

Applying point, line, and area loads to bridge objects

Tutorial

Name:	Applying point, line, and area loads to bridge objects
Description:	This tutorial demonstrates point-, line-, and area-load application to bridge objects.
Program:	CSiBridge
Version:	15.0.0
Model ID:	na

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Model description

- Create a new model from template. Define as a simple span, 40m long, with steel girders cross-section.
- Release the bearing at the end abutment to achieve a simply supported condition.
- Define point, line, and area loads in separate [load cases](#) as follows:
 - Point load: 10kN load applied at station 20, centered transversely.
 - Line load: 1kN/m load applied between stations 15 and 25, centered transversely.
 - Area load: 0.1kN/m² load applied between stations 15 to 25 and across the width of the deck.

These loads will all cause an effect equivalent to loading the bridge midspan with a 10kN point load

- Run the analysis and check the midspan moments. For point loading, the theoretical midspan moment is given as follows:

$$\frac{PL}{4} = \frac{10kN \cdot 40m}{4} = 100kNm$$

Plan, elevation, and section diagrams depicting load application are given in Figure 1:

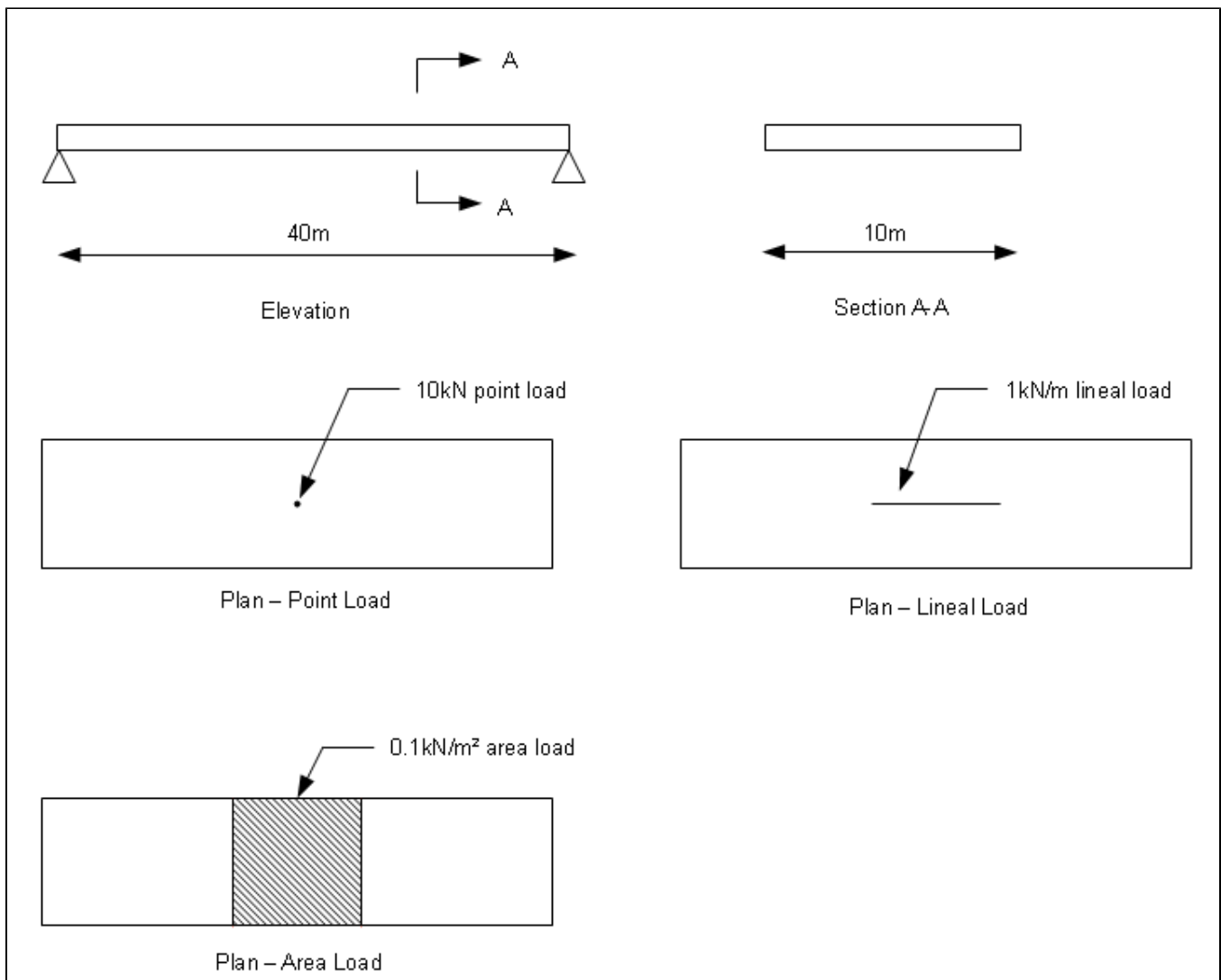


Figure 1 - Load application diagrams

Model development

Define and apply loads

Use the Loads > Loads - Point command to define a new point load, as shown in Figure 2:

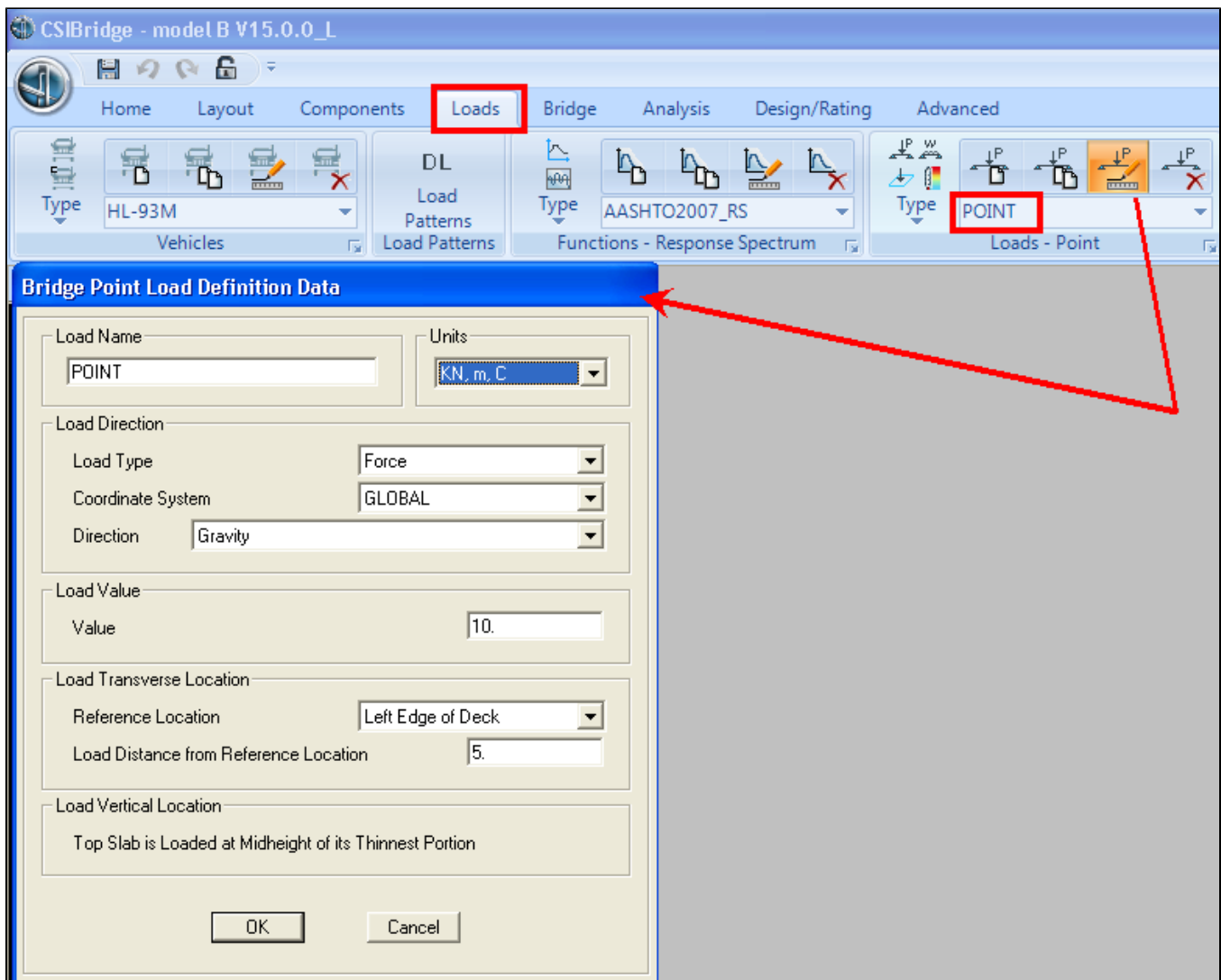


Figure 2 - Define point load

Use the Bridge > Loads > Point Loads command to assign the previously defined point load, as shown in Figure 3:

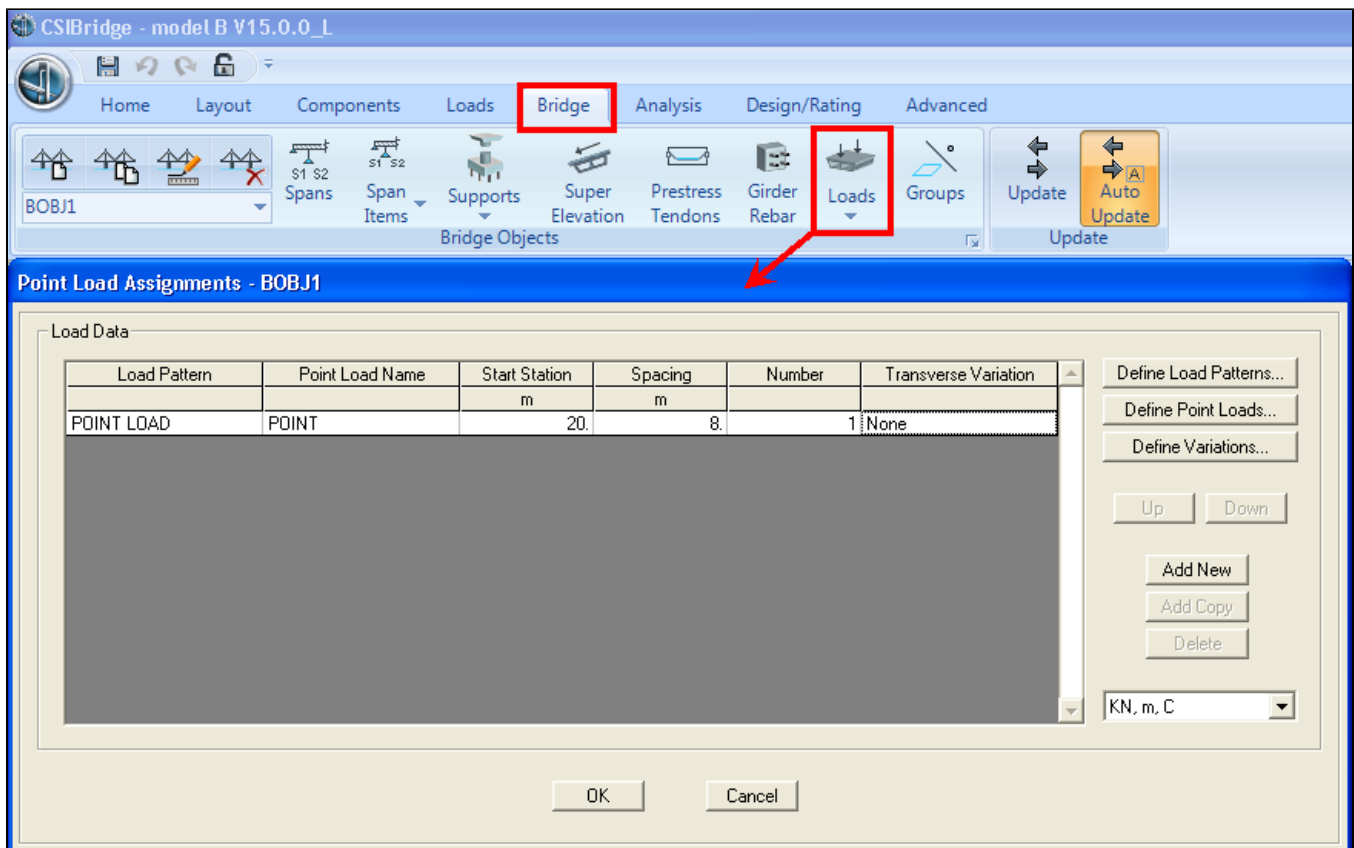


Figure 3 - Assign point load

Using a similar approach, define and apply line and area loads.

Results

The moment diagrams below (Figures 4-6) depict the midspan moment expected.

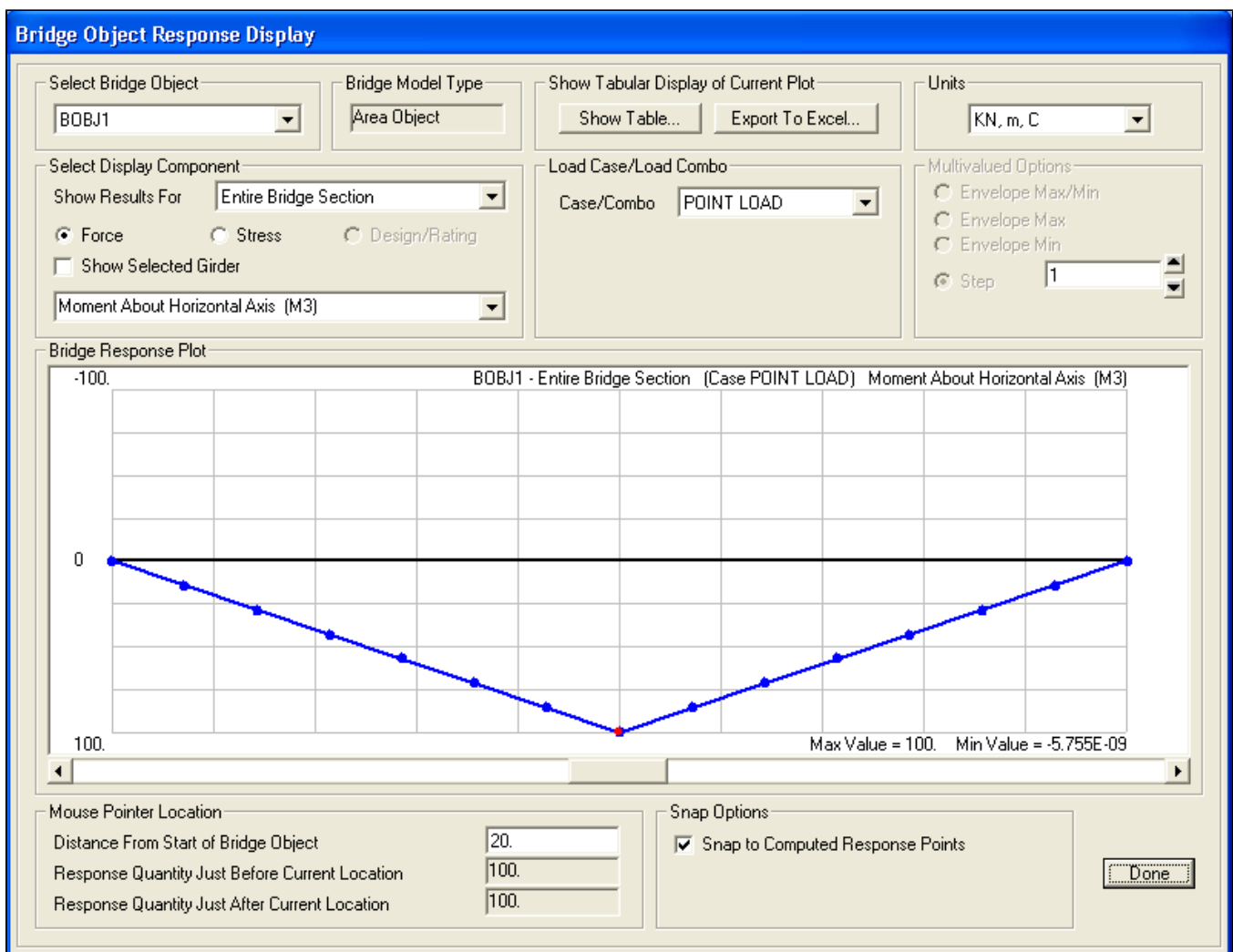


Figure 4 - Point load moment diagram

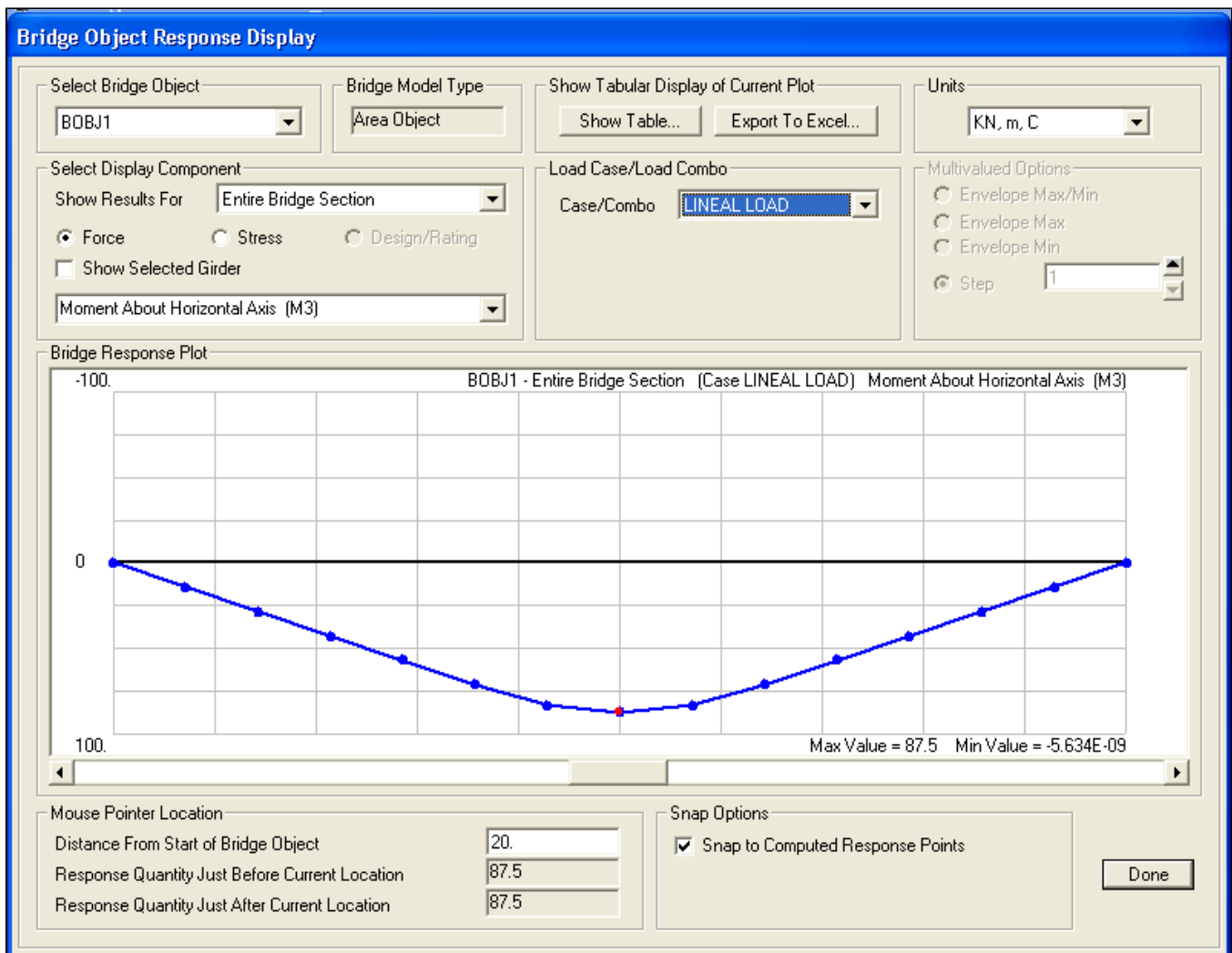


Figure 5 - Line load moment diagram

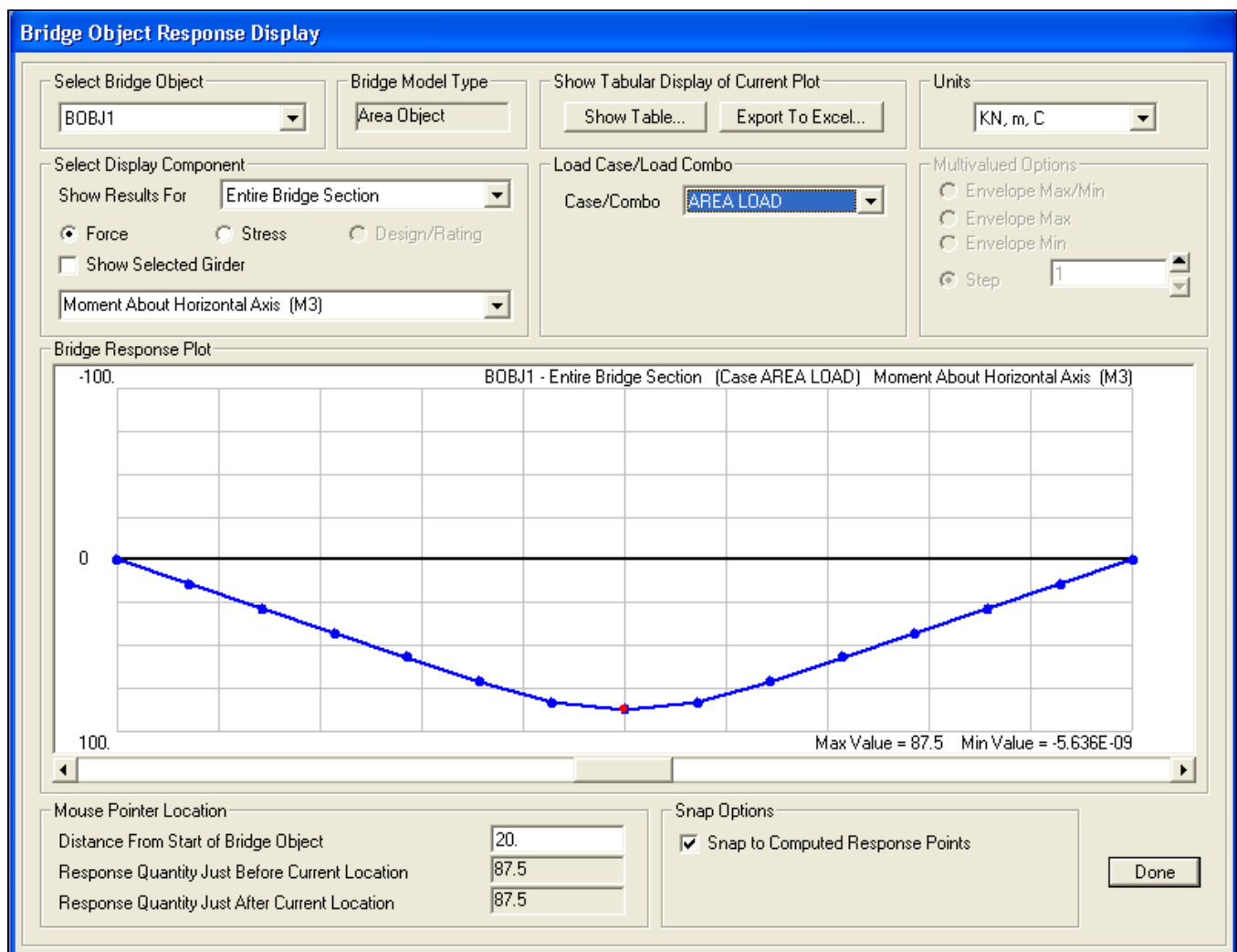


Figure 6 - Area load moment diagram

Attachments

- [CSiBridge V15.0.0 model](#) (zipped .SDB file)