



Altair

HyperWorks

Altair HyperMesh 2019 Tutorials

HM-3410: Creating Area Connectors

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In this tutorial, you will learn how to apply an adhesive connection to the left rails.

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Model Files


This exercise uses the `frame_assembly_1.hm` file, which can be found in the `hm.zip` file. Copy the file(s) from this directory to your working directory.

Exercise

Area connectors must be meshed in order to work properly. When the connector's location is existing FE mesh elems, the connector automatically gets meshed to match the elements chosen. However, after creating an area connector on surfs, lines, or along nodes, you must use the automesh options (which display when you select one of these locations types) to create a mesh on the connector area.

- **area** Create and realize area connectors in a single process.
- **create** Create, but not realize, area connectors.
- **realize** Create FE representations of previously-created area connectors.

Step 1: Retrieve and view the model file.

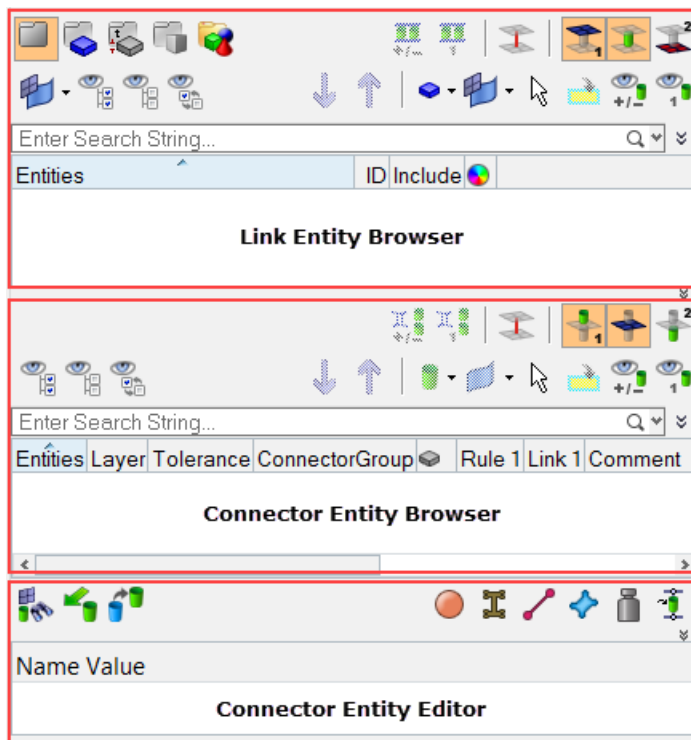
1. Start HyperMesh Desktop.
2. In the **User Profile** dialog, select **OptiStruct**.
3. Click **OK**.
4. Open a model file by clicking **File > Open > Model** from the menu bar, or clicking  on the **Standard** toolbar.
5. In the **Open Model** dialog, open the `frame_assembly_1.hm` file. A model appears in the graphics area.
6. Observe the model using various visualization options available in HyperMesh (rotation, zooming, and so on).

Step 2: Load the Connector Browser.

1. Open the **Connectors** browser by clicking **View > Browsers > HyperMesh > Connector** from the menu bar.

- Review the layout of the **Connector** browser. Currently there are no components or connectors listed because there are no connectors in the model.

Note: You can use the **Connector** browser to view and manage the connectors in your model. The top portion of the browser is referred to as the **Link Entity** browser, and it displays information about the linked entities in your model. The middle portion is referred to as the **Connector Entity** browser, and it contains a list of the connectors in your model. The bottom portion of the browser is referred to as the **Connector Entity Editor**, and it displays attributes assigned to the connector(s) selected in the Connector Entity browser. HyperMesh groups the connectors based on their connection type.




Step 3: Create an adhesive connection between component **Left_Rail_1** and **Left_Rail_2** on the top flange.

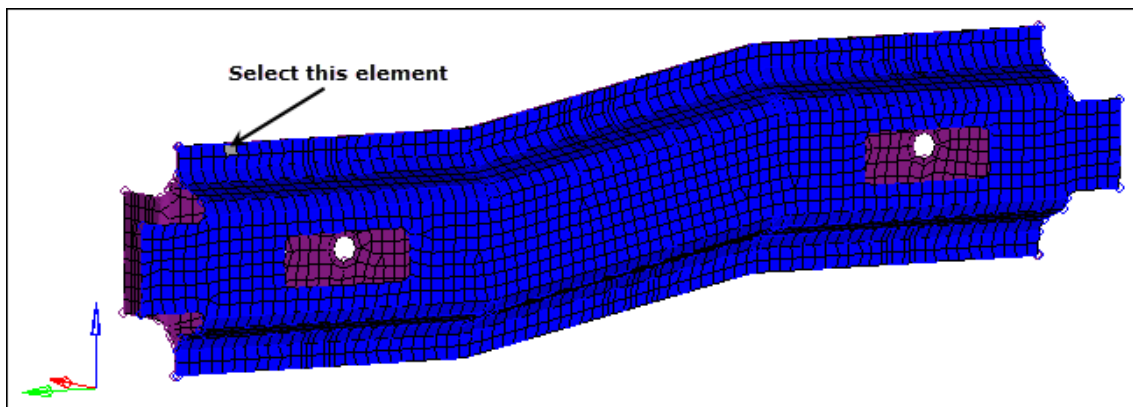
- In the **Model** browser, **Components** folder, isolate **Left_Rail_1** and **Left_Rail_2**.
- Zoom into an area displaying the two flanges and inspect the elements to be joined.
- In the **Model** browser, right-click and select **Create > Component** from the context menu. HyperMesh creates and opens a component in the **Entity Editor**.

Note: HyperMesh makes this new component, the current component.

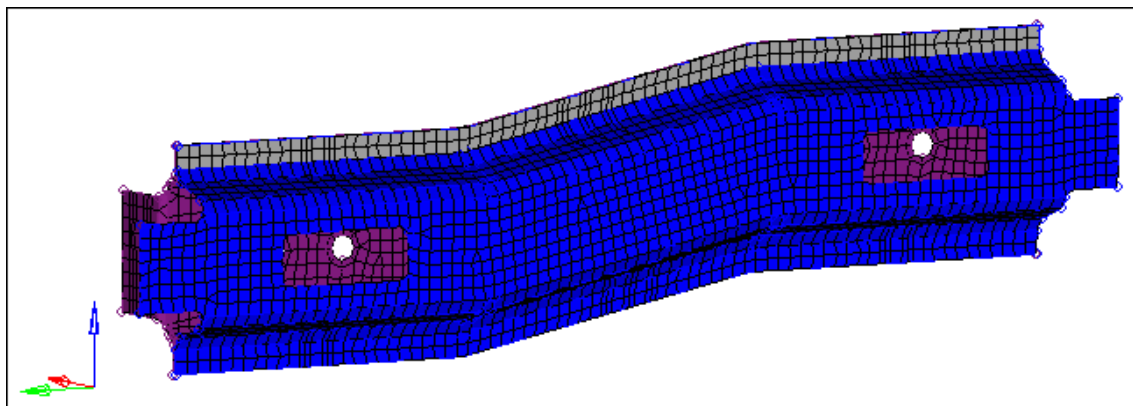
4. For **Name**, enter `area_edit_panel`.

Name	Value
Name	Left_Rail_Adhesive
ID	13
Color	
Include File	[Master Model]
Property	<Unspecified>
Material	<Unspecified>

5. Open the **Area** panel by right-clicking in the **Connector Entity** browser and selecting **Create > Area** from the context menu.
6. Set the **location** selector to **elems**.
7. Select one element on the top flange of the **Left_Rail_1** component as indicated in the following image.

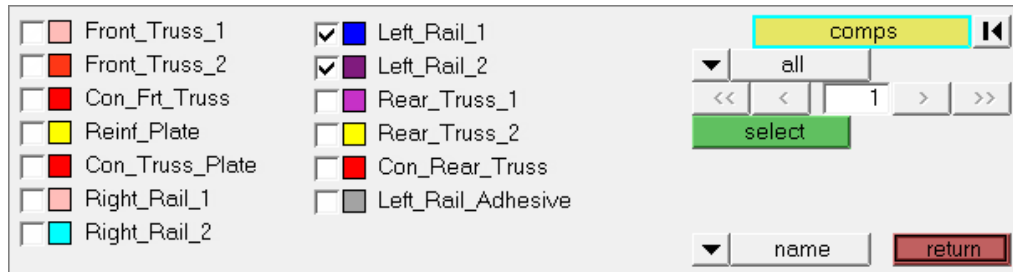


8. Click **elems >> by face**. HyperMesh selects the entire flange.



9. Set the **connect what** selector to **comps**.
10. Click **comps**.

11. Select the components, **Left_Rail_1** and **Left_Rail_2**.

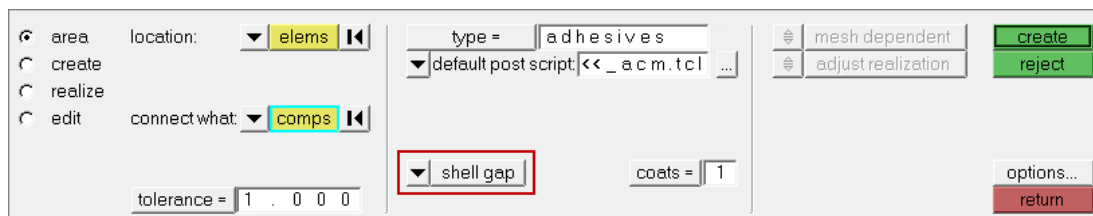


12. Click **select**.
 13. In the **tolerance=** field, enter 10.

Note: The connector will connect any selected entities within this distance of itself.

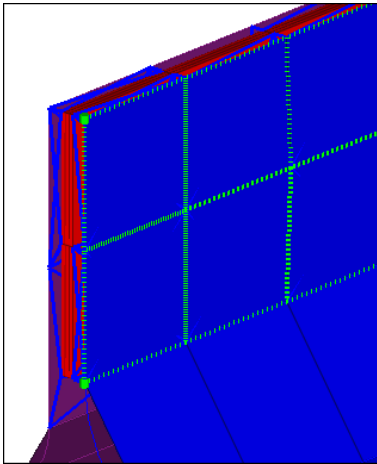
14. Click **type=** and select **adhesives**.
 15. Set the hexa thickness to **shell gap**.

Note: This option projects directly to the shell component and takes no account of the thickness of the shell components.



16. Click **create**. HyperMesh creates a new adhesive area connector.
 17. Click **return**.
 18. Inspect the new adhesive.
 19. In the **Connector Entity** browser, right-click on the adhesive connector and select **Unrealize** from the context menu. The connector becomes unrealized, and the **Entity Editor** opens and displays the selected connectors corresponding attributes.
 20. In the **Entity Editor**:
- Set **Hexa Thickness Option** to $(T1+T2)/2$.
Note: $(T1+T2)/2$ takes into account the thickness of each shell part.
 - For **Coats**, enter 3.
Note: This option increases the number of hexas through thickness from 1 to 3.

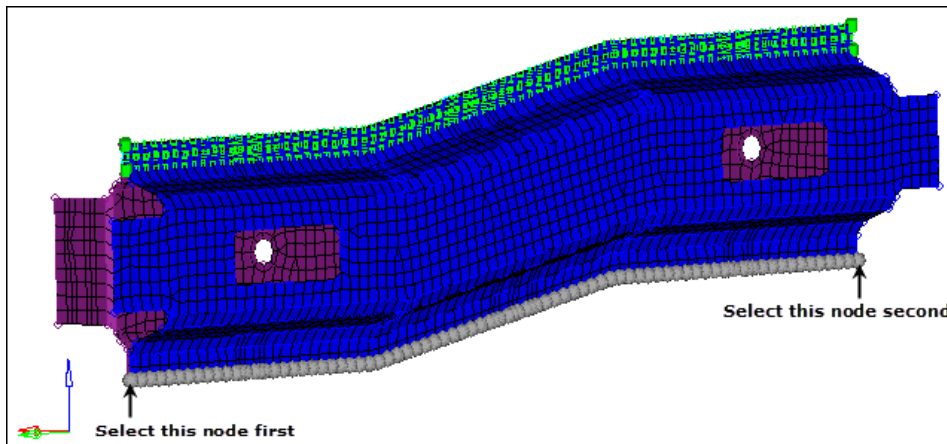
- In the **Connector Entity** browser, right-click on the unrealized adhesive connector and select **Rerealize** from the context menu.



For the other set of flanges you will manually create an area connector and mesh it accordingly.

Step 4: Create an adhesive connection between component **Left_Rail_1** and **Left_Rail_2** on the bottom flange.

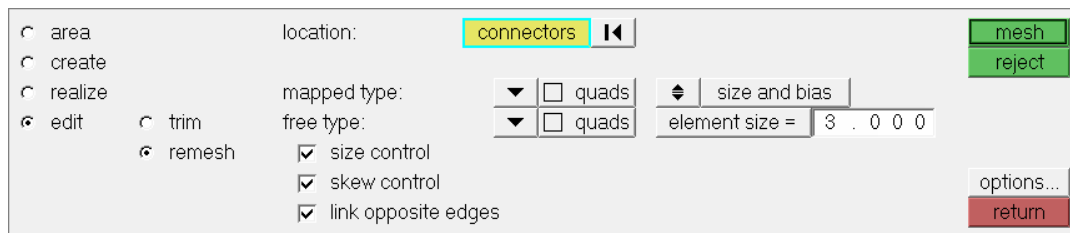
- Go to the **area** panel.
- Set the **location** selector to **nodes**.
- Click **node list >> by path**.
- Select the row of nodes on the outer flange of the **Left_Rail_1** component by first selecting the left most node on the bottom flange of **Left_Rail_1** and then selecting the right-most node on the bottom flange as indicated in the following image.



- In the **width=** field, enter 10.
- In the **offset=** field, enter 3.
- Next to **connect what**, click **comps**.
- Select **Left_Rail_1** and **Left_Rail_2**.

9. Click **select**.
10. Click **create**.

Note: The default mesh size for these mesh independent area connectors (when choosing by nodes/lines/surfs) is 10. However, you can specify a different **elem size** if needed.
11. Go to the **edit** subpanel.
12. Select **remesh**.
13. Use the **location: connectors** selector to select the area connector you just created in step 4.10.
14. In the **element size=** field, enter 3.



15. Click **mesh**.

Note: Connector unrealizes if there is a pre-existing mesh.
16. In the **Connector Entity** browser, select the unrealized connector.
17. In the **Entity Editor**:
 - Set **Hexa Thickness Option** to **const_thickness**.
 - For **Const Thickness**, enter 0.3.
18. In the **Connector Entity** browser, right-click on the unrealized connector and select **Rerealize** from the context menu.
19. Inspect the new adhesive created.

Note: When creating area connectors from elements, HyperMesh automatically meshes the area connector using the current mesh. If the area connector is created from nodes, lines, or surfaces and the default mesh is unsuitable from the **area** subpanel, then you can apply a manual mesh.

