

Altair HyperMesh 2019 Tutorials

HM-3450: Multi-Component Replacement

altairhyperworks.com

#### HM-3450: Multi-Component Replacement

In this tutorial, you will learn how to simultaneously replace multiple components in your current model using the Part Replacement tool. You will be replacing six related components (bumper, front frame, and radiator frame) in the Pr\_Inc.k Include file with components that contain a finer mesh.

#### **Model Files**

This exercise uses the files located in the hm-3450 folder, which can be found in the hm.zip file. Copy the file(s) from this directory to your working directory.

#### Exercise

# **Step 1: Start HyperMesh Desktop and Load the LS-DYNA User Profile**

- 1. Start HyperMesh Desktop.
- 2. In the **User Profile** dialog, select **LS-DYNA**.
- 3. Click **OK**.

#### Step 2: Import the Solver Deck File

- 1. Open the **Import Solver Deck** tab by clicking *File > Import > Solver Deck* from the menu bar.
- 2. In the File field, open the Master.k file.
- 3. Click *Import*.



## Step 3: Replace Parts in the Pr\_Inc.k Include File

In the Model browser, right-click on the *Pr\_Inc.k* Include file and select *Replace* > *Manual* from the context menu.



The **Part-Replace** dialog opens.

💪 Part-Replace				<b>—</b>
Replace using: Comp in File				۲ ال
Tolerance: 0.01				
	Check Nodes FeAbsorb	ID Manager	Preview Accept	Reject
Entities	Status Preserve ID	😮 Card Imag	e Info	
😑 Replace Entities				
🕂 External Entities				
🖶 🙀 Connections (49)				
🗄 🙀 Loadcols (1)				
🕀 🙀 Sets (14)				
🕂 🙀 Groups (2)				
🗄 📷 Rigidwalls (2)				
👾 Internal Entities				
🖶 🙀 Connections (13)				
🗄 🙀 Sets (13)				
🖻 🗟 Comps (7)				
🗢 🗢 26_bumper	2000132	*PART	Existing Component	
🗢 🥯 39_bumperbrktr	2000133	*PART	Existing Component	
🧇 40_bumperbrktL	2000134	*PART	Existing Component	
🗢 😔 32_framefrontcapR	2000135	PART	Existing Component	
- 🧇 31_framefrontcapL	2000137	*PART	Existing Component	
🗢 😔 43_radiatorframeR	2000144	*PART	Existing Component	
🗢 🥪 44_radiatorframeL	2000145	PART	Existing Component	



2. Set the **Replace using** field to *Comp in File*, then open the Incoming\_idclash.k file, which contains the target, replacement parts.

Replace using:	Comp in File	-	C:/hm_3450/Incoming_idclash.k
Tolorphoo	0	1	

- 3. In the **Tolerance** field, field, enter a tolerance to search for closest nodes and elements to re-establish the connections and other references between the target part and the model. For this tutorial, you can leave the default tolerance of 0.01.
- 5. Click **Preview**.
- 6. In the **Component Pairing** dialog, check the component pairing.
  - a. In the second row, note that there is one -two mapping. If it does not come up display, click on the second row to add the new pairing.
  - b. Click OK.
  - **Note**: When performing Manual part replacement, you have the flexibility to modify the component pairing using add/remove pairing option in component pairing window; whereas, when performing Automatic part replacement, you cannot modify component pairing.

4	Component Pairing	<b>•••</b>
	Existing	Incoming
1	26_bumper-2000132	26_bumper.1-10001008
2	39_bumperbrktr-2000133	For_PR_6000001-10001009
3	40_bumperbrktL-2000134	For_PR_6000002-10001010
4	32_framefrontcapR-2000135	For_PR_6000003-10001011
5	31_framefrontcapL-2000137	For_PR_6000004-10001012
6	43_radiatorframeR-2000144	For_PR_6000006-10001013
7	44_radiatorframeL-2000145	For_PR_6000007-10001014
-		
		Ok

7. In the **Entities Selection** dialog, specify replacement methods for incoming/existing entities and click **OK**.

External entities are shared with other components, along with the selected components that are being replaced (example: sets, groups, output blocks, and so on). Internal entities are specific to the components being replaced (example: sets, groups, output blocks, and so on).

- Accept incoming entities (existing entities deleted) deletes all of the internal entities on accept.
- Accept existing entities (Incoming entities deleted) deletes all of the incoming entities on accept.
- Merge existing and incoming entities (no entities deleted) retains both existing and incoming entities on accept.



**Note:** When performing Automatic part replacement, HyperMesh automatically selects the **Accept incoming entities (existing entities deleted)** method.

4	Entities Selection		×
	Entity	Selection	
1	Groups	Accept existing entities (Incoming entities deleted)	
2	Rigidwalls	Accept incoming entities (existing entities deleted)	
3	Sets	Accept existing entities (Incoming entities deleted)	
4	Connections	Accept existing entities (Incoming entities deleted)	
			Ok
		, i i i i i i i i i i i i i i i i i i i	

8. Check the status of each entities.

Note: All internal entities are deleted, and all external entities are updated.

Entities	Status Pr	eserve ID	Card Image	Info
🖂 Replace Entities				
🖨 External Entities				
🕀 🙀 Connections (49)				-
🕀 🙀 Loadcols (1)				=
🕀 🙀 Sets (14)				
🖨 🙀 Groups (2)				
CONTACT_TIED_SHELL_EDGE_TO_SURFACE	$\checkmark$	1	*CONTACT_TIED_SHELL_EDGE_TO_SURFACE	E Master - 2 comps replaced w
ASingSurf_2	<i></i>	2	*CONTACT_AUTOMATIC_SINGLE_SURFACE	Slave - 7 comps replaced wil
🗄 📾 Rigidwalls (2)				
🛱 🗉 Internal Entities				
🖨 🙀 Connections (13)				
🖻 🎇 Rigidlink (13)				
📟 🖽 Element	$\checkmark$	1	*CONSTRAINED_NODAL_RIGID_BODY	8 of 8 nodes replaced
🗝 🖽 Element	$\checkmark$	2	*CONSTRAINED_NODAL_RIGID_BODY	12 of 12 nodes replaced
📟 🖽 Element	$\checkmark$	3	*CONSTRAINED_NODAL_RIGID_BODY	8 of 8 nodes replaced
📟 🖽 Element	<i></i>	4	*CONSTRAINED_NODAL_RIGID_BODY	8 of 8 nodes replaced
🗁 🖽 Element	*	5	*CONSTRAINED_NODAL_RIGID_BODY	4 of 8 nodes replaced
🛛 🖽 Element	*	6	*CONSTRAINED_NODAL_RIGID_BODY	4 of 8 nodes replaced 💦 🚽
: :				

## Step 4: Review ID Ranges

- 1. Click *ID Manager* to invoke the **ID-Manager**, from which you can review existing ID ranges defined for the components.
- 2. Modify ID ranges as needed.
- 3. Click *Close*.

## Step 5: Run Model Checker Post Part Replacement

1. Under Advanced options, enable the *Invoke Model Checker after Accept* checkbox to automatically run the **Model Checker** after you click **Accept** in the **Part-Replace** dialog.



I≅ Advanced options		
Delete existing component		
Assign existing component material to incoming component		
Assign existing component property to incoming component		
Assign existing component Name to incoming component		
Copy existing component card image to incoming component		
Invoke Model Checker after Accept		
Merge Nodes on incoming component boundary		
Box Approach for Node Sets		

## Step 6: Accept Part Replacement Changes

1. Click *Accept*. The source part is deleted and the connection of the new part to the model is accepted.

