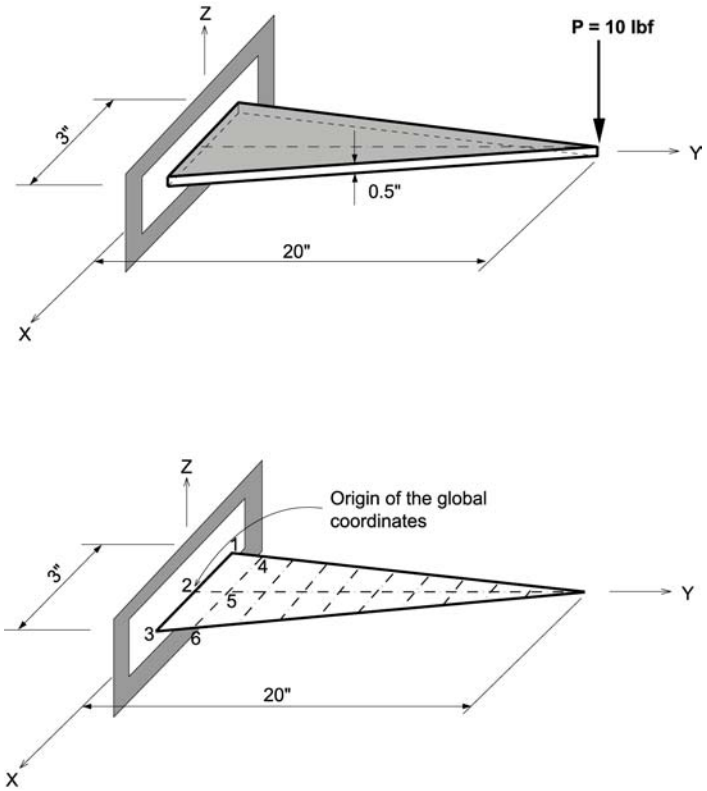
Static-32

Title

Tapered plate (beam) under static load

Description

A tapered cantilever plate of rectangular cross-section is subjected to a vertical load at its tip. Find the tip displacement in the load direction.



Structural geometry and analysis model

MODEL

Analysis Type

3-D static analysis

Unit System

in, lbf

Dimension

Length 20 in

Element

Plate element

Material

Modulus of elasticity $E = 3.0\times10^7$ psi
Poisson's ratio $\nu = 0.0$

Sectional Property

Width: b = 3 in, Thickness: t = 0.5 in

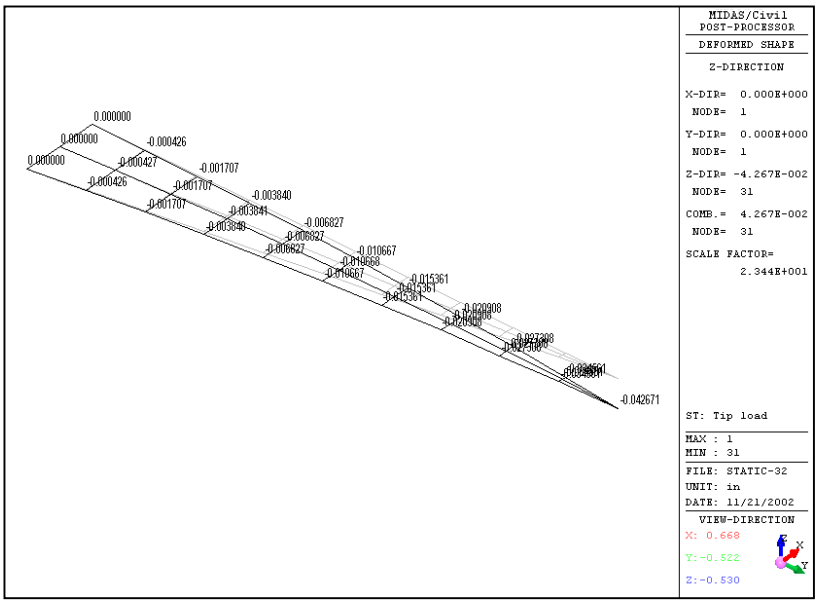
Boundary Condition

Node1~3: Constrain all DOFs

Load Case

A concentrated vertical load, P = 10 lbf is applied at the tip of beam.

Results



Displacements (δ_Z) in the load direction

Comparison of Results

Unit: in

Result	Theoretical	MIDAS/Civil
Displacement (δ_Z)	-0.042667	-0.042668

Reference

Harris, C. O. (1959). "*Introduction to Stress Analysis*", The Macmillan Co., New York, NY.