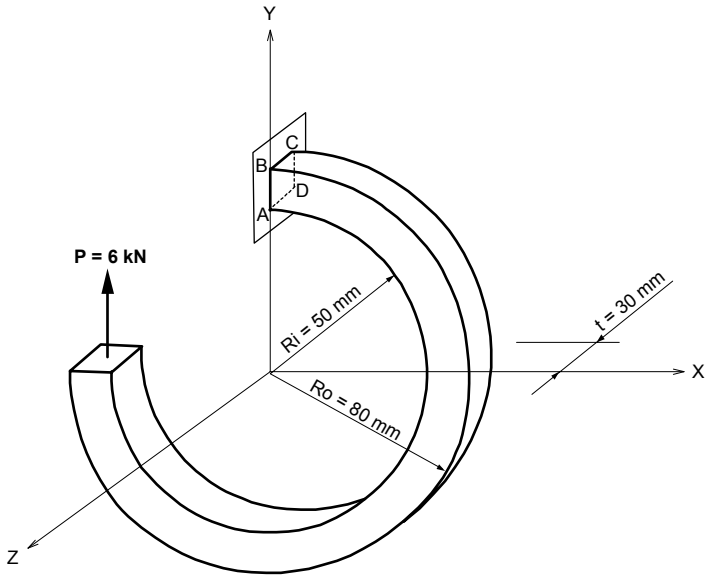
Static-38

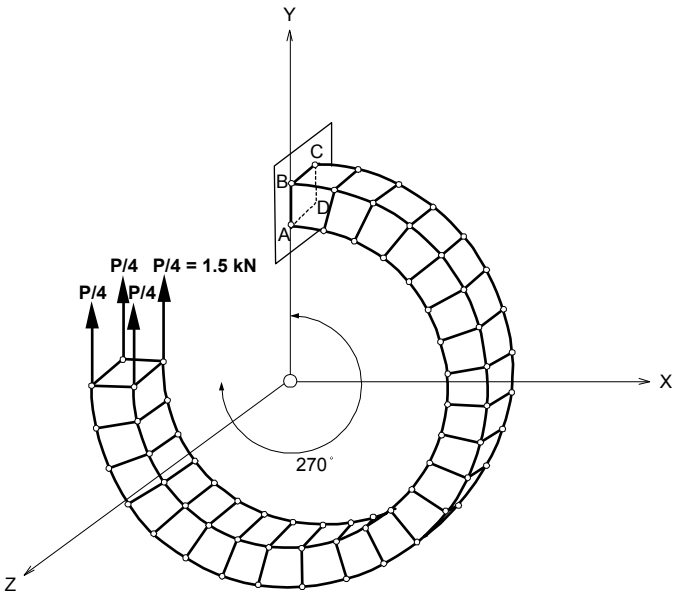
Title

Curved solid beam loaded in its plane

Description

A curved beam of a square cross-section is subjected to the action of a vertical load applied in its plane.
Determine the displacement of the free end of the beam in the load direction.





Structural geometry and analysis model

MODEL

Analysis Type

3-D static analysis

Unit System

mm, kN

Dimension

Inner radius 50 mm Outer radius 80 mm Thickness 30 mm

Element

Solid element

Material

Modulus of elasticity E = 200 GPa
Poisson's ratio $\nu = 0.29$

Sectional Property

Square cross-section: h = 30 mm, t = 30 mm

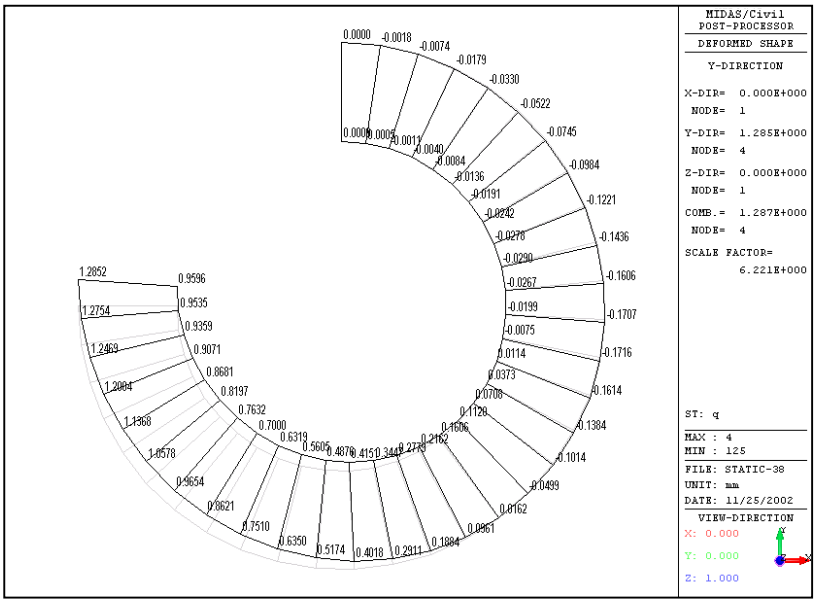
Boundary Condition

Node A, B, C, D: Constrain all DOFs.

Analysis Case

A concentrated load, P = 6kN is applied to the nodes at the free end in the Y direction.

Results



Displacement (δ_Y) of the beam

Comparison of Results

Unit: mm

Result	Theoretical	MIDAS/Civil
Displacement (δ_Y)	1.1278	1.1224

Reference

Boresi, A. P., and Sidebottom, O. M. "*Advanced Mechanics of Materials*", 4th edition, John Wiley & Sons, New York, NY. (1985)