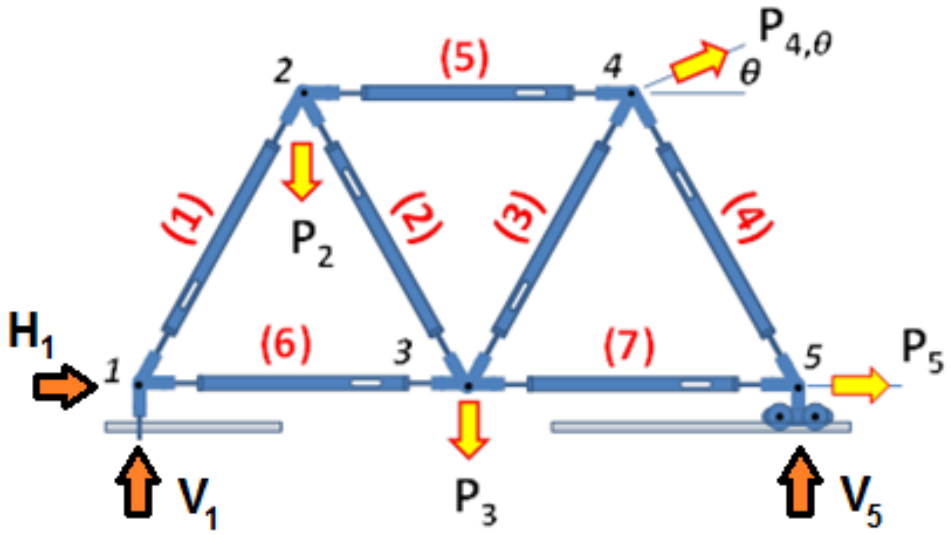
TechnoLab

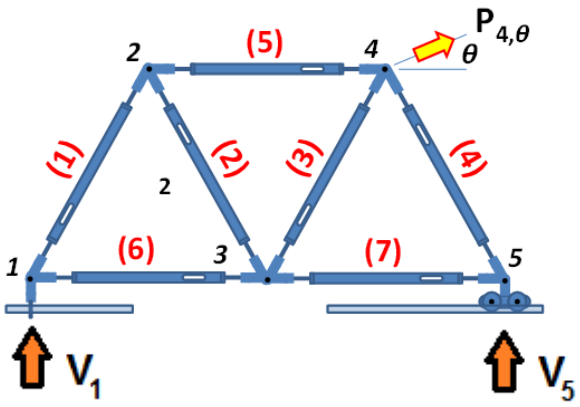
Truss HomeLab Series

Experiment T3: Forces in a 7-bar Truss



Case 1: 7-bar Truss – Load @ Node#4

$P_{4,\theta}$	θ
As noted and Nominated below	
~200gm _____ N	0°
~400gm _____ N	0°
~200gm _____ N	30°
~400gm _____ N	30°



Note the observed Nodal Movements

Node	1	2	3	4	5
Δ_x (mm)	0				
Δ_y (mm)	0				0

k_m = _____ *N/mm*

Note the Experimentally Determined/Measured Member Forces and Reactions

Reaction/ Member	H1	V1	V5	1	2	3	4	5	6	7
Member δ_m (mm)										
$F = K_m \delta_m$ (N)										

Note the Theoretically Determined Member Forces and Reactions (7-bar_Truss.xlsx)

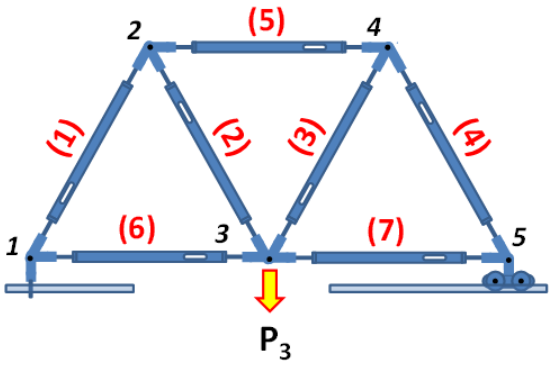
Reaction/ Member	H1	V1	V5	1	2	3	4	5	6	7
δ_m (mm)	0	0								
Force (N)										

Comments (Member Forces) :_____

_____
_____
_____
_____
_____
_____
_____
_____

Case 2: 7-bar Truss – Load @ Node#3

P_3	θ
As noted and Nominated below	
~300gm _____ N	270°
~400gm _____ N	270°
~500gm _____ N	270°
~600gm _____ N	270°



Note the observed Nodal Movements

Node	1	2	3	4	5
Δ_x (mm)	0				
Δ_y (mm)	0				0

k_m = _____N/mm

Note the Experimentally Determined/Measured Member Forces and Reactions

Reaction/ Member	H1	V1	V5	1	2	3	4	5	6	7
Member δ_m (mm)										
F = K_m δ_m (N)										

Note the Theoretically Determined Member Forces and Reactions (7-bar_Truss.xlsx)

Reaction/ Member	H1	V1	V5	1	2	3	4	5	6	7
δ_m (mm)	0	0								
Force (N)										

Comments (Member Forces) :_____

_____

_____

_____

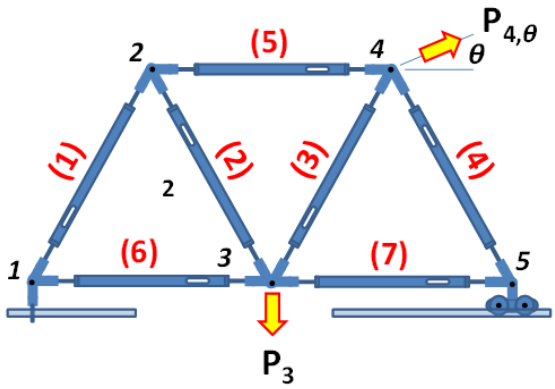
_____

_____

_____

Case 3: 7-bar Truss – Case 1 and 2 Loads Applied Simultaneously

As noted for Case 1	
$P_{4,\theta}$	θ
_____ N	^{o}
As noted for Case 2	
P_3	θ
_____ N	270^{o}



Note the observed Nodal Movements

Node	1	2	3	4	5
Δ_x (mm)	0				
Δ_y (mm)	0				0

k_m = _____N/mm

Note the Experimentally Determined/Measured Member Forces and Reactions

Reaction/ Member	H1	V1	V5	1	2	3	4	5	6	7
Member δ_m (mm)										
F = K_m δ_m (N)										

Note the Theoretically Determined Member Forces and Reactions (7-bar_Truss.xlsx)

Reaction/ Member	H1	V1	V5	1	2	3	4	5	6	7
δ_m (mm)	0	0								
Force (N)										

Comments (Member Forces) :_____

_____

_____

_____

Sum of Observed Nodal Movements for LC1 and LC2 compared with LC3

Node	1	2				3				4				5			
Load Case		LC1	LC2	Sum	LC3	LC1	LC2	Sum	LC3	LC1	LC2	Sum	LC3	LC1	LC2	Sum	LC3
Δ_x (mm)	0																
Δ_y (mm)	0													0			

Comments (Superposition of Nodal Displacements for LC1 + LC2 - comparison with LC3 Results)

_____

_____

_____

_____

Sum of Observed Member Elengations/Forces and Reactions for LC1 and LC2 compared with LC3

Reaction/ Member	H1	V1				V5				1			
Load Case		LC1	LC2	Sum	LC3	LC1	LC2	Sum	LC3	LC1	LC2	Sum	LC3
Member δ_m (mm)													
F = K_m δ_m (N)													

Member		2				3				4			
Load Case		LC1	LC2	Sum	LC3	LC1	LC2	Sum	LC3	LC1	LC2	Sum	LC3
Member δ_m (mm)													
F = K_m δ_m (N)													

Member		5				6				7			
Load Case		LC1	LC2	Sum	LC3	LC1	LC2	Sum	LC3	LC1	LC2	Sum	LC3
Member δ_m (mm)													
F = K_m δ_m (N)													

Comments (Superposition of Member Elongations for LC1 + LC2 - comparison with LC3 Results)

_____
_____
_____
_____
_____

Comments (Superposition of Member/Reaction Forces for LC1 + LC2
- comparison with LC3 Results)

_____
_____
_____
_____
_____

Supporting Material

Supporting Material

Supporting Material