



Altair

HyperWorks

Altair HyperView 2019 Tutorials

HV-6000: Creating Measures for an FEA Model

HV-6000: Creating Measures for an FEA Model

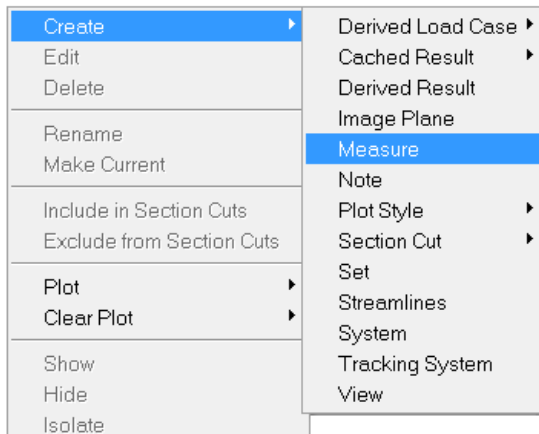
In this tutorial, you will learn how to:

- View the Minimum and Maximum values of results applied
- Create a Measure group
- Plot a Measure created

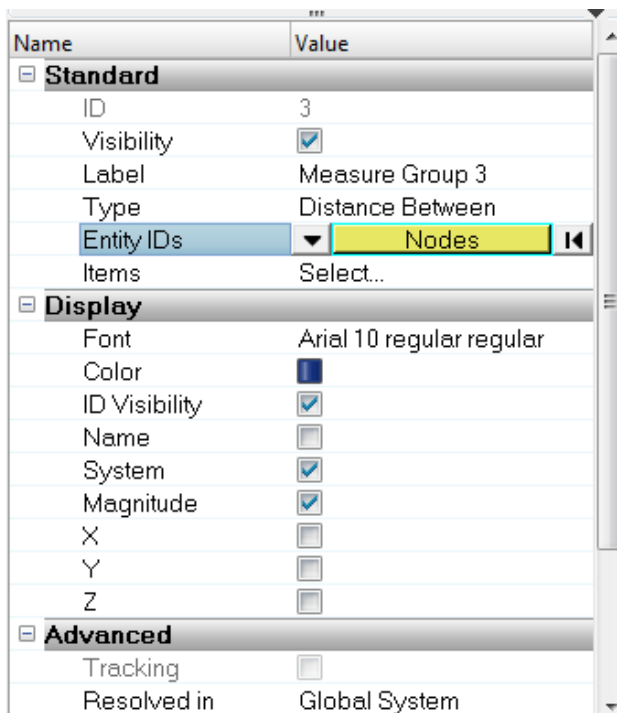
Tools



Measures are created and displayed in the **Results Browser** and edited using the **Entity Editor**.

- To create a Measure, right-click in the **Results Browser** and select **Create > Measure** from the context menu.



- To edit a Measure, select it in the **Results Browser** to see the properties in the **Entity Editor**.






- To display the Measure, click on the icon  next to the measure in the **Results Browser**.
- To hide a displayed Measure, click on the icon  next to the measure in the **Results Browser**.

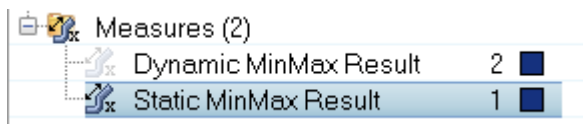
Measures allow you to measure the distance between nodes, position of coordinates, relative displacement, relative angle, and angle between nodes. Measures also allow for the measuring of nodal and elemental contour values.

Exercise: Using the Measure Panel

This exercise uses the d3plot file as both the model and the results file.

Step 1: Create a measure for the minimum and maximum results.

1. Load the d3plot file, located in the animation\truck folder.
2. Click the **Contour** panel button  on the **Result** toolbar to enter the **Contour** panel.
3. Contour the model for **vonMises** stresses using **Simple** averaging.
4. Click **Apply**.
5. Animate the model .
6. Stop the animation.
7. Expand the **Measures** folder in the **Results** browser.
8. Click the icon  next to the **Static MinMax Result** measure to display the values.

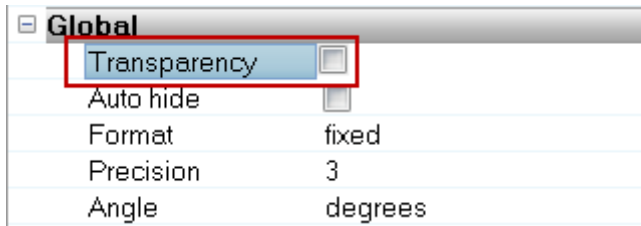


The minimum and maximum values are displayed across all time steps.

9. Next, click directly on the **Static MinMax Result** measure item in the **Results** browser.

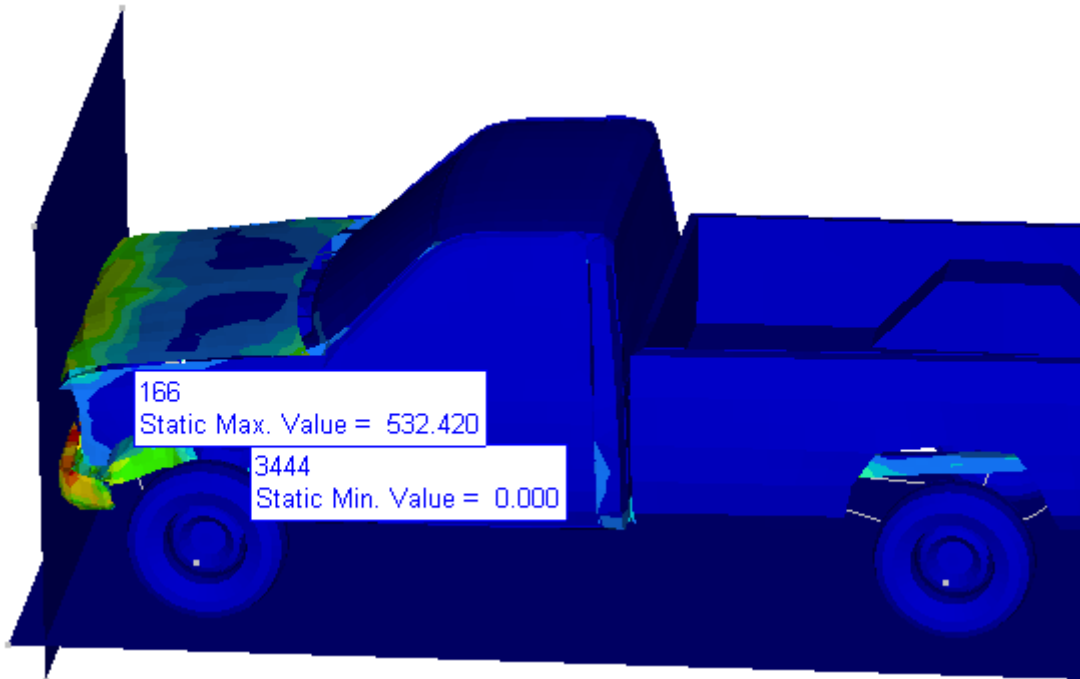
The **Entity Editor** is displayed below the Results browser.




- Under the **Global** section in the **Entity Editor**, uncheck the **Transparency** check box.



The measure is displayed on a background.

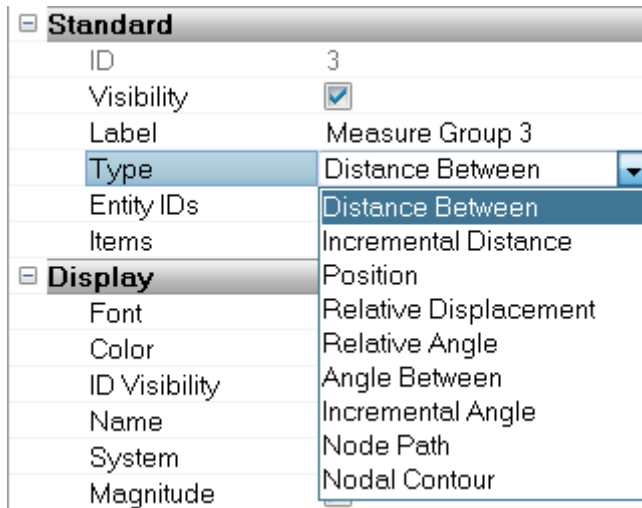
The minimum and maximum values are displayed across all time steps.



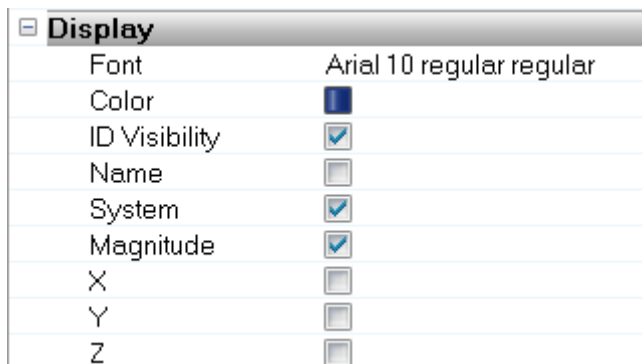
- Click the icon  next to the **Static MinMax Result** measure to turn off the display.
- Click the icon  next to the **Dynamic MinMax Result** measure to display the values.
The minimum and maximum values are displayed for each time step.
- Animate the model.
Observe the values change on the screen.
- Click the icon  next to the **Dynamic MinMax Result** measure to turn off the display.
- Stop the animation.

Step 2: Create a measure for the distance between two nodes.

1. Right-click in the **Result Browser** and click **Create > Measure**.
2. Under the **Global** section in the **Entity Editor**, verify that **Distance Between** is the option set for **Type**.



3. Under the **Display** section in the **Entity Editor**, verify that the **ID Visibility**, **System**, and **Magnitude** boxes are checked.



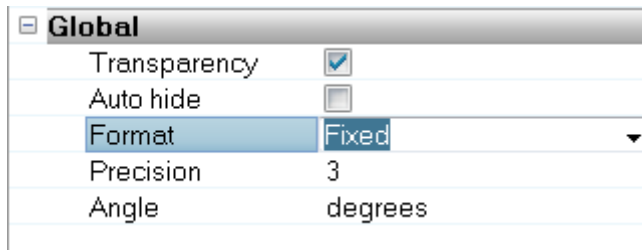
4. In the graphics area, pick one node on the roof of the truck and another node at the front end of the truck.

The distance between the two nodes is displayed.

5. Under the **Global** section in the **Entity Editor**, activate the **Transparency** option.

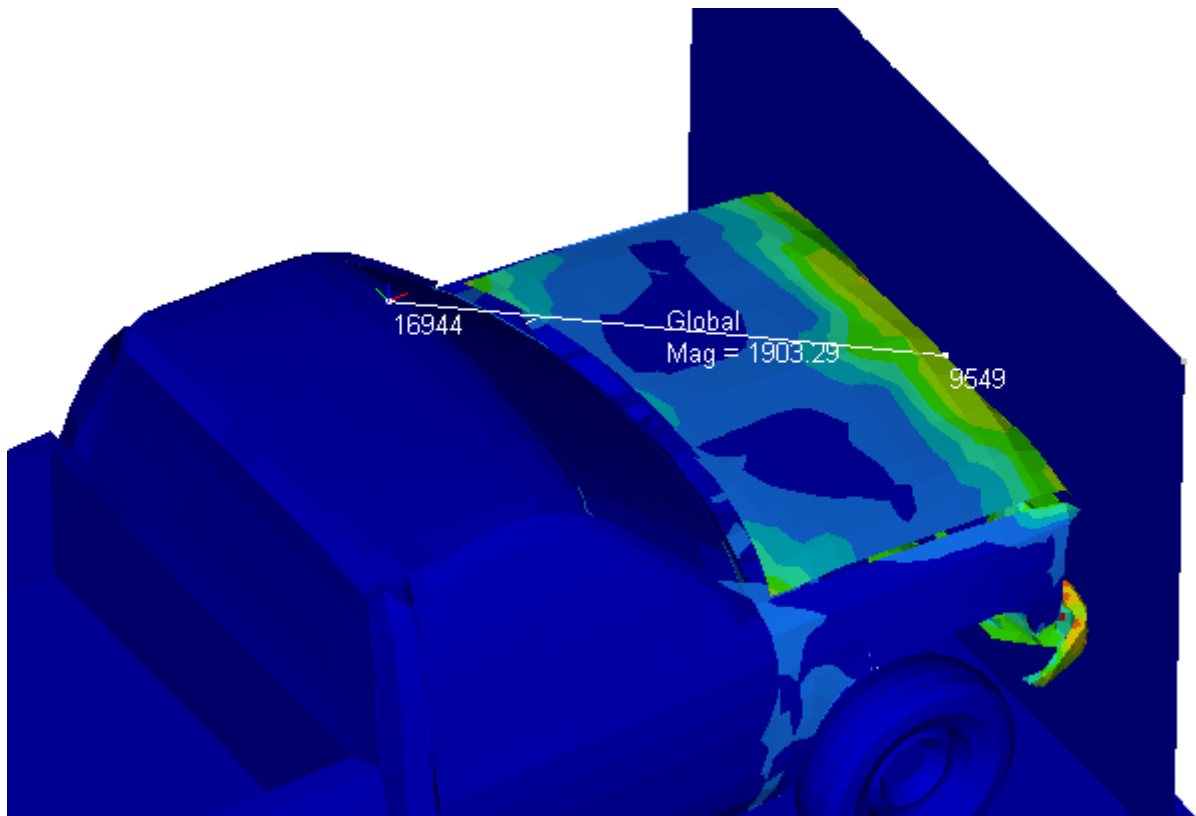
The measure is now displayed with a transparent background.

- From the **Format** drop-down menu, select **Fixed**.



- Set the **Precision** setting to **2**.

The measure is now displayed in a fixed format with 2-decimal digit precision.



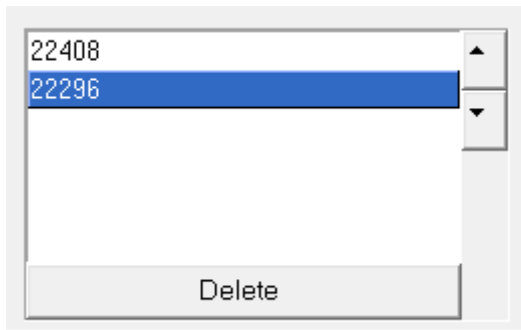
- Animate the model.

The distance between the two nodes is updated with the animation.

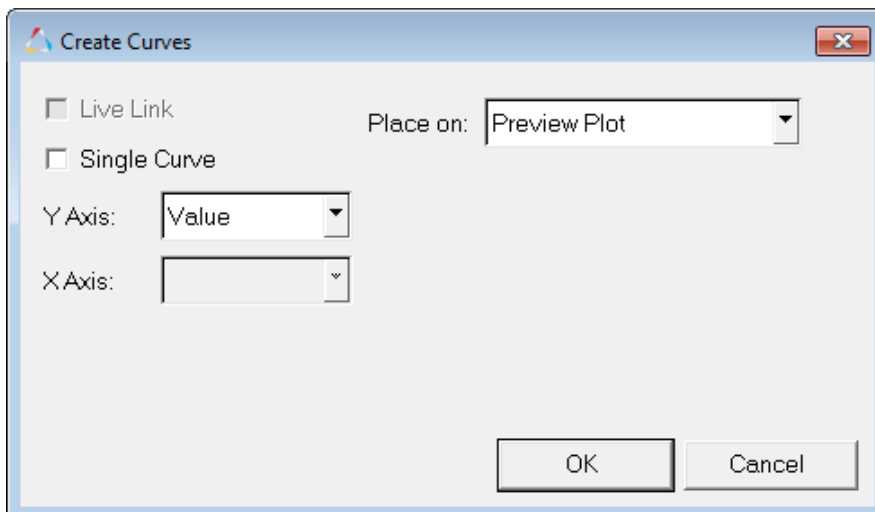
- Stop the animation.
- Turn off the display of **Measure Group 3** in the **Results** browser.

Step 3: Create a measure for nodal results using a live link.

1. Add a measure.
2. Select **Nodal Contour** for measure type.
This option becomes available when a nodal contour has been applied.
3. Under the **Standard** section in the **Entity Editor**, verify that **Nodes** is the option set for **Entity IDs**.
4. Select two nodes from the graphics area.
5. From the **Entity Editor**, click **Select...** next to **Items**.
The **Measure Items** dialog is displayed.
6. Select one of the nodes in the list.



5. Click on the **Create Curves...** button.
The **Create Curves** dialog is displayed.
6. From the **Place on** drop-down menu, select **Preview Plot**.

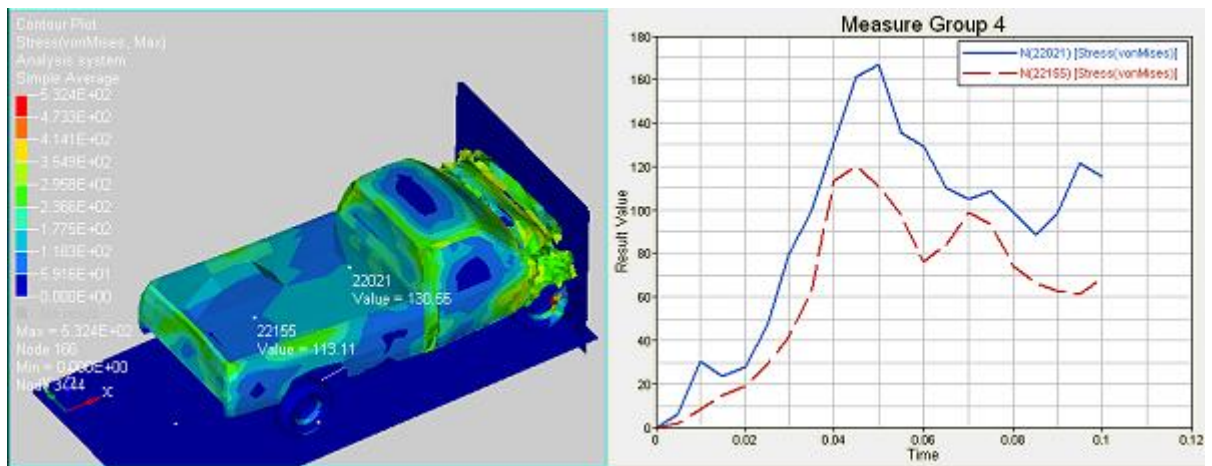


7. Click **OK**.
A preview of the curve appears in a new window.

8. Close the **Preview Window**.
9. Using the CTRL key, select both nodes in the list.
10. Click on **Create Curves....**
11. From the **Place on** drop-down menu select **New Plot**.
12. Activate the **Live Link** option (located on the upper left side of the dialog).

The **Live Link** option creates a link between the selections made in the measure and the curve.

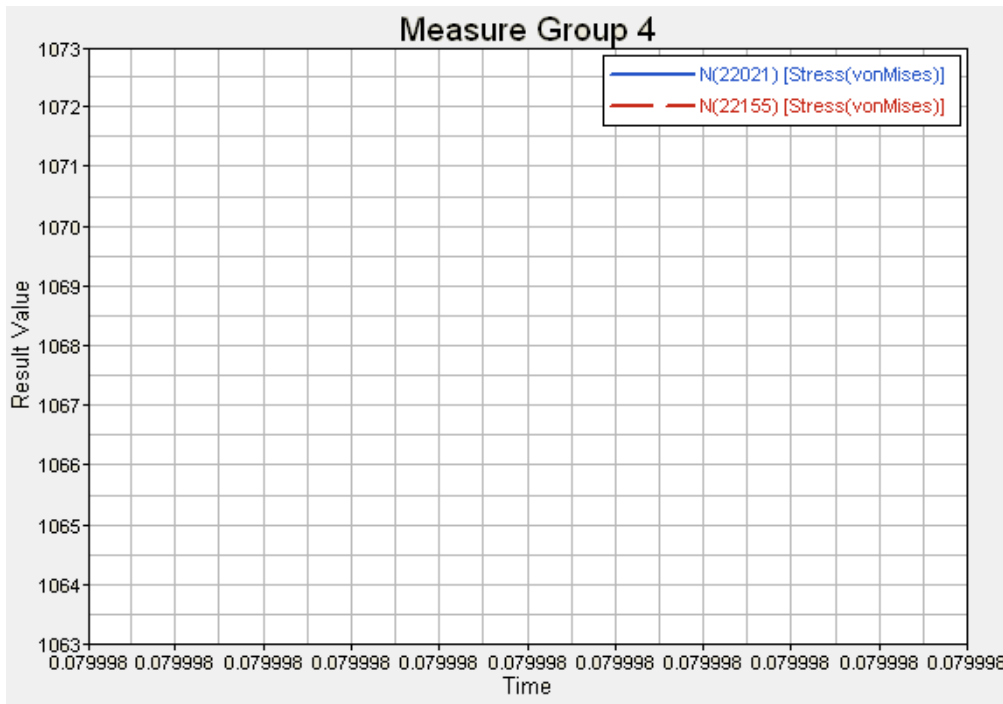
13. Click **OK**.



14. Close the **Measure Items** dialog.
15. Animate the model.
A cursor moves along each curve.
16. Stop the animation.

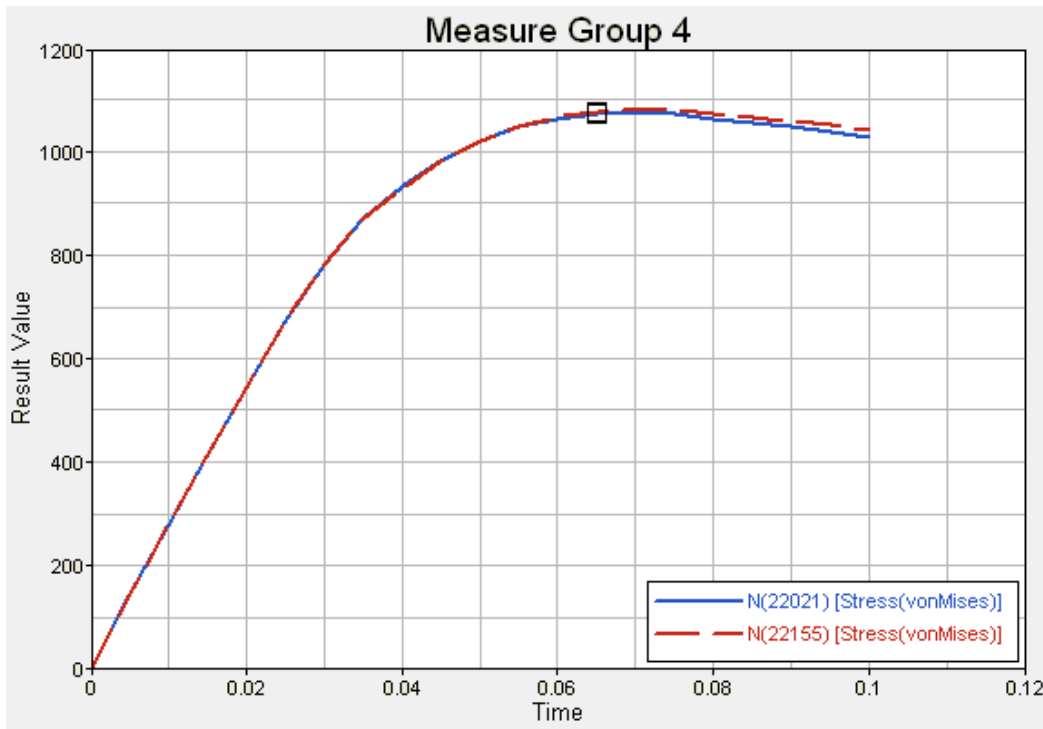
- 17. In the **Contour** panel change the **Result type** to **Displacement(v)** and click **Apply**.

Observe the change in the plot window.



- 18. Animate the model.

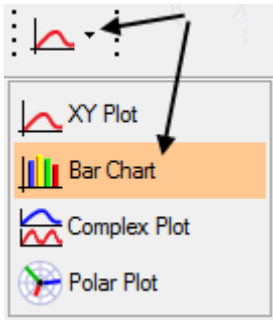
The **Live link** option updates the plot for the new contour applied.



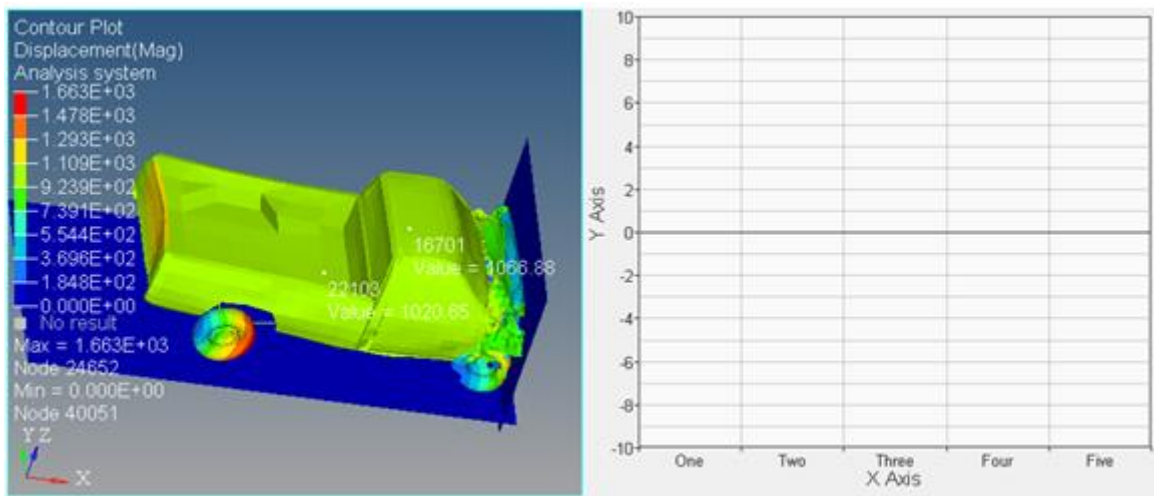
19. Stop the animation.
20. Turn off the display of **Measure Group 4**.

Step 4: Create a bar chart of the measured values.

1. Click in Window 2 and use the plotting type drop-down menu to change the plotting type from **XY Plot** to **Bar Chart**.

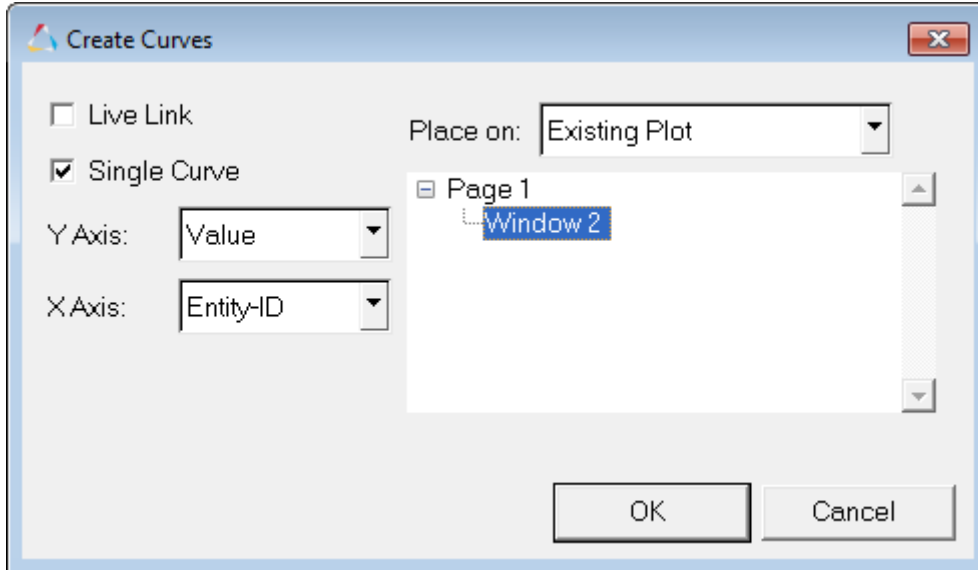


2. Select **Yes** to the message window which appears asking if you want to erase the data in the window.



3. Click on Window 1 and contour the model using **vonMises** stresses, change the **Averaging Method** to **None**, and select **Max** for **Layers**.
4. Right-click in the **Results Browser** and click **Create > Measure**.
5. From the **Entity Editor**, select **Elemental Contour** as the **Type**.
6. Under the **Standard** section in the **Entity Editor**, verify that **Elements** is the option set for **Entity IDs**.
7. Select multiple elements in the graphics area.
8. Click **Select...** next to **Items**.
9. Click **Create Curves** to open the **Create Curves** window.

10. Uncheck the option for **Live Link** and check the option for **Single Curve**.
11. For **Y Axis** select **Value** (from the drop-down menu), and for **X Axis** select **Entity-ID**.
12. For **Place on** select **Existing Plot**, and in the tree below select **Window 2**.

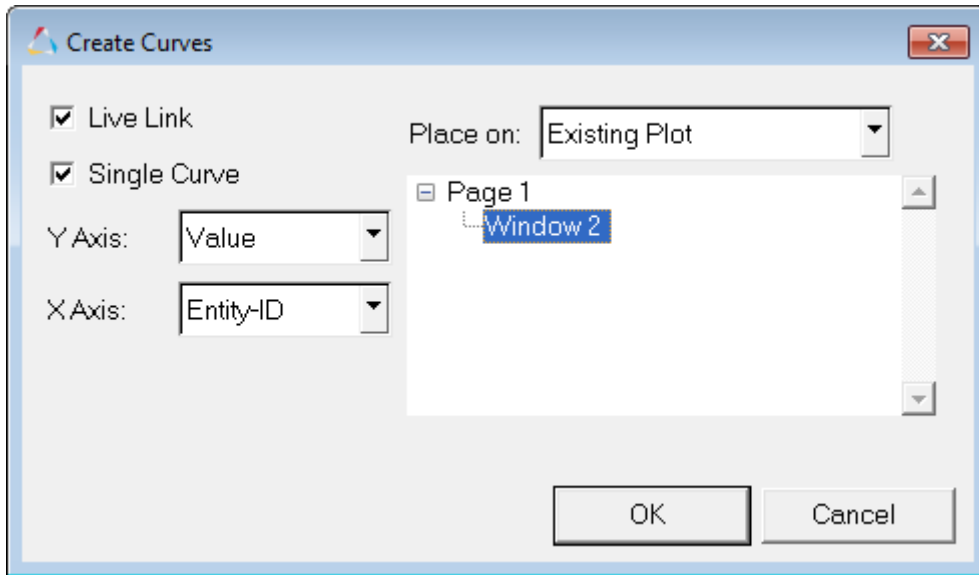


13. Click **OK**.

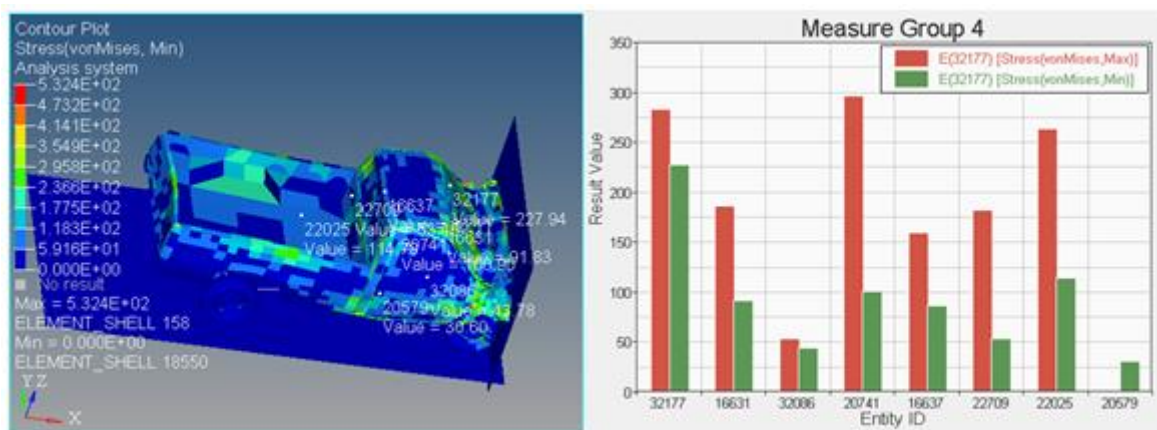
This populates the bar chart in Window 2, where the x axis is the entity ID and the y axis is the measured value.

14. Close the **Measure Items** dialog.
15. Return to the **Contour** panel and change **Layers** to **Min**
16. Click **Apply**.
17. From the **Entity Editor**, click **Select...** next to **Items**.
18. Click the **Create Curves** button in the **Measure Items** dialog.

19. Activate both the **Live Link** and **Single Curve** options, and keep the other options the same as entered in the steps above.

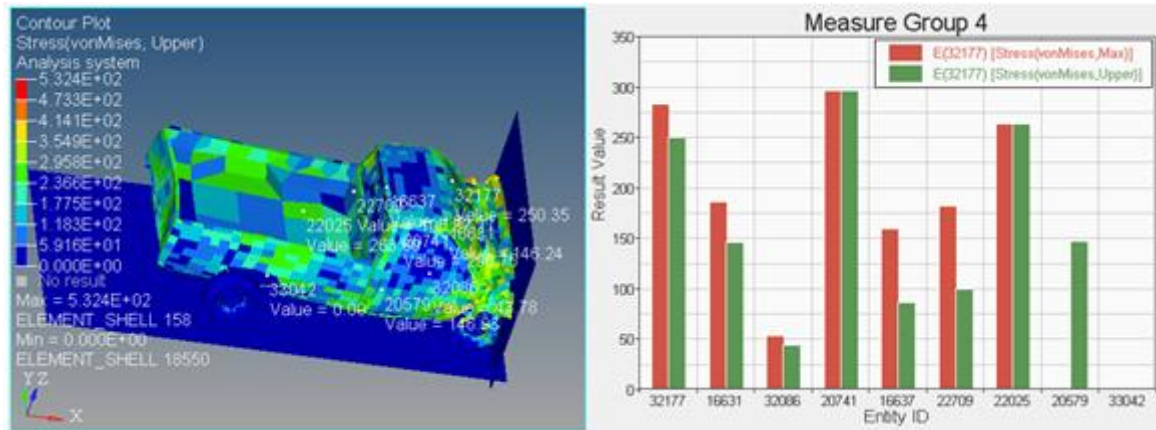




20. Click **OK**.



21. Close the **Measure Items** dialog.
22. Return to the **Contour** panel and change **Layers** to **Upper**.
23. Click **Apply**.

Notice how the second curve created in the bar chart updates, this is because **Live Link** was selected for the second curve and not the first.



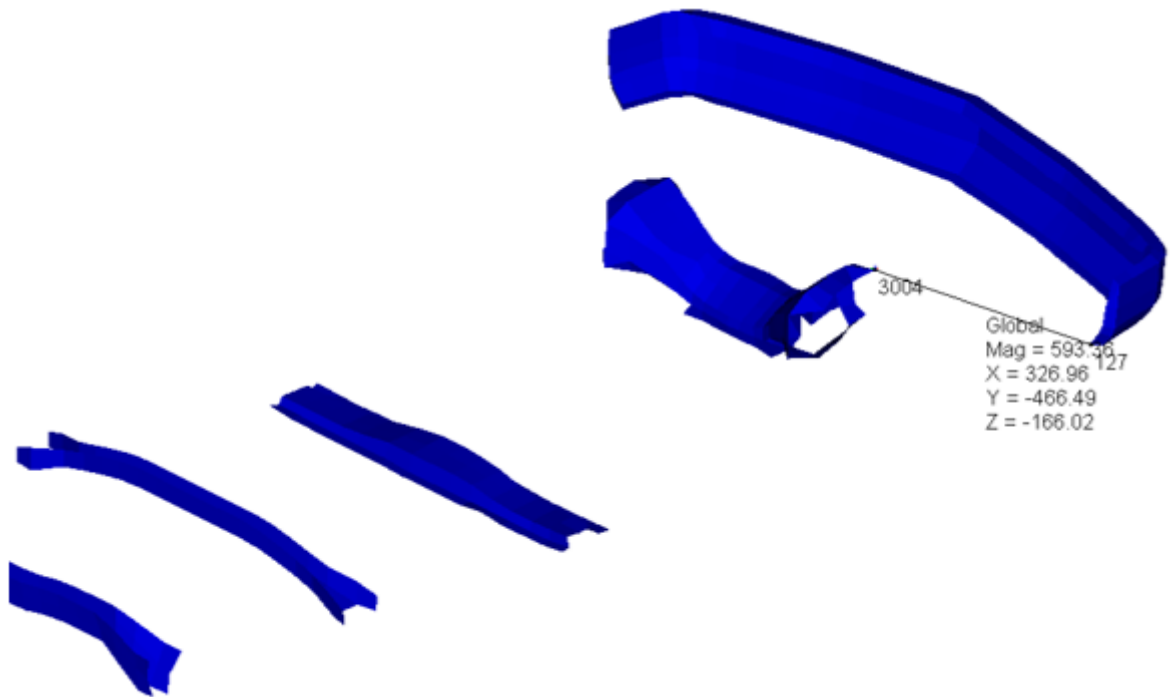
- Return to a single window layout by clicking the arrow next to the **Page Window Layout** button  on the **Page Controls** toolbar, and selecting the single window layout .
- Turn off the display of **Measure Group 5** in the **Results** browser.

Step 5: Create a minimum distance measure between two entities.

- Expand the **Components** folder in the **Results** browser.
- Select **Shell 1** and **Shell 36**.
- Right-click and select **Isolate Only** from the context menu.
- Add a measure using the right-click context menu (**Create > Measure**).
A new measure group is created.
- In **Entity Editor**, set the **Type** to **Minimum Distance**.
- Click on **Entities** to display the **Minimum Distance** dialog.
- Set the **For** collector to **Components** and pick **Shell 36**.
- Set the **To** collector to **Components** and pick **Shell 1**.
- Optional:* Switch between the **From** and **To** collectors to verify that the selections are correct.

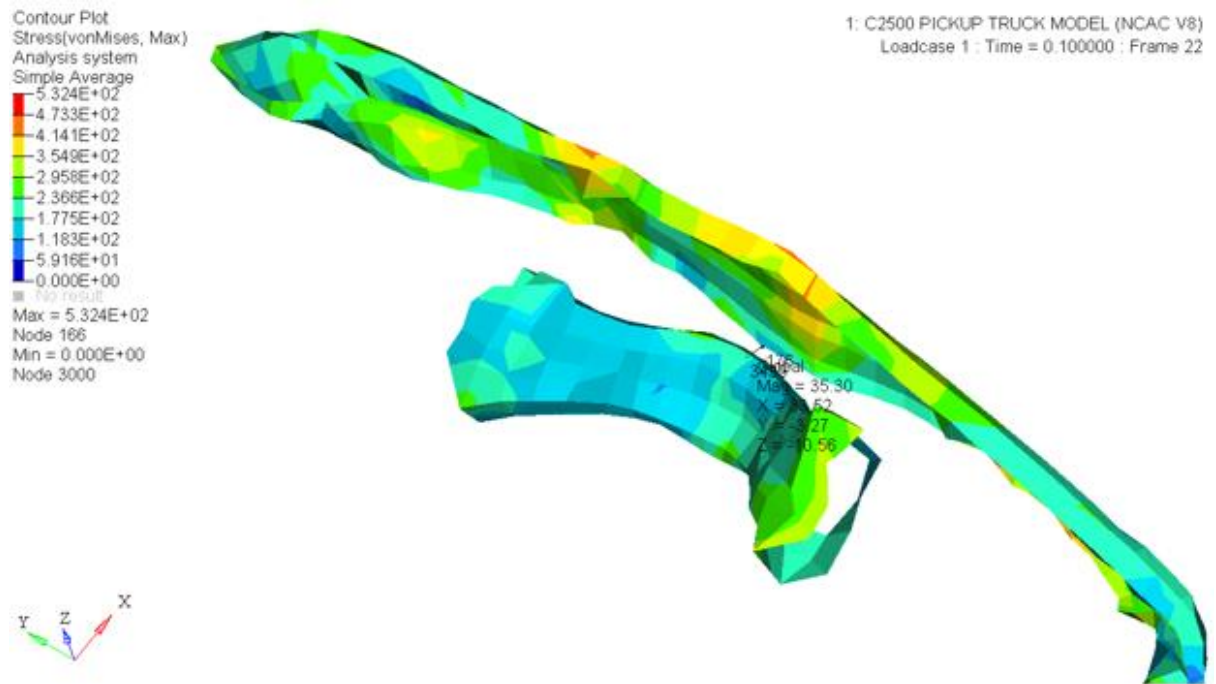
10. Click **OK** to dismiss the dialog.

The measure is now displayed in a fixed format with 3-decimal digit precision.



11. Animate the model.

The distance between the two entities is updated with the animation. Since minimum distance is calculated at each time step between the two entities, notice how as the animation is played the location and the value of the minimum distance measure gets updated.



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12. Stop the animation.
 13. *Optional:* If you would like to review the entities selected for a particular measure item, click on **Items** in **Entity Editor** and then click on the **Review** button.
The **From** side is shown in green and the **To** side is shown in white.
 14. *Optional:* If you would like to change the selection for a particular measure item, click on the **Edit** icon, select new entities for **From** and **To**, and then click **OK**.
 15. Turn off the display of **Measure Group 6** in the **Results** browser.