



Tutorial

Visualizing and analyzing critical traffic load
positions

Preface

This tutorial explains how to visualize and analyze the critical traffic load positions for a vehicle in the result mode of BRIGADE/Standard. This includes how to show the fixed load case response of a vehicle's load position and probing results.

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1 Overview

In the result mode of BRIGADE/Standard, functionality exist to show the most adverse load position for a given vehicle, envelope and result component. When visualizing a load position, it is also possible to show the fixed load case response of this position and probing result values at individual nodes of the model. How to use these functions will be explained in the current tutorial using the bridge model shown in Figure 1.

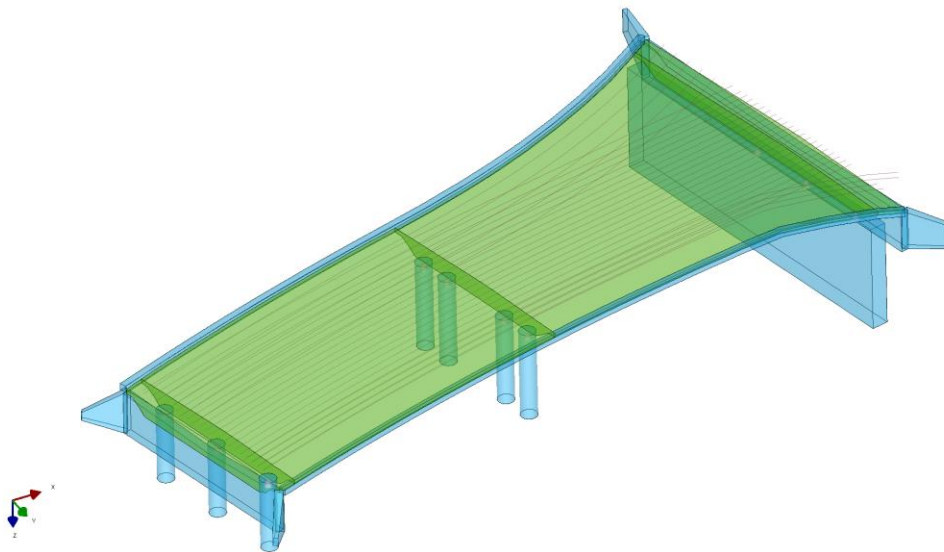

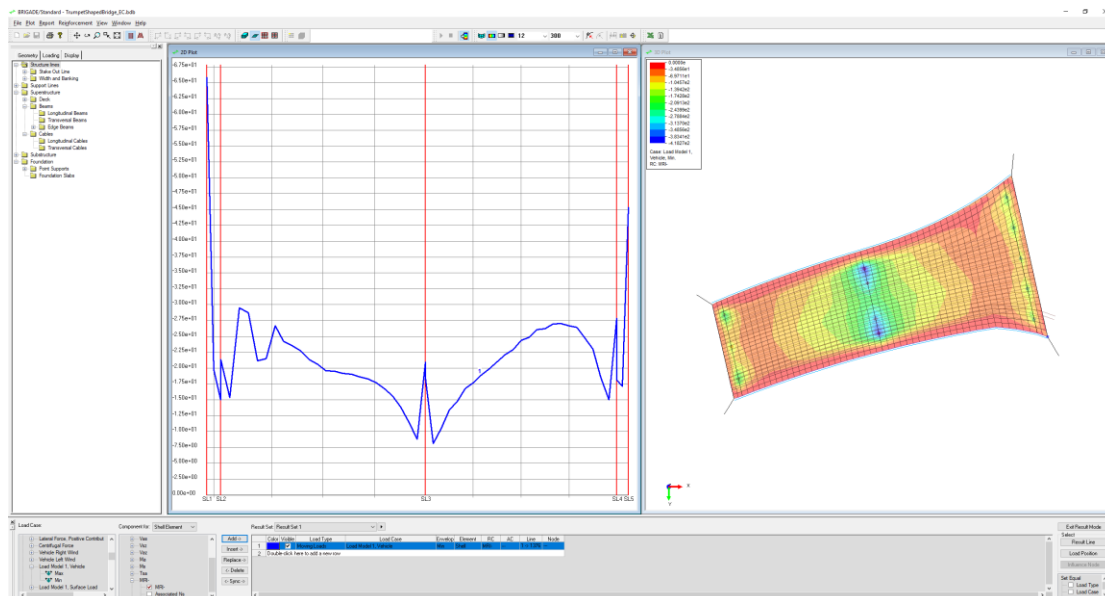


Figure 1 Bridge geometry used in this tutorial.

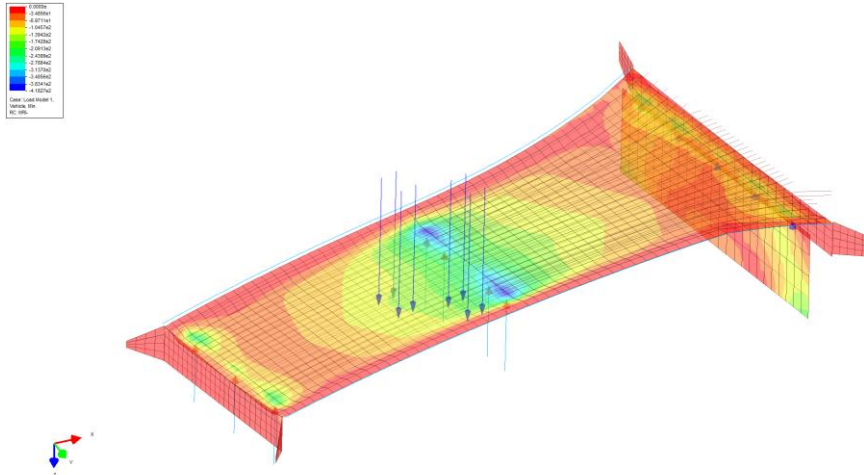
2 Visualizing most adverse load position

Follow the steps outlined below to successfully visualize the most adverse support moment used for design of reinforcement in the longitudinal direction over one column in the bridge shown in Figure 1.

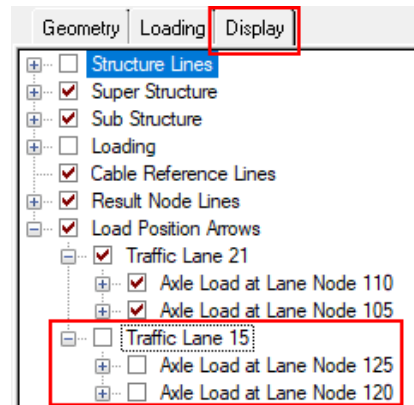
1. Select **File** → **Open** from the main menu and navigate to the downloaded file **TrumpetShapedBridge.bdb** and press **Open**.
2. Start an analysis of the model by pressing **Start Calculation**.
3. When the analysis has completed, enter the result mode by pressing **View Results** .
4. From the main menu, select **Window** → **Tile Vertically**.
5. Using the plot control, expand **Load Model 1, Vehicle** under **Moving Loads** in the **Load Case** window and select the **Min-envelope**. Select **MRI** as the result component for **Shell Element** and press **Add ->**. The window should now look like the figure below.



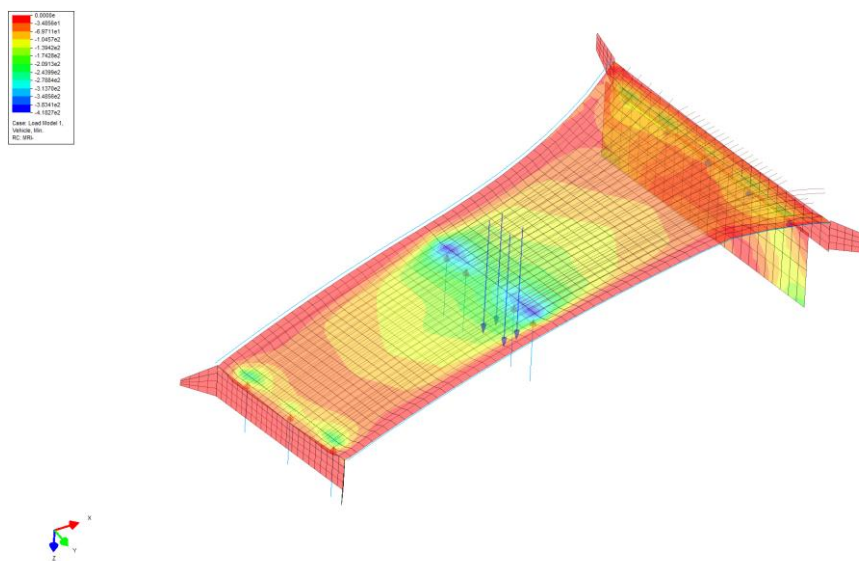
6. In the **Plot Control**, press **Load Position** and select node 680 in the deck (the node located above column 1 in support line 3). Load position according to the figure below should now be shown. Each of the visualized arrows correspond to the force from a single wheel pressure.




- Remove the vehicle applied in **Traffic Lane 15** by switching to the **Display** tab in the **Workspace window** on the left-hand side and deactivating these axle loads.

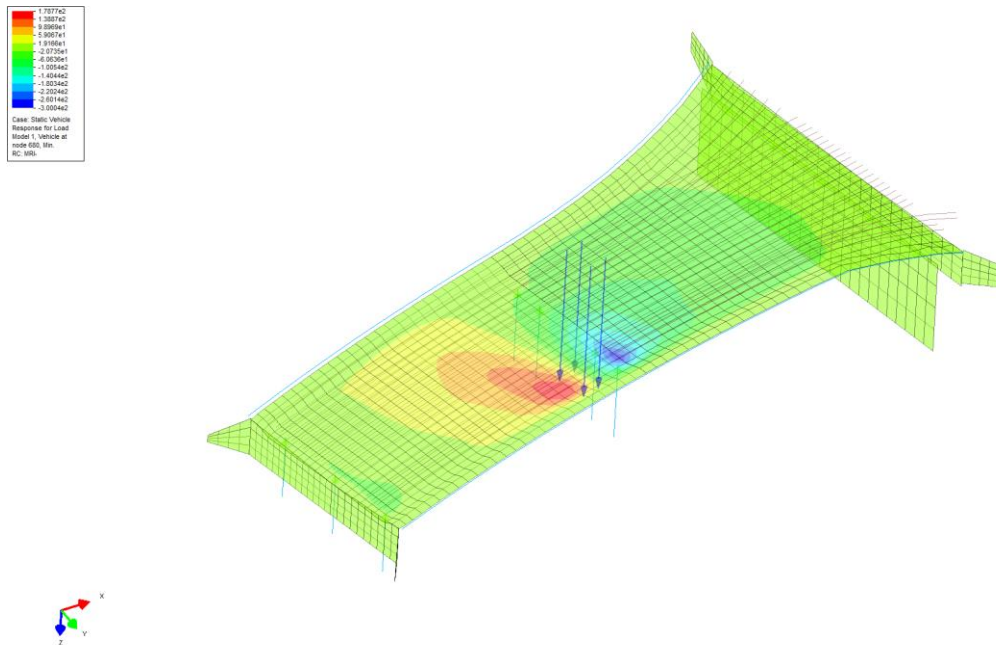


- The figure should now look like the figure below.




3 Show load position response

To show the fixed load case response of the load position visualized in Section 2, press the **Show Load Position Response** button . The 3D plot window will now look like the figure below.

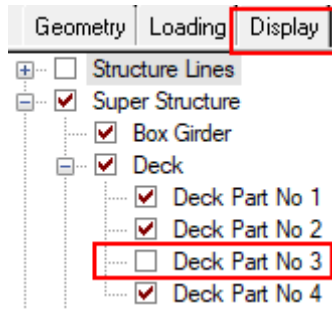


NOTE: The fixed load case response visualized when pressing the **Show Load Position Response** button will be calculated using the load arrows visualized in the viewport. If the load arrows are modified while viewing a fixed load case response, the load position response needs to be recalculated by pressing the **Show Load Position Response** button again.

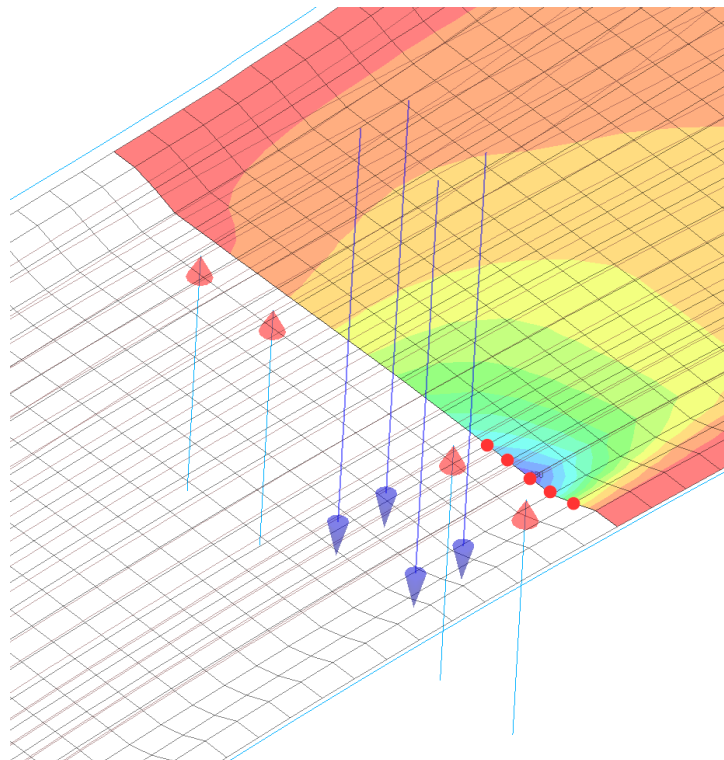
4 Probe Values

To access the **Probe Value** functionality, press the **Probe Value** button . Follow the steps outlined below to successfully probe the values in the nodes adjacent to node 680 in the transverse direction.

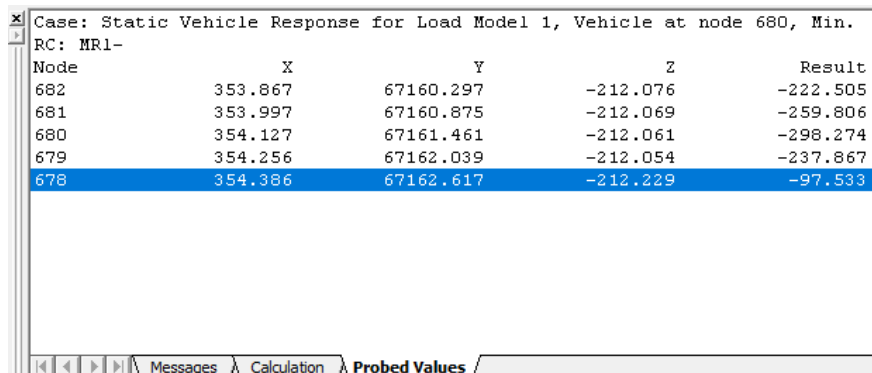
1. To make certain that all probed values are from the same **Deck Part**, use the **Display** tab in the **Workspace window** on the left-hand side to remove **Deck Part No 3** from the 3D plot window.



2. Deactivating this part will reset the shown response to the **Min**-envelope of **MRI**- instead of the fixed load case response. Therefore, press the **Show Load Position Response** button again.
3. Press five nodes in a row along the transverse direction around node 680 such that node 680 constitutes the third node. The nodes are marked with red dots in the figure below.

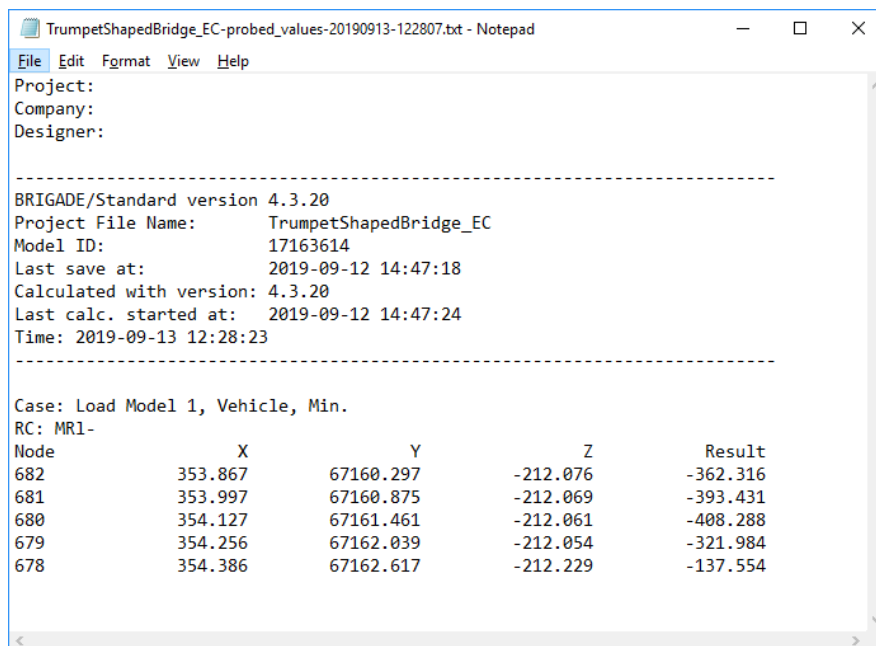


- Note that the probed nodes will populate the **Probed Values Output** window.



Node	X	Y	Z	Result
682	353.867	67160.297	-212.076	-222.505
681	353.997	67160.875	-212.069	-259.806
680	354.127	67161.461	-212.061	-298.274
679	354.256	67162.039	-212.054	-237.867
678	354.386	67162.617	-212.229	-97.533

- From the main menu, select **Report → Probed Values**.
- This will open the **Probed Values Report** window. Accept the default **File Name** (default file directory is where the bdb-file is saved) and press **Print**.
- A text file containing the probed values will be opened in a text editor. These values could for example be used to average the moment used for design of longitudinal reinforcement in the transverse direction.



```

TrumpetShapedBridge_EC-probed_values-20190913-122807.txt - Notepad
File Edit Format View Help
Project:
Company:
Designer:

-----
BRIGADE/Standard version 4.3.20
Project File Name: TrumpetShapedBridge_EC
Model ID: 17163614
Last save at: 2019-09-12 14:47:18
Calculated with version: 4.3.20
Last calc. started at: 2019-09-12 14:47:24
Time: 2019-09-13 12:28:23
-----

Case: Load Model 1, Vehicle, Min.
RC: MR1-
Node      X          Y          Z          Result
682      353.867    67160.297  -212.076   -362.316
681      353.997    67160.875  -212.069   -393.431
680      354.127    67161.461  -212.061   -408.288
679      354.256    67162.039  -212.054   -321.984
678      354.386    67162.617  -212.229   -137.554

```

NOTE: The **Probed Values** are cleared when a different load case, envelope or result component are selected in the plot control. The functionality is accessible for all load cases, envelopes or result components and not limited to probing values for the static response of a load position.