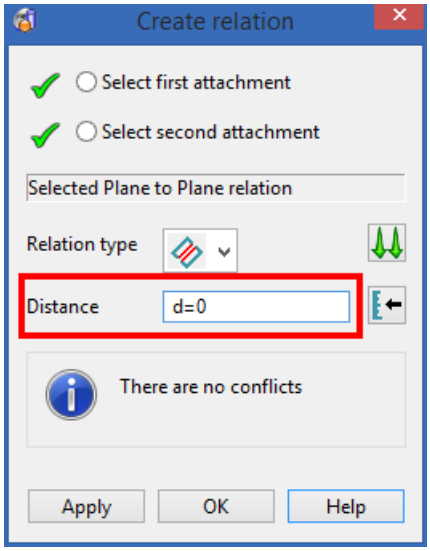


The attachment is highlighted and the components aligned.



5 Click the **Align or Anti-Align** option until  is displayed.

6 Type a **Distance** of **d=0**.



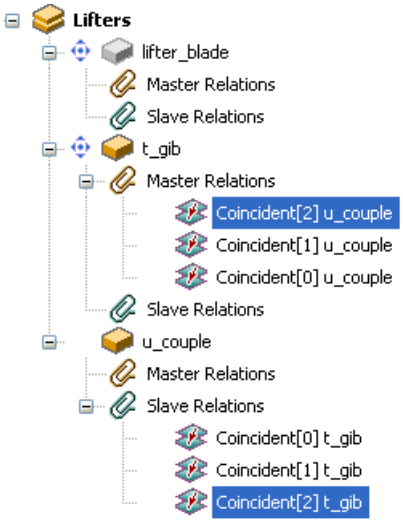
7 Press **Enter**.

8 Click **Apply**.

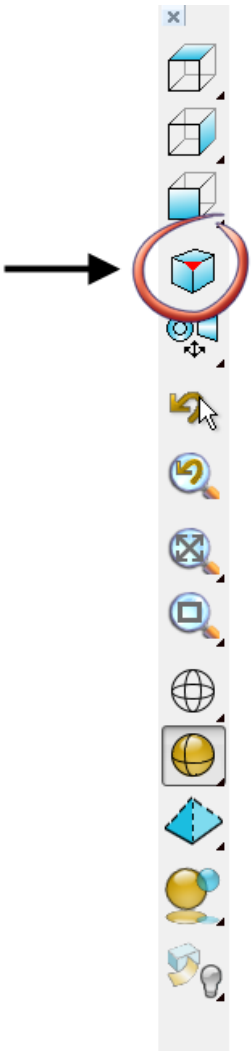
9 Click **OK**.

10 Click **Select**  .

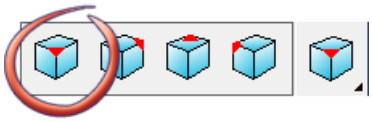
11 Click ⊞ to expand the feature tree to see the relationships created.



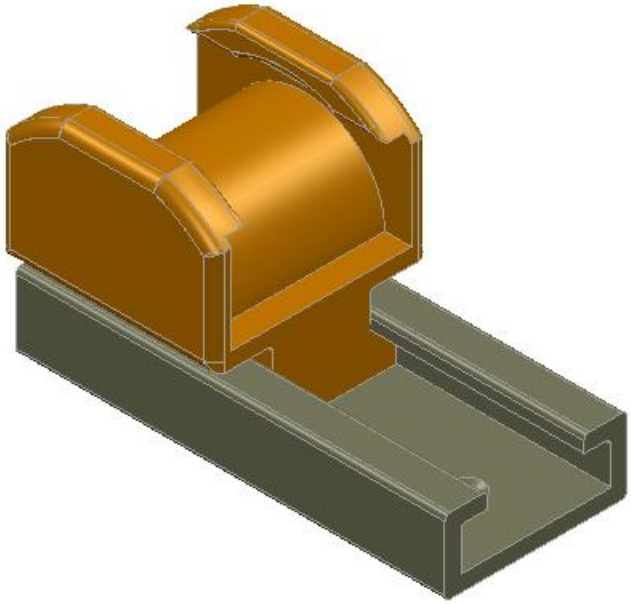
12 Click **View ISO1** using the right mouse button  .



13 From the flyout, click **View ISO1**  .

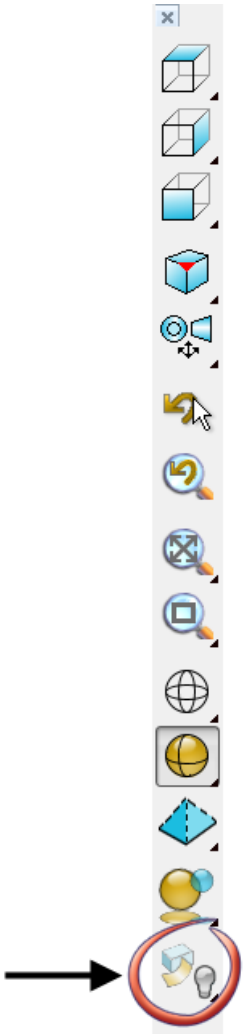


Your model should look like the one shown below:



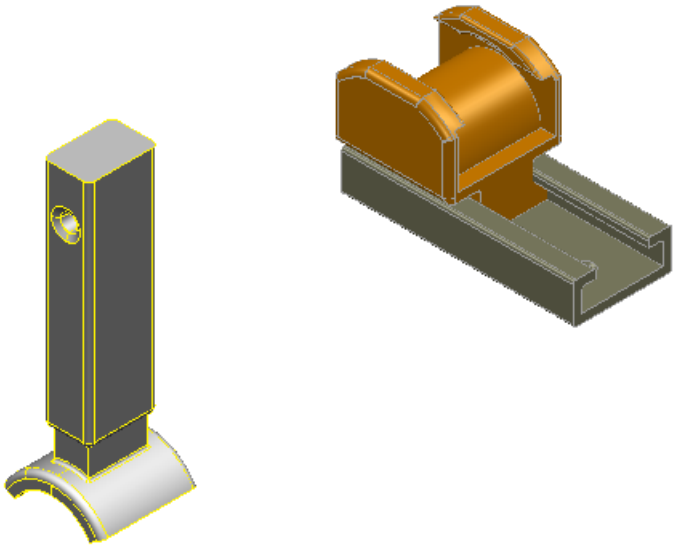
9. Create the fourth relationship

1 Click **Blank Selected**  using the right mouse button.

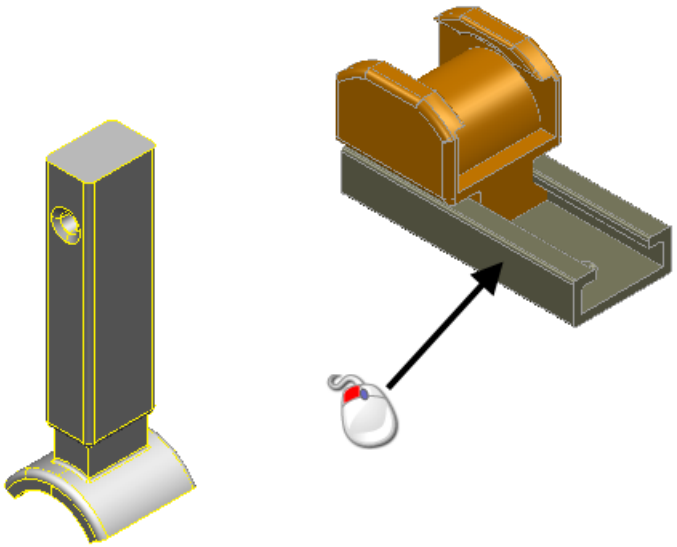


2 From the flyout, click **Unblank**.

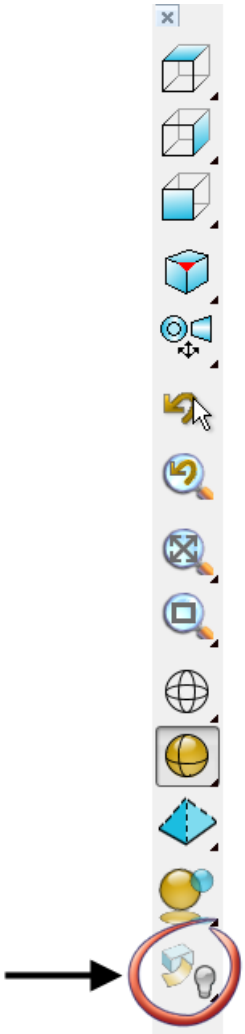
3 Click **Resize to Fit** .



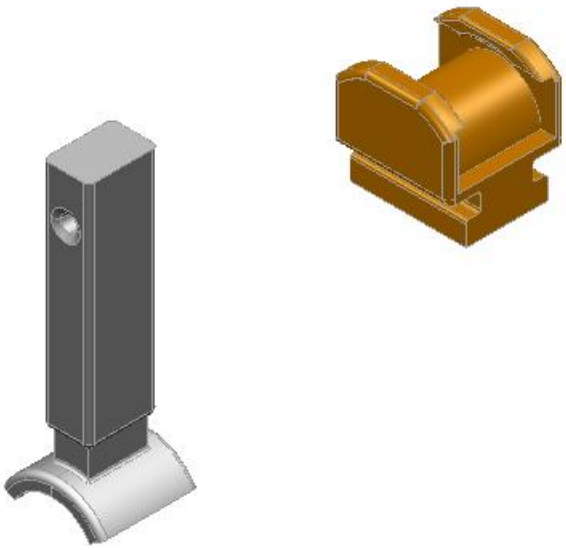
4 Click on **t_gib** component.



5 Click **Blank Selected**  .

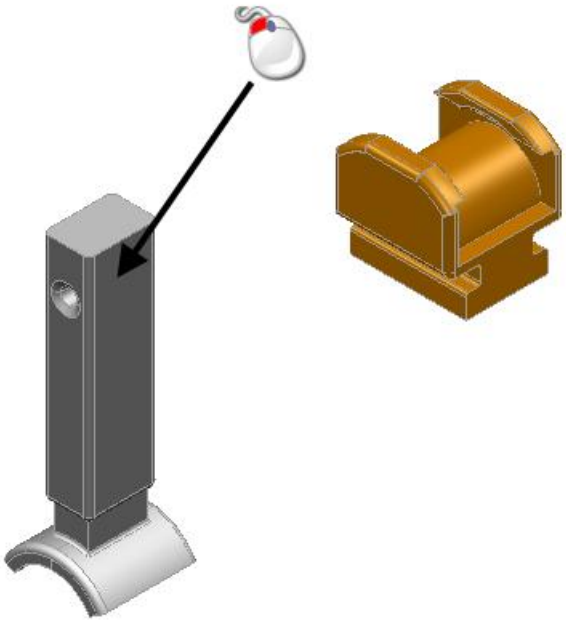


Your model should look like the one shown below:

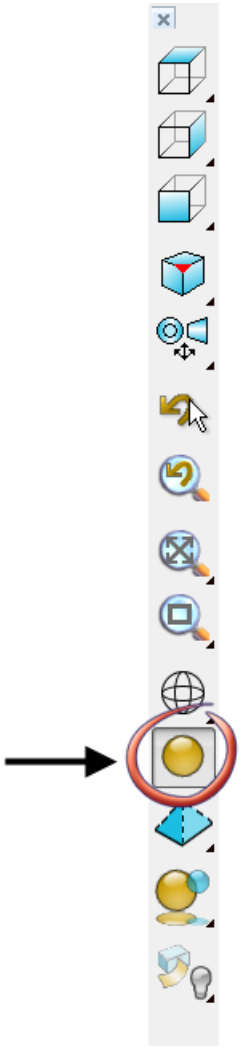


6 Click **Select** .

7 Click on **lifter_blade** component.

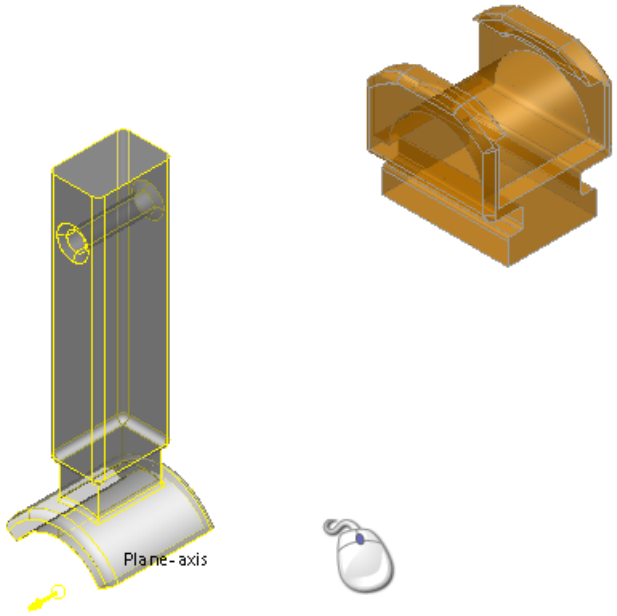


8 Click **Shaded View**  using the right mouse button.



9 From the flyout, click **Toggle Transparent Views**  .

10 Move the cursor over **lifter_blade** component, until the **Plane-axis Attachment** displays.



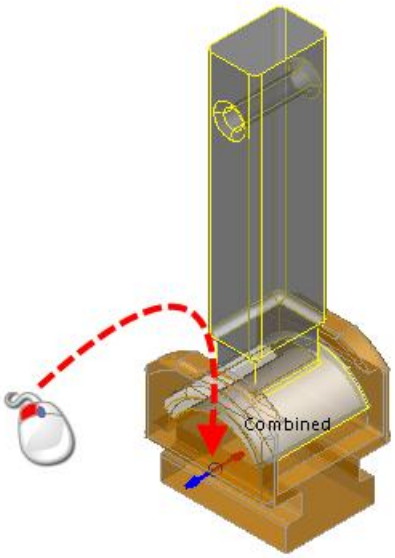
11 Click on and hold down the left mouse button.

If you click once to select a component, it selects the component and displays the plane and combined attachments when the cursor is moved over the component. (This is required for this example.)

If you click a component twice, the component is selected but displays point attachments when the cursor is moved over the component.

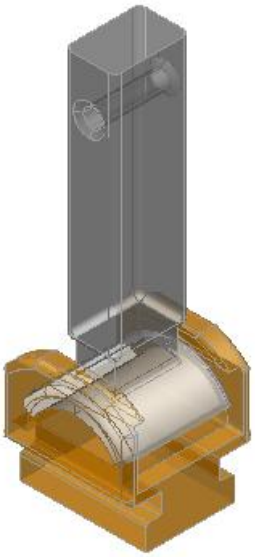
12 Drag the **lifter_blade** over **u_couple**.

13 Move the cursor over **u_couple** component until the **Combined Attachment** displays in the position shown below:



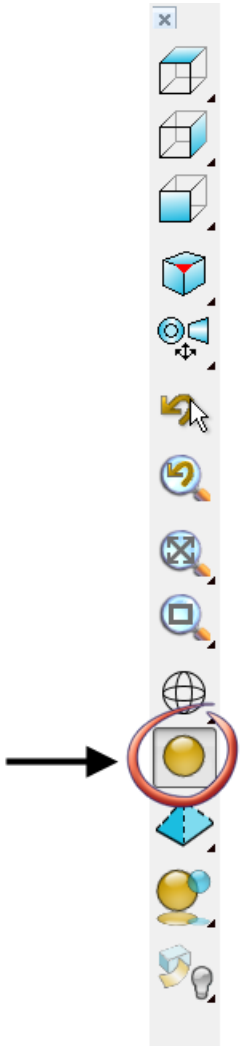
14 When the **Combined attachment** displays, release the left mouse button.

15 Click anywhere in the graphics window to deselect the model.



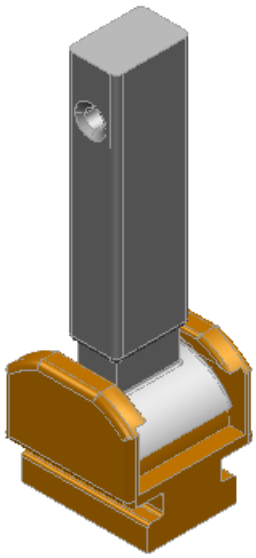
16 Click **Select** .

17 Click **Shaded View**  using the right mouse button.

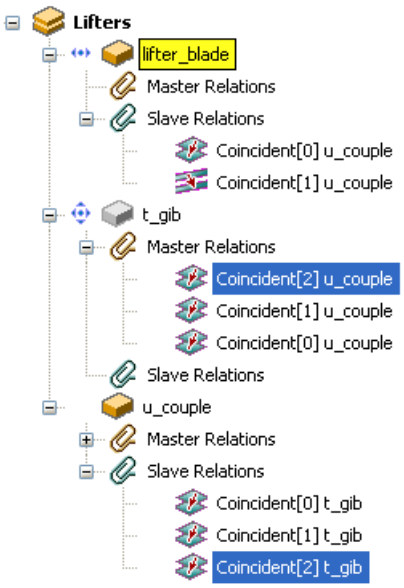


18 From the flyout, click **Shaded and Wireframe view**  .

Your model should look like the one shown below:



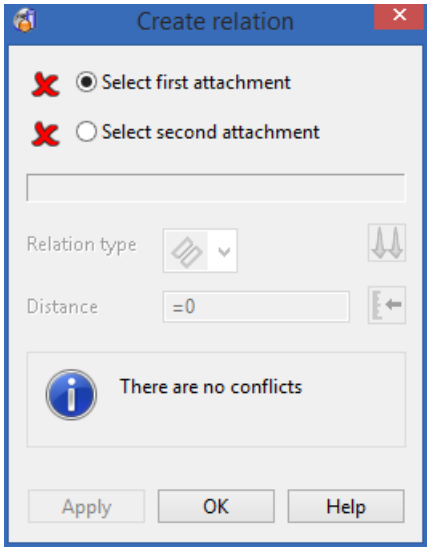
19 Click ⊞ to expand the feature tree, to see the relationships created.



10. Create the fifth relationship

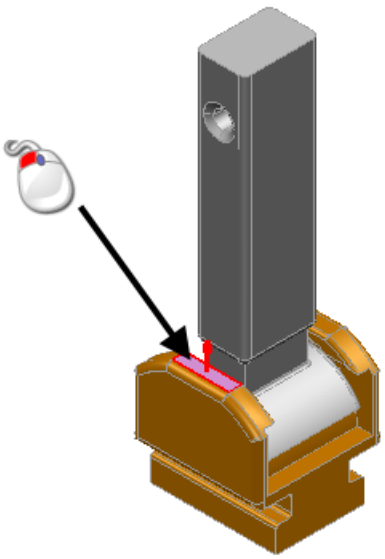
1 Click **Add relation using attachments**  .

The **Create relation** dialog is displayed.

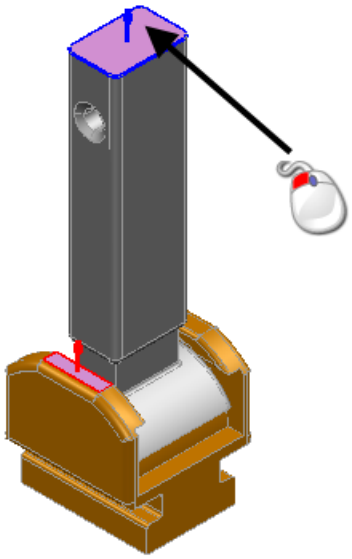


2 **Select first attachment** is selected on the **Create relation** dialog, waiting for the *first* attachment to be selected.

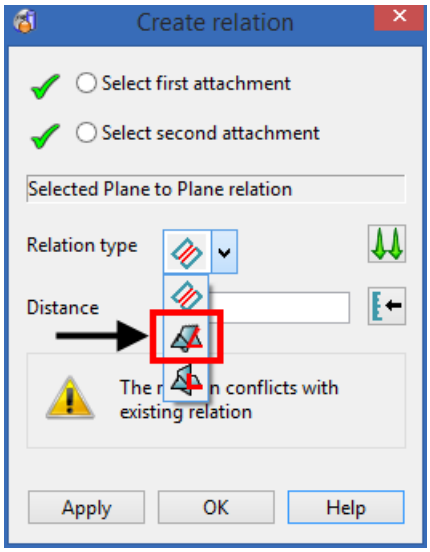
3 Click on the **u_couple** component when the plane attachment is highlighted.



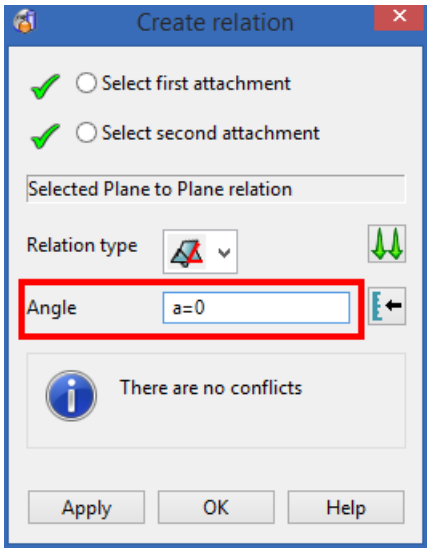
4 **Select second attachment** is selected on the **Create relation** dialog, waiting for the *second* attachment to be selected.



5 Select the relation type **Angular** option.



6 Type an **Angle** of **a=0**.



7 Press **Enter**.

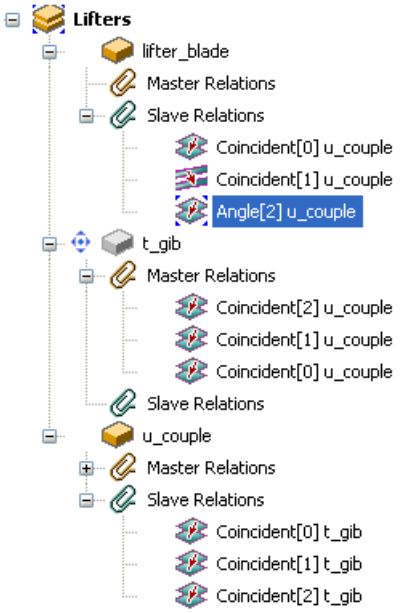
8 Click **Apply**.

9 Click **OK**.

10 Click **Select**  .

This ends the **Add Relation** command.

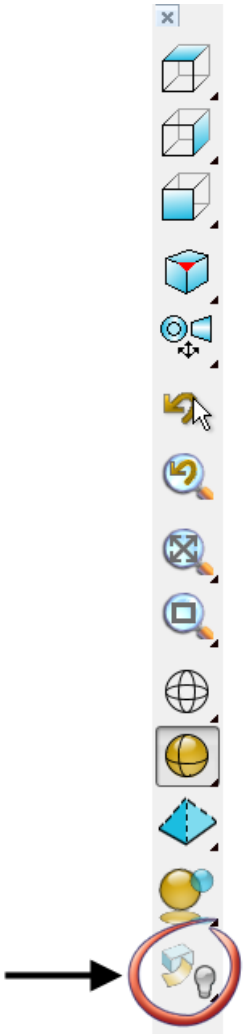
11 Click ⊞ to expand the feature tree, to see the relationships created.



Using the parameterised component

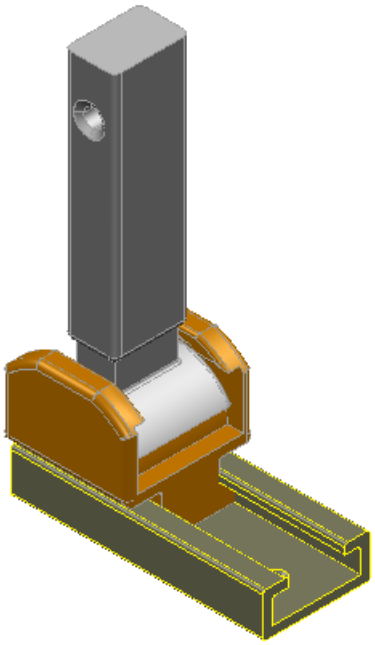
11. Modify parameters

1 Click **Blank Selected**  using the right mouse button.



2 From the flyout, click **Unblank**.

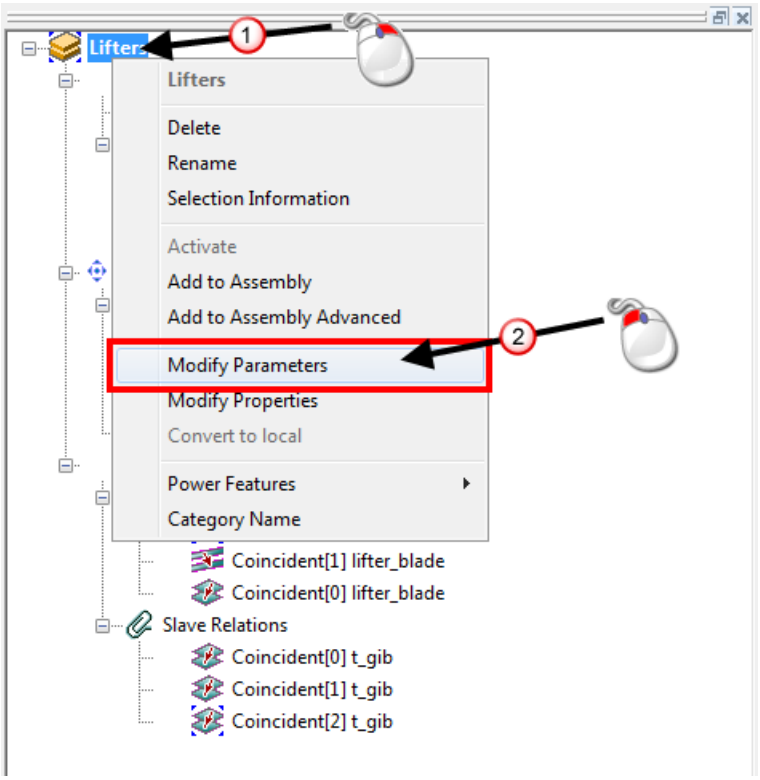
3 Click **Resize to Fit** .



4 Click on **Lifters** assembly in the tree, using the right mouse button.

The popup menu is displayed.

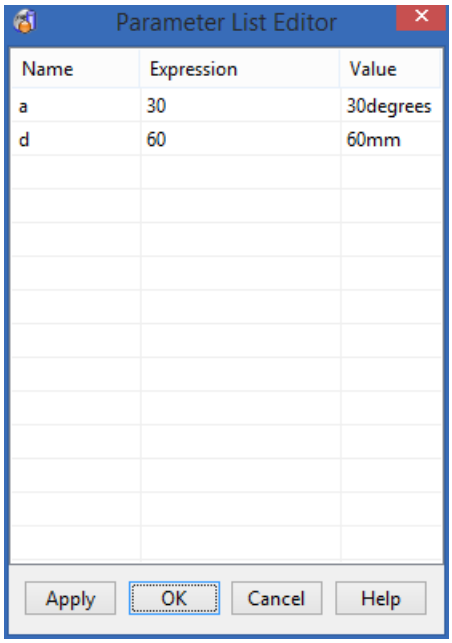
5 Select **Modify Parameters**.



6 The **Parameter List Editor** is displayed.

7 For **a**, enter an **Expression Value** of **30**.

8 For **d**, enter an **Expression Value** of **60**.

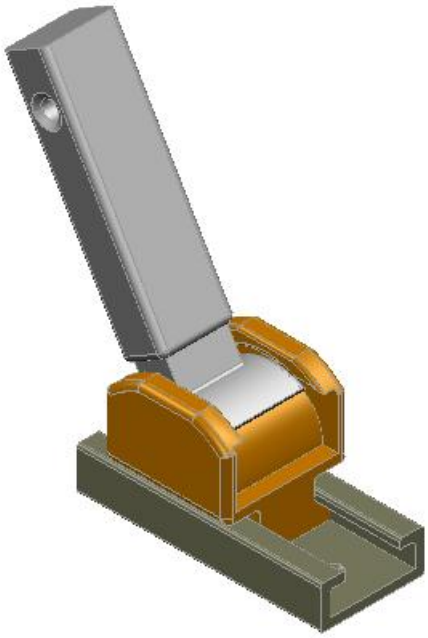


9 Click **Apply**.

10 Click **OK**.

11 Click **Resize to Fit** .

12 Click anywhere in the graphics window to deselect the model.



13 Try entering different parameter values to see the component move.

Summary

You have created a *lifter assembly using the assembly feature tree.*

You have done the following:

- Created a solid from surfaces
- Renamed solid objects
- Created an assembly
- Registered components in an assembly
- Registered components using a shortcut
- Created relationships between components
- Modified the parameters of the components