Altair

HyperWorks

Altair HyperMesh 2019 Tutorials

HM-3670: Positioning a Dummy Using Limiting Constraints

HM-3670: Positioning a Dummy Using Limiting Constraints

Model Files

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

Exercise: Using Limiting Constraints and Freehand Morphing to Position a Dummy and Morph the Seat

In this exercise, you will learn to position the H-point of the dummy on a seat cushion.

This helps to reduce design and remeshing of the seat based on the pre-stress analysis. To do this exercise you will be using a limiting constraint and freehand morphing.

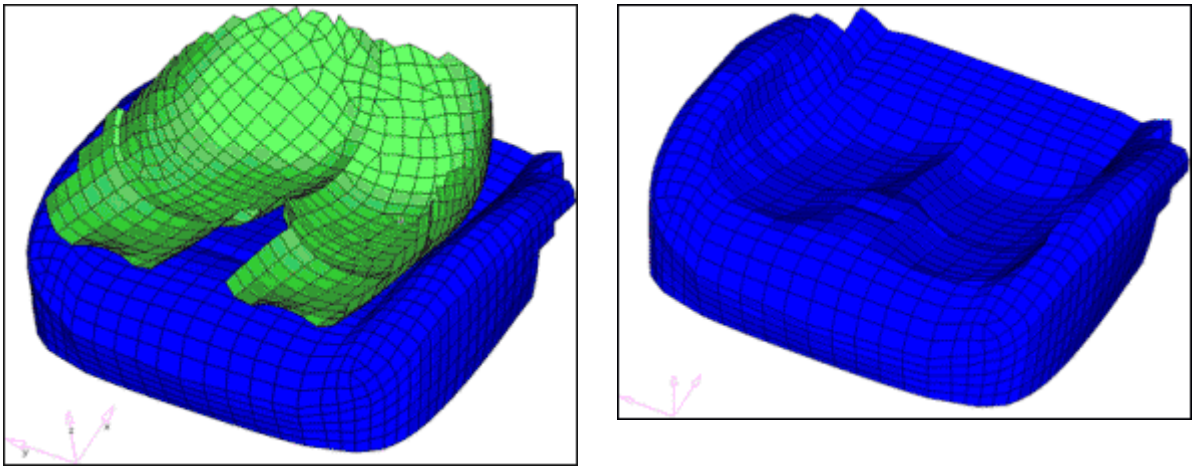


Figure 1 Model with Seat cushion and dummy

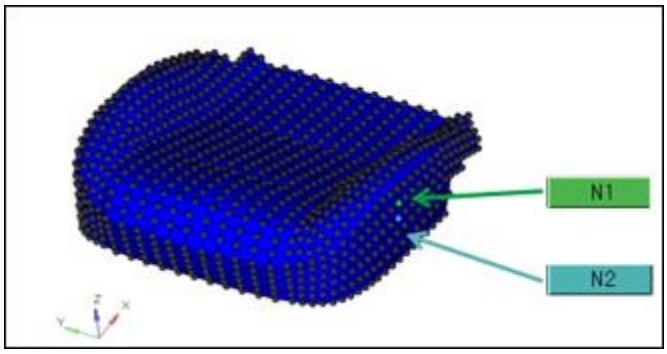
Step 1: Load and review the model.

Open the HyperMesh file `dummy.hm`

Step 2: Create constraints.

1. From the menu bar select ***Morphing*** > ***Create*** > ***Morph Constraints***.
2. Set **name=** `const1`.
3. Set type of constraint to ***on elements***.
4. Set the option under **nodes** to ***bounded***.

5. Set **project along:** to ***N1,N2*** along negative z (choose from side of cushion).



6. Set **distance=** 2.

   This will ensure that there is a distance of 2 units between the dummy and the seat after the morphing is complete.

7. Use ***nodes >> by collector*** and select ***cushion***.
8. Click ***select***.
9. Use ***elems >> by collector*** and select ***dummy***.
10. Click ***select***.
11. Click ***create***.

    Constraints with a diamond shape are created.

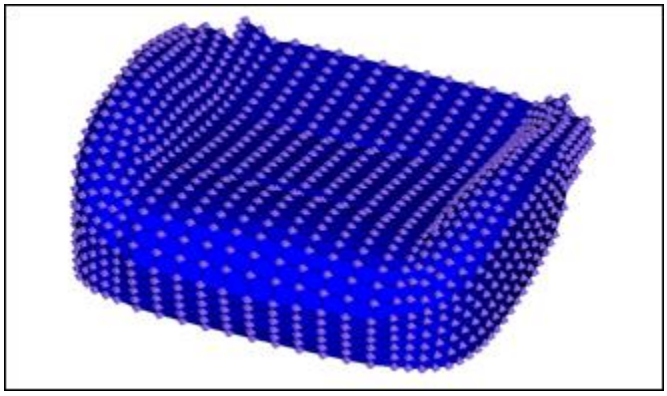


Figure 2 Morphing Constraints on Seat cushion and dummy

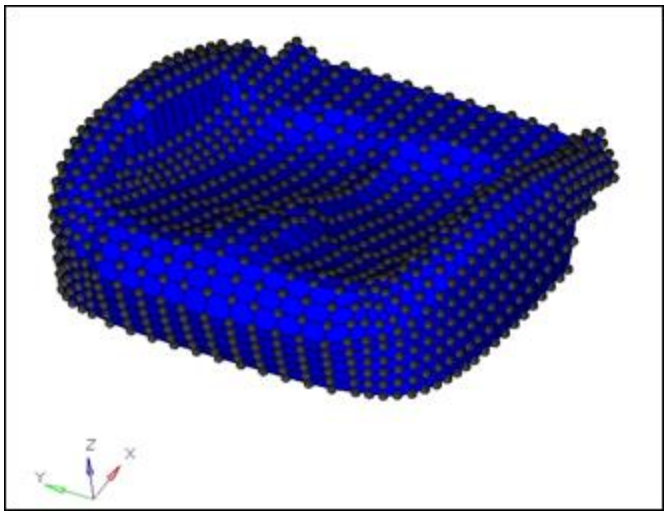
Step 3: Morph the part.

1. Right-click ***MorphingConstraint*** in the **Model Browser** and select ***Hide***.
2. From the menu bar, select ***Morphing*** > ***Free Hand*** and select the **move nodes** subpanel.
3. Switch moving method to ***translate***.
4. For **moving nodes**, use ***nodes >> by collector*** and select ***cushion***.
5. Click ***select***.

6. For **fixed nodes**, use ***nodes >> by collector*** and select ***dummy***.
7. Click ***select***.
8. For **affected elements**, use ***elems >> by collector*** and select ***cushion***.
9. Click ***select***.
10. For the translate magnitude, set
    - **x** = 0
    - **y** = 0
    - **z** = 80
11. Click ***morph***.

    The top surface of the cushion has conformed to the shape of the dummy.

    The distance between the dummy and the seat-cushion is 2 mm.



Summary

Using limiting constraints, you are able to move a mesh such that it moves an adjoining mesh along with it, thus preventing penetration between the two of them.