

RamSeries - Validation Case 20

Cable Loaded With Self-Weight



RamSeries

Version
15.1.0

Table of Contents

Chapters	Pag.
Validation Case 20 - Cable loaded with punctual self-weight	1
Model Description	1
Results	2
References	4
Validation Summary	5

1 Validation Case 20 - Cable loaded with punctual self-weight

Model Description

This test case deals with the simulation of a cable of length L , subjected to the action of its self-weight (W), and simply supported at its ends.

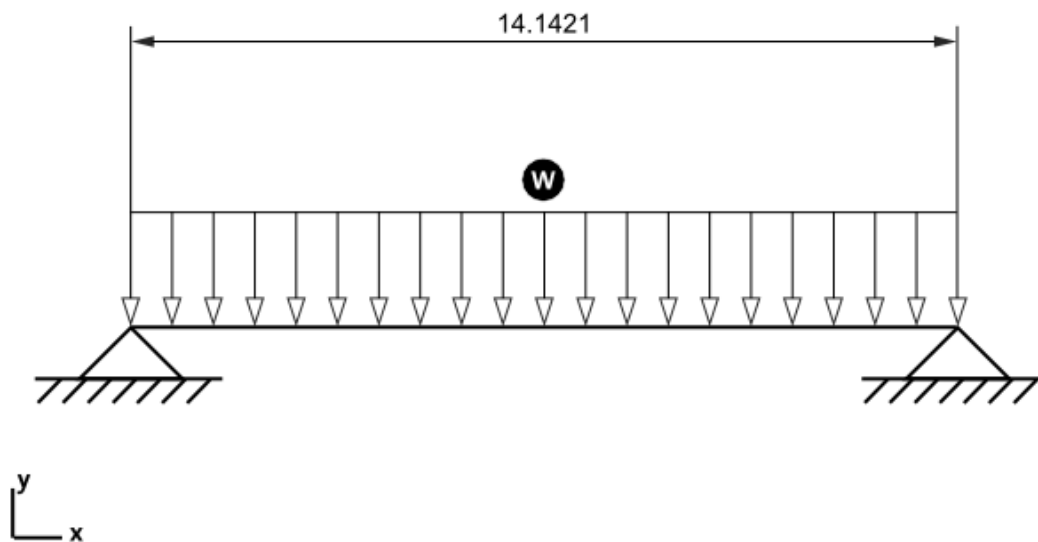
Following the example showed in Ref. [1], the data used for this test is:

$A=0.0005 \text{ m}^2$ (Area of the cable element section).

$E=5.01\text{E}6 \text{ N/m}^2$ (Young modulus of the material).

$L=14.1421 \text{ m}$ (Length of the cable).

$\rho=980 \text{ N/m}^3$ (Density of the material).



Geometric description of the test. Units [m]

Results

For the sake of validation, a simulation is performed in order to verify that the resulting reactions of the analysis coincides with the weight corresponding to the cable properties described in the previous section.

The mesh used has 22 linear elements and 23 nodes.

The total reaction obtained in RamSeries is:

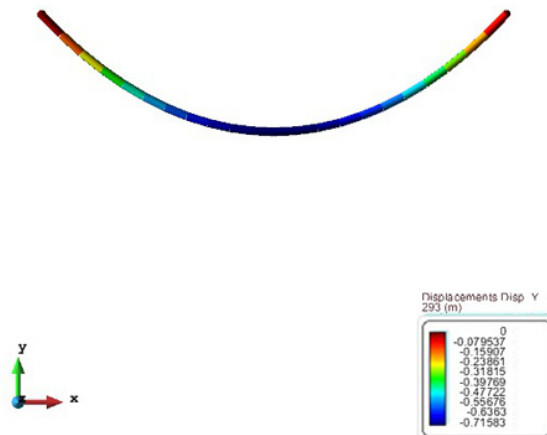
$$R_{\text{RamSeries}} = 6.92963 \text{ N}$$

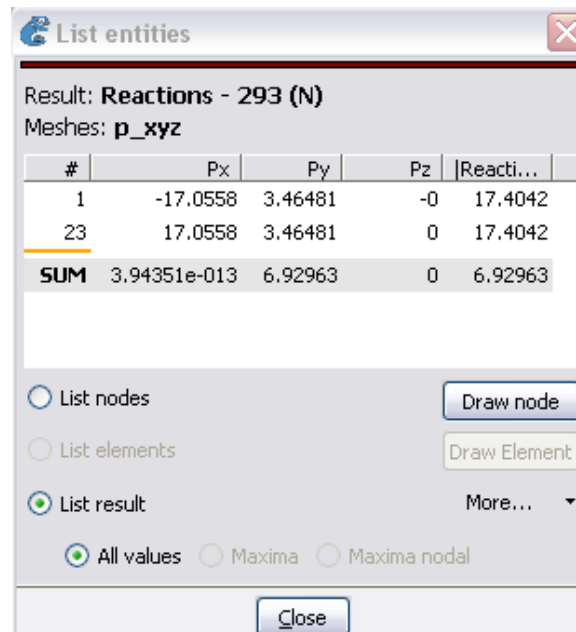
while the weight of the cable is:

$$W = 6.929629 \text{ N}$$

Therefore, exact coincidence of the results is verified.

The following images show the resulting deflection, and the reactions obtained.



The image shows a 'List entities' dialog box from the COMPASS software. It displays the results for 'Reactions - 293 (N)' for mesh 'p_xyz'. The results are shown in a table with columns for entity number, Px, Py, Pz, and Reaction value. The first two rows show individual reaction values for entities 1 and 23. The third row, labeled 'SUM', shows the total reaction values. Below the table, there are radio buttons to select the type of entity to list: 'List nodes', 'List elements', or 'List result'. The 'List result' option is selected. There are also buttons for 'Draw node', 'Draw Element', and 'More...'. At the bottom, there is a 'Close' button.

#	Px	Py	Pz	Reacti...
1	-17.0558	3.46481	-0	17.4042
23	17.0558	3.46481	0	17.4042
SUM	3.94351e-013	6.92963	0	6.92963

☐ List nodes Draw node
☐ List elements Draw Element
☒ List result More...
☒ All values ☐ Maxima ☐ Maxima nodal

Close

References

[1] I.Ortigosa. Development of a decision support system for the design and adjustment of sailboat rigging. PhD. Thesis 2011.

Validation Summary

CompassFEM version	15.1.0
Tdyn solver version	15.1.0
RamSeries solver version	15.1.0
Benchmark status	Successfull
Last validation date	27/11/2018