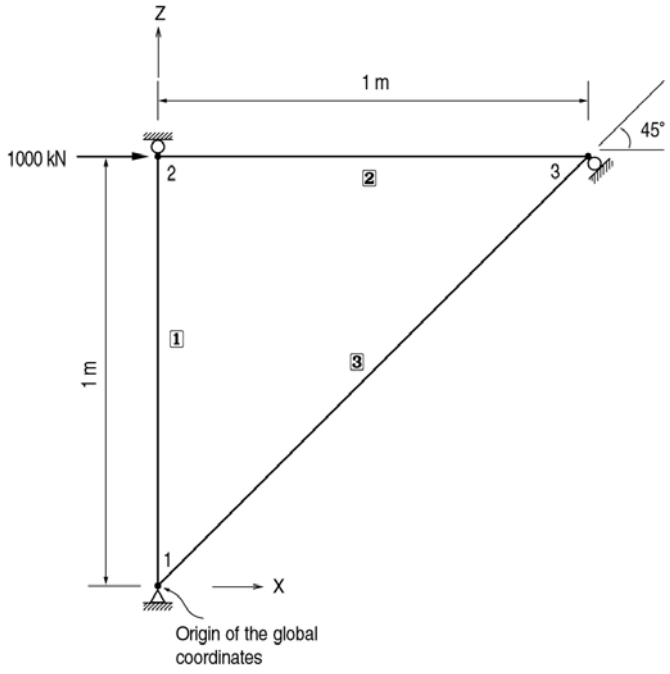
Static-26

Title

2-D plane structure with an inclined support

Description

Analyze the 2-D plane structure with an inclined support shown below.



Structural geometry and analysis model

MODEL

Analysis Type

2-D static analysis (X-Z plane)

Unit System

m, kN

Element

Truss element

Material

Modulus of elasticity $E = 2.1 \times 10^{11}$ pa

Section Property

Area Elements 1 and 2 $A = 6.0 \times 10^{-4}$ m^2

Element 3 $A = 6\sqrt{2} \times 10^{-4}$ m^2

Boundary Condition

Node 1 ; Constrain Dx and Dz.

Node 2 ; Constrain Dz.

Node 3 ; Inclined support in the direction perpendicular to the element 3
Constrain Dz.

Analysis Case

A concentrated load , P = 1000kN is applied to the node 2.

Results

Displacements

	Node	Load	DX (m)	DY (m)	DZ (m)	RX ([rad])	RY ([rad])	RZ ([rad])
▶	1	CASE1	0,000000	0,000000	0,000000	0,000000	0,000000	0,000000
	2	CASE1	0,011905	0,000000	0,000000	0,000000	0,000000	0,000000
	3	CASE1	0,003968	0,000000	0,003968	0,000000	0,000000	0,000000

Member Forces

	Elem	Load	Force-I (kN)	Force-J (kN)
▶	1	CASE1	0,000000	0,000000
	2	CASE1	-1000,000	-1000,000
	3	CASE1	707,10678	707,10678

Reaction Forces

	Node	Load	FX (kN)	FY (kN)	FZ (kN)	MX (kN - m)	MY (kN - m)	MZ (kN - m)
▶	1	CASE1	-500,000000	0,000000	-500,000000	0,000000	0,000000	0,000000
	3	CASE1	-500,000000	0,000000	500,000000	0,000000	0,000000	0,000000
	SUMMATION OF REACTION FORCES PRINTOUT							
			FX (kN)	FY (kN)	FZ (kN)			
		CASE1	-1000,000000	0,000000	-0,000000			

Comparison of Results

Unit : m, kN

Result			Theoretical	MIDAS/Civil
Displacement	Node 2 in the X direction		0.011905	0.011905
	Node 3 in the X direction		0.003968	0.003968
	Node 3 in the Z direction		0.003968	0.003968
Member force	Axial force of the element 2		-1000.0	-1000.0
	Axial force of the element 3		707.11	707.11
Reaction force	Node 1	In the X direction	-500.0	-500.0
		In the Z direction	-500.0	-500.0
	Node 3	In the X direction	-500.0	-500.0
		In the Z direction	500.0	500.0